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STEEL

ESTABLISHED 1882

Contents

Volume 106—No. 15 **April 8, 1940**

Wide World Photos, Inc.

ITS SPAN OF LIFE IS A WIRE

MILE upon mile, the shuttle moves across the sky—its thread a slender steel wire. And from the huge cables thus formed another bridge takes its place among the wonders of the world!

What's back of it? Steel wire, drawn from rod, rolled with uniform precision on Morgan Continuous Rolling Mills; rolled to exact standards—proving itself in multiple tests that detect the slightest imperfection.

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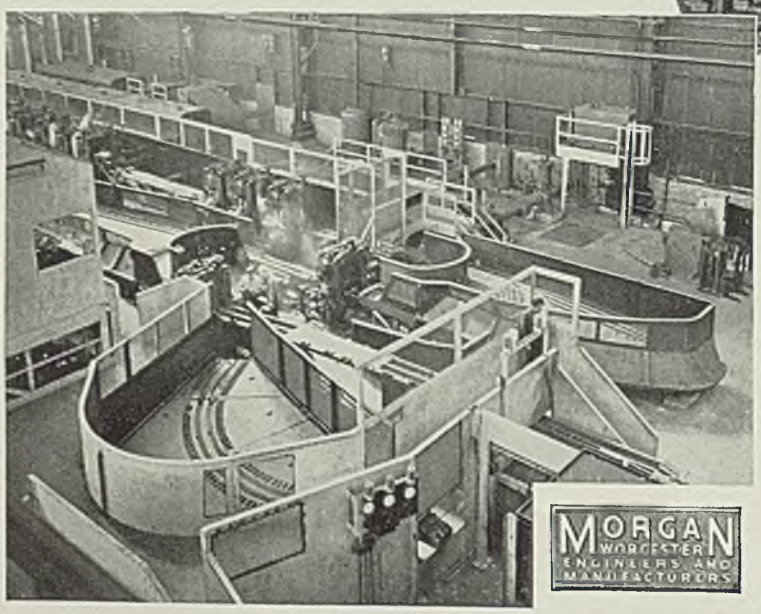

Thousands of miles of steel wire make up the gigantic suspension cables of the San Francisco-Oakland Bay and the George Washington bridges.

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MERCHANT SHAPES R-70

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views The News

■ STEEL production last week (p. 25) reflected a slight reversal from the recent trend, rose ½ point to 61½ per cent of ingot capacity. While no marked upturn is indicated, present demand is sufficient to retard the downward drift in production. Demand for railroad equipment, structural shapes, tin plate (p. 107) is improving. Farmers are buying more wire products. Export demand for finished and semifinished steel is rising, accounting for approximately 15 per cent of present shipments. Export prices on certain products have been raised. Finished steel prices on domestic sales show some irregularity, as is usual in periods of moderate buying.

• • •

Wage, Tax Rise Rapid

Taxes paid by United States Steel Corp. in 1902 amounted to 55 cents per $100 of sales income, averaged nearly $8 per $100 of sales income during the last decade. Wages advanced from $28.54 per $100 of sales income in 1902 to approximately $45 during the past ten years. These figures explain (p. 21) why it is difficult to entice new capital into industry — after these deductions there is not enough left to pay a fair dividend to stockholders. . . . Industrial construction (p. 24) still is mounting. . . . American Society of Mechanical Engineers this week (p. 24) will mark its sixtieth birthday. . . . Capacity to roll magnesium sheets (p. 27) is being increased by 50 per cent.

• • •

NLRB Fate Awaited

Fate of the national labor relations board during this session of congress rests largely (p. 31) on the outcome of the struggle between the house labor committee and the special house committee investigating the board. . . . Despite the war, Great Britain (p. 32) is making plans to develop her foreign trade. . . . Among other things, the temporary national economic committee this week (p. 31) will investigate the relation of the continuous rolling mill to employment. . . . Walsh-Healey minimum steel wage case last week (p. 27) was argued before the Supreme Court. . . . Hearings are scheduled (p. 32) to classify employes in distributive trades under the wages-hours law.

• • •

Rubber Cuts Vibrations

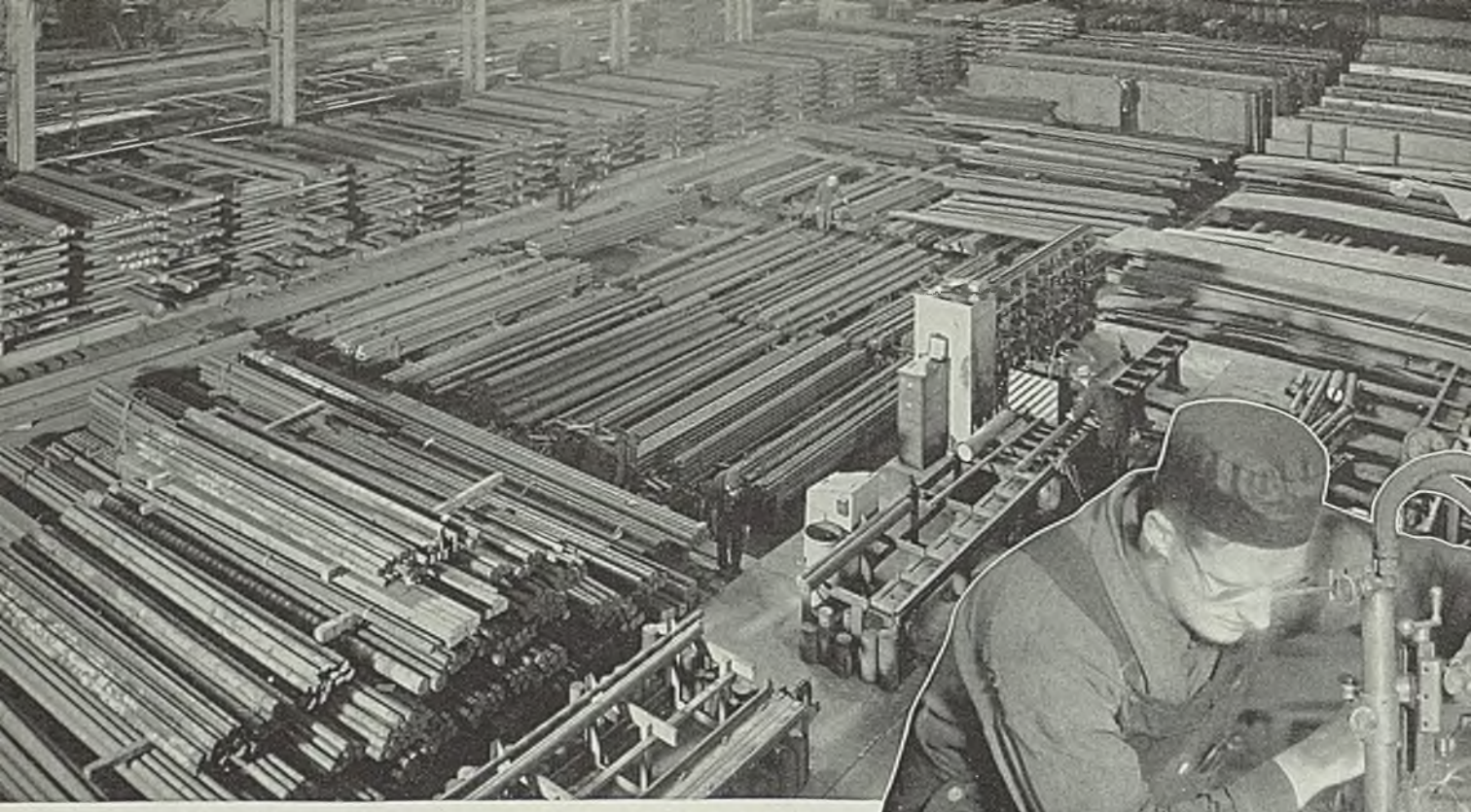
Noise and vibration developed by industrial machinery often reach intolerable proportions. Walter C. Keys describes how many such problems have been solved (p. 44) by the use of rubber mountings. . . . A process for continuous casting of ingots in the form of billets, slabs and other sections is performing satisfactorily in the experimental phase (p. 48) and is ready for steel mill application. . . . A warehouse with a unique conveyor and despatching system makes it possible for a manufacturer of air conditioning units, fans and other appliances to fill orders (p. 50) within 24 hours. . . . "Shorty" Long comments pungently (p. 59) on last week's iron and steel engineer meeting at Cincinnati.

• • •

Tooling Good Investment

Cost of tooling, instead of being a mysterious and annoying form of overhead expense, has come to be recognized by managerial and financial men as a gilt-edge equipment investment, says Guy Hubbard (p. 54), STEEL's machine tool editor. . . . G. A. Caldwell (p. 60) discusses ventilating facilities for protecting steel mill motors from conductive and abrasive dusts. . . . Infra-red ray drying time (p. 64) varies according to the color of the coating. . . . Job plating shops benefit (p. 70) from recently developed equipment which increases output and controls thickness of plate. . . . Automatic forging temperature control (p. 73) sharply reduces the proportion of rejects.

E C Kreutzberg



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RYERSON

WAGES–TAXES

Take Increasing Part of Sales Dollar: Narrow Profit Margin

■ WHY have industrial profits become increasingly difficult? Why does the investor today receive lower wages for his capital than two and three decades ago?

Important contributions toward answers to these questions are contained in the United States Steel Corp.'s statement on how it has earned its living since 1902, a feature of the corporation's annual report. The figures as exhibited "are of very great moment in considering the system under which we work, and how it may be improved, for, while the account is of United States Steel, all industrial business has about the same components," says the corporation.

Three facts stand out clearly in the statement:

1—Taxes per dollar of sales income have multiplied many times.

2—Wages and salaries to employes have advanced steadily.

3—Net income—dividends and amount available for surplus—have decreased sharply.

Other charges—except interest, which in the corporation's case has decreased—have remained relatively steady.

Taxes Cut Into Profits

Translation of the corporation's 38-year record into terms of disbursement per $100 sales income in the table on page 22 shows these trends clearly and makes each year comparable with every other year.

Taxes, which in 1902 amounted to only 55 cents per $100 sales income, during the past decade have averaged nearly $8 per $100 sales income. In 1902 taxes were 27 cents per net ton of rolled and finished steel products shipped; in 1939 taxes required $5.59 per net ton of finished product. Tax peaks were reached in the World war years, 1918 and 1917, when excess profits and other special taxes were in effect, and in 1932 when low volume of business pushed all expense items to abnormal levels.

In seven of the past eight years taxes have exceeded net income. In the 30 previous years taxes exceeded profit in only four—during the World war and the adjustment period immediately following.

Taxes now must be considered a permanent high direct cost. Despite the staggering tax bills in recent years—an estimated $147,000,000 in 1939 for the companies producing steel ingots—all tax payers still owe for "government delivered but not paid for," the result of government deficit financing. That taxes now in force can be abolished without new ones equally or more burdensome appears impossible.

Wages Take Larger Share

Second striking item of increased cost is that of wages and salaries. From $28.54 per $100 sales income in 1902, wages and salaries advanced to $49.74 in 1934. For the past ten years slightly more than 45 cents of every sales dollar have gone to wages and salaries.

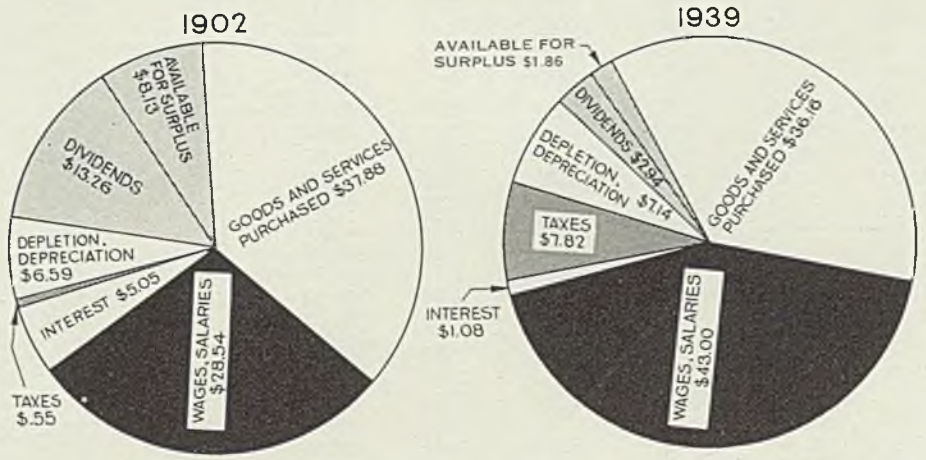
Wage rates have increased even more rapidly than has the proportion of the sales dollar going for wages and salaries. Common labor rate, for example, was 20 cents in 1915, is now 62½ cents. Technological improvement and increased efficiency have tended to modify the effect of advancing wage rates but wages and salaries still are taking around 15 cents more of each sales dollar than during the corporation's early years.

The encroachment of higher taxes and higher wage and salary requirements per sales dollar into profits has been inevitable in the face of the relative stability of other costs.

Of these, the item of goods and services purchased from others is the most important. Amounting to $37.88 per $100 sales income in 1902, it decreased to $28.70 in 1918, reached a peak of $51.47 in depression year 1933, was back at $36.16 in 1939. While this disbursement has fluctuated from year to year, no definite long-term trend is discernible. It is, of course, subject to the same influences affecting all costs—subject to increases as result of higher taxes and labor costs and to decreases as result of technological improvements and increased efficiency.

Depletion and depreciation costs have been relatively stable, although lower in years of high production and higher in years of restricted output.

Corporation interest charges per sales dollar have decreased in recent years. During the past decade



■ Division of U. S. Steel's sales income in 1902 and 1939: In the company's first year, $21.39 per $100 sales income was available for dividends and additions to surplus. In 1939, only $4.80 per $100 sales was profit. Higher taxes and wages and salaries were largely responsible

interest has not reached 2 per cent of sales in any year.

The corporation points out it has relatively little control over the expense items of goods and services purchased from others, taxes, depletion and depreciation, and interest. Last year these items required $52.20 per $100 sales income.

As to wage payments "the corporation nominally had a considerable discretion for nominally it may bargain as to the rate it will pay. But actually the bargaining power has been much limited by law. Such expense last year was $43 per $100 sales income.

Left for dividends and additions to surplus was only $4.80.

In contrast, goods and services purchased, depletion and depreciation, taxes and interest in 1902 took $51.07 per $100 sales income. Of the $49.93 left for wages of men and facilities (dividends and surplus additions) wages and salaries took $28.54, leaving $21.39 for profit.

These figures go far in explaining why it has become increasingly difficult to entice a free flow of capital into industry in recent years.

FINANCIAL

INLAND STEEL'S 1939 NET EARNINGS UP 122 PER CENT

■ INLAND STEEL CO., Chicago, reflected in its 1939 net earnings considerable increase in volume last year over 1938. Net sales aggregated $115,346,665, against $74,058,924 in previous year. Steel ingot production operating rate averaged 77.9 per cent of capacity; in 1938 average was 54 per cent. Operating rate in four quarters last year was, respectively: 69.6 per cent, 62.9 per cent, 75.5 per cent and 103.7 per cent.

Company's net consolidated profit in 1939 was $10,931,016, equal to $6.73 a share on 1,624,265 shares of capital stock outstanding Dec. 31. This compares with $4,916,203 consolidated net profit, equal to $3.12 a share on 1,577,005 shares outstanding year previous. In 1937 net income totaled $12,605,317.

Fourth quarter net income, based on nine months' and year's reports, was $4,558,206, compared to $1,759,785 in same 1938 quarter and $2,587,750 in third period last year.

Total taxes charged against income last year were $5,158,640, equal to $3.18 a share on stock outstanding Dec. 31. This compares with $3,249,816 total taxes, equal to $2.06 a share on outstanding stock, in 1938.

Aggregate expenditures for additions and improvements in 1939 totaled $5,847,538, not including properties acquired through acquisition of Wilson & Bennett Mfg. Co., Chicago. Additions to raw material reserves made during the year include leasing of the Sherwood mine, large iron ore deposit on Michigan's Menominee range; acquisition of all Jackson County Iron Co.'s stock, making available a large lean ore deposit situated within rail haul of Chicago and suitable for beneficiation by the magnetic process; and purchase of a substantial acreage of high grade Elkhorn coal at Wheelwright, Ky.

Average number of employes last year was 17,278, compared to 11,455 in 1938. Total payroll was $32,281,261; in 1938, $23,560,959.

Dividends declared and paid in cash last year aggregated $4 per share, totaled $6,473,632, compared to $2.50 a share and $3,940,692 in previous year.

Balance sheet summary:

	1939	1938
Net sales	$115,346,665	$74,058,924
Operating cost, exclusive of depreciation, depletion	93,738,206	61,488,670
Provision for depreciation, depletion	6,463,424	4,800,470
Net profit	10,931,016	4,916,203
Surplus	38,516,030	34,098,110
Current assets	58,497,125	48,140,364
Current liabilities	11,695,416	7,686,331
Inventories	30,308,822	24,018,598

ALLEGHENY LUDLUM'S TAXES 4 PER CENT OF 1939 RECEIPTS

Aggregate taxes accrued and paid last year by Allegheny Ludlum Steel Corp., Brackenridge, Pa., totaled $1,569,019, equal to 4 per cent of the year's total receipts, $37,394,588. Approximately $72 was paid in taxes for every $100 of net earnings reported.

Letter to corporation's stockholders, signed by W. F. Detwiler, board chairman, and H. G. Batcheller, president, says sales last year totaled $37,332,141. This compares with $18,261,231 in 1938, the latter figure including sales of the former Ludlum Steel Co. and its subsidiaries from Aug. 16 that year.

Fourth quarter sales were $13,650,056, about 38 per cent of the first nine months' total, $23,682,085. Last 1939 quarter net profit was $1,411,423, compared to $682,095 in first three quarters.

Previously reported 1939 net earnings, $2,093,518, were confirmed, represent a strong reaction from 1938's $1,070,186 net deficit. Net in-

How U. S. Steel's Income Was Distributed

Per $100 of Sales Income

Year	Goods and Services Purchased	Depletion, Depreciation	Taxes	Interest Paid	Wages, Salaries	Dividends Paid	Available for Surplus
1902	$37.88	$ 6.59	$ .55	$ 5.05	$28.54	$13.26	$ 8.13
1903	40.78	7.41	.76	6.48	30.56	10.90	3.11
1904	44.13	5.61	.95	9.27	30.74	7.76	1.54
1905	36.94	6.84	.88	7.28	31.29	6.16	10.61
1906	34.92	7.35	.91	6.05	30.51	7.31	12.95
1907	34.00	6.52	1.07	5.83	31.86	7.01	13.71
1908	32.10	6.75	1.63	9.43	36.32	10.67	3.10
1909	32.18	6.62	1.96	7.11	34.28	10.28	7.57
1910	32.52	6.13	1.87	6.21	35.53	10.27	7.47
1911	34.55	6.00	2.22	7.18	37.27	11.69	1.09
1912	40.78	5.81	1.83	6.09	35.37	9.45	.67
1913	34.70	5.68	2.35	5.93	36.89	9.01	5.44
1914	37.88	6.07	3.05	8.03	39.30	9.78	— 4.11
1915	36.85	6.17	2.59	6.25	33.68	6.02	8.44
1916	29.90	4.37	2.95	3.54	29.17	7.72	22.35
1917	29.06	3.96	19.77	2.43	27.22	9.14	8.42
1918	28.70	3.06	22.41	2.31	34.09	7.26	2.17
1919	35.72	4.10	7.35	2.71	43.20	4.56	2.36
1920	34.91	3.60	5.88	2.26	44.88	3.91	4.56
1921	34.91	5.07	5.19	3.92	45.87	6.97	— 1.93
1922	42.03	5.28	4.42	3.51	39.87	6.25	— 1.36
1923	34.82	4.71	5.04	2.56	42.93	4.97	4.97
1924	29.50	5.31	4.92	2.97	48.06	6.60	2.64
1925	33.44	5.48	4.97	2.65	44.61	5.94	2.91
1926	33.09	5.91	4.82	2.46	42.99	5.59	5.14
1927	32.44	6.12	4.82	2.71	44.77	7.80	1.34
1928	33.56	6.65	5.04	2.54	40.92	7.42	3.87
1929	31.38	5.78	5.03	1.36	38.40	8.13	9.92
1930	27.64	6.98	5.71	.67	46.57	10.19	2.24
1931	33.42	8.58	6.21	1.00	48.43	11.29	— 8.93
1932	51.47	13.96	10.98	1.84	46.41	7.17	—31.83
1933	45.07	11.56	8.40	1.38	43.27	1.91	—11.59
1934	35.18	10.54	8.46	1.21	49.74	1.70	— 6.83
1935	36.84	8.75	7.06	.92	46.23	1.32	— 1.12
1936	36.34	7.18	6.68	.62	42.81	6.36	.01
1937	32.75	5.92	8.55	.50	43.05	6.54	2.69
1938	37.72	8.04	7.98	1.36	46.16	4.12	— 5.38
1939	36.16	7.14	7.82	1.08	43.00	2.94	1.86

come last year, after provision for preferred dividends, was equal to $1.49 a share on common stock outstanding Dec. 31, including shares reserved for exchange of Ludlum Steel Co.'s stock. Common share earnings were 41 cents in first nine months, $1.08 in last quarter.

Dividends on 7 per cent preferred stock, totaling $233,639, were paid during 1939. Fifty cents per share on common was paid Dec. 21.

Corporation's research activities, says the report, have been the means of maintaining its advanced position in special alloy steel field. Expenditures for improvements in addition to regular maintenance costs were $843,723 last year.

In keeping with trend of simplifying annual reports, Allegheny Ludlum presents a percentage disposition of its total receipts. Salaries of corporation's officers and its subsidiaries aggregated 1.2 per cent of total receipts, included value of stock delivered as part of remuneration. Other wage and salary payments totaled 31.8 per cent; raw materials, fuel and power, supplies, maintenance and repair material, 49.5 per cent; selling and administrative expense, excluding salaries, 3.9 per cent.

Taxes, including amounts provided for income and social security levies, were 4 per cent of the total receipts; interest paid, 0.1 per cent; depreciation and depletion, 3.6 per cent; net profit, 5.6 per cent and proportion of profit of subsidiaries applicable to stock not owned by Allegheny Ludlum, 0.3 per cent.

Operations averaged 39.5 per cent of capacity last year, compared to 24.1 per cent in previous year. Net income per ton ingots produced was $9.87, against $8.29 deficit in 1938.

LACLEDE STEEL CO.'S 1939 NET INCOME TOTALS $210,053

Declaration of war, said Thomas R. Akin, president, Laclede Steel Co., St. Louis, caused a very large increase in foreign and domestic business during fourth 1939 quarter. Full operations for the company resulted, with better selling prices and lower manufacturing costs, but with advanced raw material prices.

Net 1939 income was $210,053, equal to $1.02 a share on $20 par stock and 36.7 per cent lower than 1938's $331,849 net profit, equal to $1.61 a share. In 1937 net income was $455,729 or $2.21 per share. Per cent income on capitalization was 3.45 last year, 5.3 in 1938.

Dividends aggregating $1 per share and totaling $206,250 were paid last year, compared to $1.25 per share in previous year and $2 in 1937.

Depreciation totaling $457,992 was taken up, against $389,945 in 1938.

Ingot production last year totaled 152,492 net tons, compared to 155,961 in previous year and 227,064 in 1937.

Improvements in open hearth department, said Mr. Akin, have increased capacity and lowered costs. Rated ingot capacity, Dec. 31, was 295,357 net tons, compared to 263,200 year previous. Additional machines in the wire mill and new equipment in the tube mill have enabled those departments, according to Mr. Akin, to maintain a position of increasing importance.

Balance sheet and earnings statement summary:

	1939	1938
Gross profit	$704,872	$798,280
Net profit	210,053	331,849
Dividends paid	206,250	257,813
Surplus, Dec. 31	1,796,071	1,792,268
Current assets	3,153,675	3,133,857
Current liabilities	493,810	419,382
Inventories	2,089,436	2,048,749

OTIS STEEL CO. REPORTS $214,965 NET 1939 PROFIT

Otis Steel Co., Cleveland, reports $214,965 net 1939 income, compared to $1,230,296 net loss incurred in previous year. Fourth quarter net profit, based on nine months' and year's reports, was $650,923, compared to $52,779 net income in corresponding 1938 period and $184,517 net deficit incurred in third 1939 quarter.

Demand for finished products varied widely during the year, said E. J. Kulas, president, in his annual report to stockholders. Shipments in January, 1939, were at the rate of 78 per cent of capacity. They receded to a low of 35 per cent in June, advanced to full capacity at year's end.

Particularly severe competition in flat-rolled products, said Mr. Kulas, resulted in sharp sales price decline beginning with second quarter and continuing throughout the year. This despite unchanged wage rates and increase in raw material prices.

Balance sheet summary:

	1939	1938
Gross sales	$24,500,022	$13,718,500
Operating profit	893,872	*502,594
Net profit	214,965	*1,230,297
Capital expenditures	227,088	1,170,173
Maintenance, repairs	2,169,866	1,153,595
Current assets	11,499,474	9,950,907
Inventories	6,039,189	4,571,900
Current liabilities	2,446,158	1,696,576
Surplus	5,285,098	5,245,272

*Loss.

ARTHUR G. McKEE CO.'S 1939 INCOME LESS THAN IN 1938

Net 1939 profit earned by Arthur G. McKee & Co., Cleveland, was $210,812, equal to $2.56 a share on company's outstanding class B stock. This compares with $612,771 net profit, equal to $7.45 per share, earned in 1938.

Dividends aggregating $3.50 per share were paid on class B stock last year, compared with $4 a share in 1938 and ten year average of $2.60.

Iron, Steel Consumers' Earnings Statements

AGGREGATE net 1939 income earned by 352 iron and steel consumers was $349,330,836, compared to $140,166,529 net profit realized by the same companies in 1938. Only 42 reported a net loss for the year, against 117 in 1938. Previous tabulations in STEEL, Feb. 19, p. 29; Feb. 26, p. 16; March 4, p. 38; March 11, p. 18; March 18, p. 22; March 25, p. 24 and April 1, p. 14 listed 320 companies; the following includes 32. All figures are net earnings except where asterisk denotes loss:

	Fourth Quarter 1939	Fourth Quarter 1938	1939	1938
All Metal Products Co., Wyandotte, Mich.	$.....	$.....	$142,970	$ 51,323
American Chain & Cable Co. Ltd., Bridgeport, Conn.	.....	.....	2,252,483	841,169
Art Metal Construction Co., Jamestown, N. Y.	.....	.....	295,365	637,210
Automatic Products Corp., Chicago	.....	.....	487,389*	53,755*
Barlow & Seelig Mfg. Co., Ripon, Wis.	.....	.....	201,747	67,835
Blaw-Knox Co., Pittsburgh	.....	.....	954,424	1,188*
Borg-Warner Corp., Chicago†	2,200,765	1,091,496	5,683,801	19,066*
Bower Roller Bearing Co., Detroit†	341,890	234,749	969,421	449,953
Diamond T Motor Car Co., Chicago†	147,547	3,724*	301,394	1,154
Central Foundry Co., New York†	24,595	145,594*	64,828	415,999*
Centrifugal Pipe Corp., Jersey City, N. J.	.....	.....	91,011	503,902
Checker Cab Mfg. Corp., Kalamazoo, Mich.†	135,438*	93,750*	367,123*	294,203*
Curtiss-Wright Corp., New York†	674,706	972,841	5,218,258	3,598,739
Electric Household Utilities Corp., Chicago	.....	.....	113,764	378,042
Fairchild Engine & Airplane Corp., New York	.....	.....	187,694	185,229*
Graham-Paige Motors Corp., Detroit	329,523*	454,244*	1,406,627*	1,920,186*
Grumman Aircraft Engineering Corp., Bethpage, N. Y.	.....	.....	892,063	617,074
Hayes Steel Products Ltd., Merritton, Ont.	.....	.....	152,019	79,808
Howell Electric Motors Co., Howell, Mich.	.....	.....	49,792	55,877*
Hudson Motor Car Co., Detroit†	1,065,773	228,004*	1,356,750*	4,670,004*
Noorduyn Aviation Ltd., Montreal, Que.	.....	.....	15,115*	41,098*
North American Aviation Inc., Inglewood, Calif.	2,038,475	889,595	7,088,092	1,904,086
Ingersoll-Rand Co., New York	.....	.....	6,010,594	5,219,188
Perfect Circle Co., Hagerstown, Md.	.....	.....	344,804	150,198
Remington Rand Inc., Buffalo	752,255	921,188	1,427,346	2,163,130
Reo Motor Car Co., Lansing, Mich.	.....	.....	1,682,392*	2,228,806*
Ruud Mfg. Co., Pittsburgh	.....	.....	77,808	89,042*
Sperry Corp., New York	.....	.....	5,462,061	4,961,398
Starrett Corp., Athol, Mass.	.....	.....	285,429*	460,712*
Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.	.....	.....	67,475	130,626
Vega Airplane Co., Burbank, Calif.	.....	.....	86,311	19,916*
Warner Aircraft Corp., Detroit	.....	.....	21,501*	8,407

†Fourth quarter statement based on nine months' and year's statements.

Canada Importing More Steel From U. S.: February Output Off

TORONTO, ONT.

■ CANADIAN steel imports from United States continue to rise steadily, to cope with growing domestic, war and export requirements. With producers unable to meet demand, imports from United States approximate $45,000,000 monthly, may increase as demand broadens under more extensive war commitments.

Canadian production of steel ingots and castings, pig iron and ferroalloys in February was smaller than in January but almost double that of February, 1939. Comparisons follow:

	Steel ingots, castings	Pig iron	Ferro-alloys
Feb., 1940.....	140,343	87,032	7,711
Jan., 1940.....	166,496	104,703	8,065
Feb., 1939.....	77,179	41,333	5,299

Decline in output was due in part to February's being a short month.

Rolling stock orders placed and pending are estimated sufficient to keep Canadian equipment plants at capacity operations throughout 1940. In addition to domestic orders, contracts totaling $3,000,000 and calling for 57,000 tons of rails have been placed by South African railways and harbor administration, South Africa. Orders will be divided equally between Dominion Steel & Coal Corp., Sidney, N. S., and Algoma Steel Corp., Sault Ste. Marie, Ont. Latter company also has order from same source for 85,000 pairs of fish plates.

Contracts placed by Canadian war supply board last week totaled $1.726,151; major portion was for aircraft and supplies. Orders placed:

Aircraft supplies—Ontario Hughes-Owen Co., Ottawa, Ont., $433,786; Instruments Ltd., Ottawa, $220,773; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $185,004; Fairchild Aviation Corp., Jamaica, N. Y., $133,123; British air ministry, $112,794; Macdonald Bros. Aircraft Ltd., Ottawa, $7214; Robert Marshall, Ottawa, $5623; Aviation Electric Ltd., Montreal, Que., $11,802.

Machinery and tools—Delamere & Williams Ltd., Toronto, $12,960.

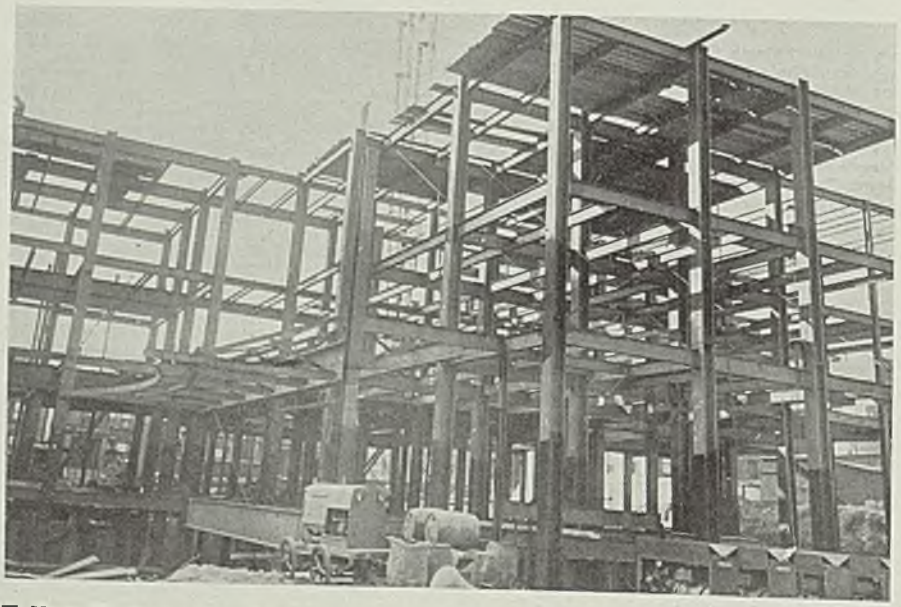
Barracks stores—Beatty Bros. Ltd., Fergus, Ont., $27,500; Dowswell, Lees & Co. Ltd., Hamilton, Ont., $6860.

Construction — Frontenac Construction Co. Ltd., Toronto, for work at Royal Canadian air force station, Camp Borden, Ont., $34,695; Custodis Canadian Chimney Co. Ltd., Montreal, for work at Dominion Arsenal, Foundry & Rolling Mills, St. Malo, Quebec city, $11,985; Carter-Halls-Aldinger Co. Ltd., Vancouver, B. C., for work at Patricia Bay, B. C., air force station, $8953.

Public works department, Ottawa, awarded contract for wharf extension, other work at naval drydock, Halifax, N. S., to Angus Robertson Co., Montreal. Cost, $425,000.

Dufferin Shipbuilding Co. Ltd., Toronto, was assured of a contract of about $3,500,000 from the war supply board for mine sweepers.

22-Story Hospital Completely Field Welded



■ New 22-story nurses' home being erected at Jersey City, N. J., contains 2200 tons structural steel, is completely field welded. Approximately 18,000 feet of ¼-inch equivalent bead will be required. Part of the wind bracing connections are as heavy as ⅞-inch butt welds. Photo, courtesy Hobart Bros. Co., Troy, O.

Engineers' Society Will Observe Anniversary

■ American society of Mechanical Engineers will celebrate this week the sixtieth anniversary of its founding as a professional organization. With headquarters in New York and 71 local sections throughout America's industrial areas, society's membership today is nearly 15,000.

Achievements and contributions made to science and industry by the organization's members cover a wide field of endeavor. Included are air conditioning, aeronautics, electric machinery, engineering research, metals, fuels, hydraulic turbines, internal-combustion engines, machine tools, naval improvements, ordnance material, petroleum, plastics, printing presses, pumps, railroads.

Building Costs Steady as Plant Construction Rises

■ Industrial building costs have remained constant since beginning of the year, according to quarterly index of Austin Co., Cleveland, based on typical one-story structures.

George A. Bryant Jr., executive vice president of the company, says the steady increase in factory building which began last fall continued through the first quarter and still is mounting.

"The chemical, aviation, machine tool and other industrial equipment industries, as well as many manufacturers in consumer fields, have been particularly active," Mr. Bryant said. "The general confidence which pervades industrial circles in the face of unsettled international and political factors seems to indicate that the most active period of factory building since the twenties is ahead of us."

Galvanizers Committee in Meeting at Pittsburgh

■ A day of plant inspections, a dinner and evening session, and another day of closed sessions comprise the program for the seventh meeting of the Galvanizers committee at the William Penn hotel, Pittsburgh, April 11-12. This committee, functioning under sponsorship of the American Zinc institute, includes in its membership technical and operating representatives of the galvanized sheet industry.

A tour of the Steubenville, O.,

plant of Wheeling Steel Corp. is scheduled for the morning of April 11. After lunch at the Steubenville Country club as guests of the Wheeling company, an inspection of Weirton Steel Co.'s plant at Weirton, W. Va., will be made. Dinner and an informal session will be held in Pittsburgh in the evening.

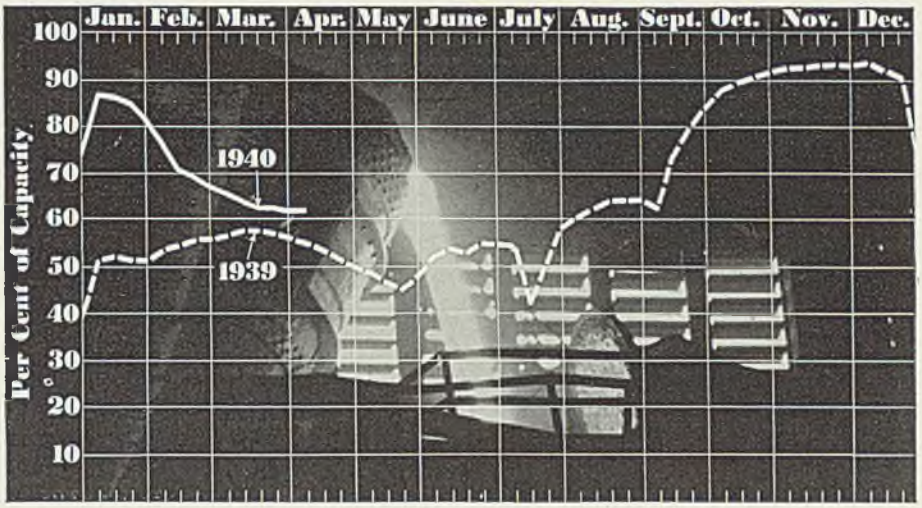
Second day's sessions, morning and afternoon, will be open only to members of the committee. F. R. Morral, Continental Steel Corp., Kokomo, Ind., will present two papers at the morning sessions; in the afternoon R. W. Hodil, Youngstown Sheet & Tube Co., Youngstown, O., will be the principal speaker. Round-table discussions of selected topics will follow both sessions.

First Quarter Ingots Third Best in History

■ Steel ingot production during first quarter, 1940, represented third largest first quarter output in history, according to the American Iron and Steel institute. The total of 14,230,373 net tons was exceeded by 16,073,636 tons in first quarter, 1937, and 15,564,663 tons in the same period, 1929.

March output was 4,236,050 tons, compared with 4,374,625 tons in February and 3,814,013 tons in March, 1939.

Daily average rate in March was 956,219, at 63 per cent of capacity, compared with 1,056,673 tons at 69.62 per cent in February and 860,951 tons at 56.30 per cent in March, 1939.



PRODUCTION... Up

■ STEELWORKS operations last week rose ½-point to 61½ per cent. Five districts made small gains, three showed slight declines and four were unchanged. A year ago the rate was 53½ per cent; two years ago it was 32 per cent.

Youngstown, O.—Dipped 1 point to 42 per cent as Republic Steel Corp. took off an open hearth at Warren, O. Three bessemer converters and 37 open hearths are producing. Schedule for this week is at the same rate.

Cincinnati — Increased 7.5 points to 53 per cent, following equipment repairs.

Cleveland — Off 1 point to 68 per cent, one furnace being shut down for repairs.

St. Louis — Rebounded 12 points to 51 per cent.

Birmingham, Ala. — Advance of 3 points to 81 per cent with 19 of 26 open hearths in production.

Chicago — Recovered 1 point to 57.5 per cent on slightly improved rate at several mills.

New England — Holds at 65 per cent for the third week with a slight decline indicated for this week.

Detroit—Steady at 79 per cent.

Central eastern seaboard — Continues at 59 per cent, changed only slightly since early March.

Pittsburgh — Unchanged at 57.5 per cent with indications for same rate this week.

Wheeling — Receded 10 points to 61 per cent, which probably will be regained this week.

Buffalo — Rose 2.5 points to 46.5 per cent as Republic Steel Corp. added an open hearth.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Apr. 6	Change	Same week 1939	Same week 1938
Pittsburgh	57.5	None	49	29
Chicago	57.5	+ 1	53.5	31
Eastern Pa.	59	None	40	28
Youngstown	42	— 1	48	33
Wheeling	61	—10	66	33
Cleveland	68	— 1	52.5	27
Buffalo	46.5	+ 2.5	44.5	28
Birmingham	81	+ 3	62	66
New England	65	None	35	20
Cincinnati	53	+ 7.5	44	45
St. Louis	51	+12	42	42.4
Detroit	79	None	69	18
Average	61.5	+ 0.5	53.5	32

Steel Ingot Statistics

	Calculated Monthly Production — All Companies — Open Hearth — Net tons	Open Hearth — Per cent of capacity	Bessemer — Net tons	Bessemer — Per cent of capacity	Total — Net tons	Total — Per cent of capacity	Weekly production, all companies, net tons	Number of weeks in month
1940 Reported by Companies which in 1938 made 98.67% of Open-Hearth and 99.90% of Bessemer.								
Jan.	5,333,698	85.82	286,000	56.16	5,619,698	83.58	1,268,555	4.43
Feb.	4,168,892	71.78	205,733	43.23	4,374,625	69.62	1,056,673	4.14
March	4,044,299	65.07	191,751	37.65	4,236,050	63.00	956,219	4.43
3 mos.	13,546,889	74.28	683,484	45.74	14,230,373	72.12	1,094,644	13.00
1939 Reported by Companies which in 1938 made 98.67% of Open-Hearth and 99.90% of Bessemer.								
Jan.	3,389,916	54.96	165,358	27.26	3,555,274	52.48	802,545	4.43
Feb.	3,127,340	56.15	219,948	40.16	3,347,288	54.72	836,822	4.00
March	3,595,738	58.30	218,275	35.99	3,814,013	56.30	860,951	4.43
3 mos.	10,112,994	56.48	603,581	34.28	10,716,575	54.49	833,326	12.86
April	3,100,461	51.91	230,695	39.28	3,331,156	50.78	776,493	4.29
May	3,082,855	49.98	190,766	31.45	3,273,621	48.32	738,966	4.43
June	3,290,137	55.08	210,185	35.78	3,500,322	53.35	815,926	4.29
July	3,284,875	53.38	257,163	42.49	3,542,038	52.40	801,366	4.42
Aug.	3,938,164	63.85	276,863	45.65	4,215,027	62.22	951,473	4.43
Sept.	4,405,951	73.94	333,116	56.84	4,739,067	72.41	1,107,259	4.28
Oct.	5,587,025	90.58	454,054	74.86	6,041,079	89.17	1,363,675	4.43
Nov.	5,664,574	94.83	453,557	77.22	6,118,131	93.26	1,426,138	4.29
Dec.	5,430,546	88.24	353,604	58.43	5,784,150	85.57	1,308,631	4.42
Total	47,897,582	65.98	3,363,584	47.12	51,261,166	64.29	983,145	52.14

Percentages of capacity operated for 1940 are calculated on weekly capacities of 1,402,899 net tons open-hearth ingots and 114,956 net tons Bessemer ingots, total 1,517,855 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open-hearth ingots, 73,343,547 net tons; Bessemer ingots, 6,009,920 net tons.

Percentages of capacity operated for 1939 are calculated on weekly capacities of 1,392,331 net tons open-hearth ingots and 136,918 net tons Bessemer ingots, total 1,529,249 net tons; based on annual capacities as of Dec. 31, 1938, as follows: Open-hearth ingots, 72,596,153 net tons; Bessemer ingots, 7,138,880 net tons.

March Pig Iron Output Down 7.4 Per Cent as 5 More Stacks Go Out

■ FURTHER decline in United States coke pig iron production during March brought output down to average 69.5 per cent of capacity, off 5.5 points from February's 75 per cent average, as five more blast furnaces were blown out or banked. Production rate dropped for fourth consecutive month; total of furnaces in blast for third successive month.

Average daily production in March, according to reports from operators of the country's 233 potential blast furnaces, was 105,502 net tons. This was 8441 tons, or 7.4 per cent, lower than February's daily rate, 113,943 net tons, and compared with 129,825 net tons daily average in January and 136,119 tons in December. Smallest average daily output since August, 1939, with 96,122 net tons, last month's production was 22 per cent higher than 86,465 net tons daily average in March, 1939.

Total production for March was 3,270,575 net tons, down 33,793 tons, or 1.02 per cent, from February's 3,304,368 net tons, and compared with 4,024,556 net tons produced in January and 4,219,718 tons in December. The poorer showing of March was in spite of two more days as compared with February. Last month's total output was smallest since September, 1939, when 3,218,940 net tons were produced, and compared with 2,680,446 net tons output in March, 1939.

Total production in first quarter this year aggregated 10,599,499 net tons. This was 3,175,174 net tons, or 42.6 per cent, greater than output in first three months of 1939. Production in corresponding 1938 period aggregated 4,727,974 net tons.

Conforming to practice initiated by the American Iron and Steel institute and now being adopted by most iron and steel producers, STEEL's tabulations beginning with March are presented on a net ton instead of a gross ton basis. Accordingly, all comparative figures have been converted to net tons.

March pig iron operations, relating production to capacity, averaged 69.5 per cent, against 75 per cent in February, 85.4 in January, 88.5 in December and 90.3 in November. Operating rate in March, 1939, averaged 56.1 per cent. Operations for 1940 are based on the American Iron and Steel institute's newly compiled United States capacity figure of 55,628,060 net tons of coke pig iron and ferroalloys as of Dec. 31, 1939.

Furnaces in blast on last day of March totaled 152, lowest since last August with 138. This compares with 157 at end of February, 177 in January and 191 in November and December. On March 31, 1939, a total of 123 furnaces were in blast.

Four blast furnaces resumed during March, and nine were blown out or banked. One merchant stack resumed and four were taken out. In the nonmerchant or steelworks classification, three furnaces resumed and four were taken out. Since last December, 39 furnaces have been blown out or banked.

Furnaces resuming operations in March were: In Alabama: North Birmingham No. 4, Sloss-Sheffield Steel & Iron Co. In New York: Lackawanna G, Bethlehem Steel Co. In Ohio: Youngstown No. 4, Republic Steel Corp.; one Campbell, Youngstown Sheet & Tube Co.

Stacks blown out or banked were: In Alabama: Birmingham No. 1, Republic Steel Corp.; City No. 2, Sloss-Sheffield Steel & Iron Co. In Illinois: South Chicago Old E, Carnegie-Illinois Steel Corp. In Ohio: Cleveland No. 1, Republic Steel Corp. In Pennsylvania: Duquesne No. 1 and Farrell No. 2, Carnegie-Illinois Steel Corp.; Perry, Interlake Iron Corp.; Palmerton No. 1, New Jersey Zinc Co., and Sharpsville, Pittsburgh Coke & Iron Co.

MONTHLY IRON PRODUCTION

Net Tons

	1940	1939	1938
Jan.	4,024,556	2,436,474	1,618,245
Feb.	3,304,368	2,307,405	1,463,093
March	3,270,575	2,680,446	1,646,636
Tot. 3 mo.	10,599,499	7,424,325	4,727,974
April		2,301,965	1,554,569
May		1,923,625	1,412,249
June		2,373,753	1,188,037
July		2,638,760	1,358,645
Aug.		2,979,774	1,674,976
Sept.		3,218,940	1,885,069
Oct.		4,062,670	2,315,599
Nov.		4,166,512	2,561,060
Dec.		4,219,718	2,478,244
Total		35,310,042	21,156,422

AVERAGE DAILY PRODUCTION

Net Tons

	1940	1939	1938	1937
Jan.	129,825	78,596	52,201	116,327
Feb.	113,943	82,407	52,254	120,800
March	105,502	86,465	53,117	125,385
April		76,732	51,819	126,956
May		62,052	45,556	128,083
June		79,125	39,601	116,304
July		85,121	43,827	126,501
Aug.		96,122	54,031	130,677
Sept.		107,298	62,835	127,604
Oct.		131,053	74,697	104,450
Nov.		138,883	85,369	74,929
Dec.		136,119	79,943	54,319
Ave.	116,478	96,740	57,962	112,642

MARCH IRON PRODUCTION

Net Tons

	No. in blast last day of Mar.	No. in blast last day of Feb.	—Total Tonnages— Merchant	Non-Merchant
Alabama	16	17	95,164*	177,259
Illinois	9	10	52,126	179,452
Indiana	12	12	125	355,729
New York	10	9	64,651	160,291
Ohio	32	31	69,003	580,101*
Penna.	51	56	101,015*	954,215*
Colorado	3	3		
Michigan	5	5		
Minnesota	1	1	17,132*	162,508
Missouri	0	0		
Tenn.	1	1		
Utah	1	1		
Kentucky	1	1		
Maryland	6	6		
Mass.	0	0	3,539*	298,265
Virginia	1	1		
West Va.	3	3		
Total	152	157	402,755*	2,867,820*

*Includes ferromanganese and spiegeleisen.

RATE OF FURNACE OPERATION

(Relation of Production to Capacity)

	1940[1]	1939[2]	1938[3]	1937[4]
Jan.	85.4	51.0	33.6	76.6
Feb.	75.0	53.5	33.6	79.5
March	69.5	56.1	34.2	82.5
April	....	49.8	33.4	83.7
May	....	40.2	29.4	84.3
June	....	51.4	25.5	76.6
July	....	55.0	28.2	82.9
Aug.	....	62.4	34.8	85.7
Sept.	....	69.7	40.5	83.7
Oct.	....	85.2	48.0	68.4
Nov.	....	90.3	55.0	49.3
Dec.	....	88.5	51.4	35.6

[1] Based on capacity of 55,628,060 net tons, Dec. 31, 1939; [2] capacity of 56,222,790 net tons, Dec. 31, 1938; [3] capacity of 56,679,168 net tons, Dec. 31, 1937; [4] first six months on capacity of 55,454,265 net tons, Dec. 31, 1936—last six months on capacity of 55,695,065 net tons, June 30, 1937. Capacities by American Iron and Steel institute.

Says Conditions Favor Bessemer Process Revival

■ Economic trends today contain elements favorable to revival in the bessemer steelmaking process, H. W. Graham, director, metallurgy and research, Jones & Laughlin Steel Corp., Pittsburgh, told a group of engineers and metallurgists last week.

Present economic conditions, he warned, justify earnest attention to increased use of the bessemer converter as partial protection against decreasing availability of scrap.

Mr. Graham also discussed factors affecting control of the bessemer process, pointing out fundamental considerations requisite upon steelmaking, and explained how his company's photo-cell arrangement has made possible more accurate control.

Supreme Court Hears Argument In Minimum Steel Wage Case

WASHINGTON

■ WALSH-HEALEY minimum steel wage case, a matter of controversy between eastern steel producers and the federal government for more than a year, last week was submitted to the United States Supreme Court.

Arguments were presented to the court by Francis Biddle, solicitor general of the United States, and by William Clark Mason, representing Lukens Steel Co., Coatesville, Pa., and seven other of the smaller steel companies involved.

Appeal to the Supreme Court was made by the government following a decision by the District of Columbia court of appeals that the secretary of labor had exceeded her authority in determining minimum steel wages (STEEL, Oct. 9, 1939, p. 25).

Argument before the Supreme Court, dealt extensively with the definition of "locality," as did arguments in the lower courts.

Counsel for the steel companies insisted the word "locality" was never intended by congress to mean the whole of the United States or one-sixth of the United States. He also said that the acting secretary of labor in charge of the oral argument preliminary to determination of the minimum wages "rendered labor service to the statute" by purporting to construe the term "locality" as employed in the act and then to select geographical areas comprehended within his definition of "locality" and to determine prevailing minimum wages.

The acting secretary, Mr. Mason said, construed the term "locality" to mean any area, however large, which the secretary of labor may select in light of "economic facts" pertaining to the industry for the purpose of determining prevailing minimum wages. Mr. Mason said this construction was disingenuously stated to be the consistent administrative construction of the act.

Holds "Locality" Indeterminate

Mr. Mason insisted the appellate court's decision plainly conforms with both the letter and spirit of the Walsh-Healey act.

The solicitor general contended the secretary of labor was justified in making the minimum wage decision. The secretary, he said, holds she could take the United States or any part thereof as a "locality".

Mr. Biddle argued the steel respondents have no legally protected rights which will be injured by the inclusion in government contracts of a stipulation requiring the payment of the minimum wages as determined by the acting secretary of labor to be the prevailing minimum wages in the "locality" in which respondents' plants are situated. He argued, therefore, that they have no standing to complain of the wage determination or of the requirement on the part of contracting officers that contractors with the government must pay wages specified.

Mr. Biddle contended the respondents are mere prospective bidders on government contracts. Neither the prevailing minimum wage determination nor the inclusion of the minimum wage stipulation in government steel purchase contracts limits or controls the respondents in the conduct of their general iron and steel business.

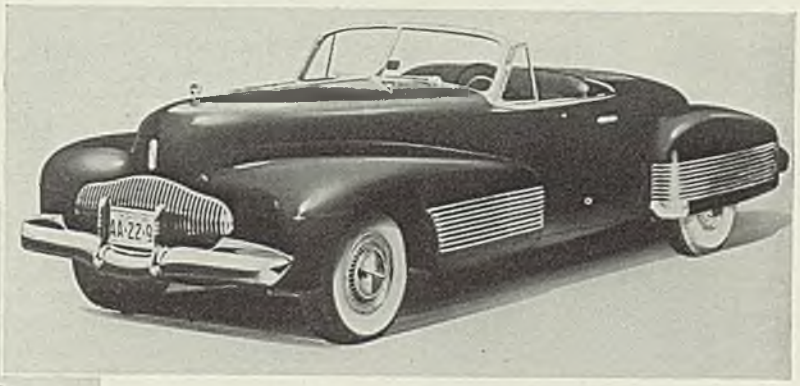
The solicitor general told the court that to apply to the public contracts act the construction of the word "locality" adopted by the lower court "would defeat the purposes of the act.

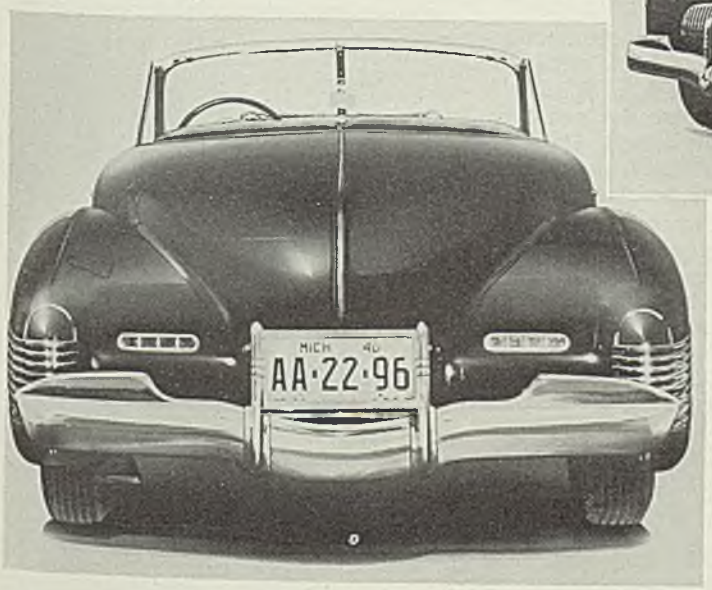
Dow Chemical Increases Magnesium Sheet Output

■ Completion of a $500,000 rolling mill by Dow Chemical Co. at its Midland, Mich., plant this summer will increase output of Dowmetal in sheet form by at least 50 per cent, according to Willard H. Dow, president. In addition to present equipment, a new 4-high rolling mill will be installed. All rolling equipment will be housed in a new 100 x 300-foot one-story building.

Experimental Buick—May Be Preview of Tomorrow's Car

■ Built for Harley J. Earl, chief of General Motors styling section, this modernly styled experimental Buick car suggests current thoughts of automotive engineers and designers and points to future realities in construction. Hand-built throughout, the streamlined body is mounted on a special 123-inch wheelbase chassis, powered by the Buick 50 engine. Features include retractible headlights, flush-type door handles, completely concealed automatically operated top, electrically operated window regulators, 13-inch tires on small wheels with airplane-type brakes, and exceptionally heavy bumpers with license plate brackets combined with guard posts. Most striking is the car's low-hung appearance and similarity of front and rear end designs. Note that the rear section of the long, front fenders is a part of the door and opens with the door, hinged at the front. Doors conceal inbuilt running boards equipped with chromium-plated safety steps and scuff plates





MEN of INDUSTRY

■ EDWARD J. CHARLTON has been appointed general manager, Lukenweld Inc., Coatesville, Pa., a division of Lukens Steel Co. Mr. Charlton has been a design engineer with Lukenweld since 1931 and before that was with Shepard Niles Crane & Hoist Co.

Robert L. Bunting, assistant shop superintendent since 1936, has been promoted to superintendent, succeeding Roland J. Whiting, resigned. Before joining Lukenweld in 1933, he was with Cleveland Auto Co., Reliance Electric Motors and H. K. Ferguson Co., Cleveland.

George L. Snyder, since 1937 assistant chief engineer, has been promoted to chief engineer. He joined the engineering department of the company in 1935.

D. Bruce Johnston, engaged in experimental development and research work for five years, has been appointed manager of development and research.

Robert B. Nivison has become chief of inspection. Associated with Lukenweld nine years, he formerly was night superintendent.

Other appointments include: Robert C. Sahlin as assistant manager of sales, S. Nelson Buell as assistant chief engineer, Fred W. Forbes as assistant superintendent, W. J. McAlpine as general foreman and George Wheatley as methods engineer.

♦

Alexander Norden Jr. has been elected vice president, L. S. Brach Mfg. Corp., Newark, N. J.

♦

David E. Jackman, since 1911 treasurer, Firth-Sterling Steel Co., McKeesport, Pa., has retired, but will continue as a director. Prior to joining Firth-Sterling, Mr. Jackman was treasurer of Westinghouse Machine Co. before it became a part of Westinghouse Electric & Mfg. Co.

D. E. Jackman

E. J. Charlton

H. R. Huemme, heretofore assistant treasurer, has become treasurer, succeeding Mr. Jackman.

♦

R. H. Munn Jr. has been named representative in the Pittsburgh district for Ampco Metal Inc., Milwaukee, with headquarters in the Frick building, Pittsburgh.

♦

Dewey M. Dow, who joined Air-Way Electric Appliance Corp., Toledo, O., as a tool and die maker when it was formed 20 years ago, has been named vice president in charge of production.

♦

D. H. Schultz, associated with Leeds & Northrup Co., Philadelphia, about 20 years, and since 1928, assistant treasurer, has been elected secretary and treasurer, succeeding the late C. A. White.

♦

Elmer J. Burnes has become associated with the New York offices of Hickman, Williams & Co., 300 Madison avenue. Formerly he had been general sales agent for the Chateauguay Ore & Iron Co., with headquarters in New York.

♦

Cecil M. Knights has been appointed manager, Detroit office, Hanson-Van Winkle-Munning Co., Matawan, N. J. He joined the company in 1929 as a salesman at Chicago, and in October, 1939, was transferred to Detroit.

♦

J. D. Fletcher, export sales manager, and T. R. Farley, assistant to the president, Caterpillar Tractor Co., Peoria, Ill., have been elected vice presidents. Mr. Fletcher will continue as head of the export department, which position he has held the past ten years, and Mr. Farley, who at present is abroad studying export markets, will retain his administrative duties.

♦

Ferris M. Angevin, secretary, Cincinnati Milling Machine Co., Cincinnati, has been elected a director.

♦

A. E. Walker, vice president and a director, National Supply Co., Pittsburgh, and president, Spang Chalfant Inc., Pittsburgh, has been elected president of National Supply, succeeding the late J. A. Geismar. Before joining National Supply in April, 1939, Mr. Walker served as executive vice president, Pittsburgh Steel Co., Pittsburgh, for two years, and previous to that was general manager of sales, Republic Steel Corp., Cleveland, and president of Truscon Steel Co., Youngstown, O., a Republic subsidiary.

♦

Hayes Parsons has been appointed sales manager, Link-Belt Speeder Corp., Chicago. The past several years Mr. Parsons has represented Speeder Machinery Co., and after the consolidation, Link-Belt Speeder Corp., in the Seattle district.

♦

A. W. MacLaren has been named vice president, American Steel Foundries, Chicago. He succeeds Warren J. Lynch, retired. Mr. Lynch, with the company since 1911, will continue as a director. Mr. MacLaren has been with American Steel Foundries about 12 years.

♦

Ralph W. Baker, since 1932 sales engineer in the sales development and co-ordination division of Repub-

Ralph W. Baker

lic Steel Corp., Cleveland, has joined Flood Co., Cleveland, maker of Penetrol, a protective priming material, as assistant to the president. He will co-ordinate technical services and sales work. Mr. Baker is chairman of the American Society for Testing Materials committee on methods of corrosion testing.

♦

W. E. Borbonus has replaced F. J. Ryan as president, R-S Products Corp., Philadelphia, manufacturer of heat treating furnaces, burners, gate valves and control equipment. D. E. Wyman is the new vice president and chief engineer. He was formerly chief engineer, industrial furnace division, Philadelphia Drying Machinery Co.

♦

James D. Fleming, vice president and manager of Grinnell Co. of the Pacific, San Francisco, and associated with the company since March, 1919, has been appointed sales manager of Grinnell Co. Inc., and Grinnell Co. of the Pacific. Mr. Fleming will make his headquarters with Grinnell Co. Inc., Providence, R. I.

James D. Fleming

♦

Lewis F. Herron, metallurgist, James H. Herron Co., has been elected chairman, Cleveland chapter, American Society for Metals. George J. Hales, sales engineer, Cleveland Electric Illuminating Co., has been named vice chairman, while Carl E. Swartz, metallurgist, Cleveland Graphite Bronze Co., was made treasurer, and A. E. R. Peterka, technical assistant to vice president and advertising manager, Lamson & Sessions Co., was chosen secretary.

♦

Col. James G. Cowling has been appointed special representative of Allegheny Ludlum Steel Corp., Pittsburgh, in its relations with federal government agencies. Colonel Cowling was formerly assistant to the executive vice president, and director of purchases, J. I. Case Co., and later, general manager of J. I. Case Co. Motor Works. Subsequently he became vice president and general manager, Federal Pressed Steel Corp., deputy administrator of NRA, Washington, and regional director of NRA, located in Chicago area. He then went into business for himself in Washington under the name of James G. Cowling & Co., representing nationally known firms in Washington. His office is located at 1001 Fifteenth street, N. W., Washington.

Col. J. G. Cowling

♦

Dr. H. S. Arthur, of McKeesport, Pa., has been elected president, Massillon Steel Casting Co., Massillon, O. A physician, school board director and former mayor of McKeesport, Dr. Arthur succeeds the late Arthur H. Anthony. Dr. Arthur was vice president of the company since last August, and has been a director since the firm's organization in 1917. Supervision of plant operations will be in charge of Frank Humberger, former secretary-treasurer, who has been elected vice president and treasurer, and Mindred Emory, works manager, who has been elected assistant treasurer. Glenn Wilt, sales manager, has been made secretary and a director.

Died:

■ CHARLES R. BOGGS, 56, vice president and general manager, Simplex Wire & Cable Co., Cambridge, Mass., April 1 at Waban, Mass.

♦

John P. Schmidt, 75, retired Milwaukee sheet metal contractor, March 29 in Tampa, Fla.

♦

Robert Mueller, 75, vice president, Mueller Co., Decatur, Ill., maker of plumbing equipment and brass supplies, March 27.

♦

Sumner H. Whitten, 82, president, Holyoke Machine Co., Holyoke, Mass., in Granby, Mass., March 30.

♦

John F. Kirby, superintendent, Somerville Iron Works, Somerville, N. J., recently. He had been with the company 33 years.

♦

William W. Wilcox Jr., 38, vice president and treasurer, Wilcox-Crittenden & Co. Inc., Middletown, Conn., in Hartford, Conn., April 2.

♦

Phillip L. Buxton, 61, scrap dealer, Worcester, Mass., and formerly a member of Perry, Buxton & Doane Co., Boston, dissolved in 1932, March 28 in Worcester.

♦

Charles S. Noble, 78, superintendent, Savary & Glaeser Co., structural steel fabricator, Middlesex Borough, N. J., April 1 in Plainfield, N. J.

♦

Frank Plass, 62, secretary-treasurer and general manager, DeCroupet Iron Works, Royal Oak, Mich., March 21 at his home in Pleasant Ridge, Mich.

♦

Albert Harris Barber, 58, March 19, at his home in Hubbard Woods, Ill. He had been secretary, Cherry-Burrell Corp., Chicago, dairy supply manufacturer and distributor.

♦

Harry V. Wilkinson, mining electrical engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Pittsburgh, March 23. He had been with the Pittsburgh division of Westinghouse the past 17 years.

♦

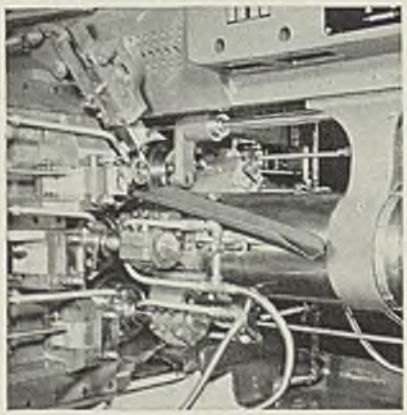
Mrs. Louise Hubbard Johnson, 74, former president, Pulsometer Steam Pump Co., March 31, in New York. Following death of her husband in 1914, Mrs. Johnson operated the company 20 years until it was merged with Hannafin Mfg. Co., Chicago, in 1934.

♦

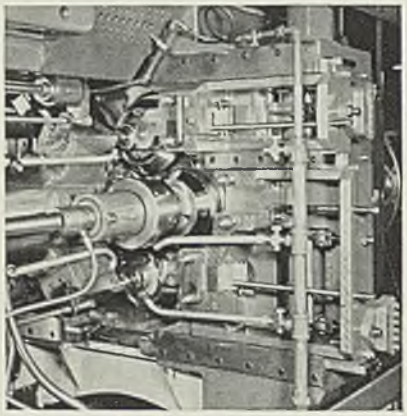
A. A. White, 60, president and general manager, White Foundry Co., Jersey City, N. J., and identified with the industry 42 years, at his home in Belleville, N. J., March 24. He had long been a member of the American Foundrymen's association and the New Jersey Foundrymen's association.

Making the Smoke Fly

THE 3½" six-spindle Conomatic was recently used for making ash trays from bar stock as a demonstration job to show the application of this machine to several types of difficult machining operations. In the fourth position a milling attachment was used for milling out the four slots on the top of the tray. In the fifth position a stamping attachment was used to stamp the name and address around the edge in one revolution of the work. Note the deep forming cuts used on the under side and base. These ash trays were produced in 2 minutes each — that's making the smoke fly! Your own jobs may not include the type of operations needed to produce this ash tray, but here is the proof that the 6-spindle Conomatic is built to handle the tough jobs along with the easy — both with savings that will look attractive to any progressive manufacturer.

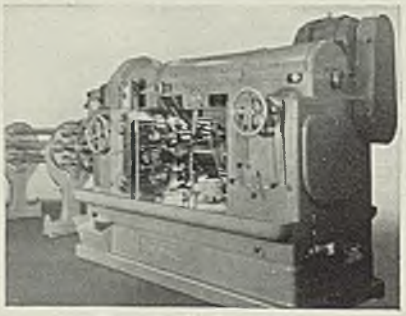


Close-up of tooling, front side of Six-Spindle Conomatic.



Close-up of tooling, back side of machine.

Cone Automatic Chip Remover used on the mochine described above.



Six-spindle Conomatic Screw machine.

CONE AUTOMATIC MACHINE CO., INC.
Windsor, Vermont, U. S. A.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ FORMAL report on special house committee's national labor relations board investigation was filed last week by Representative Howard W. Smith, Virginia, committee chairman. Report stated Wagner act amendment at this session of congress is imperative to correct "wrongs that are being perpetrated daily upon industry, labor and the general public." It explains committee's proposed amendments to the act were recently submitted in the form of a bill, reviews committee's work in analyzing testimony presented before it, and gives definite conclusions.

Supreme Court's decision in the Fansteel case, reversing board's viewpoint on a sitdown strike is cited as justification for amendment of the act, excluding from the act's operations those who have "wilfully engaged in violence or unlawful destruction or seizure of property."

Despite Supreme Court's Fansteel decision, report declares, labor board, in McNeely & Price Co.'s case has undertaken to reinstate employes who engaged in a sitdown.

Its action in the latter case, report holds, makes it obvious the board "has not receded from its original position."

Proposes New Board

Committee, in its report, declared it has not advised taking from present act "one single power now contained therein." It proposes creation of a new 3-man board and an administrator.

Report states present act prohibits appointment of individuals for statistical work where these services may be obtained from department of labor. Despite this provision, according to the report, the board has built up a division of economic research comprising 14 economists and clerical help, with $73,000 annual salary expenditure.

"The division of economic research has engaged in activities deemed b your committee not only unnecessary but highly improper," report adds.

"Lengths to which the board has gone in construing the word 'interference' in its attempts to restrain constitutional right of free speech have been so extreme as to meet with universal condemnation," committee states. "The present policy of foreclosing the most innocent communication between employer and employe is inexcusable and indefensible."

Norton Committee Proposals

In addition to Smith committee's report, regular house labor committee completed its work last week on proposed amendments to the labor board act.

Latter proposed amendments providing the right of a majority of employes in any craft in industry to recognition as a collective bargaining unit, and employers' right to petition for employes' election to settle disputes between unions. Committee had previously approved proposed amendment increasing the board from three to five members. Fourth amendment adopted upholds contracts already entered into by employers and their employes.

House labor committee also voted to approve a bill Chairman Mary Norton had introduced, embodying amendments on which the committee had agreed. Entire situation regarding amendments to the labor board act has become very involved. Smith committee made plans to bring its measure up by petition of house membership.

Mrs. Norton, on the other hand, was instructed by her committee first to seek to pass the measure introduced under suspension of the rules. Failing in that, she said she would exhaust every other means, first asking house rules committee for a closed rule under which her bill could be considered without amendment.

SCHEDULED TECHNOLOGY HEARINGS TO START APRIL 8

Technology hearings will begin before temporary national economic committee April 8. Two weeks have been allotted for hearings dealing with effect of machinery on employment and production. Those in close touch with the situation, however, believe hearings will continue at least three weeks.

Charles R. Hook, president, American Rolling Mill Co., Middletown, O., will appear before the committee this week, dealing with technology in steel industry.

Dr. Theodore J. Krepps and Dr. H. Dewey Anderson, economic advisers to the committee, will have charge of case's presentation.

Among witnesses scheduled to appear are: William Green, American Federation of Labor; Phil Murray, Steel Workers Organizing committee, Edsel Ford, president, Ford Motor Co.; Paul Hoffman, president, Studebaker Corp.; C. F. Kettering, vice president, General Motors; R. J. Thomas, president, United Automobile Workers; and Dr. Isador Lubin, commissioner labor statistics.

APPROPRIATIONS COMMITTEE CUTS AIR DEFENSE BUDGET

House committee on appropriations last week slashed administration's estimates for air defense by eliminating funds for 400 airplanes and a proposed $12,000,000 Alaskan air base.

Members said $921,000,000 outlay projected for the army next year had been cut about $120,000,000. Nearly $65,000,000 of the budget decrease represents cash, remainder contract authorizations.

Practically all replacement airplanes asked by the war department were rejected. Only some amphibians required for the new Puerto Rican base and a few other new

types, between 50 to 75 in all, were allowed.

While refusing to allow $12,000,000 in contractual authorization for proposed air base at Anchorage, Alaska, committee voted $4,000,000 for an auxiliary base at Fairbanks. Last year army proposed building only one base in the northern territory and obtained initial funds for construction at Fairbanks. Later, officials decided a base was needed at Anchorage, where climate is more moderate.

Only $2,000,000 of a $16,000,000 budget estimate for so-called "educational order"' program was allowed. The difference was added to ordnance and other munitions funds, for purchase of new army equipment.

UNFAIR MINING PRACTICES BILL IS REPORTED FAVORABLY

Favorable report has been made by house committee on mines and mining in connection with H. R. 8285, introduced by Representative Peterson, Florida, defining unfair trade methods with reference to certain mine practices. Bill, of interest to steel industry, states:

"That it shall be deemed an unfair trade practice and a violation of the right of the patentee to import for use, sale, or exchange any minerals mined, produced, or processed by use of any mining process covered by the claims of any outstanding United States letters patent heretofore or hereafter issued, except where such minerals are produced, processed, or mined under authority of the owner of such process."

House committee states bill is designed to correct present problem, created when court of customs and patent appeals reversed its former decision and held importation of products made abroad in accordance with United States process patent without consent of patentee was not regarded as an unfair method of competition. Such importation had been formerly regarded as unfair method of competition.

Report states bill is limited to mining processes.

INDIA'S JANUARY MANGANESE ORE EXPORTS SHOW INCREASE

Official figures show manganese exports from British India during January totaled 80,327 gross tons, approximately one-third more than in each of the two preceding months, according to a report from Vice Consul Harrison Lewis, Calcutta.

Gain was due to increased shipments to United Kingdom, Belgium, France and United States, which more than offset decline in exports to Japan and other countries.

Most notable increase was in exports to Belgium, which rose from a negligible figure to 14,500 tons in January. January exports to United Kingdom and the United States, 23,930 and 18,100 gross tons, respectively, represented in each case a 50 per cent advance over preceding month.

BRITAIN PLANS TO DEVELOP FUTURE STEEL EXPORT TRADE

Despite war needs absorbing total domestic steel production, Great Britain's export council is making plans to develop export trade, particularly to South America, when output reaches a level permitting export margin to be built up, according to a report from Vice Consul M. A. Colebrook, London.

Present steel mill capacity is reported approximately 14,500,000 tons per annum. Addition of empire output will increase total to 18,500,000 tons.

Considerable tonnages of semifinished steel are still imported chiefly from Belgium, Luxemburg and United States. Deficiency of British mills able to produce ingots and raw steel necessitates such imports.

British steel industry is said to have large pre-war contracts with the Dominions. Until these commitments are satisfied there will be little British-produced steel available for exports. According to authoritative sources, when Great Britain is finally in position to export steel it will be in the highly finished form.

EGYPT CONSIDERING LOCAL DOMESTIC SCRAP PROCESSING

Egypt's ministry of commerce and industry is considering feasibility of processing locally available domestic scrap metal, according to report from Commercial Attache James T. Scott, Cairo.

Since outbreak of European war, Egyptian government has placed a ban on exportation of scrap iron, steel, nickel and copper. Ministry of commerce and industry is said to believe this scrap metal could be processed in Egypt so that bars, steel for reinforced concrete construction, and bands for cotton baling could be produced locally. Substantial quantities of these three items, it is pointed out, are now imported annually into the Egyptian market.

COMMISSION HOLDS EXPORT ASSOCIATION EXCEEDED LAW

American exporters, particularly members of export associations organized under Webb-Pomerene act, are much disturbed over rumored prosecution by federal trade commission.

Rumors have probably arisen from trade commission's complaint against Pacific Forest Industries, Tacoma, Wash. It is reported justice department has no interest in this case under Sherman anti-trust act.

Trade commission has concluded laws have been violated by certain agreements and acts of Pacific Forest Industries, an export trade association.

Hearing was held and investigation made following which commission concluded certain contracts and by-laws of the association prohibited its members from selling to independent exporters, except through the association. Certain of its acts and practices in fixing prices and conditions of sales to independent exporters, it was held, were in restraint of such exporters' trade, as the latter were found to be association's domestic competitors, within export trade act.

Commission made certain recommendations for readjustment of association's business "in order that it may maintain its organization and management and conduct its business in accordance with the law."

EMPLOYES OF DISTRIBUTIVE TRADES TO BE RECLASSIFIED

Hearing will be held April 10 on petitions to redefine terms used to describe employes in wholesale distributive trades, exempt from benefits of the wage and hour law, according to Col. Philip B. Fleming, administrator, labor department wage and hour division. Classifications to be considered for redefinition include: Executive, administrative, professional and outside salesman.

Representatives of groups affected will be permitted to take part in the hearing. They may file briefs and participate in oral argument if the latter is entertained. Evidence, however, will be confined to effect of present and proposed definitions of such employes' classifications upon wholesale distributive trades.

Hearing was set upon application of American Retail Federation, Southern States Industrial Council and Council of National Wholesale Associations for changes in wording of regulations issued by the administrator defining terms used to describe exempt employment as they apply to employes in wholesale distributive trades.

GOVERNMENT WALSH-HEALEY PURCHASES TOTAL $160,266

During week ended March 23, government purchased $160,266.25 worth of iron and steel products under Walsh-Healey act as follows: Blaw-Knox Co., Pittsburgh, $32,300; Transue & Williams Steel Forging Corp., Alliance, O., $26,047.50; National Forge & Ordnance Co., Irvine, Pa., $62,250; United States Steel Export Co., Washington, $39,668.75 and C. O. Jelliff Mfg. Corp., Southport, Conn., $14,162.40.

AVIATION

AIRCRAFT ENGINE LIFE APPEARS ALMOST ENDLESS

■ WHAT happens to airplane engines that have served their allotted number of hours in flying the ships of first class airlines? This point was the subject of some interesting remarks by H. J. Fischbeck, chief metallurgist, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn., in an address last week before the Cleveland chapter, American Society of Metals.

When first modern engines were delivered, said Mr. Fischbeck, their life was estimated conservatively at 1000 hours. But at that stage their performance showed no deterioration so they continued to be flown 1500, 2000, 2500 hours and so on.

Today the life of engines for first class airlines is held to be around 4000 hours. However, after this length of service they continue so efficient that it is unnecessary to discard them. Instead they are sold to feeder lines, with a substantial number going to Asiatic and Central and South American lines. Some of these engines still are in use after seven years of such additional service.

Such phenomenal service life, as Mr. Fischbeck pointed out, springs from the selection of the best materials, to care and accuracy in fabrication and to painstaking inspection before, during and subsequent to completion of parts.

Mr. Fischbeck reported considerable progress in standardization of metals for aircraft engines as a result of co-operation by six leading aircraft engine manufacturers with the government's aeronautical materials specification committee and said the committee soon will issue its findings in printed form. Where some companies had as many as 62 metal specifications for engine parts, the number now is around 50, with likelihood of further reduction.

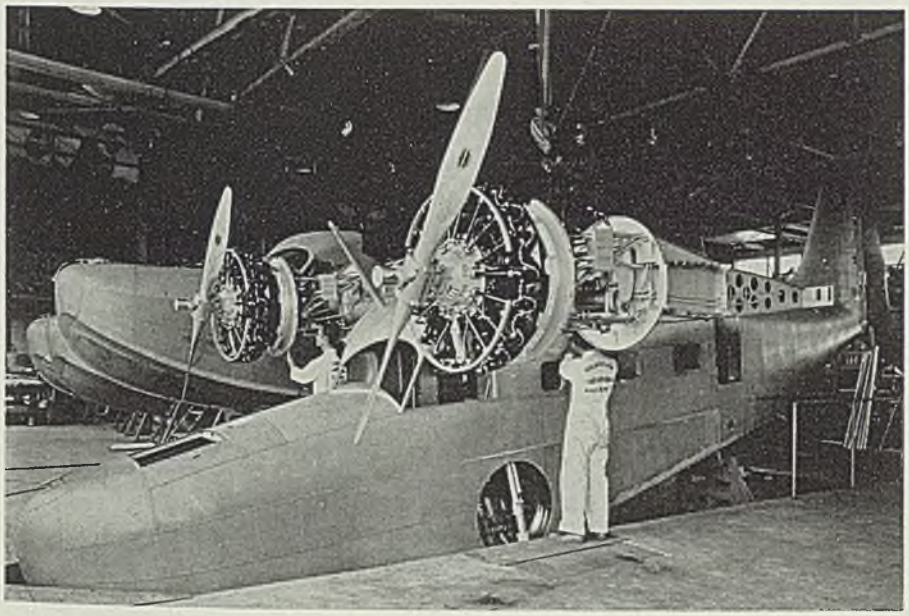
Today's Pratt & Whitney radial engine, he said, breaks down as follows: Aluminum alloys, 42 per cent; steel, including cast iron piston rings, 47 per cent; magnesium, 7 per cent; copper and bronze, 4 per cent.

OUTLOOK FOR STEEL HANGARS APPEARS MORE PROMISING

A fabricator of steel hangars takes encouragement from the fact that a substantial increase in insurance on airplanes not housed satisfactorily is being considered by insurance companies.

Some such development, he says, is needed to stimulate this business because many more planes today are kept in the open than are quartered in hangars. Interest in steel hangars, as reflected by the number of inquiries, is live, but the percentage that develops into actual orders is relatively small.

Tilts and Lowers Plane in Assembly



■ Tilting and lowering platform in floor pit at Grumman Aircraft Engineering Corp., Bethpage, N. Y., facilitates installation of aircraft engines and interior fittings, eliminates need for scaffolding, saves 800 man-hours time in assembling each plane. Platform, 8 x 40 feet, is tilted by independently actuated cylinders under ends. Photo, courtesy Rotary Lift Co., Memphis, Tenn.

February Steel Payrolls, Employment in Decline

■ Employment and payrolls of the steel industry declined in February, reflecting a lower rate of production and the short month. February figures were substantially above those of a year ago, however.

An average of 538,000 employes were at work during February, according to the American Iron and Steel institute. By comparison, the number of steel industry employes averaged 556,000 in January and 453,000 in February 1939.

February steel payrolls were $70,847,000, compared with $82,827,000 in January and $57,044,000 in February a year ago.

Wage-earning employes earned an average of 83.4 cents per hour as against 83.5 cents per hour in January and 82.7 cents per hour in February 1939.

Number of hours worked weekly by wage earners averaged 34.1 in February, compared with 37.1 in January and 33.5 in February of last year.

Amplidyne Engineers Win Coffin Awards

■ For development of the Amplidyne generator and consequent improvements to control equipment for high-powered, complicated operations, Kenneth H. Bowman, M. A. Edwards, and Francis Mohler, General Electric Co., Schenectady, N. Y., were given Charles A. Coffin foundation awards, highest honor conferred by the company on employes.

Outstanding application of the Amplidyne generator in the steel industry is in the electric flying-shear. Without mechanical connection between shear and mill, the device permits red-hot bars emerging from the mill at 2000 feet per minute to be cut to 30-foot lengths with an accuracy of ¼-inch.

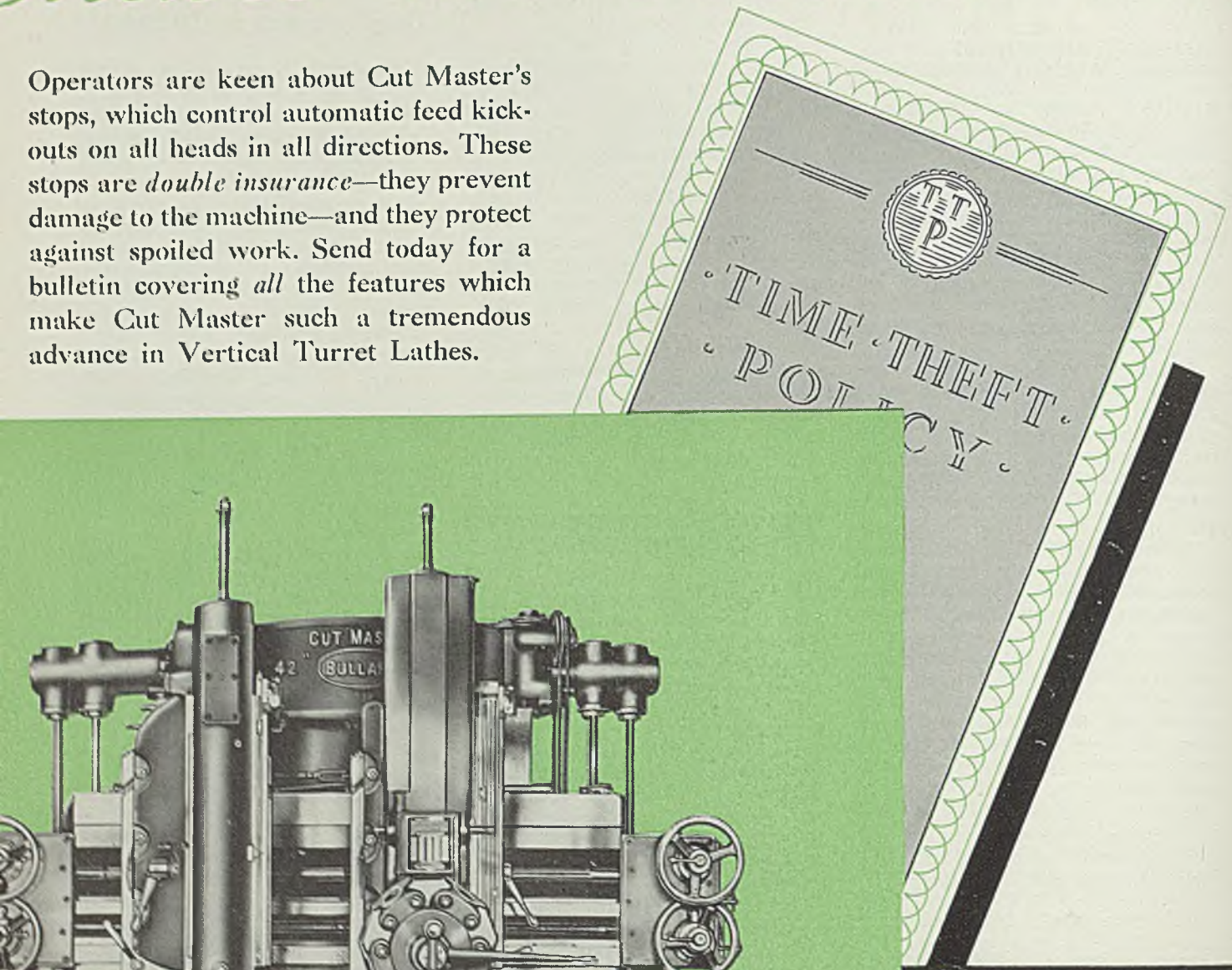
Refrigerator Sales Rise To New February Record

■ Household electric refrigerator sales in United States in February set a new record for that month, according to National Electrical Manufacturers association. Units sold totaled 261,328, compared to 184,643 in February 1939, 134,946 in February 1938, and 228,532 in February 1937.

February world sales rose to 275,366 units compared to 197,781 of February 1939, 148,726 in February 1938 and 245,614 in same month of 1937.

Insure THE BULLARD WAY

Operators are keen about Cut Master's stops, which control automatic feed kick-outs on all heads in all directions. These stops are *double insurance*—they prevent damage to the machine—and they protect against spoiled work. Send today for a bulletin covering *all* the features which make Cut Master such a tremendous advance in Vertical Turret Lathes.



This is a

42 INCH

CUT MASTE

VERTICAL TURRET LATHE

Also available in 30", 36", 54", 64" sizes with any combination of heads to suit your needs.

THE BULLARD COMPANY

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ THIS city, or more accurately the eastern part of this state, is regarded by many industrialists throughout the country as the industrial pulse of the nation. Because of the concentration of the motor industry here, because of its large volume of business, because of its peculiar ability to adjust itself quickly to the tenor of the ultimate consumer, the Detroit area is watched closely for signs of trouble, for signs of improvement or decline in industrial activity.

Industrial eyes are focused more intently than ever on activity here just now, because business in general has been sinking slowly since the turn of the year and the question naturally is asked: Is Detroit responsible? In one sense it is—the over-acceleration to accumulate and make commitments for stocks of raw materials last fall, with the resultant lag in new business this spring. But in another sense it is not—for automobile production has been sustained all through the winter months at a pace of around 100,000 cars a week.

Auto Production Steady

In fact, some people are beginning to wonder whether the long-dreamed-of millennium may not be here at last, that day when auto production will hold to a constant weekly figure throughout the model year, thereby avoiding the customary wide swings in employment and in material and parts purchasing.

Detroit also is accorded the dubious honor of fighting the "labor battle" for the rest of the industry. Talk to plant operators in small towns throughout the East and Middle West and they will tell you that on the solution of labor problems in Detroit rests their own eventual freedom from strife and discord, even their own perpetuation as unshackled business enterprises.

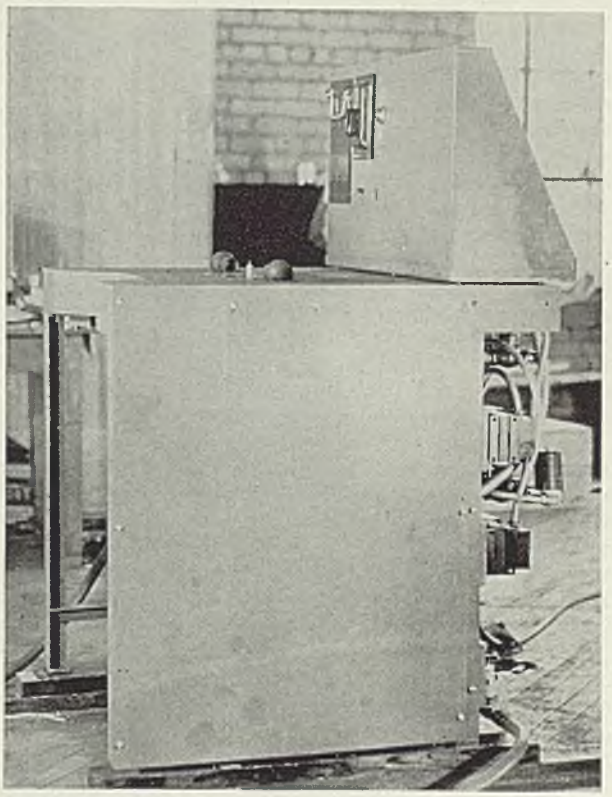
Outwardly, of course, there is being fought no labor battle here now, and since the disastrous Chrysler strike of last fall comparative quiet has prevailed on the labor front. Inside plants the story is different, but plant managers, in the face of uninterrupted production schedules, are making the best of situations which often border on the ludicrous.

A. R. Clay, in the treasurer's office of General Motors Corp., New York, calls this writer's attention to a somewhat incorrect analysis of production and sales statistics in last week's issue. He points out that while car and truck sales for January and February totaled 569,246, against factory sales to dealers of 852,941 in the same period, the latter figure includes both United States and Canadian output, as well as shipments to export. Production for consumption in the United States is estimated at about 782,000 by the bureau of the census, leaving a somewhat lower difference—213,000—to apply against unfilled orders and dealers' stocks.

Reliable estimates of the total number of cars between production lines and the hands of buyers indicate a total of about 600,000 units,

Sets Gap in Spark Plugs

■ Hydraulically actuated machine for bending spark plug electrode wires and setting gap within limits of 0.0015-inch, the latter by means of auxiliary vacuum tubes and relay equipment, all built into the machine. The unit was designed and built by Electronic Control Corp., Detroit, and will handle plugs on a machine cycle of 1¾ seconds



or roughly six weeks' production. However, this apparently hefty total does not seem to be regarded apprehensively by dealers. Scattered reports from individual dealers indicate that while their stocks are in some instances heavy (one dealer had a showroom, a lot and a warehouse crammed with new cars) they are not considered excessive when stacked up against current sales which have been running anywhere from 15 to 30 per cent ahead of this time last year.

■ FROM the number of inquiries which developed regarding the paint thickness gage illustrated here recently, more information on the device would appear to be called for. Designed and built by Electronic Control Corp., 2667 East Grand boulevard, Detroit, the gage is in use in nearly all General Motors' plants now and was first introduced about three years ago. It is called a Bathytrol (why, no one seems to know) and sells for $85.

Uses Phonograph Needle

The unit comprises a penetrator which is connected to a separate electrical control box. The penetrator comprises an ordinary phonograph needle mounted in a micrometer screw calibrated in ten-thousandths of an inch. The needle itself is enclosed in a circular shaped piece of bakelite, and before a test is adjusted so the point is just flush with the outer edge of the plastic piece, and the micrometer set on zero. A ground clamp is attached to the base metal on which a paint coating is to be measured. The curved carrier is rocked back and forth over the painted surface and the micrometer advanced about a tenth at each stroke. At the moment the needle makes contact with the metal surface, the circuit is completed through an electronic tube and relay, thereby lighting a warning lamp.

The operator reads the micrometer and has the paint thickness, accurate to about a tenth of a thousandth, depending to some extent upon his skill in manipulating the instrument. Penetrators are nothing new for measuring paint thicknesses, but this device is considered more accurate than some older types because of the greatly increased sensitivity obtained through the use of electronic tube. The fine point contact which the penetrator makes with the base metal means high resistance is developed to the passage of current, and in some other instruments it was necessary for the needle to indent the metal surface before there was sufficient current in the circuit to operate a relay. Using a tube, a current measured in microamperes is enough to flash the warning light, indicating contact.

Obviously the instrument is suited only to the measurement of nonmetallic coatings and would be of no value in determining the thicknesses of plate or galvanized coatings, for example.

Versatility of the electric eye type of control is well known in industry and has extended into many fields outside, such as horse racing and, more recently, bowling where foul line violations are automatically flashed.

Electronic Control has just shipped an unusual type of machine to a spark plug manufacturer for automatically bending over and "gapping" spark plug electrode wires on a machine cycle time of 1¾ seconds per plug. The machine comprises a table carrying a die in which plug is chucked hydraulically. Two sets of hydraulic cylinders are actuated in succession, the first set of tools bending over the electrode points at right angles, the second set bringing the points to the proper setting with relation to the center electrode.

A complicated electronic tube control automatically keeps the gap within the limits of 0.0265 and 0.0280-inch. A further electric eye setup is incorporated into the table of the machine so that it will not function as long as the operator's hands interrupt the light beam across the top of the die.

It is expected that this type of machine will greatly facilitate the setting up of spark plug electrodes, an operation which now involves considerable hand work with feeler gages, etc.

"Curtain of light" safety controls for presses is another familiar application of the electric eye principle which in recent months has had to be practically suspended because lens supplies from Germany have been cut off. Present domestic lenses available are said to be far too costly for this equipment. A solution to the impasse may be a new optical system which Corning Glass Works now has under development.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,962	449,314
Feb.	202,597	317,520	421,820
March	238,447	389,495	.....
April	237,929	354,266	.....
May	210,174	313,248	.....
June	189,402	324,253	.....
July	150,450	218,494	.....
Aug.	96,946	103,343	.....
Sept.	89,623	192,678	.....
Oct.	215,286	324,688	.....
Nov.	390,405	368,541	.....
Dec.	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

Estimated by Ward's Reports

Week ended:	1940	1939†
Mar. 9	103,560	84,095
Mar. 16	105,720	86,725
Mar. 23	103,395	89,400
Mar. 30	103,370	85,980
April 6	101,655	87,019

†Comparable week.

	Week ended April 6	Mar. 30
General Motors	44,000	45,790
Chrysler	24,635	25,330
Ford	20,630	20,750
All others	12,390	11,500

■ CONSTRUCTION has started on a new 78,000 square foot manufacturing building at the Highland Park plant of Chrysler Corp., of one-story monitor-type steel construction with continuous steel sash and brick curtain walls, 135 feet wide by 575 feet long. At one end is a high press bay 75 feet wide by 268 feet long, and a second story over part of the other end will house offices, lunchrooms, washrooms, etc.

Inside the building there will be only one row of columns, 38 feet apart and set 75 feet from one side and 60 feet from the other, requiring unusually wide roof trusses. All glass on the south side of the building will be of a special glare-free and heat-resisting type. Designed by Albert Kahn Inc., the building is expected to be completed early in June.

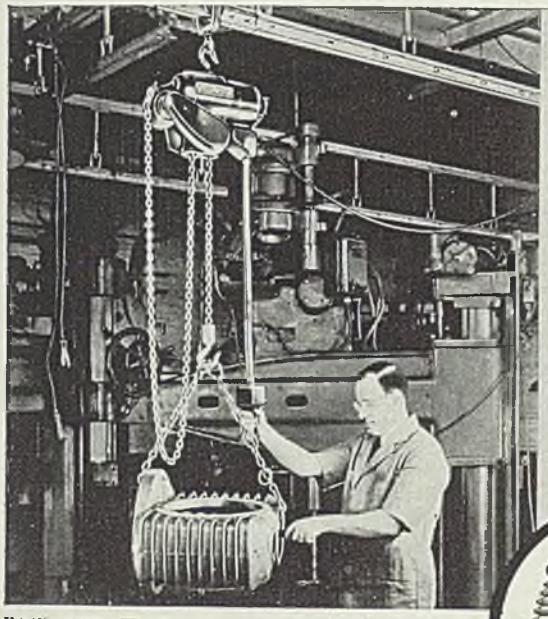
Will Make Fluid Transmissions

The corporation makes no mention of what type of manufacturing is to be carried out in the building, but it is understood in equipment circles that the space will be devoted to greatly expanded manufacture of the fluid flywheel transmission now offered on several Chrysler lines. The inference is that this type of transmission may be available in 1941 perhaps on Dodge and DeSoto as well as Chrysler models.

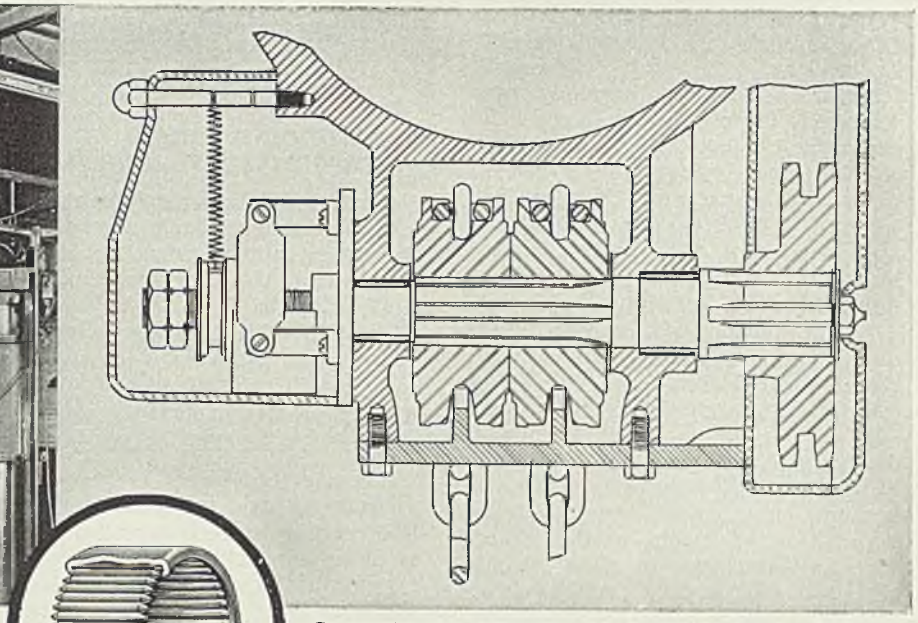
Extensive tooling program for the Ford 6-cylinder model was turned over to the Ford tool and die shop early in March and the result has been sharply expanded production there, some departments being on a 24-hour per day basis. Apparently the O.K. has been given to this OMA engine, with six cylinders and overhead valves, although the mental reservation always must be made that the entire project could be shelved at a moment's notice, should Mr. Ford be so inclined.

SPEEDMASTER HOISTS

get MAXIMUM capacity in MINIMUM space with *TORRINGTON NEEDLE BEARINGS*



EASY OPERATION, with a reduction in the horsepower required to do the job, is one contribution which Torrington Needle Bearings make to the well-known "SPEEDMASTER" Hoists.



Cross-section view of the point of the load shaft where Needle Bearings are installed. Shows how maximum anti-friction benefits in minimum space can be obtained.

HIGH LOAD CAPACITY—small size for installation in limited space—plus the ability to "take" the brutal punishment of overloading . . . these are the vital requisites of any anti-friction bearing used for the load shaft in the fast and powerful "SPEEDMASTER" Hoists. And in the Torrington Needle Bearing, engineers of The Master Electric Company found exactly the features they specified.

"Not sufficient space for conventional types of anti-friction bearings—yet an anti-friction bearing at the load shaft was vital," says L. G. Knapp, Manager of the Company's Industrial Equipment Division. "For this application, the Torrington Needle Bearing is *ideal*, and has entirely fulfilled the strict requirements imposed upon it."

"Moreover," adds Mr. Knapp, "the use of a Torrington Bearing in this instance has given us the advantage of a reduction in horsepower and has immensely simplified our design and application problem. The Torrington Needle Bearing is readily installed; offers considerable time-saving in assembly; saves on production costs . . . and we are decidedly of the opinion that it presents a distinct step in advanced engineering of hoisting equipment."

Ready adaptability to product designs is an inherent characteristic of Torrington Needle Bearings. Translate these remarkable manufacturing and operating improvements into terms of your own product, and you'll quickly see why so many manufacturers of widely diverse items are fast turning to Torrington Needle Bearings for economies in space, weight and cost. Let the Torrington Engineering Department show you how these and other advantages of the Needle Bearing can be incorporated in your product designs. For further information, write for Catalog No. 10. For Needle Bearings to be used in heavier service, request Booklet 103X, from our associate, Bantam Bearings Corporation, South Bend, Indiana.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.
Makers of Needle and Ball Bearings
New York Boston Philadelphia Detroit
Cleveland Chicago London, England

TORRINGTON
NEEDLE BEARING

MEETINGS

DALLAS PLACE FOR TRIPLE MILL SUPPLY CONVENTION

■ PLANS now are complete for the annual triple mill supply convention to be held at the Adolphus hotel, Dallas, Tex., April 22-24, by the American Supply and Machinery Manufacturers' association, National Supply and Machinery Distributors' association and Southern Supply and Machinery Distributors' association. Three sessions will be conducted jointly, others independently by each group.

Theme of the convention will be "The Mill Supply Industry in the Laboratory." Among addresses scheduled for joint sessions are: "The Mill Supply House in the Laboratory," by J. A. Channon, editor *Mill Supplies*; "Preferred Types of Sales Literature and How to Use Them," by C. F. Conner, B. F. Goodrich Co.; and "The Small Order Problem," by J. Robert Kelley, Manning, Maxwell & Moore.

A skit, "Everybody Is Busy," produced and presented by Little Theatre of Dallas, Inc., will be a feature of the closing session.

H. F. Seymour, Columbian Vise & Mfg. Co., will present an address "Distributor Relations," before the opening meeting of the American association. Sessions of this group will be given over to clinic discussions on mill supply problems.

INDUSTRIAL HEALTH TOPIC OF NEW YORK CONVENTION

American Association of Industrial Physicians and Surgeons will hold its twenty-fifth annual meeting jointly with first annual meeting of the American Industrial Hygiene association at Hotel Pennsylvania, New York, June 4-7. The program will be devoted to problems of industrial health in all of their various medical, technical and hygienic phases, with particular stress on prevention and control of occupational hazards. An exhibit will be conducted during the meeting.

Feature of the dinner on June 6 will be award of the William S. Knudsen medal for 1939-40.

GEARMAKERS ARRANGING ANNUAL MEETING PROGRAM

American Gear Manufacturers' association announces technical papers and addresses to be presented at its twenty-fourth annual meeting at Grove Park Inn., Asheville, N. C., May 20-22.

These include: "Cutting Fine Pitch Gears," by D. T. Hamilton, Fellows Gear Shaper Co., Springfield, Vt.; "Gears and Gear Cases," by Everett Chapman, Lukenweld Inc., Coatesville, Pa.; "Boring Mills in a Gear Shop," by E. P. Blanchard, Bullard Co., Bridgeport, Conn.; "How's Business," by W. L. Schneider, Falk Corp., Milwaukee; "Pitting in Gear and Roller Tests," by Dr. Stewart Way, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; "My 40 Years' Experience with Tooth Forms," by A. A. Ross, General Electric Co., Lynn, Mass.; "Tooth Bearings for Straight and Curved Tooth Bevel Gears," by A. H. Candee, Gleason Works, Rochester, N. Y.; "Diesel and Gas Engine Load Characteristics," by Austin Kuhns, Farrel-Birmingham Co., Ansonia, Conn.

George F. Nordenholt, editor, *Product Engineering*, New York, will address the annual dinner on "New Products—A Threat or a Promise."

REINFORCING GROUP DEFERS ANNUAL MEETING ONE DAY

Concrete Reinforcing Steel institute has moved back one day its sixteenth annual meeting at the Homestead, Hot Springs, Va., from April 25-26 to April 26-27, to avoid a conflict with another convention at the same place.

A.S.M.E. SCHEDULING PAPERS FOR MILWAUKEE MEETING

A review of latest developments in industry and engineering in the Midwest is to be covered in technical session being arranged for the semiannual meeting of the American Society of Mechanical Engineers at Hotel Pfister, Milwaukee, June 17-20. The technical program will be supplemented with visits to manufacturing plants in the vicinity.

Among subjects to be discussed in technical sessions are: Fuels, heat transfer, hydraulic equipment, machine shop practice, management, steam turbines, power plants, steam power, and a symposium on steam locomotive valves and valve mechanism. The aeronautic division will give attention to hard surfacing of metal surfaces, tool and die milling, and experience with metals at high temperatures.

PENNSYLVANIA CHAPTERS OF A.S.M. IN ANNUAL MEETING

Fourth biennial interchapter meeting of the Philadelphia, Pittsburgh, Lehigh Valley, York, Southern Tier, and Penn State chapters of the American Society for Metals will be held at Pennsylvania State college, State College, Pa., May 3-4.

Papers scheduled for the afternoon session on May 3 are: "Evaluation of Steels for High-Temperature Service," by C. L. Clark, University of Michigan, Ann Arbor, Mich.; and "Commercial Aspects of High Temperature Alloys," by J. J. Kanter, Crane Co., Chicago. Papers for the session on the morning of May 4 are: "Hardenability and Quenching," by M. A. Grossmann, Carnegie-Illinois Steel Corp., Chicago; and "Commercial Aspects of Hardenability Tests," by W. T. Jominy, General Motors Corp., Detroit.

Visits will be made to the laboratories and exhibits of the college's mineral industries building, and to the Titan Metal Mfg. Co., Bellefonte, Pa.

MANAGEMENT IS SUBJECT OF CONFERENCE IN CLEVELAND

Donald B. Gillies, vice president, Republic Steel Corp., Cleveland, will be one of the principal speakers at the annual spring conference for the Advancement of Management at Hotel Statler, Cleveland, April 11-12. He will discuss "What is Ahead for Business."

Other speakers and subjects listed are: "Getting the Production Job Done," by Stuart Symington, president, Emerson Electric Mfg. Co., St. Louis; "Present-Day Relations of Government and Business," by Joseph C. Hostetler, partner, Baker, Hostetler & Patterson, Cleveland; "Keeping Production Costs in Line," by W. C. Wright, manager of supervisional training, Goodyear Tire & Rubber Co., Akron, O.; "Making the Budget an Effective Management Tool," by P. K. Poulton, secretary-treasurer, Talon Inc., Meadville, Pa.; "Pricing Your Product To Reach Your Market," by J. Frederic Dewhurst, economist, Twentieth Century Fund Inc., New York; "Multiple Management of Industry," by Charles P. McCormick, president, McCormick & Co., Baltimore; and "Effectuating Public Relations Policies in Industry," by John W. Hill, partner, Hill & Knowlton, New York, and Whiting Williams, consultant on employe and public relations, Cleveland.

PURCHASING AGENT MEETING IS SILVER ANNIVERSARY

National Association of Purchasing Agents announces its twenty-fifth annual international convention and Inform-a-Show to be held at the Netherlands Plaza hotel, Cincinnati, June 3-6. With the association celebrating its silver anniversary with 61 affiliated chapters and a record-breaking total membership of 5500, a large attendance is anticipated. A wide variety of products and processes will be included in the 75 exhibits in the show.

CHEMICAL EXPOSITION IN CHICAGO IN DECEMBER

An American Chemical exposition to be held in Chicago in even numbered years to alternate with the Exposition of Chemical Industries in New York is being organized under

(*Please turn to Page* 82)

Current Events in Chicago . . .

By J. F. POWELL, Chicago Editor, STEEL

■ STEEL Workers Organizing committee will hold its second international wage and policy convention here May 14-17 at Morrison hotel. According to Philip Murray, chairman, and David J. McDonald, secretary-treasurer, delegates of all SWOC lodges will convene for the purpose of adopting a wage policy to provide a basis for negotiating future wage agreements, to adopt rules for governing local lodges, and "to make plans for the future of the Steel Workers Organizing committee, in order to completely organize every steel plant in America." Wage discussions may center around establishment of SWOC's idea of a uniform wage for steelworkers. This would be in line with a recently-announced union policy of reluctance to take wage reductions when steel industry operations go to seasonal lows but refraining from asking for horizontal increases when operations zoom to peaks.

♦

Diesel Locomotives Delivered

Milwaukee railroad is taking delivery this month on 18 diesel locomotives to be acquired on a lease-purchase basis. Last week in Chicago delivery was taken on three 660-horsepower diesel-electric switching locomotives from Electro-Motive Corp., General Motors subsidiary, La Grange, Ill., and also a 1000-horsepower diesel switching locomotive. The smaller three will go into switching service in the Goose Island industrial district.

♦

Stoker Sales Rise

H. L. Bilsborough, Fairbanks, Morse & Co. stoker division manager, revealed the company anticipates 1940 stoker sales will be increased 35 per cent over 1939. About 85 per cent are expected to be for domestic use. Although stoker prices generally are no higher than last year, the company is bringing out nine new models that will sell in higher price ranges.

♦

Washington Award

Daniel Cowan Jackling, founder, Utah Copper Co., will be presented with the Washington Award for 1940 at a dinner at the Drake Hotel here April 15. The Washington Award, whose earlier recipients include such well-knowns as Herbert Hoover, Orville Wright, Charles F. Kettering and many others since 1919, will be presented Mr. Jackling for "pioneering in large-scale mining and treatment of low-grade copper ores, releasing vast resources from formerly worthless deposits." Award is by Western Society of Engineers, with the award commission representing American Society of Civil Engineers, American Institute of Mining & Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and Western Society of Engineers.

February Iron, Steel Imports at Low Level

■ February iron and steel imports, excluding scrap, totaled 6467 gross tons, valued at $666,272, compared with 7832 tons, valued at $918,626 in January and with 17,736 tons, valued at $1,236,673 in February, 1939, according to the metals and minerals division, commerce department.

Cumulative total for January and February was 14,299 tons, valued at $1,584,898. This was only 34 per cent in volume and 53 per cent in value of the 42,067 tons, valued at $2,965,818, imported in the comparable period in 1939.

Pig iron was the leading commodity, 2032 tons, followed by ferromanganese, 1595 tons. No other item reached 500 tons in February.

British India was the principal source of imports, contributing 1782 tons of pig iron, Norway was second with 1595 tons of ferromanganese and 100 tons of other ferroalloys and Sweden third with 1531 tons, including 499 tons of wire rods and 194 tons of hollow bar and drill steel.

Scrap imports also declined sharply, 273 tons, valued at $3541 against 442 tons, valued at $4423, in January and 1413 tons, valued at $22,568, in February, 1939. Canada contributed 253 tons of the total scrap. In two months scrap imports totaled only 715 tons, valued at $7964, compared with 4746 tons, valued at $53,275, in the comparable period last year.

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

Gross Tons

	1940		1939	
	Exports	Imports	Exports	Imports
Jan.	583,521	8,274	362,672	27,664
Feb.	671,301	6,740	359,690	19,149
Mar.	.....	.....	474,360	25,369
April	.....	.....	394,008	44.083
May	.....	.....	532,641	28,142
June	.....	.....	588,856	32,587
July	.....	.....	513,664	30,851
Aug.	.....	.....	477,078	28,328
Sept.	.....	.....	575,613	29,874
Oct.	.....	.....	591,856	19,189
Nov.	.....	.....	605,555	15,216
Dec.	.....	..,...	600,437	14,709
Total	.....	.....	6,076,429	315,161

ORIGIN OF FEBRUARY IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Sweden	72,563	.....	.....	.....
Canada	189	250	.....	.....
Mexico	328	.....	.....	.....
Cuba	32,000	.....	6,500	.....
Chile	132,000	.....	940	.....
British India	.....	1,782	5,084	.....
Brazil	.....	.....	2,981	.....
Netherlands Indies	.....	.....	299	.....
Soviet Russia	.....	.....	7,899	.....
South Africa	.....	.....	9,405	.....
Gold Coast	.....	.....	4.013	.....
Norway	.....	.....	.....	1,595
Total	237,080	2,032	37,121	1,595

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
United Kingdom	17	1	...	...
Sweden	3	...	92	...
Belgium	...	82	55	51
Canada	...	...	1	...
France	...	...	...	1
Total	20	83	148	52

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

(Gross Tons)

ARTICLES	Feb. 1940	Jan. 1940	Jan. thru Feb. 1940
Pig iron	2,032	1,914	3,946
Sponge iron	160	12	172
Ferromanganese*	1,595	1,945	3,540
Spiegeleisen	169	78	247
Ferrochrome†	.....	.....	.....
Ferrosilicon‡	40	269	309
Other ferroalloys§	100	50	150
Steel ingots, bl'ms, etc.	.....	.....	.....
Billets, solid or hollow	22	204	226
Concrete reinforce bars	.....	.....	.....
Hollow bar, drill steel	196	189	385
Bars, solid or hollow	148	400	548
Iron slabs	...	...	...
Iron bars	39	85	124
Wire rods	499	1,037	1,536
Boiler and other plate (including skelp)	1	1	2
Sheets, skelp, saw plate	20	8	28
Die blocks, blanks, etc.	6	.....	6
Tin plate, taggers' tin and terneplate	11	3	14
Structural shapes	83	216	299
Sashes and frames	.....	.....	.....
Sheet piling	.....	.....	.....
Rails, track material	186	109	295
Cast-iron pipe, fittings	419	.....	419
Mall. iron pipe fittings	.....	.....	.....
Welded pipe	.....	.....	.....
Other pipe	193	412	605
Cotton ties	...	...	...
Other hoops and bands	52	305	357
Barbed wire	.....	.....	.....
Round iron, steel wire	120	200	320
Teleg., telephone wire	..	..	..
Flat wire, steel strips	237	230	467
Wire rope and strand	82	81	163
Other wire	.....	.....	.....
Nails, tacks, staples	7	38	45
Bolts, nuts, and rivets	19	5	24
Horse and mule shoes	.....	3	3
Castings and forgings	31	38	69
Total	6,467	7,832	14,299
Iron and steel scrap	273	442	715
GRAND TOTAL	6,740	8,274	15,014

*Manganese content; †chrome content; ‡silicon content; §alloy content.

The Social Security System Needs Revision

■ AS REVEALED by Clarence B. Bartlett in STEEL of April 1, many manufacturers, through intelligent and realistic management policies, are finding that they actually can improve their competitive position through full compliance with the purposes of the state social security laws. Through regularization of employment they are able to convert into an asset a tax system which originally they viewed as a liability.

That is—they have been able to accomplish these results in states which allow a reduction in the tax based on a company's experience rating, and in varying degree as permitted under the various state laws.

Mr. Bartlett startlingly illustrates the effects of different state laws in connection with the leather manufacturing industry, located principally in Wisconsin, Ohio, Massachusetts and Pennsylvania. He points out that the Wisconsin manufacturer who is taking full advantage of his possibilities now has a payroll tax equivalent to 5.2 mills on every dollar's worth of leather produced. The Ohio manufacturer, if he proceeds with the same degree of intelligence, can in 1942 be in a position where his tax will be 9.2 mills on every dollar's worth. The Massachusetts manufacturer will be in a position where his cost may be equal to 7.2 mills on every dollar's worth produced. In Pennsylvania, however, where no experience credit is allowed, the leather manufacturer will have an arbitrary in cost of 1.6 cents on every dollar's worth.

Manufacturer May Gain Advantage Over Competitor in Another State

This difference in cost possibilities in these four states is due to the fact that in Pennsylvania the minimum tax cost under the state law is 3 per cent of the payroll, under the Ohio law it will be 1 per cent, under the Massachusetts law it will be one-half of 1 per cent, while under the Wisconsin law the state tax can be reduced to nothing.

To appreciate the full significance of these varying tax burdens it is necessary only to realize that profits on leather sales during the past 22 years have not averaged more than 1 cent a pound.

Heretofore a good many state legislators and state administrators have pointed out that the social security system imposes certain handicaps on unemployed persons. While the system of unemployment compensation has created more stability in employment, thus practically freezing the employed person in his job, it has on the other hand, made it correspondingly more difficult for the unemployed to get jobs.

Variations in Security Tax Presage Future Industrial Dislocations

It is desirable that state legislators be made to realize also that in the social security system lie the seeds of potential widespread future dislocation of industry. This is true because of the fact that differences in the provisions of the laws of the various states favor industries in some states over their competitors in other states. For example, Wisconsin, with her favorable treatment of manufacturers who comply fully with the law, logically can be expected to grow industrially at the expense of certain other states having less favorable laws.

This whole subject is one in which industry should be vitally interested. Manufacturers will do well to promote widespread publication of these facts so that the people in every community in every state unfavorably affected will understand clearly just what the social security laws really mean in terms of individual employment and to the industrial future of such states.

The BUSINESS TREND

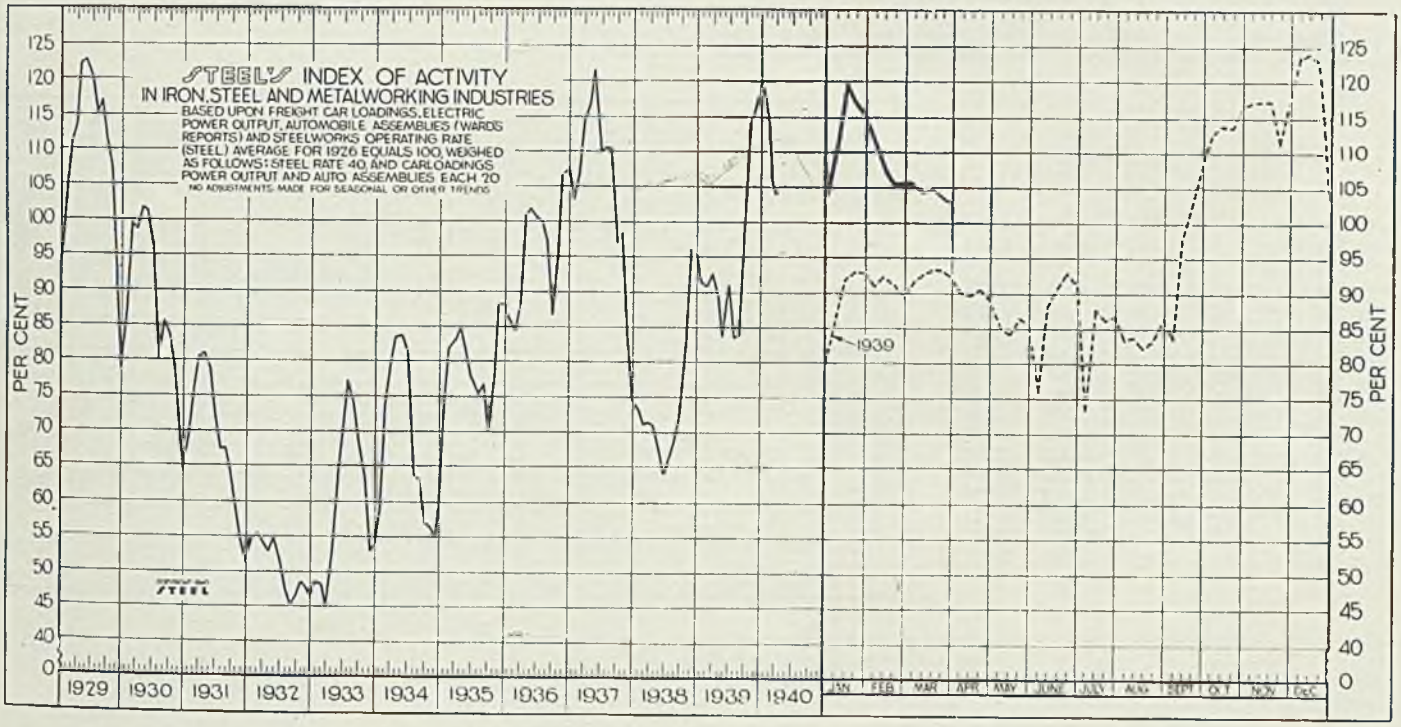
Most Business Indicators Record Little Change

■ THE leveling off of the sharp downward tendency of industrial activity during March is reflected in STEEL'S index average for the month. Last month the index averaged 104.1, a decline of but 1.7 points from the February average of 105.8. In contrast with this showing, the index recorded a decline of 8.9 points during February from the January level of 114.7. Current indications seem to point to a more definite sidewise movement for the immediate future.

In the week ended March 30, STEEL'S index declined 0.5 point to 103.2. During the corresponding week a year ago the index stood at 92.2 and in 1938 at 72.0.

Continuation of the downward tendency in steelmaking operations was the principal factor forcing STEEL'S index to lower levels during the latest period. The national steel rate eased 1.5 points to 61 per cent during the week ended March 30, but it remained above the 55.5 level recorded in the same week a year ago.

Fluctuations in the other business indicators composing STEEL'S index were minor during the latest period. Automobile production remained substantially unchanged at 103,370 units. Electric power consumption declined seasonally.



STEEL'S index of activity declined 0.5 points to 103.2 in the week ended March 30.

Week Ended	1940	1939
Jan. 27	115.4	92.9
Feb. 3	111.6	90.7
Feb. 10	107.2	92.1
Feb. 17	105.1	91.1
Feb. 24	105.4	89.3
Mar. 2	105.6	91.5
Mar. 9	104.7	92.7
Mar. 16	104.9	93.3
Mar. 23	103.7	93.2
Mar. 30	103.2	92.2

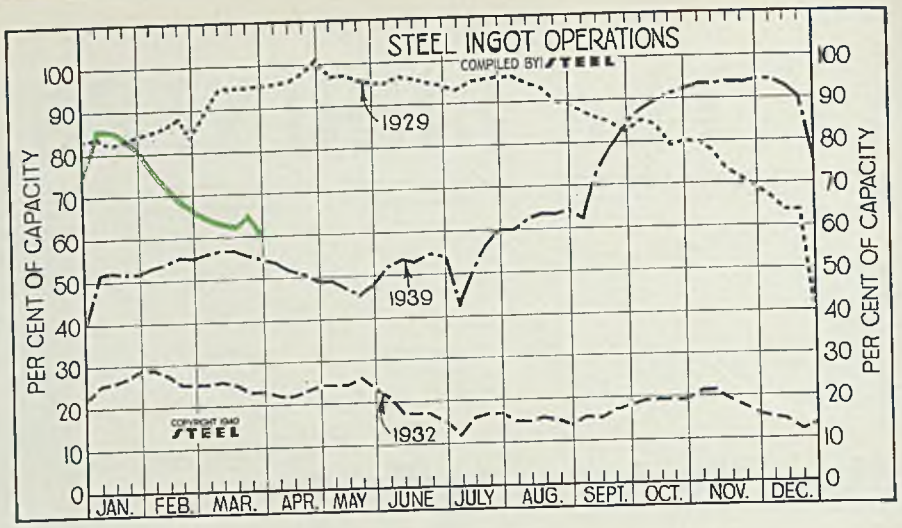
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	.....	89.8	70.8	116.6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

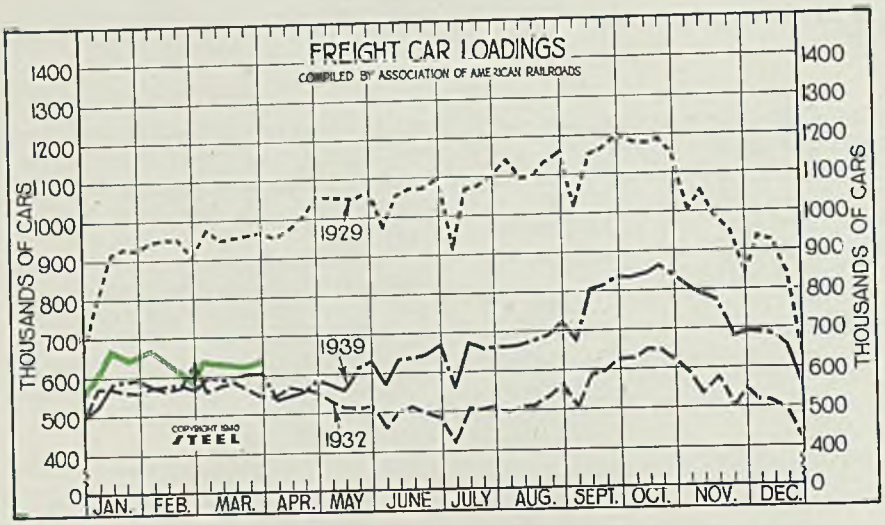
Steel Ingot Operations

(Per Cent)

Week ended	1939	1938	1937
Dec. 30	75.5	40.0	21.0

Week ended	1940	1939	1938	1937
Jan. 6	86.5	51.5	26.0	79.5
Jan. 13	86.0	52.0	29.0	79.0
Jan. 20	84.5	51.5	30.5	80.0
Jan. 27	81.5	51.5	33.0	76.0
Feb. 3	76.5	53.0	31.0	79.5
Feb. 10	71.0	54.0	30.0	81.0
Feb. 17	69.0	55.0	31.0	83.0
Feb. 24	67.0	55.0	30.5	84.0
Mar. 2	65.5	56.0	29.5	86.0
Mar. 9	63.5	56.5	30.0	87.0
Mar. 16	62.5	56.5	32.0	89.0
Mar. 23	62.5	55.5	35.0	90.0
Mar. 30	61.0	54.5	36.0	91.5





Freight Car Loadings

(1000 Cars)

Week ended	1939	1938	1937
Dec. 30	550	500	457

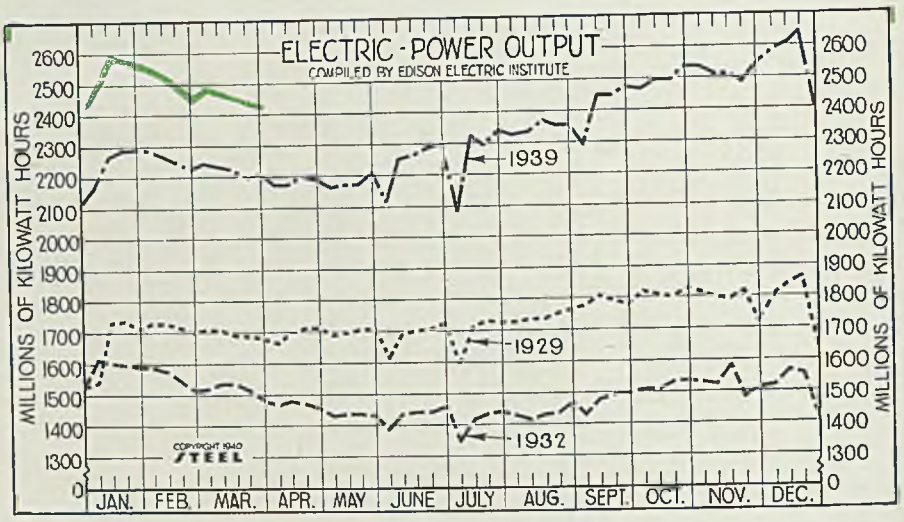
Week ended	1940	1939	1938	1937
Jan. 6	592	531	552	699
Jan. 13	668	587	581	700
Jan. 20	646	590	570	670
Jan. 27	650	594	553	660
Feb. 3	553	577	565	675
Feb. 10	627	580	543	692
Feb. 17	608	580	536	715
Feb. 24	595	561	512	697
Mar. 2	634	599	553	734
Mar. 9	621	592	557	749
Mar. 16	619	595	540	759
Mar. 23	620	605	573	761
Mar. 30	628	604	523	727

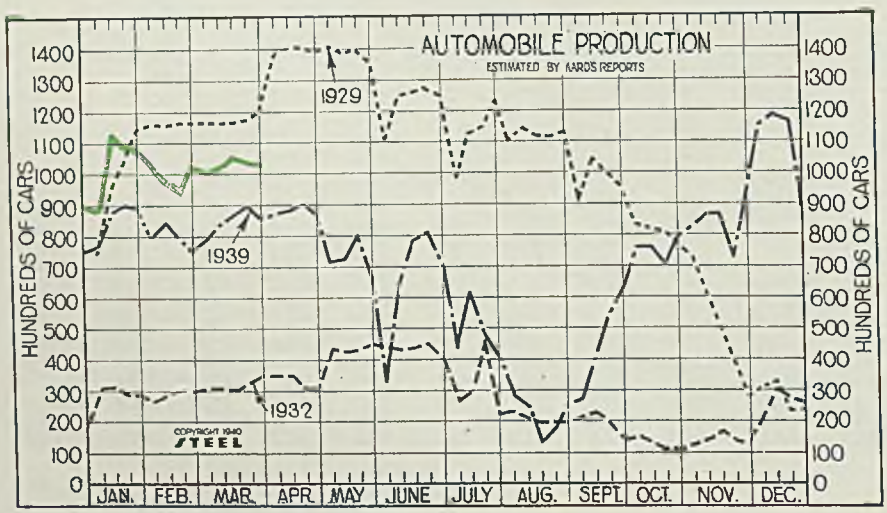
Electric Power Output

(Million KWH)

Week ended	1939	1938	1937
Dec. 30	2,404	2,121	1,998

Week ended	1940	1939	1938	1937
Jan. 6	2,473	2,169	2,140	2,244
Jan. 13	2,593	2,270	2,115	2,264
Jan. 20	2,572	2,290	2,109	2,257
Jan. 13	2,566	2,293	2,099	2,215
Feb. 3	2,541	2,287	2,082	2,201
Feb. 10	2,523	2,268	2,052	2,200
Feb. 17	2,476	2,249	2,059	2,212
Feb. 24	2,455	2,226	2,031	2,207
Mar. 2	2,479	2,244	2,036	2,200
Mar. 9	2,464	2,238	2,015	2,213
Mar. 16	2,460	2,225	2,018	2,211
Mar. 23	2,424	2,199	1,975	2,200
Mar. 30	2,422	2,210	1,979	2,147



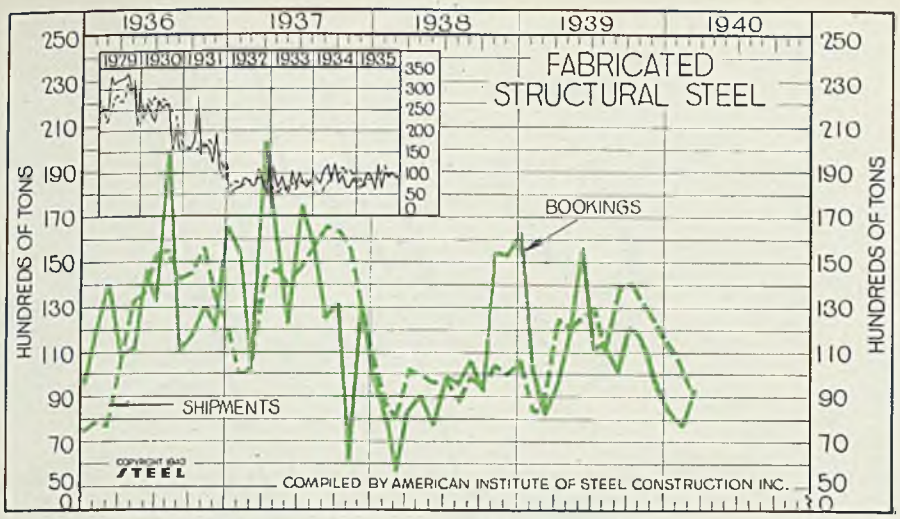


Auto Production

(1000 Units)

Week ended	1939	1938	1937
Dec. 30	89.4	75.2	49.6

Week ended	1940	1939	1938	1937
Jan. 6	87.5	76.7	54.1	96.8
Jan. 13	111.3	86.9	65.7	91.7
Jan. 20	108.5	90.2	65.4	81.4
Jan. 27	106.4	89.2	59.4	74.1
Feb. 3	101.2	79.4	51.4	72.3
Feb. 10	96.0	84.5	57.8	72.8
Feb. 17	95.1	79.9	59.1	95.7
Feb. 24	102.6	75.7	57.0	111.9
Mar. 2	100.9	78.7	54.4	127.0
Mar. 9	103.6	84.1	57.4	101.7
Mar. 16	105.7	86.7	57.5	99.0
Mar. 23	103.4	89.4	56.8	101.0
Mar. 30	103.4	86.0	57.5	97.0



Fabricated Structural Steel

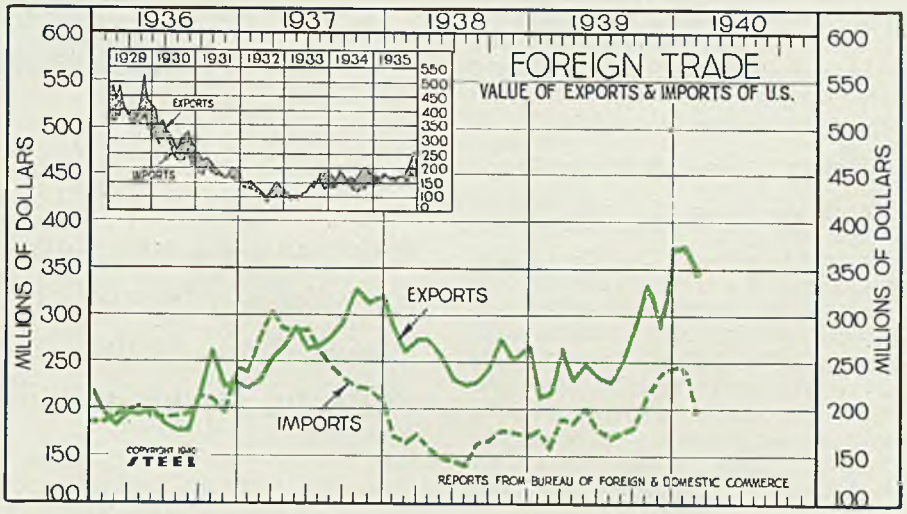
(1000 tons)

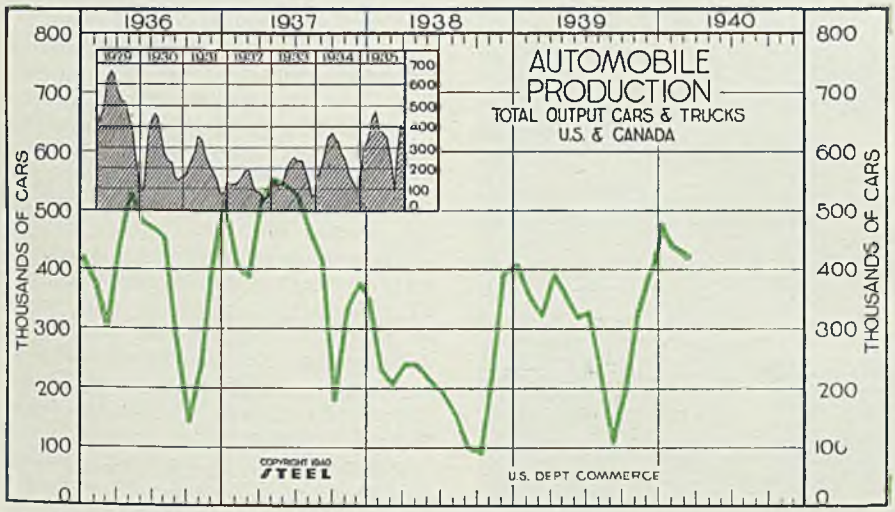
	Shipments			Bookings		
	1940	1939	1938	1940	1939	1938
Jan.	109.5	84.3	87.8	78.8	101.7	80.3
Feb.	91.9	84.4	81.2	92.5	82.7	57.1
Mar.	.....	125.3	103.3	....	95.1	84.3
Apr.	.....	120.9	100.0	....	118.3	91.2
May	.....	125.9	96.4	....	156.9	77.3
June	.....	130.1	98.6	....	111.6	99.9
July	.....	110.5	88.0	....	114.1	96.0
Aug.	.....	139.7	98.6	....	100.9	106.8
Sept.	.....	140.8	93.5	....	121.4	92.5
Oct.	.....	133.8	105.0	....	118.8	154.8
Nov.	.....	128.2	99.9	....	99.3	153.1
Dec.	.....	116.2	106.5	....	84.4	163.4
Total	....	1440.1	1158.8	....	1305.0	1256.6

United States Foreign Trade

(Unit: $1,000,000)

	Exports		Imports	
	1940	1939	1940	1939
Jan.	$368.6	$212.9	$241.9	$178.2
Feb.	346.8	218.6	199.8	158.0
Mar. ...	.....	267.8	.....	190.5
April ...	.....	231.0	.....	186.3
May ...	.....	249.5	.....	202.5
June ...	.....	236.1	.....	178.9
July ...	.....	229.6	.....	168.9
Aug. ...	.....	250.8	.....	175.8
Sept. ...	.....	288.6	.....	181.5
Oct.	.....	332.1	.....	215.3
Nov. ...	.....	292.7	.....	235.4
Dec. ...	.....	367.8	.....	247.0
Total .	.....	$3,177.0	.....	$2,318.3





Automobile Production

(Unit: 1000 Cars)

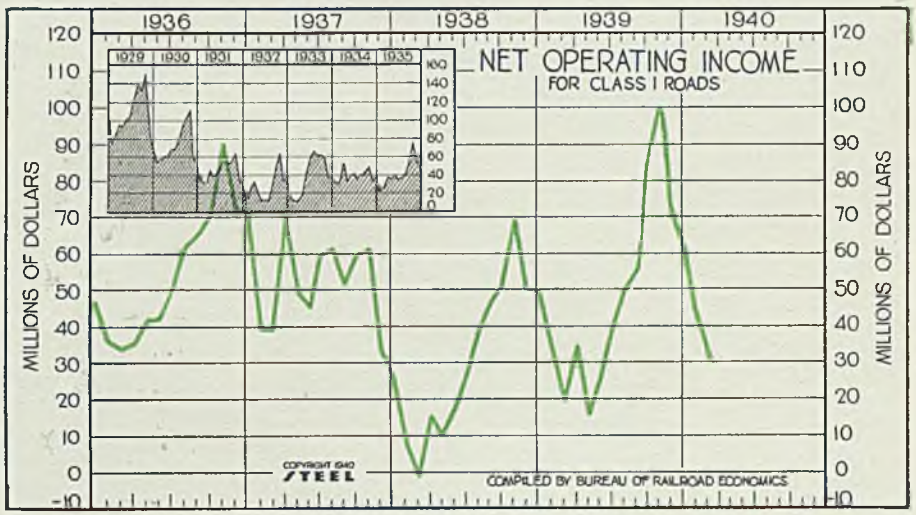
	1940	1939	1938	1937	1936
Jan.	449.3	357.0	227.1	399.2	377.2
Feb.	421.8	317.5	202.6	383.9	300.8
March	.....	389.5	238.6	519.0	438.9
April	.....	354.3	238.1	553.4	527.6
May	.....	313.2	210.2	540.4	480.5
June	.....	324.2	189.4	521.1	469.4
July	.....	218.5	150.4	456.9	451.2
Aug.	.....	103.3	96.9	405.1	275.9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

Class I Railroads Net Operating Income

(Unit: $1,000,000)

	1940	1939	1938	1937
Jan.	$45.57	$32.89	$7.14	$38.87
Feb.	32.62	18.59	1.91*	38.78
Mar.	.....	34.32	14.73	69.88
April	.....	15.26	9.40	48.36
May	.....	25.10	16.67	44.24
June	.....	39.10	25.16	59.35
July	.....	49.01	38.43	60.99
Aug.	.....	54.59	45.42	50.76
Sept.	.....	86.43	50.36	59.62
Oct.	.....	101.62	68.57	60.86
Nov.	.....	70.35	49.67	32.44
Dec.	.....	60.95	49.37	25.99
Average	.....	$49.02	$31.02	$49.18

*Indicates deficit.



Rubber Low

For Industrial

Isolation of noise and vibration now can be accomplished effectively on almost all types and sizes of equipment. Rubber in new mountings is stressed in shear to provide a most efficient vibration absorber

■ VIBRATION from a mechanism can be reduced by: Supporting entire mechanism on resilient mountings of proper flexibility to absorb the vibration instead of transmitting it to its foundation; rigidly securing the mechanism to a heavy foundation; use of countervibrators whose natural frequency is equal to the forced frequency of the mechanism.

Theory of vibration absorption, the method of reducing vibration to be detailed here, is demonstrated in a simple manner by supporting a weight on rubber bands. If only one rubber band is used, this band elongates but slightly so when the weight is bounced up and down, its natural frequency is rapid. However, if the weight is supported by a chain of five or six rubber bands in series, they will elongate to make a total stretch (known as static deflection) of several inches.

Chart Shows Relationship

With the chain of bands, rate at which the weight oscillates up and down is quite slow. Thus the natural frequency of a weight supported by a resilient mounting is a function of the static deflection of that mounting. There is a definite relationship between natural frequency and static deflection, shown by the chart, Fig. 5. Natural frequency (in cycles per minute) equals 1.88 divided by the square root of the static deflection (in inches).

If upper end of the chain of rubber bands is caused to move at a rate several times faster than the *natural* frequency of the weight suspended from those rubber bands, the weight practically stands still although supported by the rapidly moving hand. This demonstrates that for a mechanism supported on resilient mountings so *natural* frequency is much lower than the *forced* frequency, a considerable portion of the vibration will be absorbed in the mountings instead of being transmitted through them.

Outstanding success of rubber mountings in isolating noise and vibration in the modern automobile is one of the developments contributing to the satisfaction obtainable from today's cars. Rubber mountings likewise have made possible important improvements in industrial equipment.

Rubber is desirable for such use because: It can be stabilized dependably by vulcanization to retain its properties for many years; its great elasticity makes it especially useful in vibration-absorbing mountings; low sound conductivity also is important as is its ability to recover after large deformation. Rubber quickly dampens vibration by dissipating rapidly the energy stored in it, another valuable feature.

These characteristics make rubber an important material for reduction of *transmitted* vibration and noise as well as *impact* shocks and noise. Also, rubber can be made to adhere to many metals when properly processed, greatly facilitating its application as a rubber spring.

Rubber in springs can be utilized efficiently if it is stressed either in shear or compression. In general, the capacity is larger and the safe deflection smaller if rubber is stressed in compression. However, since large deflections often are desirable, rubber in shear is widely used. A common type of shear mounting is a "sandwich" of rubber bonded to and between steel plates or mounting channels.

Power-driven reciprocating mech-

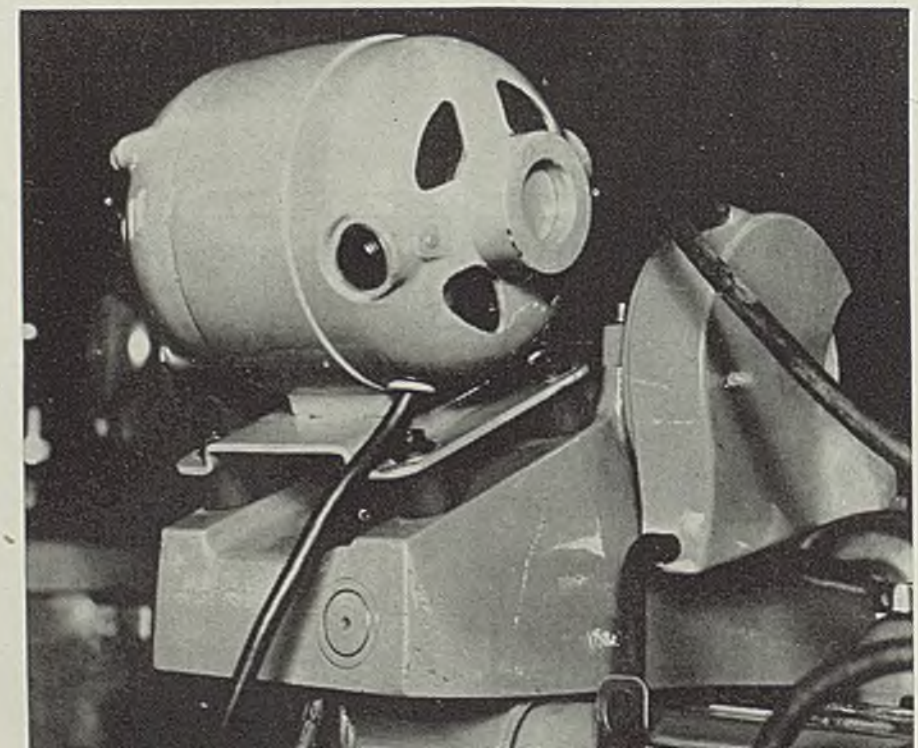


Fig. 1—This high-speed grinder must operate without vibration if precision work is to result. Insulating the 16¾-pound motor properly on rubber mountings does the job

By WALTER C. KEYS
Mechanical Product Engineer
United States Rubber Co.
1790 Broadway
New York

...tings...

Equipment

anisms and out-of-balance rotating mechanisms are *forced* to vibrate. If reciprocating, the direction and frequency of the forced vibration often can easily be determined. If one cycle of movement takes place with every revolution of the shaft, the forced frequency coincides with shaft revolutions-per-minute. If two movements per shaft revolution, then forced frequency is twice the shaft speed; and so on.

"Insulation ratio," or effectiveness of a vibration absorbing mounting, depends upon relation between forced frequency and natural frequency as obtained by dividing the forced frequency by the natural frequency. Where forced frequency is 4 times natural frequency, about 93 per cent of the vibration is absorbed in the mountings, which is considered excellent.

Frequency Ratio Important

Where ratio is 3, 87.5 per cent of vibration is absorbed, which is quite good. Similarly, for ratio of 2.5, absorption is 81 per cent; for 2, 66.6 per cent; for 1.5, only 20 per cent, which is quite poor. If 1.4, no vibration is absorbed, and if lower than this, vibration is accentuated.

Thus if not properly applied, resilient mountings actually may increase vibration instead of reducing it. Where vibration must be almost entirely eliminated, insulation ratio should be 4 or more. Satisfactory results, however, are usually obtained with ratios of 2.5 or slightly higher.

However, since natural vibration frequency can easily be found from chart in Fig. 5, and since forced vibration frequency usually is known or easily calculated, the ratio between them and thus the effectiveness of the mountings can be checked with little difficulty. Similarly, by knowing the ratio necessary to give a certain amount of vibration absorption, the problem may be attacked from that angle. Thus first deciding amount of vibration that the mounting must absorb will indicate the ratio to be used. Then, knowing the forced frequency, the ratio will give the natural frequency desired. From this the amount of static deflection can be found by referring to chart, Fig. 5. Then by referring to a list of rubber mountings, one is selected which will support the weight of the mechanism and give the desired static deflection.

As an example, a motor-generator set rotating at 1750 revolutions per minute and weighing 5600 pounds is slightly out of balance. Forced vibration therefore occurs at 1750 cycles per minute. A certain type of mounting is selected which will carry 700 pounds. Eight of these then will handle total weight. Static deflection is 0.23-inch. From chart, Fig. 5, natural frequency is 390 cycles per minute. Forced frequency divided by natural frequency then is 1750 divided by 390, or 4.5, the insulation ratio. This high ratio means excellent vibration absorption will be obtained.

In some cases, abnormal amounts of static deflection may be indicated as in the following instance. A motor-driven machine with a reciprocating head has a forced vibration of 460 cycles per minute, weighs 980 pounds. Using an insulation ratio of 2.5 to give satisfactory vibration

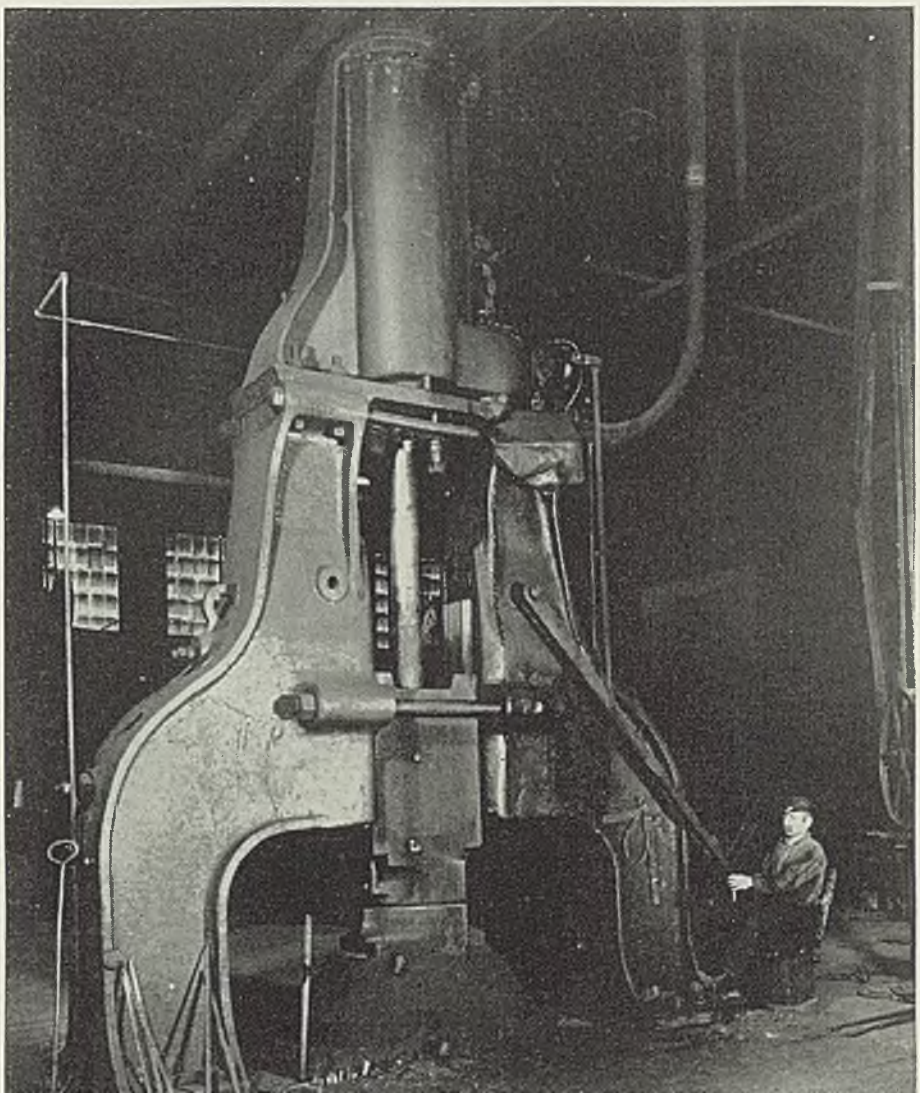


Fig. 2—Steam drophammer, weighing 170,000 pounds, delivers a blow of 6000 pounds falling a distance of 60 inches. Entire hammer floats on rubber, reducing shocks in operation 75 to 99 per cent

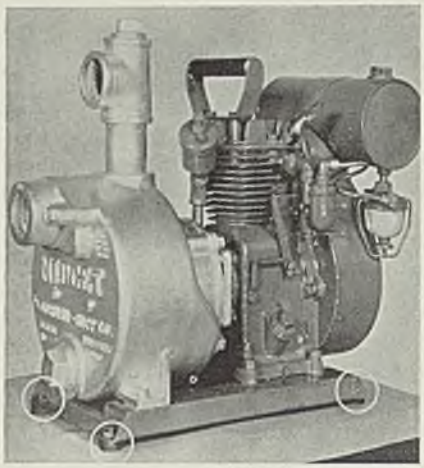


Fig 3.—Here a single-cylinder gasoline engine and water pump form a portable unit which developed considerable vibration and traveled on the floor before rubber mounting feet were employed

absorption and dividing into forced frequency of 460 gives 184 as natural frequency of the mounting to be employed. From Fig. 5, this requires a static deflection of approximately 1 inch. If no available standard mounting will give this deflection recourse may be made to use of Permacell, a cellular material, readily compressible, available in slabs 1 inch thick in two types. One deflects 10 per cent under a load of 3 pounds per square inch, the other deflects the same amount under 6 pounds per square inch.

Putting a support under each of the four legs requires each to carry one-fourth of 980, or 245 pounds. Using the 3-pound capacity material means that 245 divided by 3, or 82 square inches, of Permacell is required. Pieces 8 x 10 inches are used. Since a 3-pound load on each square inch only produces a 0.1-inch deflection, it is necessary to stack 10 slabs under each support to obtain the 1-inch deflection required. Slabs are separated by steel sheets 10¼ x 8¼ x 1/32-inch thick with an "umbrella" of thin steel over top slab to prevent oil from dripping onto the rubber. Bottom slab rests on a steel plate 10¼ x 8¼ x ¼-inch thick to be above any oil on floor.

While it might be possible to use several layers of standard rubber mountings, the Permacell is more practical and less costly.

Fig. 4—Mounted on boom of a drag shovel, much lamp breakage was encountered until the vibration was insulated from the lamps by the mountings shown

These are somewhat elementary examples, many cases being much more difficult to solve and requiring the services of an expert with sensitive equipment to determine the forced frequency causing the unwanted vibration. Often this is most difficult to determine and in many cases is not one frequency but may be several. Also in equipment which operates through a wide speed range, the problem becomes still more complicated.

Vibration Analyzers Available

In an occasional complex case, proper analyzing of the forced vibration is of utmost importance. A number of special vibration analyzers have been developed which not only tell amount but also indicate direction and frequency of the vibrations. Such analyzers are necessary to select proper mountings and to evaluate their effectiveness in these complex cases.

Fig. 6 is a typical record made from one of these instruments. It shows vibration before and after installation of rubber mountings. Frequency of vibration and relative amplitude of longitudinal versus vertical versus transverse versus rotational vibrations can readily be determined from such a record. In the example shown, the complete absorbing effect of the mountings is evident. This special analyzer is portable and is available for special cases of great importance.

To show how rubber mountings have been employed satisfactorily and to give the reader an idea of how they might be used in his own

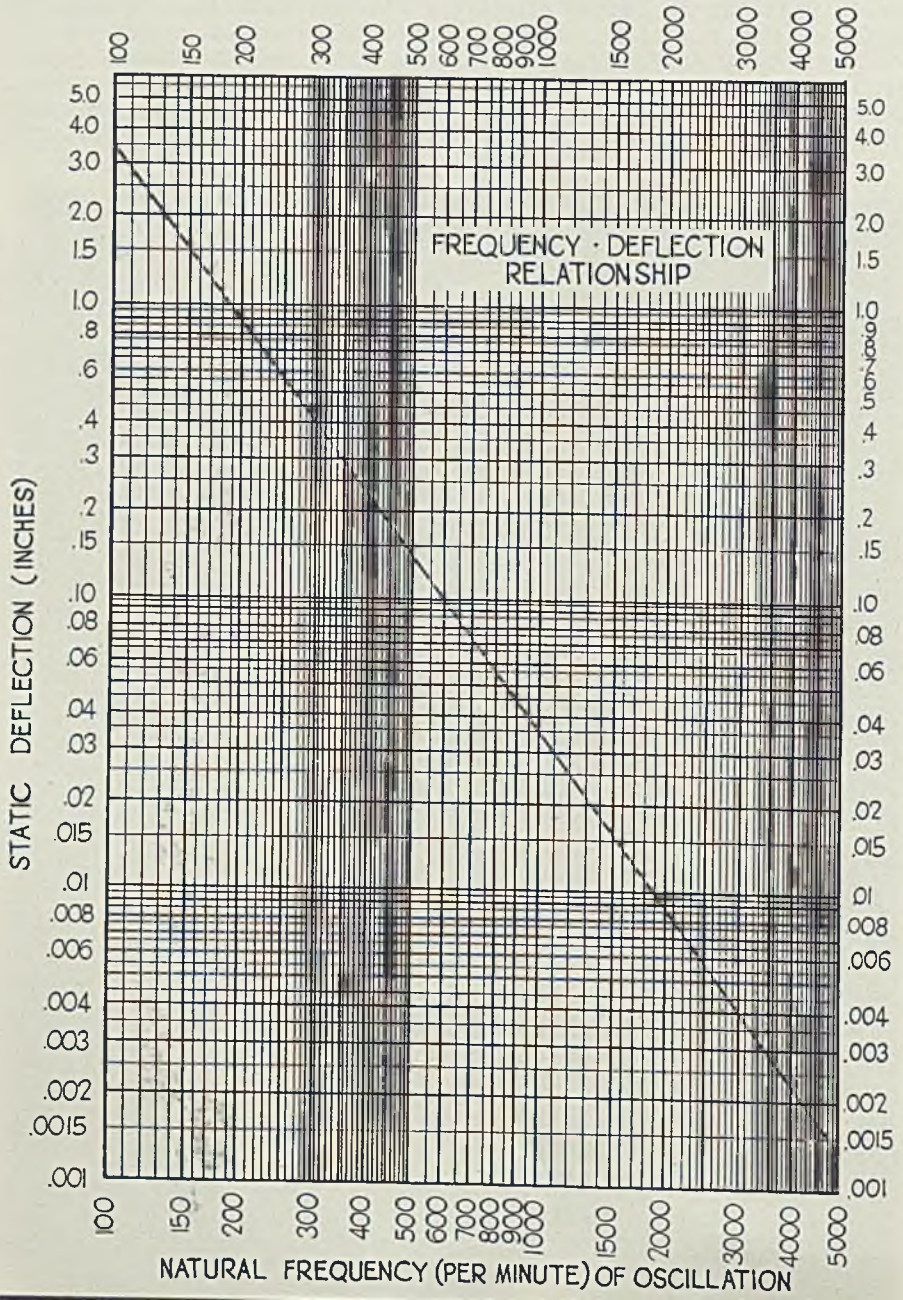


Fig. 5—This frequency-deflection chart is primary basis for figuring natural frequency of any mounting setup

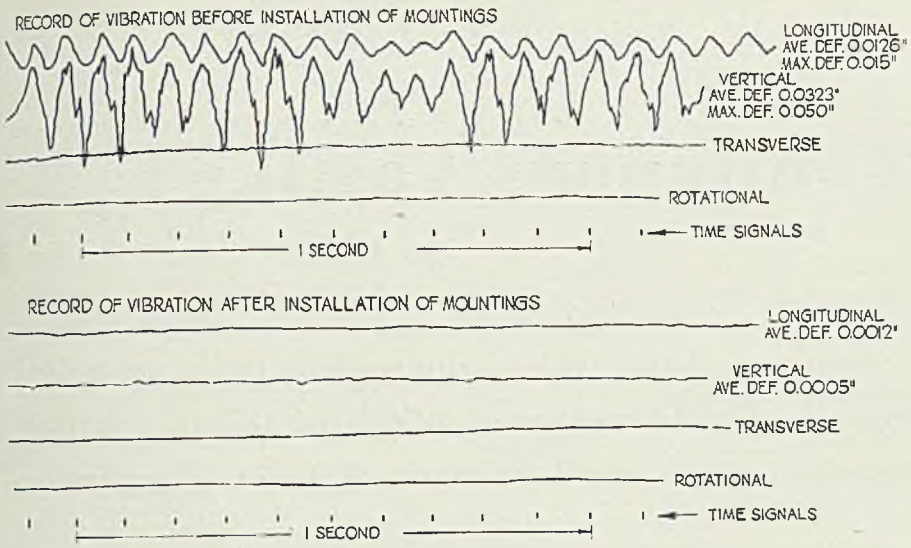


Fig. 6—The two vibration record charts shown here represent conditions before and after installation of rubber mountings. Vibration practically eliminated

work, a number of examples are given. Perhaps typical of many mounting problems is that encountered in a high speed grinder where it is necessary to prevent transmission of vibration from the motor driving the grinder. Any vibration of the grinding wheel affects the machine's precision. Motor weighs 16¾ pounds, has a forced frequency of 10,000 cycles per minute. To isolate this unit, it is supported on four mountings, Fig. 1, which absorb the 10,000-cycle vibrations, enabling the high-speed grinder to perform its job with extreme precision.

Cuts Gear Whine

Still another type of problem was encountered when a large fan and cooling tower, Fig. 7, were installed on a cold-storage building. As soon as the unit was placed in operation, a loud whine developed. It was so severe that numerous complaints were received by both the cold-storage company and the police. Three different sets of reduction gears for the fan were tried in an endeavor to overcome the trouble but without success. Fan operates at 384 revolutions per minute through a reduction gear from a motor turning at 1750 revolutions per minute. Speed reducer has a gear-tooth frequency of 30,000 cycles per minute. It is necessary for the rubber mountings to be deflected sufficiently to absorb the motor and gear tooth frequency. Fan thrust at rated speed is 188 pounds.

Fan drive support, Fig. 7, now utilizes rubber mountings with a static deflection of 0.12-inch. This required a loading of 35 pounds per linear inch of mounting, giving the unit a natural frequency of 550 cycles per minute which does not synchronize with the 384-revolution-per-minute fan speed. Mountings absorb 89 per cent of the motor vibration and 99 per cent of that caused by the meshing of gear teeth; troublesome whine is now almost inaudible.

In a hydraulic pump installation, both noise and vibration were transmitted at such a high intensity throughout the building in which they were located that owner of the premises threatened to cancel the lease unless the condition was remedied. Pump, driven through a silent chain by a 20-horsepower electric motor at 42 revolutions per minute develops 2000 pounds pressure. Pump and motor are secured rigidly to a structural steel sub-base, weight of the assembly being 3562 pounds.

To isolate it, the entire unit was placed on six heavy duty rubber mountings and all rigid pipelines to the unit were equipped with flexible connections, reducing transmitted vibration and noise almost 100 per cent.

Another company experienced noise from small pump units, each driven by a 3-horsepower motor and weighing only 475 pounds. An irritating rumble and ringing noise from these sets was being trans-

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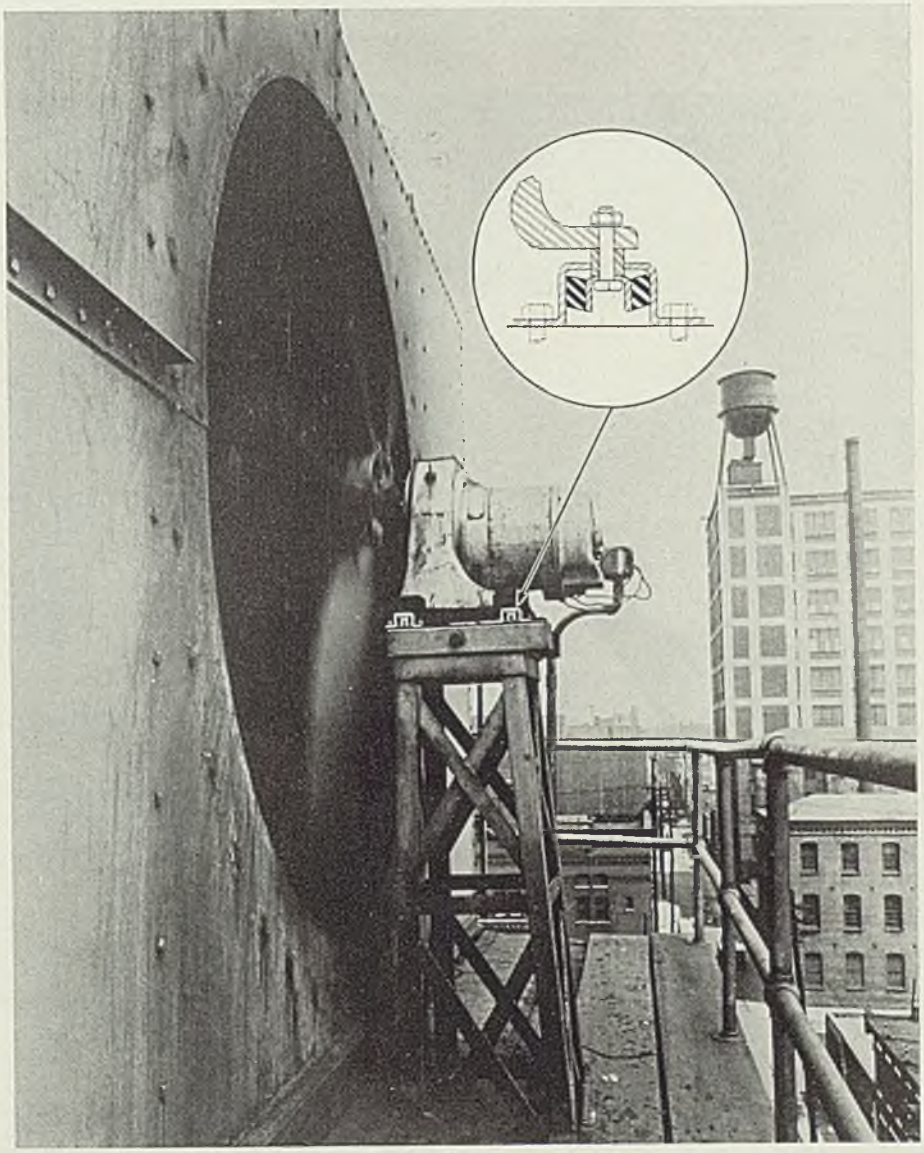

Fig. 7—Gearmotor on this cooling tower fan caused much noise until insulated from supporting stand by rubber mountings pictured

Continuous Casting

New method employs scheme which removes heat from congealing metal fast enough to avoid rupture of solidifying skin as the ingot moves continuously from mold. Length of ingot is unlimited

By EDWARD R. WILLIAMS*

Manager
Williams Engineering Co.
Latrobe, Pa.

■ CULMINATING nine years of development work, Williams Engineering Co., Latrobe, Pa., announces a new process for continuous casting both ferrous and nonferrous metals into ingots of indefinite length and extremely high quality metal. There are no surface imperfections to be chipped or ground out, and pipes or cavities are practically eliminated. With this process, there is no loss of metal such as occasioned by practice where it is necessary to discard from 10 to 20 per cent of the top of each ingot.

A continuous ingot is produced by the new method and cut into lengths as it is made. An ingot may be poured limited in length only by the amount of molten metal that is available for pouring. While experiments to date have been aimed at perfecting the quality of ingots obtained, it is planned to have continuous casting equipment shortly installed in steel-producing plants where a continuous supply of molten metal will be available for the pouring process. As the ingot comes from the mold, it will be cut into lengths either with an oxa-acetylene torch or ingot-cropping shear or saw.

* Mr. Williams, who also is president of Vulcan Mold & Iron Co., Latrobe, Pa., has been conducting the work described here personally under the name of Williams Engineering Co.

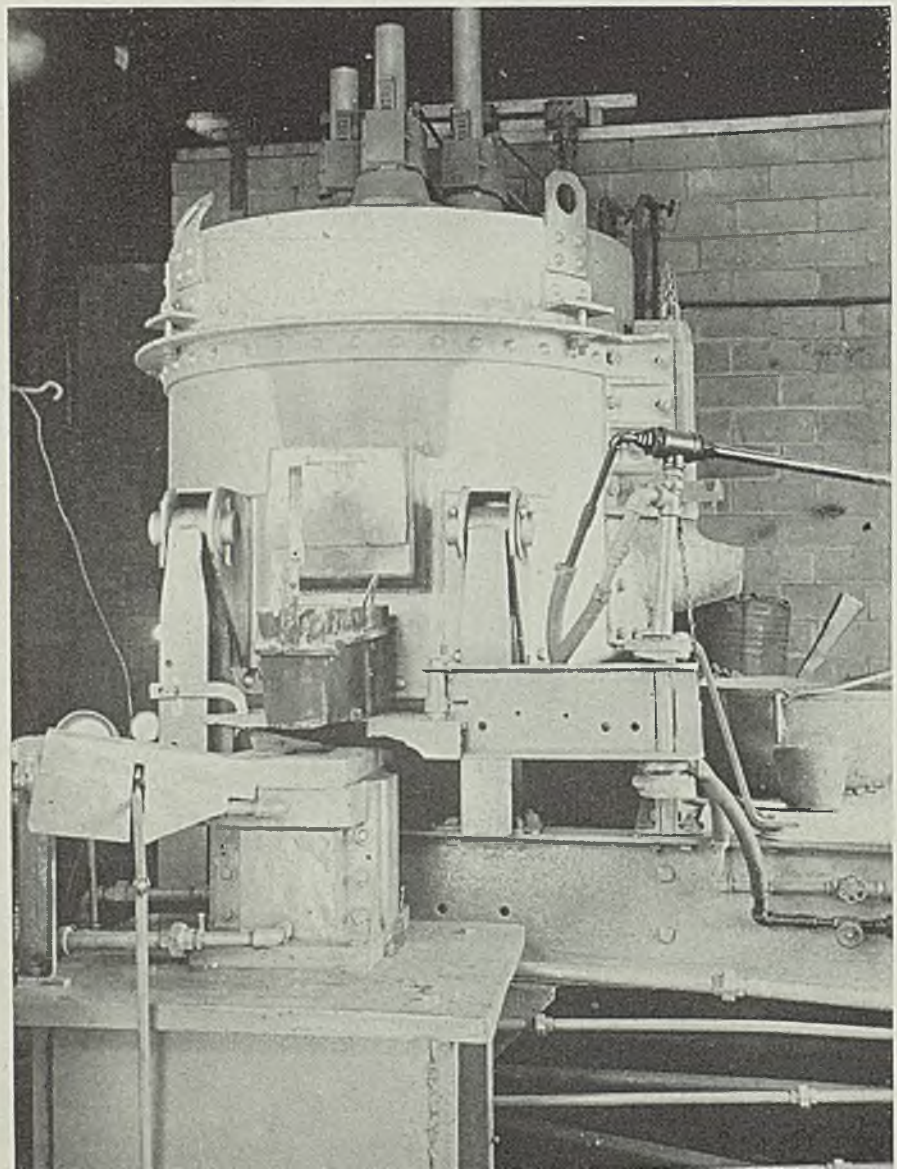

Fig. 1—Experimental setup utilizes 1000-pound melting furnace of 3-phase carbon-arc type, tilted by hydraulic cylinders to pour molten metal into pouring box from which it flows through a nozzle in a continuous stream into mold cavity, lower left

Removal of Heat Essential

Practical operation of previous continuous casting methods has not been possible due to difficulties encountered in removing heat from the metal at a sufficiently rapid rate, it is said. Success of the new method is due to development of means for removing heat from the metal as it is received and formed in the mold cavity. For successful continuous casting, it is necessary to congeal the molten metal contacting the lateral walls of the mold cavity almost instantly. The thin shell or skin so formed then must be maintained in a heat-transferring relation with the mold wall for sufficient time to permit solidification of the wall to a thickness that will prevent rupture as the ingot is moved out of the mold cavity.

Mold cavity employed here has a

thin wall of high thermal conductivity material such as copper or brass. As the molten metal is poured against the inside of the mold wall, heat is conducted through it rapidly and scoured away from the outer surface of the mold wall by a stream of water passing in a thin sheet at high speed along the outer side of the mold wall. Sufficient volume is passed through the narrow water passage to give a high velocity to scrub off the heat but with only a moderate temperature rise in the water itself.

Amount of water necessary depends upon rate of heat removal required in the particular operation. With metals having a high heat content like steel and where the ingot is to be withdrawn from the tube at high lineal speed, volume and velocity of water is much higher than when pouring nonferrous metals or at slower speed.

Control of Shrinkage Important

The mold tube, contrary to expectations, shows extremely little wear. There is practically no erosion of its surfaces, original machine marks being evident on a piece which has been used in experimental work for a number of years. This is due to the second important factor necessary for continuous casting.

This factor is the control of shrinkage. By use of a thin mold wall and water sheet to remove heat as fast as may be desired, molten metal contacting inner mold wall congeals almost instantly to form a thin shell or skin. As the metal cools, this skin contracts away from the mold wall so only an extremely small portion at top of the ingot actually contacts inner mold wall.

This contraction away from the mold wall appears to be absolutely essential for operation of the process since it immediately reduces the amount of friction against the inner mold wall to such a low value that the thin skin formed is not broken as the ingot is pulled from the mold. Length of cooled section of mold is sufficient to assure that walls of ingot have been sufficiently solidified before ingot comes from the mold. Thus it is most important to get heat out fast enough to let the skin shrink away from the mold wall and move along it without rupturing.

Secondary cooling is resorted to after the ingot has emerged from the mold by a number of water sprays set to play on the ingot below the mold. Several feet from lower end of mold, the ingot is completely solidified and usually at about a good rolling temperature so it can be rolled immediately it desired. It may be cooled faster or slower depending on amount of secondary cooling water used.

Contraction of ingot wall is important for two reasons. It assures that the skin will not be ruptured, and it automatically prevents formation of pipes in the ingot. As ingot is drawn from mold, the molten metal narrows down from practically full width of mold at top to a point in the lower part of mold where it is solidifying. This continuous shrinkage automatically removes any discontinuities in the metal. Any impurities rise to the top and flow to outer wall where they appear on the skin or outer surface of the ingot, not on the inside of the ingot. This assures good clean metal all the way through the ingot.

If desirable, sets of rolls may be placed just below the mold to size or work the ingot as it comes from the mold and while the center is still plastic. This gives additional assurance that there will be no pipes in the finished ingot as the roll pressure may be set to compensate for the volumetric shrinkages of solidification.

Molten metal from the melting furnace, Fig. 1, flows into a pouring box just above the mold. Metal is discharged from pouring box through a nozzle and flows into mold cavity in a continuous stream. At start, molten metal is poured against upper end of a blank. It congeals against top of blank around a series of removable lugs mounted in recesses and held in position by a pin which extends through transverse openings in the blank.

Lower end of blank is gripped by power-driven rollers below the mold. These pull the blank from the mold at a speed dependent upon material being poured and rate at which metal is discharged into mold cavity. Molten metal is delivered in a constant stream, and rate of withdrawal is adjusted to maintain the level of molten metal in the mold. When initially starting the apparatus, the mold cavity is filled to a predetermined level. As metal congeals against the lugs, the blank is withdrawn to start the operation. Of course, cooling water is being forced against outer mold wall and

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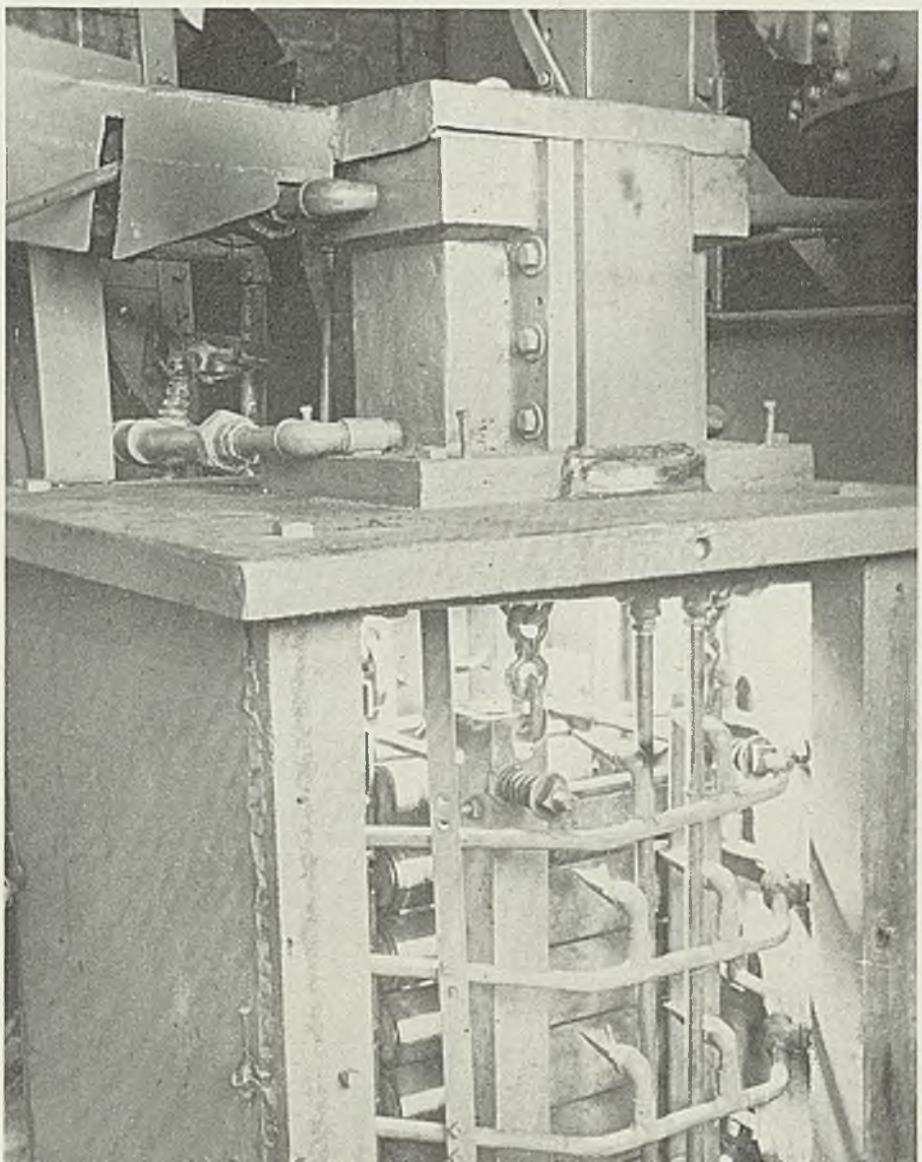
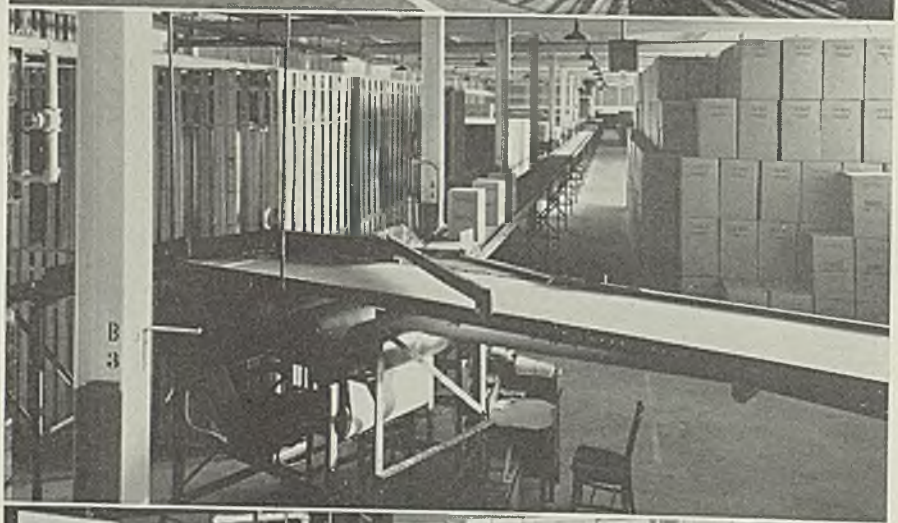


Fig. 2—Closeup of mold cavity, in upper center here. Rolls and cooling sprays may be seen in housing immediately below. One side of housing has been removed to show internal arrangement. From here, ingot goes through floor to mechanism in Fig. 3

Speeding Shipments

How to store and ship quickly large volumes of comparatively bulky products confronts many manufacturers. Unique conveyor layout is combined with a dispatching system here, all orders out in 24 hours



By O. J. GREENWAY

Supervisor
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

PART I

■ BECAUSE of the speed required to store and ship properly a variety of finished products, modern material handling methods are an integral part of Westinghouse's specially built 218,200-square feet warehouse at East Springfield, Mass. The approximate time for merchandise to reach the shipping point in the warehouse from the time it leaves the sealing machine in the packing sections of building A in Fig. 1 is 23 minutes, a distance of approximately 1600 feet. Actually, customer orders are handled completely in the warehouse. Some 90 per cent of those received are interpreted, shipped, invoiced and filed within 24 hours after receipt.

The warehouse has storage facilities for nearly 200,000 products such as commercial and residential air conditioning units, fans, domestic refrigerators, vacuum cleaners and similar appliances.

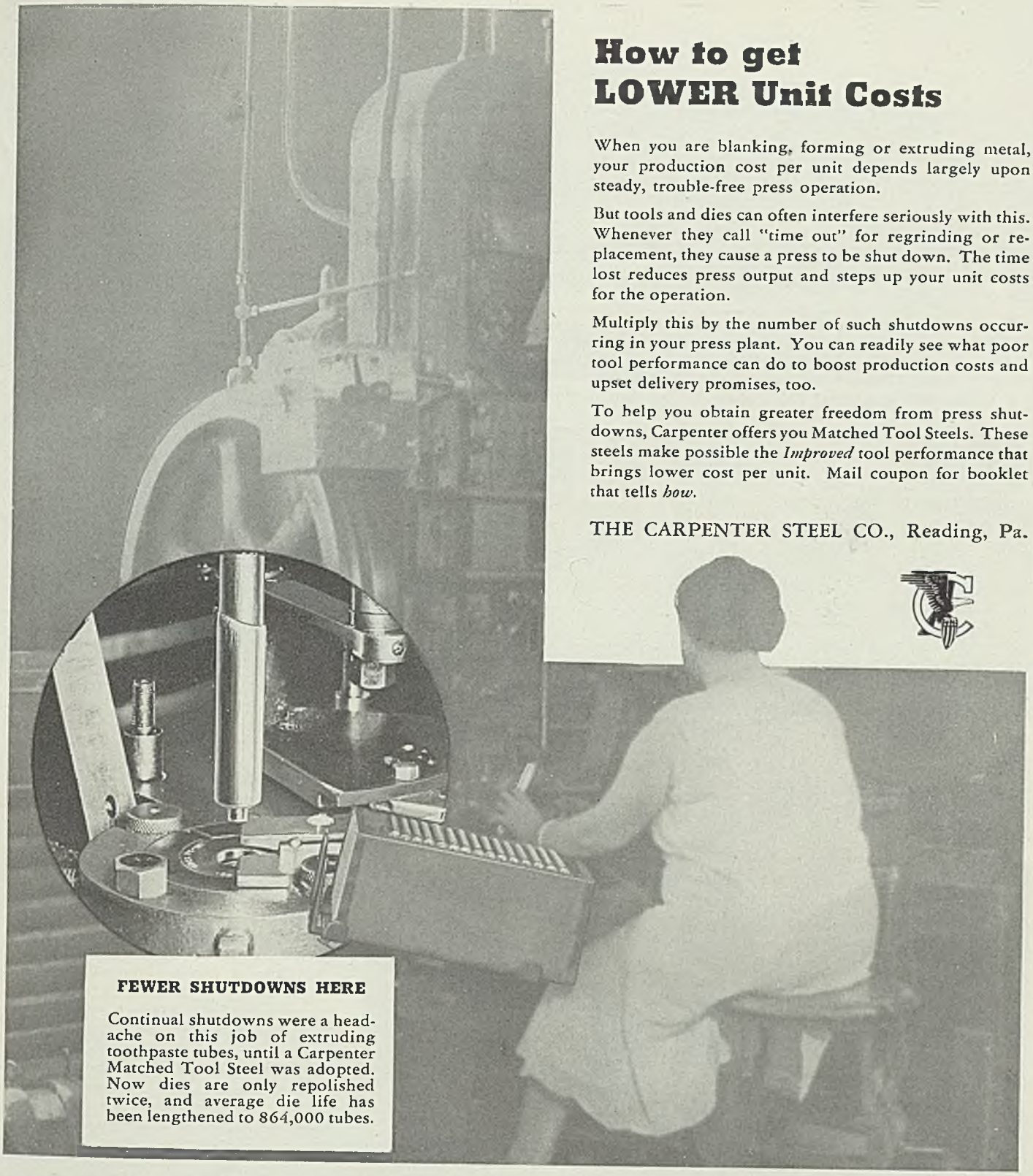
The building is composed of two adjacent structures separated only by a fire wall that has several doors

Fig. 1. (Top)—Air view of East Springfield plant of Westinghouse Electric & Mfg. Co.; various departments labeled are referred to in the story

Fig. 2. (Next to top)—Power driven conveyor handling fans

Fig. 3. (Next to bottom)—Discharge end of 573-foot conveyor

Fig. 4. (Bottom)—Control desk with control panel above it for operating 573-foot conveyor



FEWER SHUTDOWNS HERE

Continual shutdowns were a headache on this job of extruding toothpaste tubes, until a Carpenter Matched Tool Steel was adopted. Now dies are only repolished twice, and average die life has been lengthened to 864,000 tubes.

How to get LOWER Unit Costs

When you are blanking, forming or extruding metal, your production cost per unit depends largely upon steady, trouble-free press operation.

But tools and dies can often interfere seriously with this. Whenever they call "time out" for regrinding or replacement, they cause a press to be shut down. The time lost reduces press output and steps up your unit costs for the operation.

Multiply this by the number of such shutdowns occurring in your press plant. You can readily see what poor tool performance can do to boost production costs and upset delivery promises, too.

To help you obtain greater freedom from press shutdowns, Carpenter offers you Matched Tool Steels. These steels make possible the *Improved* tool performance that brings lower cost per unit. Mail coupon for booklet that tells *how*.

THE CARPENTER STEEL CO., Reading, Pa.

Carpenter MATCHED TOOL STEELS

TIME TO CHECK UP!

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Without obligation, send me your 60-page booklet that shows how to improve tool and die performance to get lower unit costs.

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Address_____

City_____ State_____

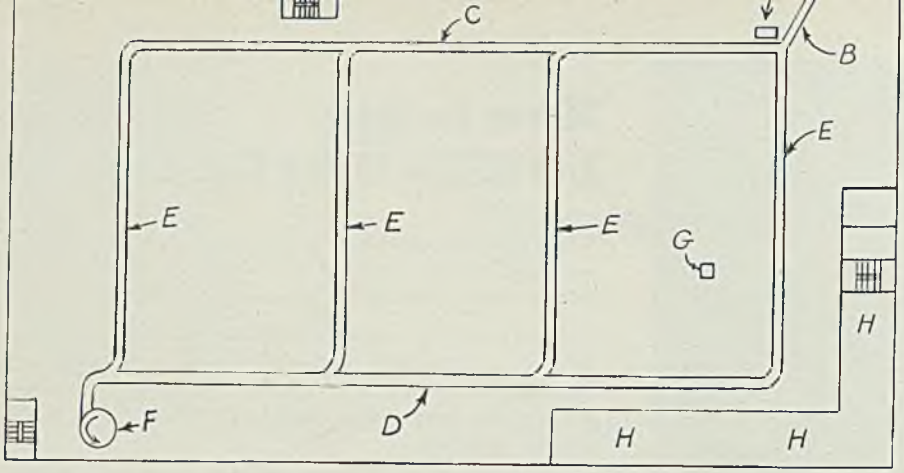

Fig. 5. (Left)—Sketch showing network of conveyor system on the second floor of the warehouse

for flow of materials. Building W, Fig. 1, is the main warehouse section. The first floor of this building is 380 feet long and 230 inches wide including inside train shed and truck dock. Area of this floor is 87,400 square feet. The 16-foot ceiling permits piling materials to a height of 14 feet. Second floor is 380 feet long and 200 feet wide with two monitor bays 300 feet long and 40 feet wide providing an area of 76,000 square feet. Monitor bays are 24 feet high allowing a piling height of 21 feet while the balance of the area has a height of 16 feet permitting 14 feet piling height.

Second section of the warehouse, identified RW, is a part of the long manufacturing building, Fig. 1. The warehouse section of the building is 340 feet long and 170 feet wide. There are two side bays each 60 feet wide and 16 feet high allowing a storage to 14 feet and one center bay 50 feet wide and 28 feet high permitting storage to 24 feet.

Fans, vacuum cleaners and appliances are manufactured in a four story building A, Fig. 1. Vacuum cleaners and appliances are produced on the second floor, the standard fans on the third floor, and the larger 24-inch Whirlaire fans on the fourth floor.

Dispatcher Controls Conveyors

At the packing sections on each of these floors the merchandise is placed on power driven conveyors, Fig. 2, that carry it to a location on the third floor of that building where a central conveyor (B in Fig. 1) carries it through an enclosed bridge 573 feet long into the warehouse.

In Fig. 3, the discharge end of this long conveyor is on the right. Directly under the conveyor is the dispatcher's desk. Above the dispatcher's desk is a control panel from which point the flow of merchandise from all three floors of building A can be controlled.

Naturally, only one of the three conveyors in building A can deliver merchandise onto the central bridge conveyor at one time. However, while merchandise is being received from one floor, the merchandise from the other floors is accumulating on their respective conveyors. For example, if the third floor con-

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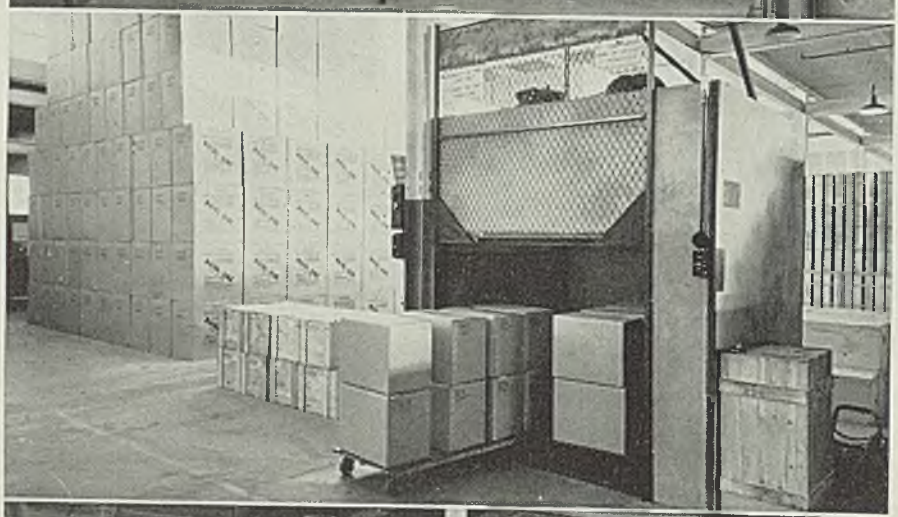
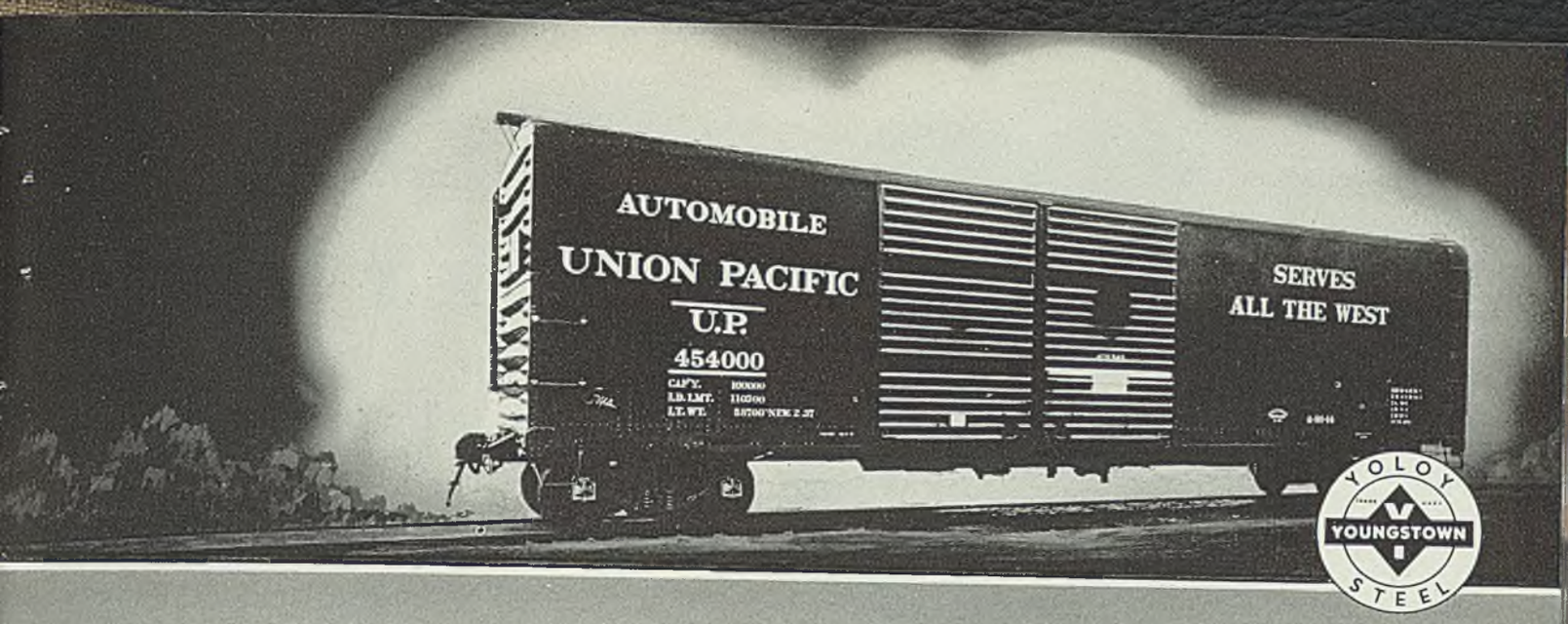


Fig. 6. (First from top)—Longitudinal view of second floor of warehouse

Fig. 7. (Second from top)—This 1000-pound lift is used between first and second floors

Fig. 8. (Next to bottom)—A spiral chute takes products from second floor

Fig. 9. (Bottom)—Loading platform with discharge end of spiral chute shown in Fig. 8



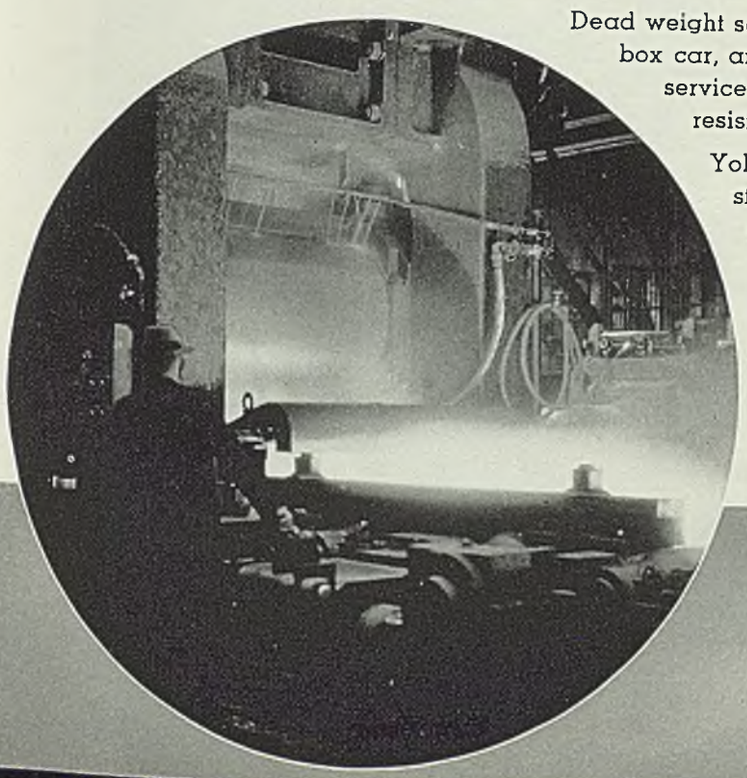
6,100 Union Pacific Box Cars

Take

YOLOY REDUCING TREATMENT

. . . Lose 6,030,800 Pounds for Life!

● Yoloy high tensile steel scores another victory over dead weight. During 1937 and 1938 the Union Pacific Railroad built 1,400 box cars, and 700 automobile cars; in 1939—1,900 box cars and 100 High Speed Merchandise Cars for Passenger Train Service, and in 1940 are building 1,500 box cars and 500 automobile cars. The sides of all of these cars, supplied by The Youngstown Steel Door Company, were made of Yoloy.



Dead weight savings total 3,015 tons or approximately 911 pounds for each box car, and 1,306 pounds for each automobile car. Normal life and service of these cars has been increased due to the high corrosion resistance of Yoloy—4 to 6 times greater than the carbon steels.

Yoloy was developed by Youngstown to provide increased strength with lighter weight. Yoloy can be welded by the arc, resistance or gas processes; has excellent corrosion fatigue properties, also greatly increased impact resistance over previously used materials.

Similar savings can be effected with all types of transportation equipment resulting in greater profits for operators.

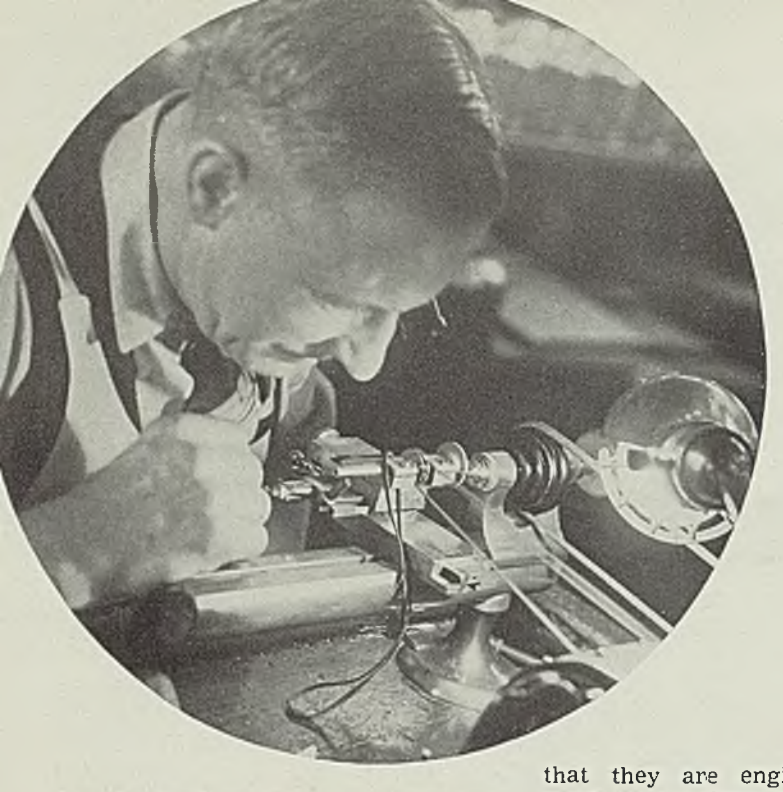
Yoloy High Tensile Steel is available in sheets, strips, plates, bars, shapes, manufacturer's wire, welding wire, seamless pipe, and electric weld pipe.

3-9C

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO



In the final analysis, success in tool engineering depends on patience, skill and pride in craftsmanship of such experienced toolmakers as the one here shown grinding a tiny tap used in production of Westinghouse electrical meters

T O O L

By GUY HUBBARD
Machne Tool Edtor

■ ANYONE who is at all familiar with modern manufacturing has some realization that any metal product made in quantity has behind it a considerable array of tools, jigs, fixtures, etc., designed and built to facilitate its production.

Unfortunately, the executive heads of manufacturing companies, as well as their financial backers, are not always as familiar as they should be with the vital importance of all this "behind the scenes" special equipment. To them it is too apt to appear as something which delays the initial appearance of the product, which interferes with subsequent changes in its design and which above all costs a tremendous amount of money.

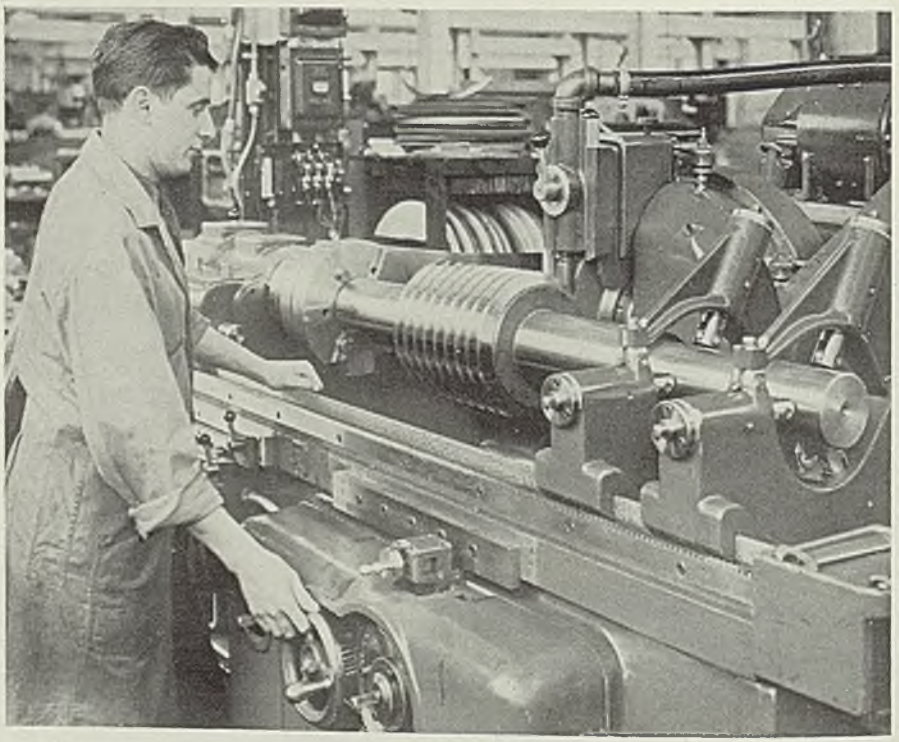
Recognition of tool engineering as a profession by those engaged in it is an important first step toward winning widespread understanding and respect for a peculiarly American form of technical activity which has been going on more or less in obscurity since the days of Eli Whitney.

In view of the fact that America's supremacy in mass production of interchangeable mechanisms rests squarely on the achievements of tool engineers over a period of 140 years, it is significant that within the past eight years the traditional pride in craftsmanship of American toolmakers and tool designers has broadened into realization on the part of these key men in industry that they are engineers just as much as are those who initiate the products whose quantity production is made possible only through modern tool engineering. To a considerable degree this has come about through the influence of the American Society of Tool Engineers, of which professional society almost 5000 tooling specialists in the United States and Canada now are members.

It is obvious to anyone who has observed the development of this society from its relatively recent beginning, that it has within just a few years definitely raised the professional level of tool engineering. It has inspired within this profession a strong tendency toward self-improvement, through encouragement of organized systems of training and through an increase in number and broadening in scope of its technical meetings—both regional and national.

Furthermore, it has played no small part in educating managerial and financial men in the significance of tooling, to the end that more and more of them are coming to realize that the cost of adequate tooling—instead of being a mysterious and annoying form of overhead expense—actually is a

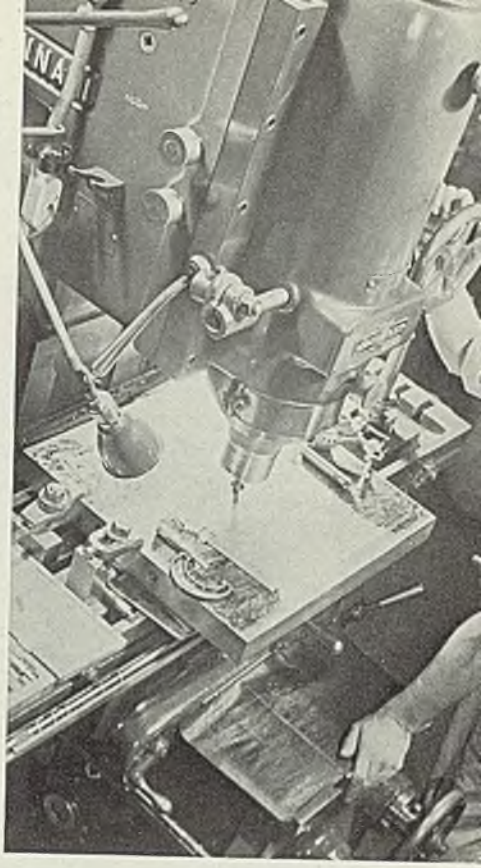
Automatic thread grinder, shown finishing 12-inch worm on 500-pound indexing unit but equally capable of grinding 100 pitch threads on small gages, developed out of Jones & Lamson's tool engineering experience in producing ground thread taps



ENGINEERING

Is Key Factor In

Boosting Production



Tool engineering problem of accurately spacing precision bored holes in bolster plate, is solved in this case by Cincinnati vertical, dial-type milling machine equipped to use precision measuring rods in conjunction with dial gage reading in "tenths"

gilt-edged equipment investment, if made under the direction of competent tooling engineers. With this growing appreciation on the part of management that proper tooling means better and cheaper consumer goods, hence more consumers and larger profits, the general public is also being awakened to the fact that the improved industrial equipment and tooling which is making available more and better goods for more people at the same time is making more and more desirable industrial jobs for more people.

Popular Theory Is Punctured

For this enlightenment of the public, much credit is due to the researches of Professor John Younger of Ohio State university and his ASTE Fact Finding Committee, whose three reports on Causes of Unemployment, issued during the past year, have done much to puncture the undeservedly popular, unsound theory that mechanization is a major cause of unemployment.

In these days when machine tools are so extremely difficult to obtain, it is necessary as never before to squeeze out of every existing machine every bit of efficiency inherent in it. Only through the ministrations of tool engineers is this possible. Any machine tool, old or new—good, bad or indifferent—has but one primary purpose. That is to bring metal and tools into controlled contact for the purpose of shaping the metal into a mechanical part of specified shape, size, accuracy and finish.

As is the case of a high grade firearm served with poor ammunition, the finest machine tool if equipped with poor tools cannot give satisfactory performance. As a matter of fact a low efficiency old model machine, when cleverly tooled, will outperform a highly efficient new model machine which has been indifferently and cheaply tooled.

This is no argument for retention in active service of outmoded machine tools when better ones are obtainable. It is, however, a warning to industrial executives that they should expect no production miracles from the latest model machine tools unless the amount of money and quality of engineering brains devoted to the tooling of these machines are in keeping with what has gone into the machine itself.

Therefore let no one in control of equipment expenditures be appalled if, for instance, the cost of tooling a new $6000 turret lathe for quantity production on a complicated and exacting job is set as high as $2500 by qualified tooling experts. There is nothing at all unusual about that. Such a combination of a good machine and good tools should pay for itself within five years. As a matter of fact there are many cases on record where it has done so within one year.

Tooling Needs Good Management

On the other hand the foregoing is not to be taken as an argument in favor of heedless expenditures in tooling. If it is true that management still has something to learn about the significance of tooling, it is equally true that tooling engineers still have a lot to learn about management. Here is an excellent opportunity for the two groups to get together to their mutual benefit.

As was pointed out during the recent annual meeting of the ASTE by B. G. Tang, general superintendent, General Electric Co., Schenectady, any tendency to "overtool" must be held in check by tooling engineers. When a new product is about to be introduced they should take with a grain of salt the glowing predictions of its promoters and should keep the tooling as flexible as possible until they are sure that the product itself is right and that production estimates are based on facts rather than fancies. Also they must constantly be on the alert to see that the toolmakers do not allow pride in craftsmanship to run up the cost of the tools unduly. That pride is highly commendable within reasonable limits but it can degenerate into "puttering" such as putting time into unnecessary surface finishing on jigs and fixtures.

Another leaf which tooling engineers will do well to take out of management's notebook is that relating to the importance of adequate records. When tooling engineers can go to management with actual figures showing the relation between the original cost of a set of jigs and fixtures and the actual savings in production cost effected by these jigs and fixtures over a given period of time, there will be much less difficulty in getting further tooling appropriations.

There is a lot of room for improvement in the record-keeping, cost-estimating and cost-justifying in most tool engineering departments. The possibilities of charts and formulas in determining allowable cost of tooling under various manufacturing and selling condi-

(*Please turn to Page* 72)

Continuous Casting

(*Continued from Page* 49)

sprays are in operation below the mold.

When the ingot has been withdrawn to a distance sufficient to clear the blank from the rolls, blank is disconnected. Then at an appropriate distance from the mold, the ingot is cut into convenient lengths by an oxyacetylene torch, by a cropping shear, or by a saw. The continuous operation can be maintained so long as there is molten metal available.

It is apparent that in any transverse section of the ingot, the mass of unsolidified metal gradually decreases as ingot is withdrawn from mold. Molten metal maintained in interior of ingot prevents formation of shrinkage cavities. Thus, with sufficiently fast removal of heat, the molten metal which directly contacts inner mold wall is solidified almost immediately. Subsequent shrinkage of shell of solidified metal breaks the intimate engagement between shell and mold tube to reduce frictional contact. As shell moves downward, it continuously gives up heat to mold tube so that the shell thickness increases as it recedes from the metal-admission end of mold tube.

The length of mold tube depends on heat content of metal being poured and desired speed of withdrawal. Tube must be of a length to allow sufficient solidification of metal shell or skin so this skin will have sufficient mechanical strength to support ingot metal when it emerges from mold. Molding tubes 4 to 8 inches in square, round and slab section and with lengths of 12 to 30 inches have been used satisfactorily in casting steel.

In experimental setup shown in accompanying illustrations, a 1000 pound electric furnace, Fig. 1, was used to melt the metal. This was discharged through a pouring box just above the mold, Fig. 2. Pouring or teeming box is heated to about 2700 degrees Fahr. before pouring is started.

Metal is poured at 150 to 200 degrees Fahr. above its melting point, comparable to usual steel mill practice. However, it is possible to make an ingot at any temperature at which the metal will pour.

A speed of operation as high as 7 lineal feet per minute has been attained when producing 4 x 4-inch steel ingots. This by no means is highest possible speed but is the usual rate attained with present experimental equipment.

Fig. 2 is a close-up of mold tube mounting with rolls and spray heads, used to work and cool ingot, shown just below. In experimental setup, furnace and mold were mounted at third floor level, permitting casting of an ingot below the equipment to ground level, a distance of about 30 feet. In actual production operations, ingots would not be confined to this length but would be cut off automatically shortly after they emerge from the mold so that continuous operation could be maintained. However, due to limited capacity of furnace used, this clearance was sufficient to cast an ingot of maximum length of molten metal available.

Rollers Aid To Eliminate Flaws

Fig. 3 shows driving rolls which pull ingot from mold. This equipment is mounted on a balcony just below the pouring floor. Upper rolls are merely guides. Lower set of rolls is connected through wobblers to a variable-speed, low power drive of a type ordinarily used on light rolling equipment. At bottom of Fig. 3 will be seen an air cylinder which causes the rolls to grip the ingot tightly.

The small rollers, spring loaded and shown in close-up view, Fig. 2, provide added assurance that any pipes or defects in the mold will be closed, a great aid to quality on high-grade steels such as on die steels and nonferrous alloys.

Melting furnace used here is equipped with hydraulic tilting mechanism permitting smooth, easily controlled discharge of metal from the furnace. In fact, it is possible to pour directly from furnace into top of mold and yet maintain level of molten metal at desired point without recourse to a pouring box, so accurate is the tilting control mechanism. In operation, one man controls tilting of

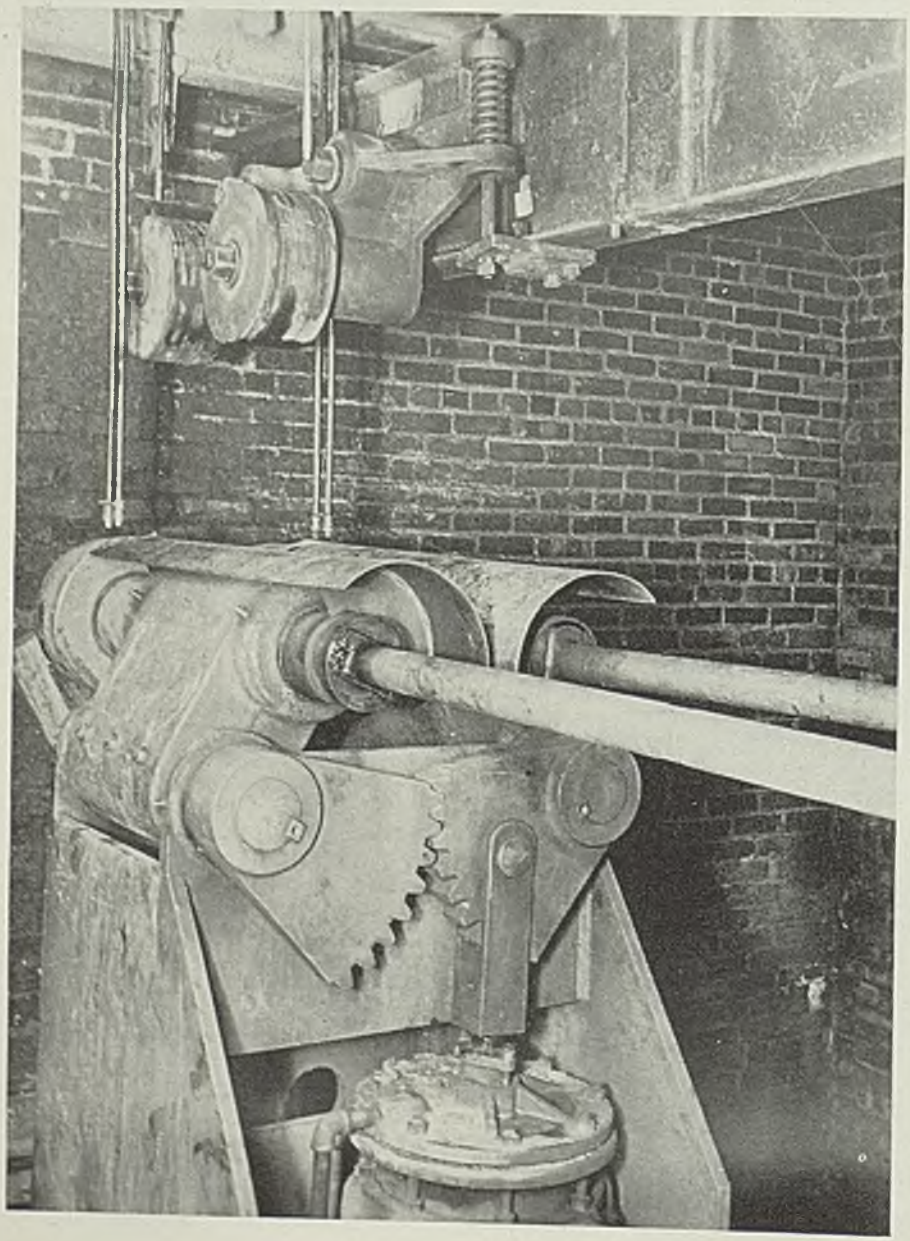
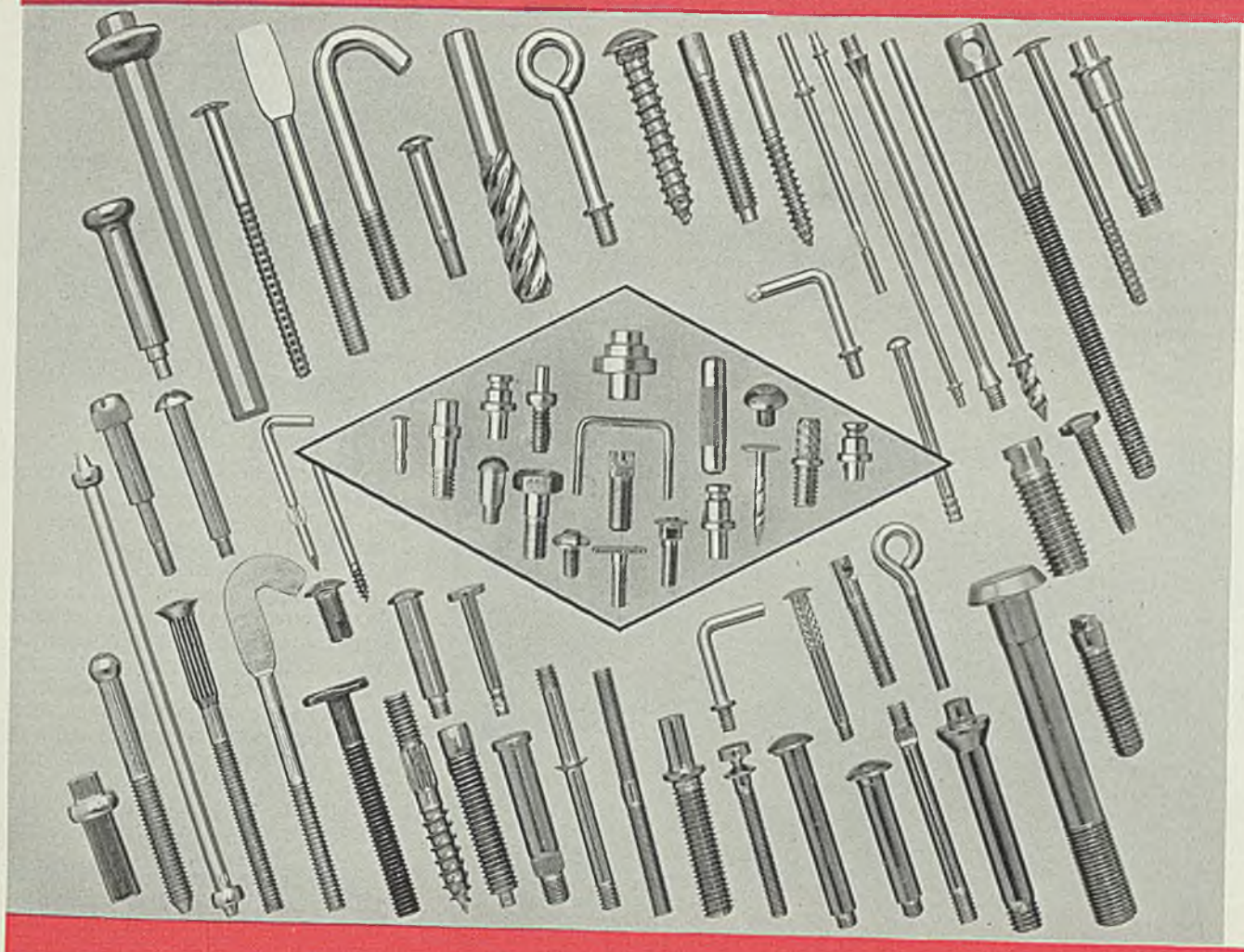


Fig. 3—Guide rolls are shown here just below floor of pouring room, Fig. 2. Below these rolls are power-driven rolls which pull ingot from mold. Air cylinder causes rolls to grip the ingot very tightly

GADGETS ...Any Size, Any Shape, ANY METAL!



IN industry there are odd-shaped metal items—unusual pieces—that are vital to production. They are nameless things—Part Numbers only to the engineers who designed them. They can be only vaguely described by words. From North, South, East and West come new jigger problems daily for our experts to solve. They seldom fail us for we can make practically anything that is headed, threaded, collared, shouldered, knurled, drilled, grooved or combinations thereof. Many of the queer things produced require the approximate accuracy and finish of costly screw machine products. They are just part of another day's work to us and we like it. All metals, with any coating or plating, are at your disposal. In all of America you won't find larger or more efficient departments devoted solely to the design and manufacture of the unnamable things we call GADGETS than at the Townsend Mills. You never can tell when you will need a Gadget so write for bulletin showing 199 different kinds.

The Largest Rivet and the Oldest Wire Manufacturers in the World

Townsend Company

—SINCE 1816—

NEW BRIGHTON (*Pittsburgh District*) PENNSYLVANIA

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

furnace and another controls speed of drive rolls pulling ingot from the mold.

The results obtained to date show great possibilities. Both ferrous and nonferrous metals have been poured with excellent results. Even such difficult materials as aluminum and aluminum alloys have been cast to produce an ingot with the appearance of an extruded material. In all cases, outside surface of ingot is smooth to the eye and to the touch, containing only a few irregularities or waves similar in appearance to an extruded piece of metal. Steel ingots, however, do not have this extruded appearance, outside of being extremely smooth and uniform, Fig. 5.

Fig. 4 shows section of typical ingots. The upper left-hand piece is through an ingot of 24S aluminum. The piece at upper right is through an ingot of pure aluminum. Both of the lower pieces are sections through 60/40 brass. These indicate the excellent quality obtained.

Fig. 5 shows 4 x 4 and 4 x 8-inch steel ingots. Those of rectangular cross section were produced using side rolls to squeeze the metal, thus giving the particular cross section noticeable. The quality of metal produced by this casting process is extremely high and uniform.

An important advantage of this process is that it permits metal to be cast in practically any section desired since it is a simple matter to make a mold produce various shapes. This means that practically all structural shapes and even wide, thin sheet slabs can be prepared by such equipment. Thus this process may permit the ultimate elimination of blooming and slabbing mills as well as roughing stands in rolling mills.

Since it is possible to cast the ingot to shape and length desired, it may eliminate all rough forming and rolling operations heretofore necessary to get the cross section desired. Thus it will be necessary to do only that rolling required to obtain desired physical characteristics. This may prove a most important economy. When steel mill installations being contemplated are completed and further data is available, additional details of these possible economies will be presented.

The process appears especially suitable for casting nonferrous metals which previously have been cast only with some difficulty. This applies particularly to aluminum which has caused considerable trouble in casting by other processes, due to extremely rapid oxidation and difficulty of preventing impurities and inclusions in ingots. When casting aluminum by this new method, pouring box nozzle is extended down into the mold so it normally is below level of molten metal in the mold. Thus, metal has no chance to oxidize since it is not exposed to the air. It gives the advantages of bottom casting while actually top casting.

Gas Protects Metal from Air

To further protect the metal, a protective atmosphere of nitrogen or a similar gas may be maintained above level of molten metal in the mold tube so surface of molten metal is not exposed to the air. When pouring aluminum in this manner, top of molten metal is such a clear, silvery, perfectly reflecting surface that it is difficult to tell just exactly where surface of metal is unless a scale is marked on the nozzle extending into the metal. By watching the scale, it is possible to control and hold the level of the molten aluminum where desired.

Ingots of aluminum and other nonferrous alloys cast by this method show an excellent structure throughout with no impurities or inclusions in the ingot proper. See Fig. 4. The outside surface thereof is comparatively smooth and uniform.

Advantages of the process thus appear to include: Elimination of surface imperfections and pipes which formerly necessitated a loss of from 10 to 20 per cent in cropping ingots; production of extremely high-grade structure of the ingot itself; practically 100 per cent utilization of all molten metal poured; elimination of oxidation in casting

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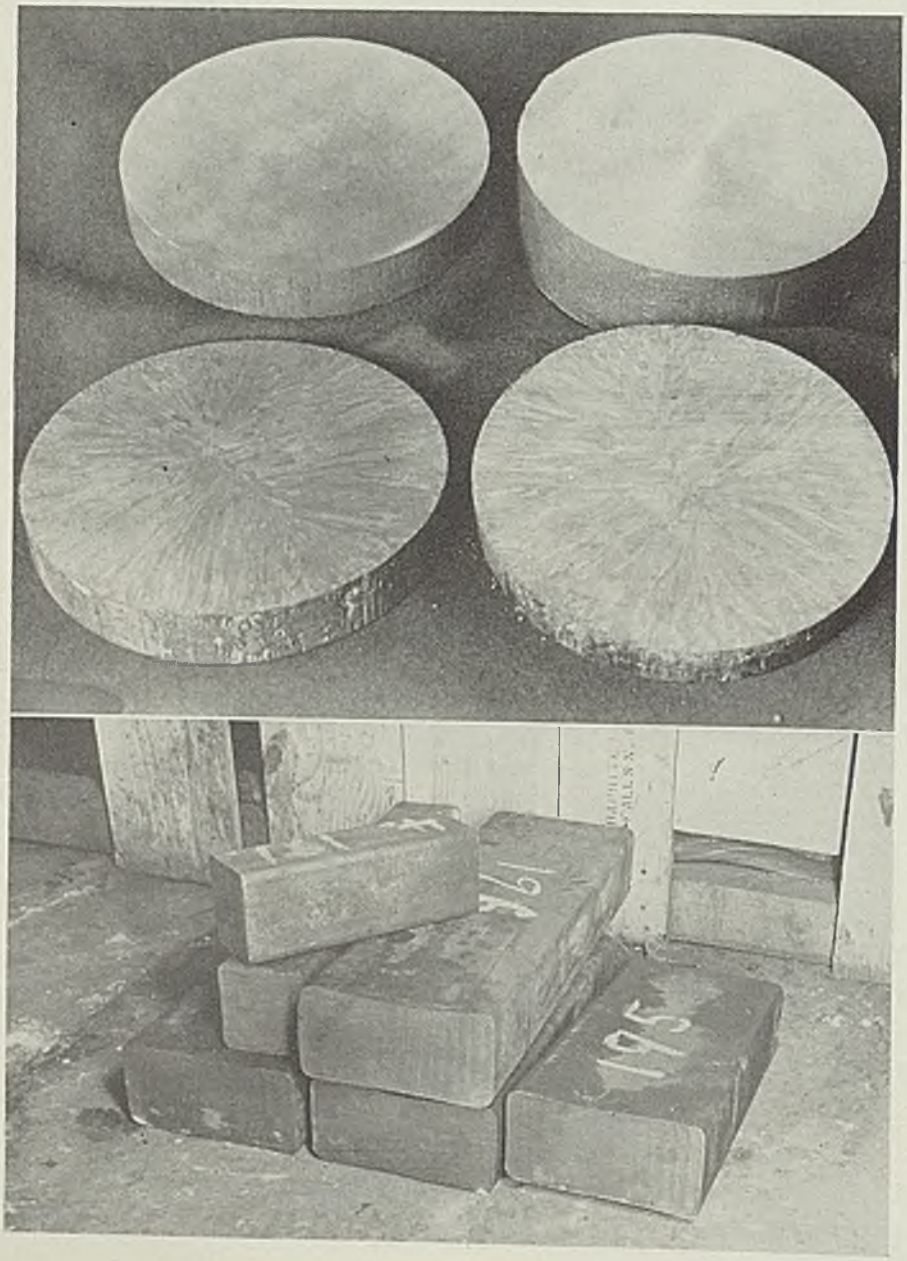


Fig. 4—Typical sections through nonferrous ingots. Upper left, 24S aluminum. Upper right, pure aluminum. Lower pieces are 60/40 brass. Note excellent quality

Fig. 5—These 4 x 4-inch and 4 x 8-inch steel ingots show good surface and cross section

BETWEEN HEATS WITH Shorty

■ Say fellers:

Went down to Cincinnati last week to 'tend a meetin' of the Iron and Steel Ingineers. They had a couple of operatin' boys on the platform doin' their stuff, and did they say a mouthful. Wait 'til I tell you 'bout one guy by the name of Dave Tranter—one of the big bosses for Armco.

And when they mentions Dave's name, old "Careful Mover" Johnson settin' next to me pipes up and says, "hellava fine guy Dave is. I knowed him for many years. I was second helpin' on No. 4 at Middletown when Dave was sittin' pretty up in the super's office. Knows his stuff all right."

Well, fellers, Dave struts up to the speaker's pulpit jus' like he was goin' to heave some maganese into the furnace. He sets the paper on the desk and went after the boys with a pair of tongs in his hand.

You should a seen it, fellers. The pulpit was kinda high and you couldn't see much of Dave 'cept his head, but boy that was enough. When he starts chirpin', I said, Shorty, spring really is here. Sand on the rails wouldn't have stopped him.

Tells the "Boys"

He told the boys some of the tricks in makin' quality steel and he didn't care where the chips fell. Said to the guys back at the blast furnace, "you'd better send some real stuff over to the open hearths if you want the boys to make steel." Then he tells the open hearth guys. He says, "and you bruisers out on the floor had better be handlin' those heats in good shape too." Sorta let the heater over in the soakin' pits off, though, without brushin' him clean. He says, "watch your controls, son, and don't burn 'em in the pits."

Then he went down through the mill, and when he starts tellin' 'bout snakes, pits, blisters and the likes, well boys, 'taint no use. That guy put his finger on the trouble right away and he does it in a way you like it. Say, when he finishes he had the molecules jumpin' back where they belonged and they didn't need any graphitic carbon to 'sist them in the slippin', either

The boy that introduced Dave was Charlie McGranahan. He's 'sistent general super at the Pittsburgh works of J. & L. and lookin' after the strip mill. The first part of the meetin' an ingineer by the name of McArthur of the Wean Ingineering Co. at Warren, O. told 'em all 'bout some of the big strip mills and what the 'quipment was doin'. When Mac finished the boys asked McGranahan to say a few words. And that's where they made a mistake. Charlie gets on his feet and he says to the guys that peddle strip mill equipment: "Say boys, why don't you give us somethin' that'll handle small orders," and he looked 'em straight in the eye.

I says to myself, Shorty old kid, if you were an ingineer you'd be bendin' low over the draftin' board these next few weeks devisin' some new fang dangle trinkets for the boys to send some of the 10,000 ton babies across the inspector's table.

Well anyway, that was just the roughin' pass for Charlie. He pipes up and says, "another thing fellers, I'm not satisfied with the tonnage I'm gettin' off shear knives. Time may come when 50 per cent of our orders will be for 10 tons or less and it's goin' to take us three-fourths of an hour to set up our shear line and ten minutes to run the order. This kinda operatin' aint so hot."

You'd think that was enough wouldn't you? But not from Charlie. He was just ready to put the finishin' pass on 'em, usin' the sprays to knock 'em clean and so he goes into the last pass and he lays the boys on the roller table: "Another thing, fellers, steel mills are becomin' warehouses for the customers and if you had 10 acres of finishin' capacity on the floor instead of 5, you'd have just as much congestion as you have now." And with that he sat down. And the boys brought their hands together like they were sayin' OK, Charlie.

Lot a truth in what he says, huh? Anyway Dave and Charlie sure went to town.

Saw one of the reporters for the magzeen STEEL sittin' up front in the meetin' writin' his fool head off takin' down Dave's and Charlie's stuff for his paper.

Well, so long fellers. Gota get the sleepin' car back to the plant and turn my report into the boss. I'll be seein' you.

"Shorty" Long

Well Illustrated Book On Patternmaking Work

■ *Pattern Making*, by John McC. Wilson; cloth, 140 pages 4¾ x 7¼ inches; published by Chemical Publishing Co. Inc., New York; supplied by STEEL, Cleveland, for $1.50.

This is one of a series, uniform in size, binding and general appearance, and approximately uniform in volume of text dealing with specific phases of the metalworking industry in Great Britain. The present volume is copiously illustrated with 100 freehand and mechanical drawings and carries a 2-page index.

General scope of the work is indicated in the following chapter headings: Wood for patterns; curvatures and shrinkage; tools, contraction and contraction rule; pattern drawing; wood turning; solid, hollow and face turning; plain gearing; spur and pinion wheels; cycloidal and involute teeth; building wheel; wheels, rims, ribs, arms, bosses; temporary pattern and mold; chilled castings; chilling with iron borings and sand; ornamental column with plaster of paris pattern; plaster patterns for molding; camber; carved capital; spiral shaft; cylindrical work; construction of barrels; molding cylinder in loam; obtaining uniform metal thickness, swept up work in sand; glue and gluing.

Furnishing Adjustments Required, People Taller

■ American manufacturers should note the tendency of people towards greater physical height with each succeeding generation, according to *Industrial Bulletin*, published by Arthur D. Little Inc., Cambridge, Mass. The large number of tall people that are appearing definitely indicates that adjustments in architecture and furnishings are needed.

Automobiles already are making allowances for taller people, but beds are still standard in length and pullman berths none too large. Chairs should be better designed for long legs, especially in theaters, it is stated.

By G. A. CALDWELL
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Protecting Motors in the Steel Mill

To prevent trouble from conductive and abrasive dusts, corrosive fumes, water, steam, radiated heat and high ambient temperatures, special ventilating facilities are provided for steel mill motors

■ OPERATING conditions to which electrical equipment is subjected in the steel industry vary from practically ideal conditions to the most severe. Since general operating conditions in a steel plant are never ideal, the good conditions are the direct result of using protective structures and air conditioning equipment.

Principal agents detrimental to continued performance of electrical equipment in the steel industry include the following:

Conductive dust. Air around a mill is usually filled with conductive dust such as iron ore dust from blast furnaces and ore-handling equipment, graphite dust from open-hearth furnaces and smoke from various heating furnaces. When such dust is allowed to accumulate on electrical equipment with exposed current-carrying parts, insulation resistance is reduced to a point where small creepage current flow eventually destroys insulation and results in short circuits or flashovers.

Abrasive dust. Iron ore, limestone, powdered slag and similar dusts are quite abrasive and will damage insulation on rotating equipment if present in sufficient quantity. Also, it is extremely detrimental to sleeve and ball bearings.

Corrosive Fumes. Pickling processes using various acid solutions to remove scale give rise to most corrosive fumes in steel mills.

Water and steam. Certain equipment is located outdoors. In other instances buildings are not entirely weatherproof. Water and steam sprays in many rolling mills often drench adjoining electric equipment.

Radiated heat. Rolling of steel is done at temperatures from 1500 to 2200 degrees Fahr. with auxiliary motors often mounted within a few feet of this hot metal.

High ambient temperatures. Such hot metal naturally results in high room temperatures which during summer may range from 125 to 140 degrees Fahr.

Abstracted from a paper presented at a recent branch meeting of American Institute of Electrical Engineers.

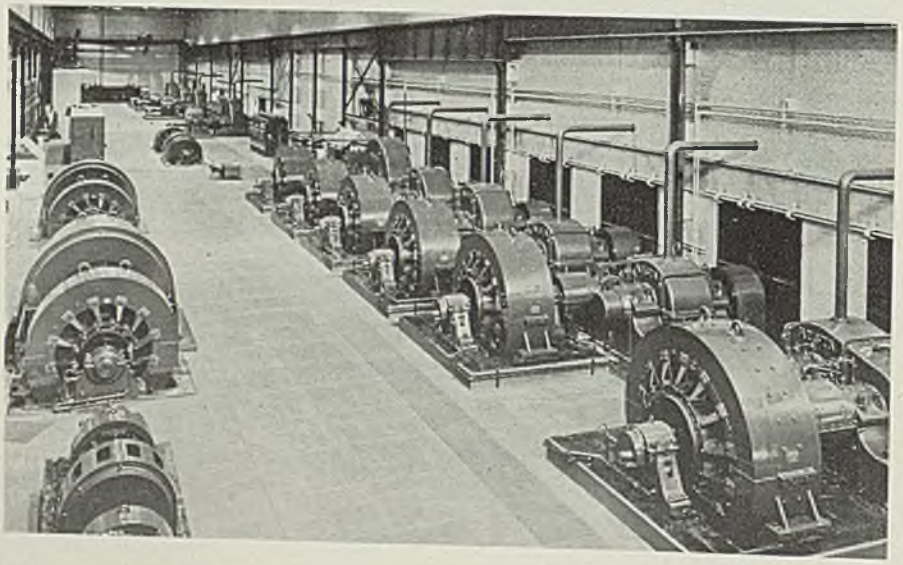


Fig. 1—Typical motor room for hot strip mill. Here electrical equipment aggregating some 50,000 to 60,000 horsepower is housed

Failures Occur in a Short Time

While usual electric equipment will operate for a limited period when exposed to above hazards failures often occur in a short time. Where maintenance records have shown standard equipment unable to withstand conditions, special designs can be utilized or suitable buildings or enclosures provided to advantage.

A typical steel plant can be divided into two main divisions: The first processing raw materials to produce pig iron, the second rolling and finishing the steel ingots to various shapes desired. Steelmaking division is worst for electric equipment due to presence of large amount of moisture, corroding gas, metallic and carbon dust. However, since a relatively small amount of

electric power is required for this portion of the plant, motors are small in size and totally enclosed weatherproof construction for motors and control has been developed which is satisfactory for most applications.

Rolling mills utilize enormous aggregations of power. A typical hot strip mill lineup includes 1000 horsepower at scalebreaker, 3000 at broadside mill, 265 at slab squeezer, 150 for edger, 3000 for roughing mill, 150 for second edger, 3000 for second roughing mill, 150 for third edger, 3000 for third roughing mill, 500 for scalebreaker and 4500 for each of six finishing stands followed by two 150-horsepower motors at the flying shear. In addition, three 6000-kilowatt motor generator sets furnish 600-volt direct current for finishing stand motors with two 1500-kilowatt auxiliary motor-generator sets and other equipment. Such a layout includes a 6600-volt alternating-current switching equipment, variable voltage control and circuit breakers for the direct-current 600-volt circuits. Such an aggregation of motors easily totals 50,000 to 60,000 horsepower.

Main drive motors and control are vital links in a chain. Failure of any one of these results in expensive delays. To be protected completely from mill atmosphere, they usually are housed in separate room immediately adjoining the strip mill.

Dust May Cause Flashover

Even collection of dust on insulating parts must be avoided as 90 per cent of particles are carbon or metallic substances. These will conduct an electric current to cause a flashover at commutators of 600-volt equipment or possibly a dead short circuit which may easily involve as much as 300,000 amperes. Possibility of such high currents has necessitated special circuit breakers and rugged bus supporting structures to withstand the stresses.

Net result of these requirements is that motors, generators and electric equipment are separated from mills proper by enclosing them in special rooms with ample ventilating facilities.

While motors on a hot-strip mill run continuously and would ventilate themselves, motors on a slabbing mill would not. These motors have low inertia armatures of small diameter compared with length, making self-ventilation difficult. In addition, they are constantly starting, stopping and reversing. Forced ventilation thus is very necessary.

Such large concentrations of electric equipment in a motor room may produce heat losses as high as 3000 kilowatts. Unless some provision is made for removing this heat, ambient temperatures become excessive so a cooling system is required even though motors will ventilate themselves.

Some installations use filtered air from outside the room blown through the motors and discharged into the motor room, passing out through roof ventilators or other openings. Motor-driven blowers and mechanical filters circulate and clean the air. Such a system does not cool the air, and in warm weather the motor room may easily become uncomfortably warm.

Recent Installations Better

Many recent installations, therefore, have provisions for cooling as well as circulating and cleaning the air. This simplifies the cleaning problem also since filters need be provided only for the makeup supply of air as a large proportion of the air is recirculated. A downdraft system may be used. Here cooled and cleaned air is blown into the motor room and exhausted from ducts directly below the motors, thus keeping the room itself at lowest temperature. A small makeup filter and fan are provided to compensate for air loss through cracks and openings in the building and to keep motor room under a slight pressure so external dust will not drift in.

For the electric equipment shown in Fig. 1, four recirculating fans rated 80,000 cubic feet per minute at a discharge pressure of 3 ounces require 75-horsepower motors. Each of four coolers absorbs 600-kilowatt loss, cools air to 90 degrees Fahr. and requires about 900 gallons per minute of cooling water at 75 degrees Fahr. Makeup fan is rated 25,000 cubic feet per minute. Additional coolers and recirculating fans are provided for roughing mill motors and auxiliary equipment. Fig. 2 shows a fin-type surface air cooler similar to those mentioned above.

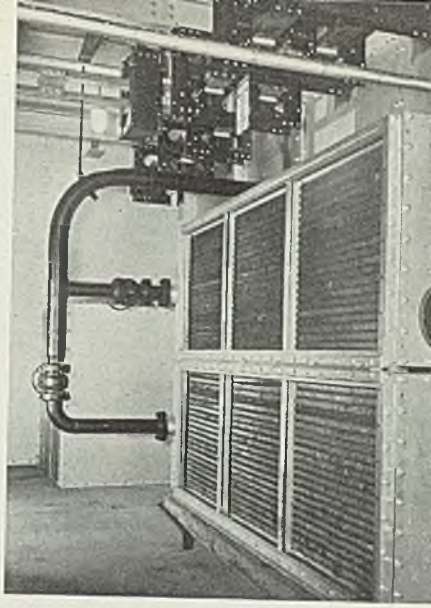


Fig. 2—Fin-type surface air-coolers utilized in recirculating ventilation systems

Many other main drive motors must be protected by some sort of ventilating system. These are usually too large for ventilating with a totally enclosing cover without a circulating cooling medium. On the other hand, if two or more motors are involved, the space requirements usually do not permit building a separate motor room. A common method is to mount a fin-type cooler and circulating fan underneath the motor, which is supplied with enclosing covers and suitable duct work.

Fig. 3 shows an installation of this type on a 98-inch 3-stand tandem cold mill capable of rolling strip 94 inches wide. It employs three motors—one 1500 horsepower and two 2500 horsepower. Some types of motors develop sufficient pressure to circulate air through the motor and fin-type cooler by means

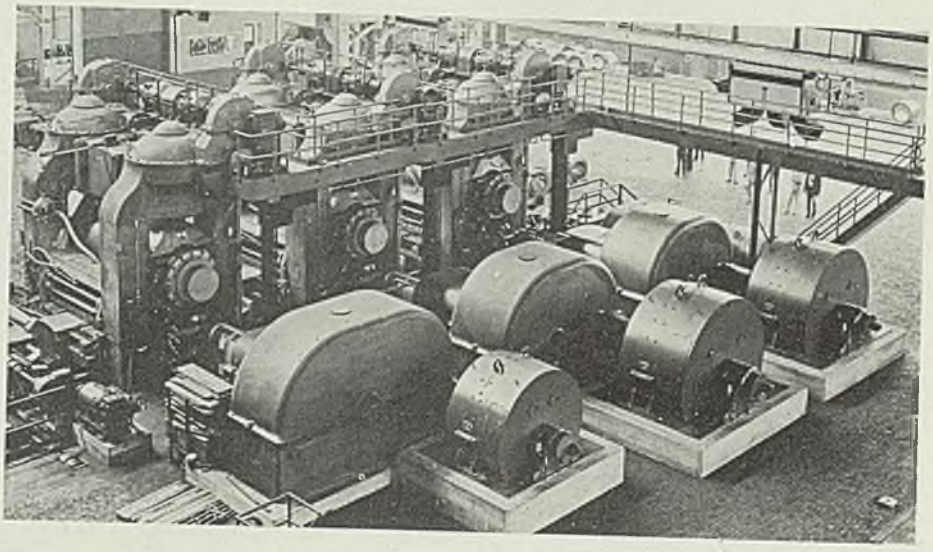


Fig. 3—Modern 3-stand 98-inch cold mill uses three motors totaling about 6500 horsepower

of fan blades built into the motor rotor. Such a unit does not require a separate motor-driven blower.

For each main-drive motor, there are many smaller motors. While these rarely exceed 200 horsepower, a large number are used so their combined horsepower rating may be 30 to 40 per cent of total of main-drive motors.

Protecting these motors is an entirely different proposition. Usually they are scattered over a wide area. Often they are mounted directly on mill machinery so must be designed to have their own frames provide protection. Often such a unit must be totally enclosed, yet operate without outside ventilation. This means it must be designed with a temperature rise sufficiently low to keep maximum temperature down to working limits.

However, since ratio of radiating surface to watts lost increases as motor becomes smaller, it is easy to build such a totally enclosed motor. Electric manufacturers have developed and standardized a line of motors meeting these requirements. Such a motor is designed to withstand the worst operating conditions possible. Since applications usually require starting, stopping and reversing without running continuously, motors are given an intermittent rating and designed to withstand peak loads of 300 to 400 per cent torque on this intermittent rating. Such motors can be exposed to weather, mill dirt and steam since they are of weather-proof construction. Provided with Class B insulation, they easily withstand high ambient temperatures near hot metal.

Occasionally these motors are put on a piece of equipment which must run continually. To meet this condition, the motor is equipped with a small motor-driven blower mounted directly on the motor to circulate air through it. Clean air is obtained from a neighboring main drive ventilating system, or filter can be mounted at the blower.

Fig. 4 shows an installation of a newly developed electrostatic air filter which provides clean air on such an application. This unit is extremely effective, removing the smallest carbon brush particles and even smoke from the air. While electrostatic filters are relatively new, it is possible to employ them for even the largest recirculating systems as they are exceptionally efficient.

Use Motor for Each Roll

While the mill-type motor is suitable for most auxiliary applications, runout tables necessitate special motors. It is usual practice to use a motor for each roll, and due to the considerable amount of mill dust, scale, steam and water, motors must be of weather-proof construction. Internal losses are relatively high due to frequent starting and stopping a high-inertia load. There is considerable radiant heat from nearby hot metal. Thus forced ventilation appears most practical on this application as it permits using a smaller frame for the motor and gives a lower operating temperature.

On tables where starting and stopping are infrequent, motors can be totally-enclosed fan-cooled type and are usually equipped with Class B insulation to permit operation at high temperature with a good margin of safety.

Coiler motors possibly are subject to the most severe conditions in the mill. These units are flange-mounted on movable rolls which vibrate quite violently during the coiling operation. As space available is limited, motor is built in a special frame to get largest possible horsepower rating. Heavy overloads are imposed on these units during starting and stopping.

In addition, the entire coiler is heated considerably due to intimate contact with the red-hot metal. To cool the coiler, streams of water are directed on it, which means the motor must withstand steam and water.

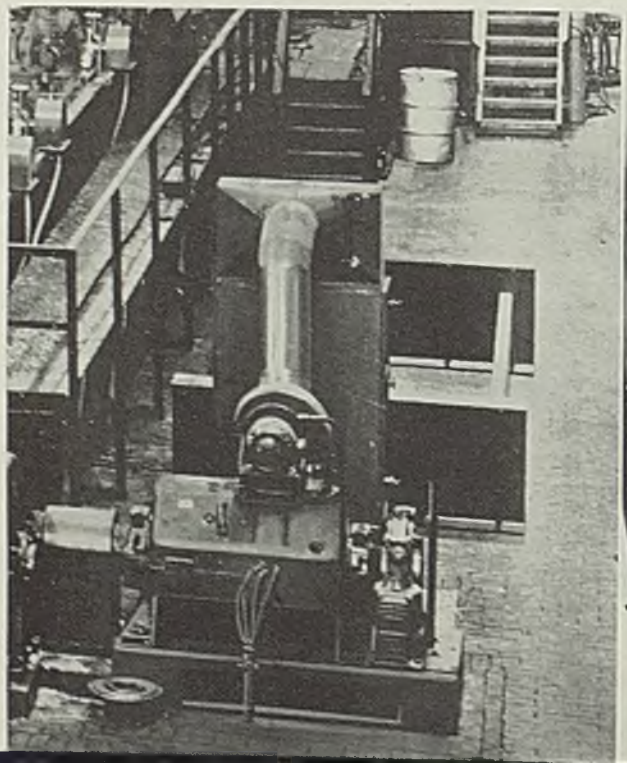
Only a totally-enclosed water-tight construction will keep out the dirt. The restricted space means ventilation is difficult so Class B insulation is supplied.

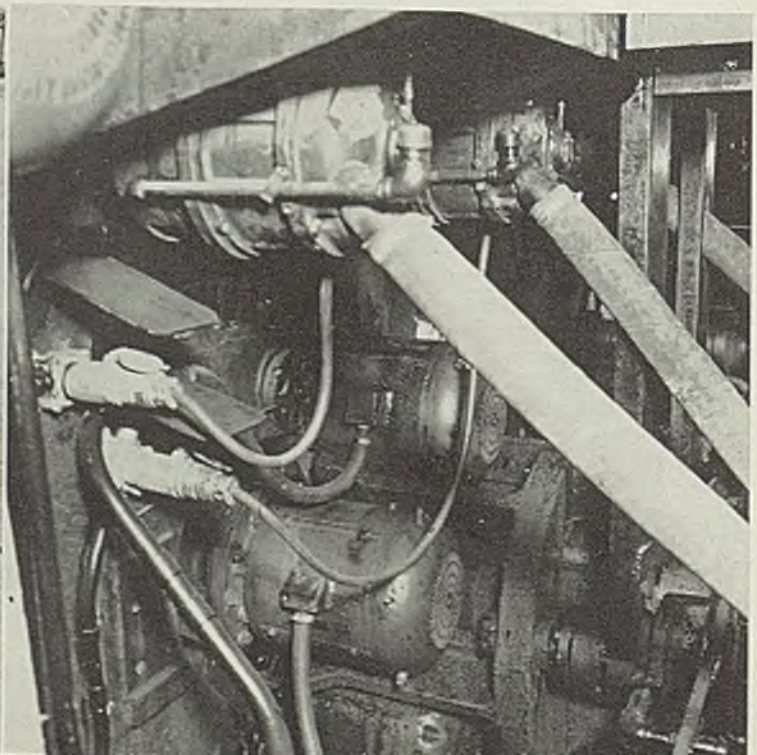
Fig. 5 shows totally-enclosed fan-cooled motors on a coiler. Such motors are provided with an extra external shell and a fan which drives air between the outer shell of motor frame and the extra shell, thus carrying heat out of the motor. This application was responsible for many motor failures until a gradual improvement in operating conditions and a better understanding of the factors involved permitted its successful solution. Units in Fig. 5 have operated two years. Records indicate operation during the past year without a single failure of any kind.

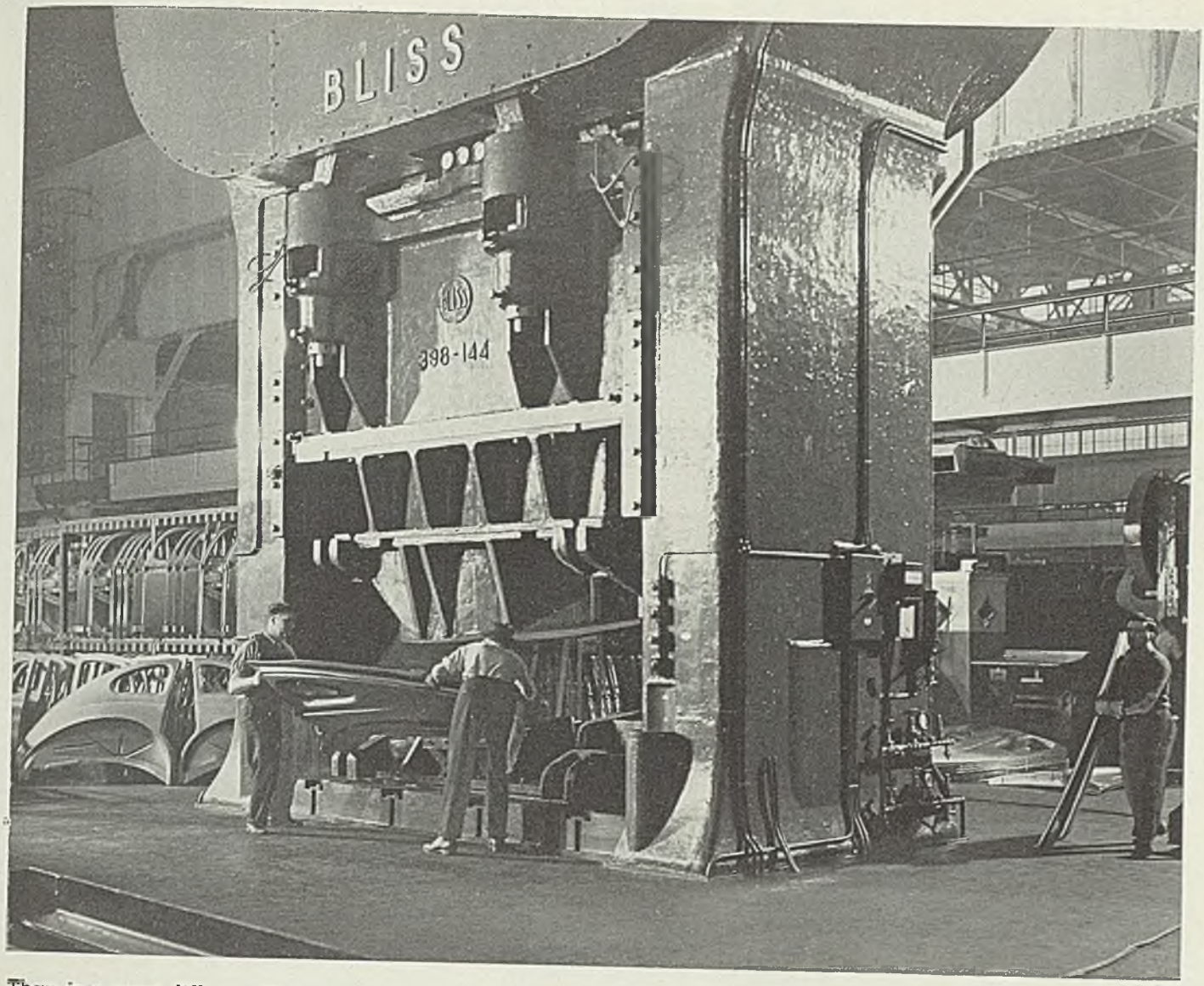
Note the ducts in Fig. 5 from motors in upper part of the picture. These carry forced ventilation to motors on the runout table above the coiler, air being blown in one end of the motor and discharged into the room at the other end.

Fig. 4—Direct-current mill-type motor with an individual blower and electrostatic air cleaner

Fig. 5—Coiler closeup showing special flange-mounted alternating-current fan-cooled totally enclosed motors below. Table motors above have ducts for forced draft ventilation







There is a great difference in presses, between the machine which will get by on the job with everything going right, and the machine which will really stand up to unforeseen abuse. Whether a press has THAT EXTRA MARGIN or not is a matter of the builder's integrity.

The Builder's Integrity

DESIGNING a punch press with a hand-book and a slide-rule is impossible. Standard beam formulae do not apply to the short spans and shock loads involved. Thorough engineering training must be combined with the experience gained on an endless variety of tough jobs to eliminate the weak spots. To sound engineering and experience must be added the will of the builder to give full value. The Bliss reputation rests upon the building of presses which "can take it."

Power Presses Die Cushions Can Making Machinery
Rolling Mills Automatic Presses Brakes and Shears
Hydraulic Presses Special Machines Mechanical Presses

E. W. Bliss Company, Brooklyn, N. Y.

Chicago Detroit Cleveland
Toledo Toronto

BLISS

April 8, 1940

Gas Executives Discuss Industrial Sales

■ Baking green or red coating on steel sheets by the infra-red ray requires only one-half the time involved in baking white coating. Black coatings require about one-third the time. Greens baked at 225 degrees Fahr. require 150 seconds; blacks at 250 degrees, 190 seconds; and whites at 280 degrees, 300 seconds.

These data were brought out at the fifth annual Industrial Gas Sales conference of the American Gas association held at Commodore Perry hotel, Toledo, O., March 28-29 by H. A. Clark, Michigan Consolidated Gas Co., Detroit. About 175 gas executives from various sections of the country were present.

Mr. Clark pointed out that the infra-red rays are part of the electromagnetic spectrum. This embraces the cosmic rays, gamma rays, ultra-violet rays, the light section from the violet to the red—and beyond the red spectrum you get into the radio waves. All of these waves, he pointed out, travel at the same speed,—186,000 miles a second. All rays are made up of bundles of energy. The electromagnetic waves contain no heat.

Vibration of molecules from the sun set up vibration in the ether. This energy travels across space without any loss. These rays are reflected by the envelope of the earth. Electromagnetic waves emanate from any hot surface and are the most efficient of transferred heat.

In the speaker's opinion, radiant energy baking is an efficient way of getting heat into material. He cited data from experiments to show that where 1.2 watts were concentrated on work, a temperature of 200 degrees Fahr. was reached in 5 minutes. By increasing the concentration to 6 watts, a temperature of 500 degrees Fahr. was reached at the same period.

Experiments disclose that where a conveyor is located so that the material receives the infra-red rays directly, the distance of the work from the lamps should not exceed 18 inches. In conclusion Mr. Clark pointed out that in baking finishes, both radiation and convection heating have their own places.

Emphasizes Economy

A. F. Koch, Surface Combustion Corp., Toledo, O., directed attention to the fact that gas as fuel can keep in step with industry by reducing costs constantly. Everywhere today manufacturers are looking for less expensive ways to do the job at hand and he suggested that costs may be reduced to producers of industrial equipment through a better utilization of gas.

One of the duties of manufacturers of gas-burning equipment is to be on the lookout for improved applications. The field is rather narrow, the speaker stated, and we must therefore depend upon utility companies to give us some idea as to what equipment is required.

No matter how well equipment is designed, Mr. Koch asserted that unless it is properly applied its use will never be successful. Even the installation of equipment should be carefully engineered so that the final sales can be complete.

In selling gas load from the standpoint of the manufacturer, the speaker cited improved product through the use of gas fuel as well as increased production using the same amount of floor space and machinery. Tangible savings that may be realized include actual fuel costs, saving in labor and reduction of rejections. In many cases, the speaker contended, the latter advantage often is the deciding factor in effecting the sale.

To utilize gas, the customer must install new equipment for burning this type fuel. The industrial engineer must be careful in selecting the equipment to see that the proper size is chosen. He must also bear n mind that the cost be kept at a reasonable figure so as not to exceed the savings to a great extent. Normally the life of gas-burning equipment is about ten years. Definite proof of analysis made of a setup should not be overlooked, the speaker said. He recommended that the customer should be referred to successful installations and that he should witness them in operation. A reduction of about 25 per cent in the price of equipment can be affected through standardization, the speaker pointed out, and he cited figures to verify his contention.

Developments Give Clue

In drawing attention to the competitive situation, Mr. Koch warned that any new developments using another type of fuel to advantage should be watched closely. We must therefore find new loads for gas and sell our fuel on a permanent basis using the best equipment and efficiency and assure the consumer a permanency of the gas load.

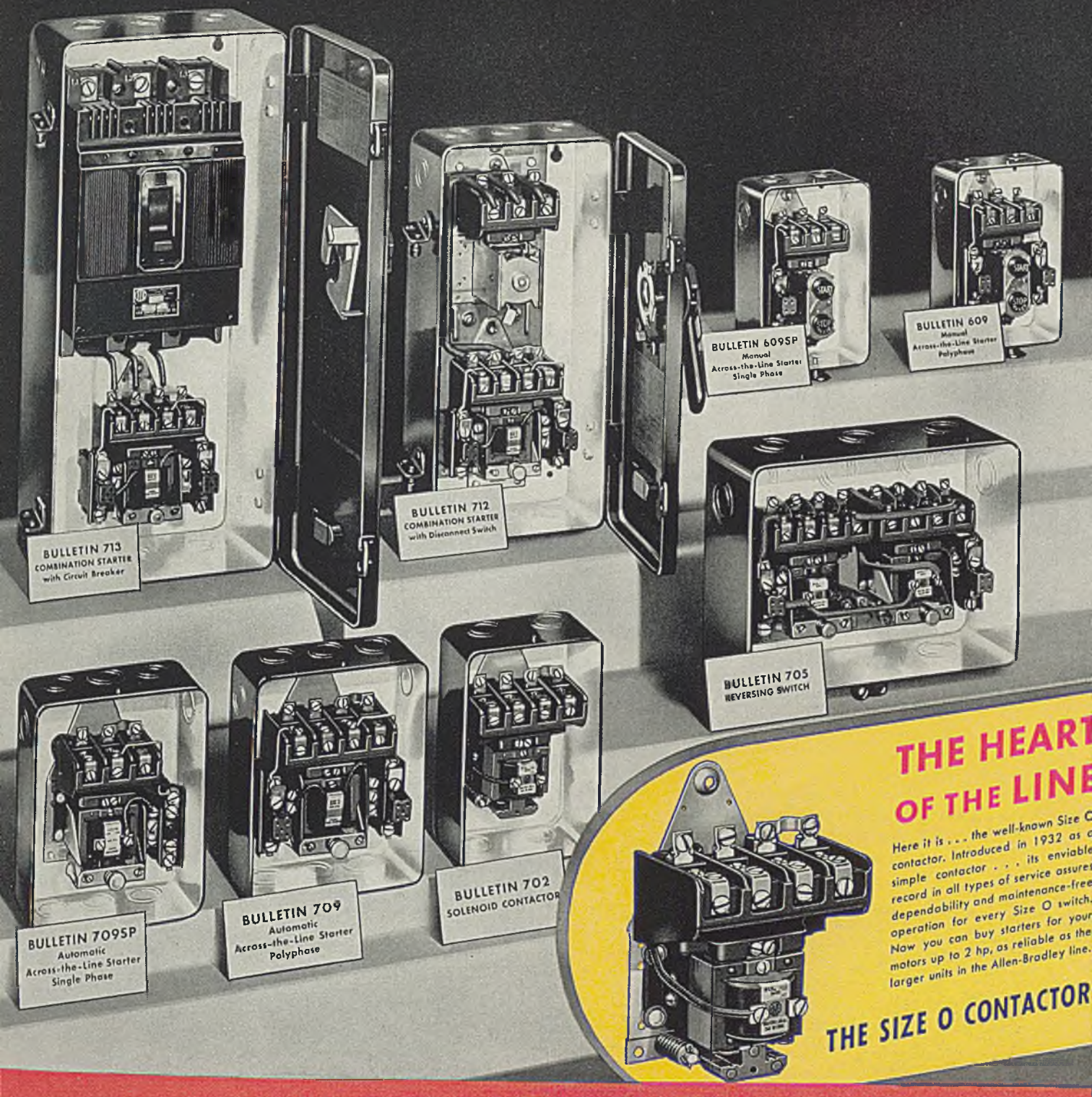
The speaker presented figures to show that while the percentage of industrial gas sold between 1934 and 1939 shows a decrease, the revenue shows an increase due to the use of better equipment. During 1938 and 1939 quantity of manufactured gas sold increased 4.4 per cent and natural gas 9.9 per cent. Industrial activity during the same period increased 11 per cent, showing that industrial activity went ahead a little faster. Looking ahead at the competitive situation in the next five years, Mr. Koch mentioned that both utilities and manufacturers will have to contribute to the situation and he made a plea for a concentration of effort in putting gas ahead of all other fuels.

Total annual volume of gas used in chemical processing is almost equal to the total sales of natural

Snapped at the meeting of the Industrial gas section of the American Gas association at Toledo, O. From left to right: F. T. Rainey, chairman, industrial gas section of A.G.A.; B. H. Gardner, vice president, Columbia Gas & Electric Corp.; R. S. Wenner, in charge of industrial gas sales, Toledo, O., Ohio Fuel Gas Co.; W. E. Whalen, supervisor of all fuel and fuel-using equipment purchases for 21 plants operated in this country by the Electric Auto-Lite Co.

For Motors up to 2 Horsepower

A Complete Line of Across-the-Line Contactors and Switches



THE HEART OF THE LINE

Here it is . . . the well-known Size O contactor. Introduced in 1932 as a simple contactor . . . its enviable record in all types of service assures dependability and maintenance-free operation for every Size O switch. Now you can buy starters for your motors up to 2 hp, as reliable as the larger units in the Allen-Bradley line.

THE SIZE O CONTACTOR

ALLEN-BRADLEY

SIZE O MOTOR CONTROL

QUALITY

"STARTER TROUBLE?

Not with A-B starters"

"Burnt contacts used to keep us on the jump. We also had to see that our starters were kept clean, or the bearings, pins, and pivots would gum up. But, since we've been using Allen-Bradley solenoid starters, that's all a thing of the past. We never look at the A-B contacts—they never need cleaning or filing. What's more, these starters have only one moving part. They just can't stick!"

How Allen-Bradley Solenoid Motor Control Eliminates Control Trouble

NO CONTACT MAINTENANCE

Contact cleaning and filing are eliminated by the double break, cadmium silver alloy contacts. These contacts need no attention and are always in perfect operating condition.

NO BEARINGS, PINS, PIVOTS

The absence of bearings, pins, pivots, flexible jumpers, complicated mechanisms, and other troublesome parts insures unfailing starter operation without maintenance.

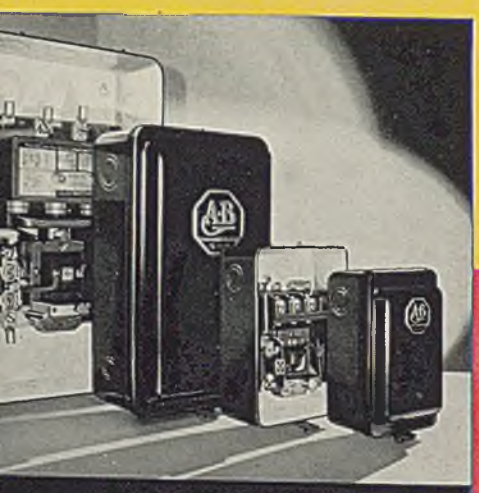
GREATER SWITCH CAPACITY

These starters easily interrupt currents of not less than ten times their maximum horsepower rating. Furthermore, high currents are interrupted without flashing and noise.

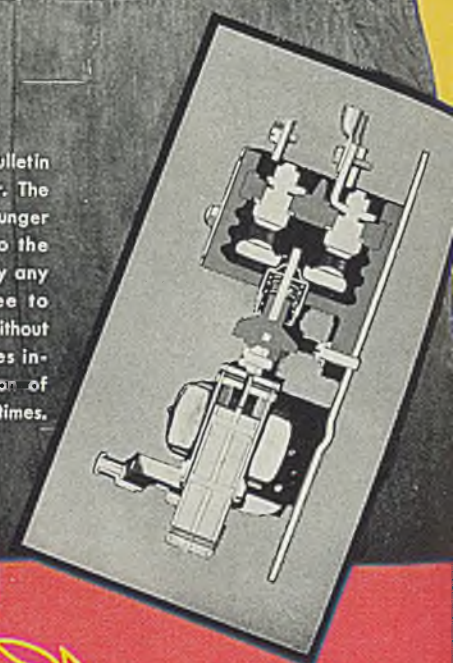
NO UNNECESSARY SHUTDOWNS

For the reasons outlined above, the Allen-Bradley solenoid starter is ideal for modern production plants, where equipment shutdowns cannot be tolerated. Play safe and specify Allen-Bradley for your motor control equipment.

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



Allen-Bradley Bulletin 709 Solenoid Starters are now available in four sizes, as shown above.



Cross section of Bulletin 709 solenoid starter. The contact-carrying plunger is not connected to the starter mechanism by any linkage, but is free to move, practically without friction. This assures instantaneous operation of the contactor at all times.

A-B

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

gas for domestic purposes according to C. G. Segeler, American Gas association, New York. The speaker cited various examples to illustrate the variety of things that can be done with gas as the chemical raw material. In Detroit, flue gases at 40-pound pressure inflate rubber bags used during the curing of automobile tires in place of steam. A number of cities burn flue gases under water to remove excess calcium carbonate by converting to calcium bicarbonate. On the Pacific coast gas is burned under boilers and the products of combustion pass through ocean water to cause a precipitation of magnesium compounds.

A. M. Thurston, East Ohio Gas Co., Cleveland, in discussing flash baking of insulating varnish drew attention to a recently designed oven through which operates a light conveyor consisting of about 20 to 22 light wires. Material passing through this equipment requires three-fourths second to bake and three-fourths second to cool in contrast to former equipment which required 45 minutes.

Synchronous Method Used

Direct flame annealing of nonferrous wire STEEL, Oct. 2, p. 44, 1939) now is being done by the synchronous method. Experiments also are being tried out on phosphor bronze and brass. The steel industry also is interested in this particular process, the speaker stated. Copper wire now is being annealed by this process on 28 installations and a production of 3000 pounds per man hour is reported. Mr. Thurston in discussing the metallizing process pointed out that spraying speeds have been reduced 50 per cent by the use of natural gas. General observations concerning the use of fuel gas as the scarfing medium indicate that billets are not burned and that the scarfed material is cleaned off with a broom. In spot annealing with fuel gas and oxygen the work can be held close to the flame, say from 1 to 1½ inches. Flame hardening of malleable iron now is possible, the speaker announced, annealing being done at 200 degrees Fahr. and hardening at 550 to 607 degrees Fahr.

Several of our foundries are lighting small cupolas with a single portable 3-inch gas-air torch.

H. C. Wolf, president, Atlanta Gas Light Co., Atlanta, Ga., directed attention to the fact that our country now is in a selling era. We are now observing a new plane of things and are being sold all kinds of new devices. Today, he stated, we have the best fuel known, yet we lack the picture of our possession and where we are going. Industrial departments are undermanned and we are not placing enough importance on industrial sales.

In our country, we are spending millions of dollars for questionable developments. Society is being arrayed against the gas industry. Moreover, domestic gas appliances are being sold by means of gadgets rather than by selling gas. Confidence is the keystone of our industry, the speaker asserted, and this requires knowledge and study. Research and development work are handmaidens of selling and if the gas industry is to go forward it must pay considerable attention to this class of work. He recommended that the industry develop more handbooks and sales helps.

In planning for increased sales, the speaker stressed the important part played by the manufacturer. He favored the appointment of a committee for the purpose of emphasizing the importance of gas for industrial and commercial use, to assist the gas sales department and to encourage the co-operation of gas manufacturers and companies in sales effort.

W. E. Whalen, Electric Auto-Lite Co., Toledo, O., in expressing his view of the gas industry, suggested that a service cost should be built into the selling price. While the responsibility of the utility company ends at the meter, Mr. Whalen believes this responsibility should go on in the plant until the last heat unit is used. In conclusion, he advocated that utilities should keep a man in the field who is capable of going into plants, teaching the efficient operation of equipment. It is an asset to industry to have such a man in various territories.

Westinghouse Issues Booklet on Switches

■ Features of new indoor disconnecting switches are embodied in a new 28-page illustrated booklet issued by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It gives details of construction and application of the switches.

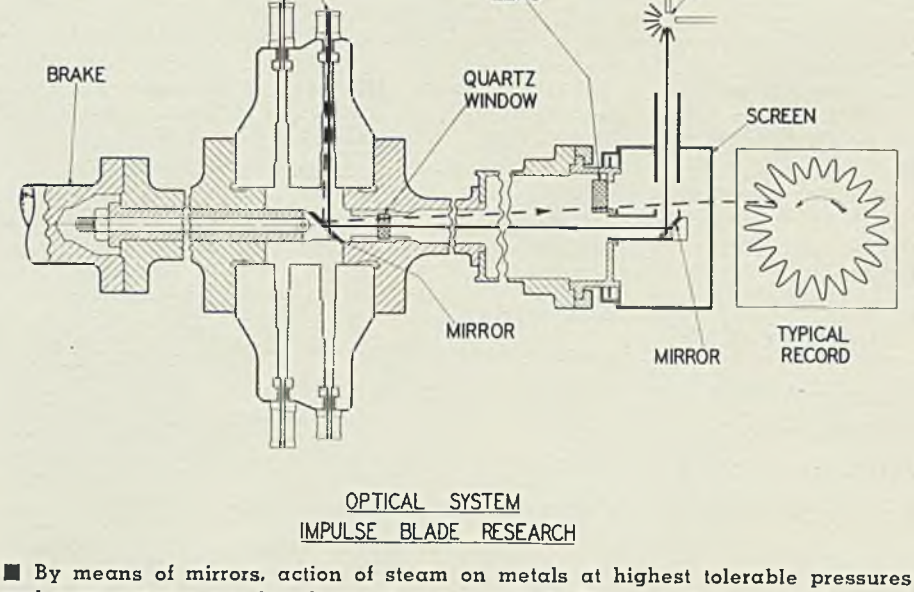
Pages 1 to 7 describe outstanding characteristics of various units and pages 8 and 9 give factors for determining the correct type of indoor disconnecting switch for individual applications.

Tables appearing on pages 10 to 27 give the classification, size, voltage, amperage, etc., of the 13 different switches, and above the tables, are line diagrams of each unit.

Correction Notice

■ The series of seven micrographs appearing on Page 45, March 18 STEEL, were transposed from right to left. The entire series on this page should have appeared in opposite order.

Measuring Vibrations with Mirrors



OPTICAL SYSTEM
IMPULSE BLADE RESEARCH

■ By means of mirrors, action of steam on metals at highest tolerable pressures and temperatures can be observed and recorded. Diagram shows a high speed turbine equipped with an optical system made up of mirrors which will be the instrument of a joint research conducted by Philadelphia Electric Co., 1000 Chestnut street, Philadelphia, and Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Vibration causes light beam to describe a wavy circle on the screen which in turn is recorded by a high speed camera. By shifting mirrors, it is possible to measure side-to-side as well as back-and-forth vibrations

Organizing a Weldery

Additional training of workers is recommended to increase their skill and versatility. Reasonable selling expense demands few steady repeat customers. Idle facilities may do outside work for extra income

By RICHARD W. STERNKE
Production Manager
Lakeside Bridge & Steel Co.
Milwaukee

PART II

■ TO KEEP overhead expenses down, the general manager should assume duties of shop superintendent and labor estimator, see Table VI. He should have a competent assistant to take charge of engineering and sales and another assistant to take charge of cost records and office work. Commercial welderies are taking new and different jobs continually, each job often presenting some new problem in cutting, bending, fitting and prevention of distortion.

This kind of work calls for resourcefulness of a high order, so a man to qualify for the position of superintendent should, of course, have a thorough knowledge of welding. Also he should be able to read drawings, be thoroughly familiar with physical and chemical properties of steel, be cost-conscious and be able to direct his men to the best advantage. In addition, estimating direct labor costs on new work calls for good judgment, which can only be obtained by experience and cost records of previous work.

This latter phase of his work is extremely important as if estimates are too high orders are lost, and if too low the company does not make a profit. Equally important, he should co-operate closely with the sales engineer in making new designs and changing over present designs to cut fabrication costs.

From paper in contest sponsored by James F. Lincoln Arc Welding Foundation, Box 5728, Cleveland.

TABLE IV—Typical Shop Order (showing cost and selling price)

Customer's Name & Address			Our Order No. X	
			Ship. wanted	
Cust. Ord. No. & Date			Date shpd.	
Ship to:			How ship freight	
Freight prepaid, F.O.B. plant			Terms Net-15th of following month	
DESCRIPTION	1 Welded Steel Base			
MATERIAL				
(Description)	**(Purchased from)**	**(Weight)**	**(Amount)**	
Steel plates— sizes itemized	Stock	1161 lbs.	24.38	
	Warehouse	460 lbs.	18.86	
		1621 lbs.		
Welding wire 61.86	Stock		6.19	
Oxygen & Acetylene	Stock		6.93	
				$56.36
LABOR				
Drawing (			8.00	
Shop (per distribution sheet			51.75	
Overheads			87.83	
				147.58
ANNEALING				4.05
SANDBLASTING				.50
TRUCKING				1.19
SPECIAL CHARGES (such as spec. engr., spec. dely., bond, etc.)				....
			Cost, F.O.B. our works	209.68
			Freight or Hauling	5.57
			Total Cost Delivered	215.25
			Margin	29.75
			TOTAL SELLING PRICE	245.00
Invoice: Mailed by				
Date				

TABLE V
Labor Distribution Sheet

Drawings	$ 8.00
Templates	6.47
Layout	.43
Cutting	5.76
Bending	3.64
Fitting	6.20
Welding	15.46
Straightening	2.02
Grinding	3.76
Annealing	1.56
Sandblasting	1.92
Material handling	1.90
Inspection	2.63
Total	$59.75

Some Education Necessary

Assistant superintendent should be a man with at least a high school education or its equivalent and with several years of experience as foreman in some metalworking plant and with a fair knowledge of good welding practice.

Since foremen hold extremely important positions in a production organization such as this, they should be chosen carefully with a view to getting men who are natural leaders, not drivers, of their men.

For skilled work such as operating bending brake, cutting torch, etc., some difficulty may be experi-

enced in getting sufficiently skilled operators. The superintendent may find it necessary to take partially experienced men and give them the necessary training. Such training should be supervised carefully and should include all phases of shop routine such as layout and templet work, torch cutting, straightening, fitting, welding, cleaning, annealing, sandblasting and inspection. An hour or two every week in a classroom for instruction in reading drawings and in handling special jobs will show in a few months' time which men are qualified for additional training.

Any weldery is dependent to a large extent for orders from manufacturers in the durable goods industries. Often there will be slack periods as well as peak periods. This means that shop organization should be flexible, with productive operations adjusted to produce smallest possible disturbance to the personnel.

It also is important in selecting men for the shop to seek workers who have had training in more than one branch as versatility is highly desirable. The smaller the organization, the more important is this factor.

Since direct labor cost can make or break the enterprise, all men in the organization should be chosen with extreme care. Not only should each be investigated thoroughly as to his training, experience and physical fitness, but special emphasis should be put on the record of his attitude toward employers during actual or threatened labor trouble.

Accurate Cost Records Important

The sales engineer, of course, must be thoroughly familiar with engineering of welded construction. Two junior engineers and a draftsman are listed as assistants to the sales engineer. An accountant with some industrial office experience probably would make the most satisfactory office manager.

Cost records are of extreme importance. They must be kept accurately to determine profit or loss on each order and to provide records from which the sales engineer can prepare an intelligent bid on future work. These records should show cost of material (making due allowance for waste), oxygen and acetylene, direct labor, factory overhead, selling and office expense and all miscellaneous charges such as special drawings and engineering, delivery charges, bond where required and other miscellaneous items.

For estimating purposes, factory and selling overhead usually are constant and are figured at a certain percentage of direct labor. This percentage is determined by dividing the total cost of all indirect expenses such as taxes, light, heat, power, etc., as shown in Table VI by total direct-labor cost. The overhead percentage for the particular weldery here is $61,710 (annual overhead expense) divided by $42,000 (direct-labor cost for one year) which gives 147 per cent.

TABLE VI

Overhead Expense (Yearly)

Salaries (nonproductive)	
General Manager, shop superintendent and estimator	$4,800
Sales Engineer	4,200
Junior Engineer	2,400
Junior Engineer	1,800
Draftsman	2,400
Office Manager	3,000
Cost Clerk	1,800
Stenographer	1,200
Clerk	960
Watchman	1,080
Sub Total	$23,640
Fixed Charges	
Insurance (fire, tornado, use and occupancy)	$1,500
Taxes (property)	3,500
Heat	2,500
Power and light	5,000
Compensation insurance	1,400
Unemployment insurance	1,700
Social security	550
Shop supplies	1,800
Office supplies	1,800
Telephone	900
Water	120
Hauling charges ($1.50/ton, 1200 tons)	1,800
Depreciation	9,000
Selling expense, advertising $500	
General expenses, travel etc. 2,000	2,500
Administration, general expense	1,000
General shop expense (nonproductive labor, etc.)	3,000
Sub Total	$38,070
Total	$61,710

Direct labor should be subdivided into as many divisions as necessary to produce the final product. This will include such items as materials handling, cutting, bending, fitting, welding, grinding, annealing and sand-blasting. Such analysis of direct-labor costs will enable the superintendent to analyze any job and to determine what costs should be reduced where they exceed estimates.

A typical labor distribution cost sheet is shown in Table V.

A perpetual inventory of raw materials should be kept so additional stock can be purchased before any item runs short. A complete inventory of materials, tools and supplies should be taken annually.

Selling price is set from total of material, direct labor and overhead costs. Amount of profit will vary depending for the most part on competition and on price of castings, forgings and similar material which might be displaced.

Selling prices also will vary from time to time, depending on the total volume of business available in the field. Low prices usually result when work is scarce, with better prices obtained when plenty of work is available as anyone naturally would conclude. Companies with plant welderies may at times enter the market for commercial welding when the capacity of the plant is not being utilized by the parent company. In choosing a location for an independent weldery, this factor should be considered.

Few Steady Customers Needed

To operate successfully, any weldery must have a few steady customers whose orders are repeated without solicitation because one sales engineer could not possibly secure enough orders from new customers to keep the plant busy. Such customers should be cultivated especially by the sales engineer.

Production of work in volume for steady customers should carry a profit margin of 5 to 10 per cent on the cost with special jobs from 15 to 30 per cent above cost. Occasionally some development work on new parts may be done at cost with a view to getting volume work at a profit later.

As the bending brake, hydraulic press, annealing oven and sandblast room are not being used continuously on work for the weldery, these facilities may be utilized to increase sales revenue when available by doing bending work, annealing and sandblasting for other manufacturers.

Assuming the weldery is financed properly and located near a reason-

(*Please turn to Page* 79)

TABLE VII—Schedule of Finance for One Year's Operations

Gross sales (1200 tons @ 9½c lb.)		$228,000
*Cost of material, 1250 tons	$75,000	
Welding wire (50,000 lbs. @ 9c lb.)	4,500	
Oxygen and acetylene	2,500	
Oil for annealing	800	
Direct labor	42,000	
Overhead expense	61,710	
		186,510
PROFIT		$41,490
(*)—Cost of material (1250 tons), 50 tons waste and scrap.		
From stock—700 tons @ $42.50 per ton		$29,750
From warehouse—550 tons @ 82.27 per ton		45,250
		$75,000

Automatic Plating Machines

New continuous automatic electroplating machines for job-shop work handle tremendous output, provide precise control of plate thickness, eliminate handling and permit flexibility

■ JOB plating business has made rapid strides in technique and equipment during the past few years. One driving force behind such advance has been the more exacting demands of customers—the automotive industry, for example—for precise control of plate thicknesses, for ability to handle a wide diversity of product without delays in shipment, and for flexibility of equipment to permit a quick shift from one order to the next.

With older types of batch plating equipment, meeting these demands was becoming progressively more difficult. Results often were not uniform, the handling problem was excessively tedious and slow. It was but a natural step to the development of full automatic and semiautomatic plating machines of the barrel and rack types.

Detroit Plating Industries, 1033 Mt. Elliott avenue, Detroit, for years has supplied the electroplating requirements of a wide range of automotive customers and now is operating two new automatic plating machines which exemplify the latest ideas in this type of equipment. One is a small-parts plating machine with 23 barrels or baskets, capable of zinc plating around 8 tons of bolts, nuts or small stampings in an 8-hour shift. The other is a rack-type machine for larger pieces with 19 carrier arms accommodating plating racks up to 24 inches in width and 40 inches in depth. Both were designed and built by Frederic B. Stevens Inc., Third and Larned streets, Detroit.

The small-parts machine, Fig. 1, is loaded and unloaded at one end, the baskets traveling down one side, around the other end and back the opposite side. In so doing, they traverse a series of tanks containing the necessary cleaners, acids rinses and plating solutions. The unit is 32½ feet long, 9 feet wide and 7 feet high. There are two separate drives on the machine, one for moving the baskets around the machine and the other for revolving the baskets. One motor is used to drive the conveyor chain. A separate motor drives longitudinal worms mounted on either side of the machine to revolve the baskets. Variable speed of from 3 to 12 revolutions per minute is provided for the baskets which are carried by central bronze support arms attached to the conveyor chain and extending downward at an angle of about 45 degrees from the horizontal. See Fig. 2. Hardened steel rollers on these arms travel over cast iron hump-type cams on the frame of the machine, serving to lift the baskets out of one tank and lower them into the next.

Load Dried in Final Station

Baskets are of perforated steel sheet, coated with anodic rubber treated to withstand chemical action of the various baths. Bottom is reinforced to insure long life. Danglers extend from the support arm down into the work in the basket to provide contact with one side of the plating circuit.

Series of tanks is arranged as follows: Electrolytic cleaner, accommodating two baskets; cold water rinse; hydrochloric acid dip; cold water rinse; sodium cyanide dip; bright zinc solution, accommodating eight baskets; cold water rinse; bright dip containing 0.5 per cent nitric acid; cold water rinse; and hot water rinse. Final station on the machine is a cabinet housing a unit heater for drying the load before it is discharged automatically into a hopper.

A basket makes a cycle of the

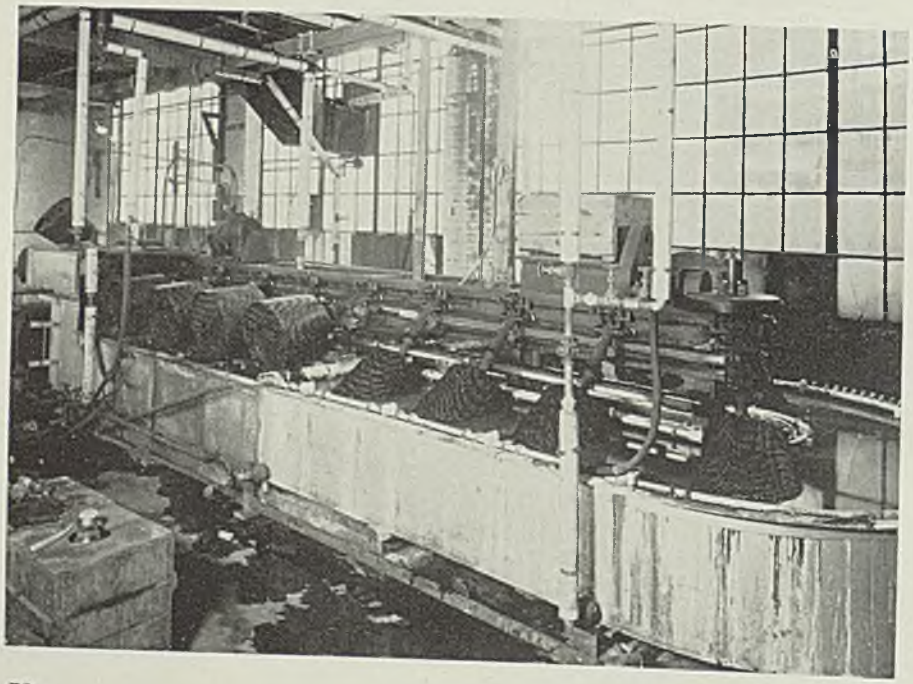


Fig. 1—The 23 baskets on this small-parts zinc plating machine are capable of processing about 8 tons of bolts, nuts and small stampings in an 8-hour shift

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IMPROVED SLUSHING COMPOUND
to protect highly finished metal surfaces

Look at the Difference!

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GULF OILCOAT NO. 1 is easily applied, long lasting and economical to use

YOU can now secure an improved material to protect highly finished surfaces of steel and non-ferrous metal products against corrosion—GULF OILCOAT NO. 1. This product is an entirely new type of slushing compound, developed by Gulf technologists after many years of research and field tests.

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machine in 50 minutes, not moving continuously, but indexing 30 inches at a time. This intermittent control is provided by a separate electric unit containing time switches, relays, etc.

Frame of machine and the drive units are insulated from the tanks. Chain guides and roller guides are located between and above the tanks and are supported on cast iron pedestals, from which are bracketed cast iron bearing stands with bronze bushings to accommodate the longitudinal worms.

Tank-Joints Are Double Welded

All drive gears on the machine are of steel. High-speed gears are heat treated. Gears are keyed on ground shafting which runs in either ball or roller bearings. Main conveyor chain is driven by a cut tooth sprocket which in turn is driven by steel bevel gears through a shear pin mounted in hardened steel bushings.

Tanks are of ¼-inch steel plate with all joints double welded and with angle reinforcing around the top. Intermediate bracing is provided on the longer tanks to prevent bulging. Those tanks containing acid solutions are lined with acid-resisting material.

Direct current at 12 volts potential is supplied to the plating tank, the solution being maintained at approximately room temperature. Current density is figured at 20 amperes per square foot, specifications calling for a minimum zinc thickness of 0.00025-inch. The Grasselli Zinolyte bright zinc process is used.

Larger pieces, such as irregularly shaped stampings which cannot be plated by the "tumbling barrel" method, are handled on a larger rack-type machine, Fig. 2, 21 feet long, 12½ feet wide and 9½ feet in height when arms are in "up" position. Each of the 19 cast aluminum arms carries two plating racks loaded to give a current density of approximately 25 amperes per square foot. Arms, capable of carrying 1000 amperes by means of a universal acting contact, are raised a distance of 48 inches through hardened steel rollers bearing on stationary hump-type cams on the frame of the machine. Intermittent control of a type similar to that used on the other machine provides a constant transfer time or indexing interval from one tank to next.

Sequence of tanks on this large unit is as follows: Caustic cleaner, accommodating three arms; cold water rinse; acid dip; cold water rinse, bright zinc solution, accommodating six arms; cold water rinse, accommodating two arms; bright dip solution; cold water rinse and hot water rinse. Two arms are always at loading and unloading stations which naturally are adjacent. By making provision for two or more arms at any one solution, amount of time that solution acts on the work is multiplied by the number of arms in the solution. Thus with two arms, time is doubled.

Ventilation of the larger machine is accomplished by mounting sheet steel hoods over those tanks giving off fumes and connecting ducts from them to an exhaust fan.

The entire machine is a self-contained unit. All moving parts, conveyor chain, cams, carriers and the entire driving unit, as well as the solid copper cathode base, are supported by cast iron pedestals set between the two rows of tanks.

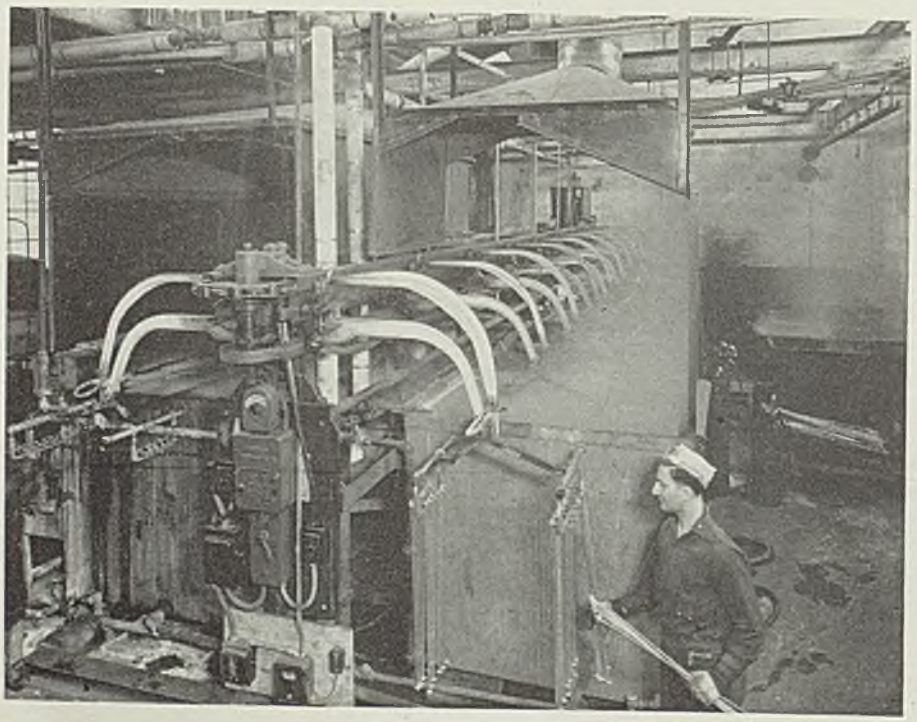


Fig. 2—Operator loading fixture on rack-type bright zinc plating machine. Note the hoods and ducts for the removal of fumes

Tool Engineering

(*Concluded from Page* 55)

tions are just beginning to be realized and their influence toward eliminating guesswork is going to be fully as widespread as similar scientific methods have been in the once empirical business of heat treating.

In tool engineering, as in any other kind of engineering, the best results are attained when theory and practice go hand in hand. The more that designers of mechanical products know about the theory of design, the more respect they have for the Greek proverb to the effect that: "What looks right is right." Therefore, the best of them today make a practice of visualizing their creations "ahead of time" as it were, through the simple expedient of making wooden, clay or plaster models of them. Automobile manufacturers learned the desirability of this years ago and many machine tool builders are doing it today.

By the same token, some of the most successful tool engineers are finding it desirable to follow similar practice. Before undertaking to design jigs, fixtures and tools, they have made up wooden or plaster models of the parts around which the jigs, fixtures and tools are to be "woven."

Through the use of these models, effective methods of loading and clamping and logical sequence of operations very quickly can be worked out; allowances for finish can be checked, and corrected if necessary; clearances for proper chip disposal can be checked; and various other practical questions can be settled "visually."

When W. J. Peets, assistant superintendent, Elizabethport (N. J.) works, Singer Mfg. Co., at the end of the recent ASTE session on economics of tooling, made the statement that: "Any new product, to be justified, must be better, or cheaper—and probably both," he suggested by implication what the role of the tool engineer is. To be better, the new product—whether it be a sewing machine, a refrigerator or an automobile—is almost certain to be more complicated in design, to have a greater number of parts and to be more exacting in fit and finish than the model it replaces. To take on what apparently is a much more costly item than its predecessor, and to set up to manufacture it to sell more cheaply and yet at a profit—that is "all in the day's work" for modern tool engineers.

Instantaneous Forging Control

New control arrangement for forging furnaces provides an instantaneous balance of fuel and air. Extreme sensitivity and speed end rejections from improper furnace temperature

■ THE high quality of steel forgings required for modern machine tools and production equipment has set entirely new standards in respect to methods of heat treating these essential parts. The steel must be worked at heats that maintain proper grain structure for easy machining. Also development of any metal defects or weaknesses must be prevented.

At a plant noted for the high quality of its machine forgings, an automatic control system now governs the operation of an oil-fired forging furnace in a manner that would appear to leave little to be desired. It has proved outstanding for to it are directly traceable substantial savings in fuel, a better product and a marked reduction in troubles from improperly heated forgings.

Oil Burners Are Staggered

This furnace, Fig. 1, is some 8 feet deep 6 feet wide and 4½ feet high, with brick walls 18 inches thick. It is fired by two oil burners inserted through the furnace walls in staggered position at about midheight section, between hearth and roof of furnace. Ordinary run of work treated requires a uniform-sustained temperature of 1950 degrees Fahr.—necessitating reliance upon pyrometer control.

A rugged, wide strip, potentiometer recording-controller, with a horizontally mounted thermocouple located some 2½ feet above furnace hearth, is the primary control device. The instrument, Fig. 3, automatically governs the manipulation of the proportioning valve that regulates flow of oil and air to furnace burners. This master controller is of the electric type. It is set for the desired furnace temperature, measured by the sensitive thermocouple and recorded continuously upon the slowly moving strip chart.

It actuates a solenoid-operated 3-way pilot valve that, in turn, regulates air pressure applied on the diaphragm top of the oil-air proportioning valve which governs fuel feed to burners. The least variance in furnace temperature causes the air pressure on the valve to be modified automatically as may be needed to hold the furnace heat with correctly balanced oil and air supplies. See diagrammatic layout, Fig. 2. Oil is at a pressure of about 8 pounds and air about 32 ounces.

This control functions so sensitively that virtually straight-line action is secured between high and low contact points. Also the action is so snappy that the valve runs from open to closed positions, or vice versa, in less than 1 second. With the conventional electric-driven motor valve, 15 seconds or more are needed to adjust the valve when a firing change of any appreciable amount is required, considerable hunting or overshooting being unavoidable at the high furnace temperature.

With this new system, however, the solenoid of the air pilot valve operates as a positive "on and off"

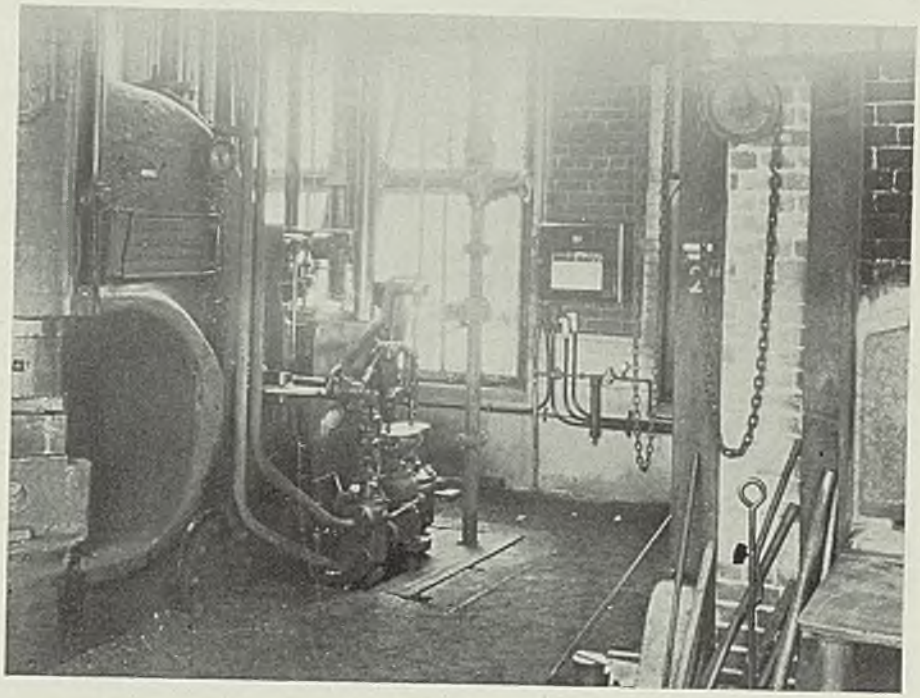


Fig. 1—General view of forge shop—hammer at left, furnace at right, wide-strip recording controller on wall. Courtesy Bristol Co., Waterbury, Conn.

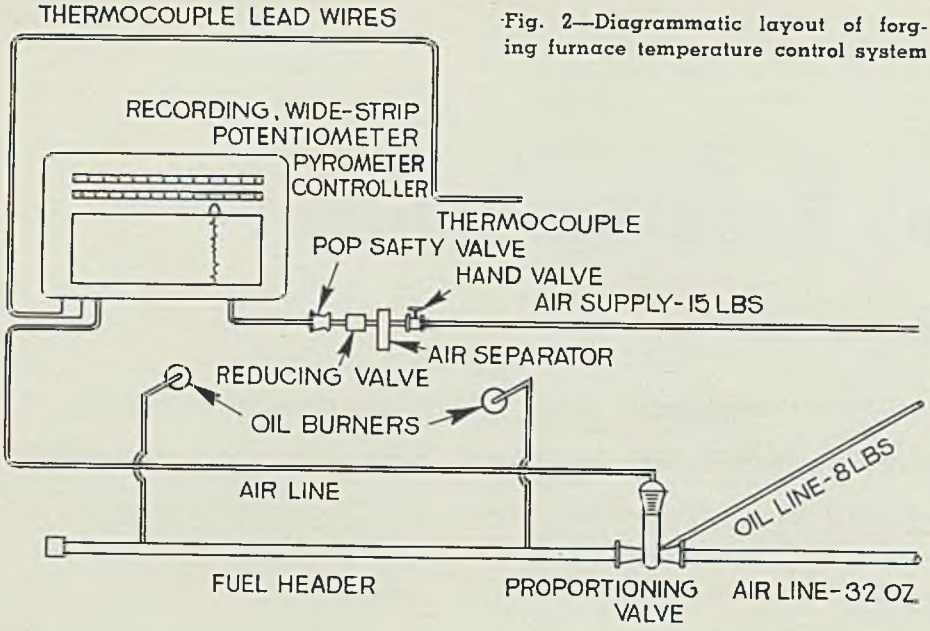


Fig. 2—Diagrammatic layout of forging furnace temperature control system

control with little or no floating, being energized and de-energized by the delicate movement of a mercury switch incorporated in the control instrument. To change the setting of furnace heat, control-point knob simply is turned to the new temperature desired.

Perhaps of greatest concern is the marked freedom from maintenance complications and the exceptionally long life of the sensitive thermocouple. Usually this unit must operate continuously in the high-temperature highly oxidizing furnace atmosphere. Ordinarily the replacement of thermocouples subjected to such severe service is a matter of three or at most six months. Here, however, a standard 24-inch chromel-alumel thermocouple made up of ⅛-inch wires with beaded head insulation and enclosed terminal end mounted in a cast alloy (20 per cent chromium, 67 per cent nickel, low-carbon steel) protection well. This thermocouple, operating almost continuously at a temperature of nearly 2000 degrees, has stood up for more than two years.

By adjusting the proportioning valve, low and high flames may be maintained. Also any determined proportion of air and oil may be held for the particular valve setting, thus providing full automatic temperature control at all times and under all conditions of furnace operation.

Even the failure of electric power, air supply thermocouple or control instrument itself cannot damage the furnace charge because any of these mishaps automatically would run the proportioning valve to its full-closed position, cutting off all fuel until such time as the trouble was corrected.

Quality of Forgings Improved

This change to automatic forging temperature control has considerably reduced the amount of work that fails to meet the exceptionally high standards imposed at the plant as it has cut sharply rejections attributable to improper temperature at the forging furnace. The shop foreman thus has been relieved of constantly adjusting hand valves in efforts to maintain satisfactory furnace temperatures. Consequently, he can discharge other of his many duties to decidedly better effect, stepping up the output as well as the uniformity and quality of forgings.

That the temperature control system actually operates to hold the temperature of furnace at a constant value is shown by Fig. 3, which includes a portion of a typical chart showing variations to about 20 degrees.

Also there has been a noticeable saving in fuel oil consumption. While not yet resolved to definite figures, the shop does report less frequent replenishments of the common oil reservoir that serves a number of other furnaces and departments as well as the modernized forging furnace. Results with the automatic control have been so satisfactory with the first furnace that other furnaces have been wired and fitted for similar systems of control and an annealing furnace, in which a predetermined temperature has to be maintained, also has been placed under automatic temperature regulation. In the latter case, it might be mentioned, an indicating type of controller replaces the recording instrument employed for the forging furnace, thermal records being considered unnecessary here so long as the predetermined and less critical annealing temperature is held substantially constant.

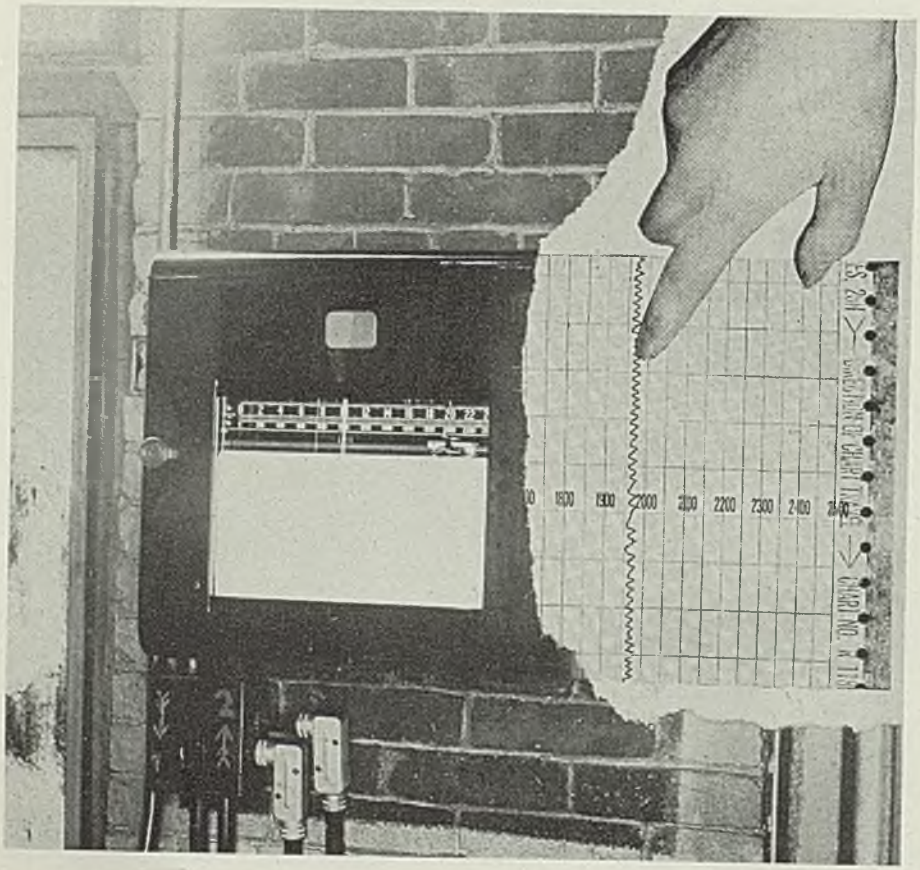
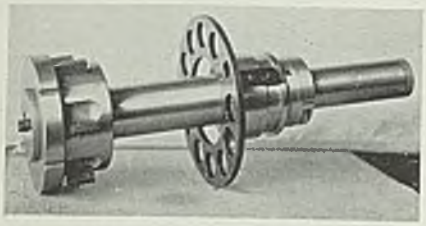


Fig. 3—Closeup of recording wide-strip pyrometer controller unit showing connections and detail of chart depicting the uniformity of the furnace temperature control

Collapsing Tap

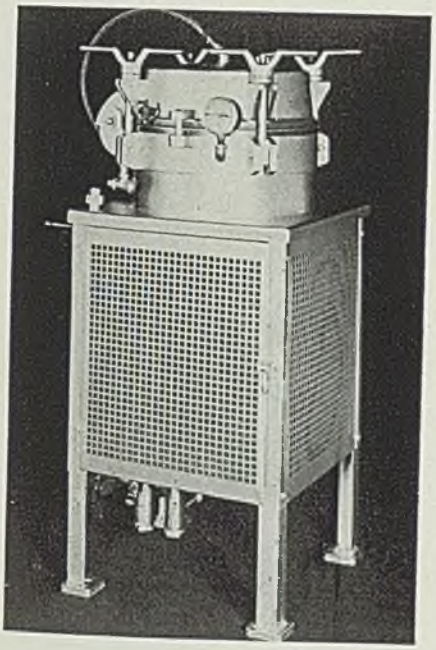
■ Geometric Tool Co., New Haven, Conn., announces a special 8-inch class S collapsing tap for cutting threads from 8½ to 10-inch diameters, 8 per inch. Tool is a length-



ened tap, equipped with roller pilots for deep hole tapping in massive castings used in marine equipment. Unusual feature is the use of a special adjusting ring which makes possible the employment of roughing and finishing cuts with the one tool.

Oil Reclaimer

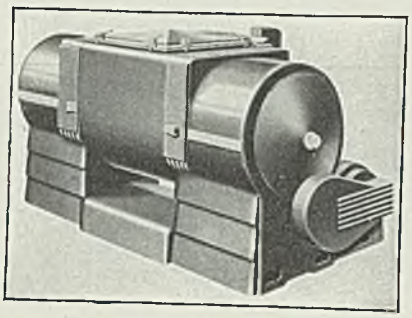
■ Hilliard Corp., Elmira, N. Y., has placed on the market its new Model B Hilco oil reclaimer to purify oil from diesel engines, all types of automotive engines, steam turbines, steam engines, air compressors and



vacuum pumps and also to purify nonlubricating oil from transformers, circuit breakers, wire-drawing machines and hydraulic presses. Being all electric and automatic in operation, it requires attention only once a day and quality of oil produced does not depend on the judgment of an operator. Filtration is through a bed of very efficient adsorbent clay to remove all solid matter such as sludge, carbon, abrasives and dust. Moisture and fuel dilution are removed by a process of evaporation under vacuum in a vaporizing chamber that is electrically heated and thermostatically controlled. Acidity and color also are favorably restored. Capacity ranges from 6 to 50 gallons per day depending upon type of oil purified.

Kneading Machine

■ Patterson Foundry & Machine Co., East Liverpool, O., announces a new line of Kneadermaster mixing, kneading and processing machinery. Mixers incorporate new design principles, with no mechanical resemblance to any former construction. They perform many difficult



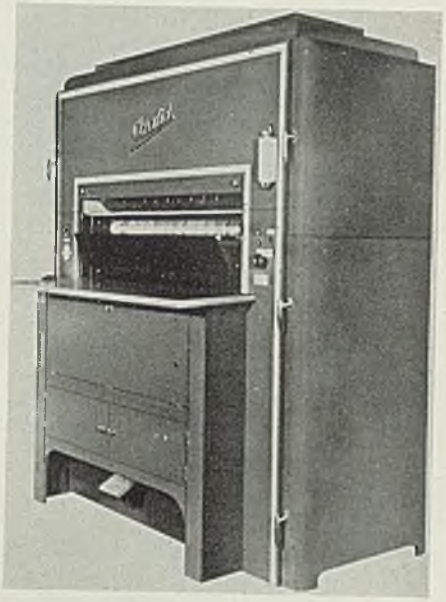
process operations and are particularly useful for mixing and treating heavy plastics and tenacious materials of every description. They are offered in almost any desired batch capacity up to 1500 gallons, in 60 different combinations of frames, sizes and horsepowers. Experimental units are available from 1/3-gallon size and in variety of types and strengths.

Hooded Reflector

■ Goodrich Electric Co., 2935 North Oakley avenue, Chicago, announces improved Seprable light reflector with steel hood. Thinner wall provides additional wiring space, while deep threads form a better ground connection. To install, it is necessary only to attach hood and wire the socket. Reflector can be snapped in place later. Fixture is fitted with a resilient socket which is also removable and which can be replaced. Socket is spring mounted to absorb vibration. Reflector is finished in porcelain enamel.

Whiteprint Machine

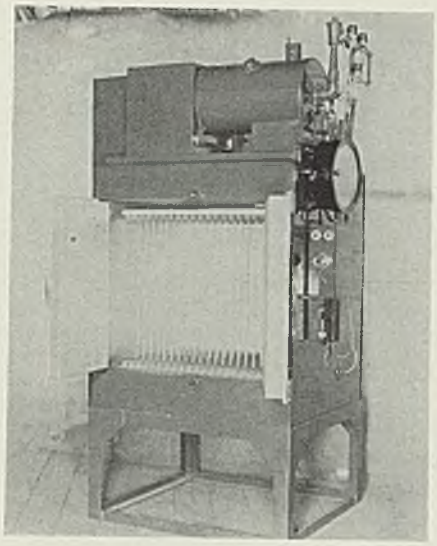
■ Ozalid Corp., Johnson City, N. Y., announces model A high-speed automatic whiteprint machine which combines printing and developing in one unit. Machine automatically separates original print after exposure, returning original to operator at front of the machine and conveying the print to the dry-developer. After development it is discharged at rear of machine, dry and ready for use. Printing speed ranges up to 20 feet per minute. Dimming arrangement incorporated allows operator to select light intensity required and permits continuous and uniform production of whiteprints. A revolving glass cylinder provides contact of original sensitized material without smudging and permits full utilization of light output. Automatic separations of print from original after exposure is possible whereby either cut sheets or continuous yardage can be obtained.



Tempering Furnace

■ Despatch Oven Co., 622 Ninth avenue southeast, Minneapolis, has placed on the market a new furnace for tempering and drawing of band saw blades wrapped in coils. Framework for holding these bandsaw coils in an upright position, as shown, is made so that it can be removed and furnace used for any other work. Furnace ordinarily develops maximum temperature of 800 degrees Fahr., but is available for maximum of 1250 degrees Fahr. It can be furnished in any size re-

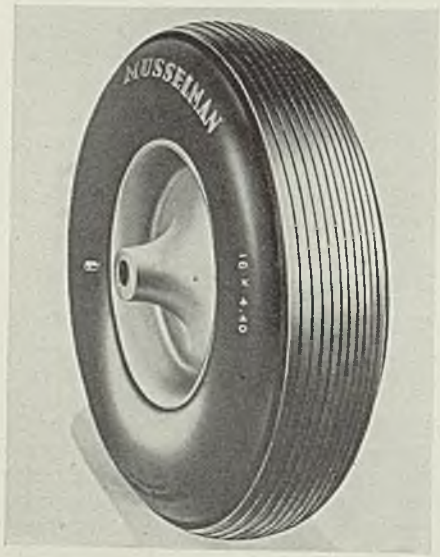
quired. Outstanding feature is use of new controlled combustion air heater, mounted at the top, with high capacity fan to supply heat to the furnace. Air is forced into ducts at the bottom of furnace, the recirculating ducts being located at



the top. While this furnace is arranged for vertical flow air circulation, horizontal flow air circulation is available if required. Furnace shown is provided with side seeing doors with special heat seal arrangement. It also is fully equipped with recording temperature control system and full safety arrangement.

Outside Valves Feature New Tires and Wheels

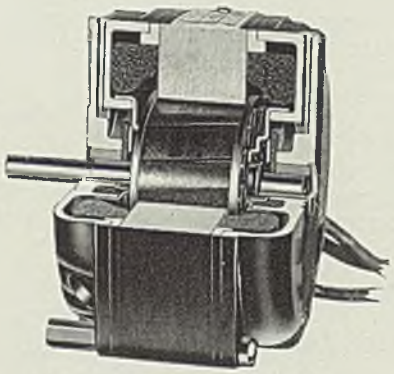
■ Musselman Products Co., 6227 St. Clair avenue, Cleveland, announces line of Doenut tires and



wheels featuring an outside valve. Valve does not contact rim at any point. Valve stem is flexible rubber and placed so as to be free from rubbing or scraping damage. Punctures are repaired without removing tire from wheel. Advantage is that it eliminates valve damage caused by creeping from under-inflated tires. Tires are available in three sizes—10 x 2.75-inch, 12 x 3.30-inch and 16 x 4.40-inch.

Capacitor Motor

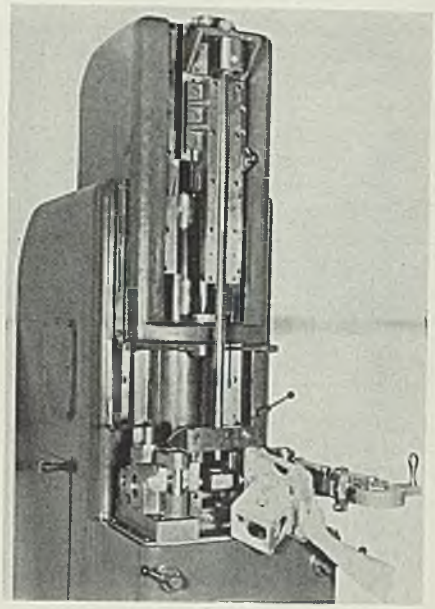
■ Bodine Electric Co., 2254 West Ohio street, Chicago, has placed on the market a small motor weighing less than 1½ pounds, for continuous operation in connection with industrial controllers, instruments, timers and similar applications. Excluding the ⅜-inch shaft, its dimensions are 2⅜ x 1⅝ inches. Designed as a capacitor motor, it can be supplied with three different windings—synchronous capacitor, nonsynchronous capacitor and dynamic braking capacitor. Standard ratings on 60 cycles are, respectively, 1/1500 horsepower at 1800 revolutions per minute, 1/1000 horsepower at 1700 revolutions per minute and 1/1500 horsepower at 1200 revolu-



tions per minute. Motor input is 8 watts or less. Motor can be reversed, even when running, by means of a single pole double throw switch. Operation is at 110-volts.

Broaching Machine

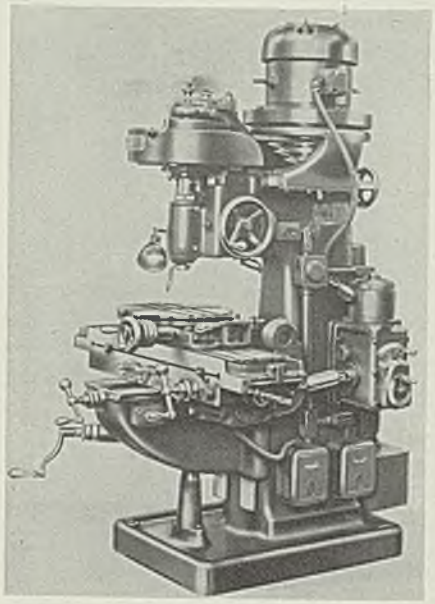
■ Colonial Broach Co., 147 Jos. Campau street, Detroit, announces a broach design and guiding method for maintaining accurate alignment when pull-broaching square or rectangular holes. As shown, broaching machine is equipped with automatic broach puller and broach handling mechanism. In operation, part is located in the rear face against fixture plate. It is also held with hardened blocks against the side faces, while the quick acting swing clamp is provided with equalizing points. When machine is started, broach handling cylinder, guide-support and broach all move downward. Puller engages lower end of broach and pulls it through the work. Broach is returned automatically into broach handling re-



tainer after part is removed. Machine is of 6-ton capacity, having a 42-inch troke.

Vertical Milling and Die Sinking Machine

■ Reed-Prentice Corp., Worcester, Mass., announces No. 3VG vertical milling and die sinking machine which incorporates a new design of auxiliary bracket using a back gear assembly to obtain slower spindle speeds than can be secured with direct belt drive. Back gear assembly, not shown in illustration, can



be used only with motors developing between 900 and 1500 revolutions per minute. New reducing bushing is supplied as standard equipment together with ½-inch collet.

Discuss Mill Problems At A.I.S.E. Meeting

■ INDUSTRY faces many deep rooted economic problems which effect the personal lives of thousands of industrial employes. Somehow a sound solution must be found, for the private enterprise system is at stake. Many today are preaching that private enterprise is not equal to its responsibilities. So away with it! But when private enterprise, with its incentives to the individual to strive, save, and work is basically altered or lost, then all hope of continued progress and a higher standard of living is doomed.

This was a portion of the message of C. R. Hook, president, American Rolling Mill Co., Middletown, O., who spoke at an informal dinner held in conjunction with the spring conference of the Association of Iron and Steel Engineers, at Hotel Netherland Plaza, Cincinnati, O., April 1-2. The meeting was attended by 525 members and guests.

Customers are demanding constantly improved quality, Mr. Hook continued. The best quality sheet of five years back will not do today. However, he explained, we cannot expect the demand for better quality to taper off. History shows it will increase. That, of itself is not undesirable; it is progress.

Involves Improvements

However to meet the demands for improved quality requires improved equipment, the speaker contended. And improved equipment means greatly increased capital investments in plants. Today, Mr. Hook pointed out, for every employe on the payroll the industry has about $11,000 invested in machines, materials, and other items necessary to provide a job. The sheet business, he asserted, has spent $550,000,000 for continuous mills and auxiliary equipment in the past ten years.

A. F. Kenyon, steel mill engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., pointed out at the morning session that the arrangement of the reversing slabbing mill and of the 80-inch continuous hot strip mill of the American Rolling Mill Co., Middletown, O., differs from the arrangement of most other strip plants in that the slabbing mill is designed to produce slabs up to the maximum width of strip which can be handled in the mill. By this arrangement, he explained, the broadside spreading stand and slab squeezer from the strip mill layout is eliminated and the rolling of full weight coils over the entire range of strip widths is effected.

The mill will handle ingots 20 x 57 inches weighing 17,500 pounds and will finish them into slabs 4 inches thick and 74 inches wide. The vertical edging mill is the largest ever built having rolls 40 inches diameter. The vertical rolls are driven by a 2000-horsepower reversing motor which is designed with small diameter, long bore armatures thereby increasing the acceleration.

Mill of Universal Type

The slabbing mill is of the modified universal type, in which the vertical roll edging stand is located 33 feet from the main horizontal roll stand. This unusual arrangement imposes special problems in control and operation, and the operator's pulpit is set into the motor room wall overlooking the table between the main and edging mills in order to afford the greatest visibility. The slabbing mill is driven by a 10,000-horsepower motor.

The speaker explained that the ingot can be turned before and after the spreading passes either on the front or back table. Special variable voltage control is utilized to locate the ultimate tapered rolls in the opposite directions to turn the ingot on the table, or in the same direction for normal operation back and forth through the mill.

The slab shear which will handle hot slabs, 6 inches thick and 72 inches wide, is driven by a variable-voltage motor and will handle 250 net tons in 8 hours.

D. A. McArthur, chief engineer, Wean Engineering Co. Inc., Warren, O., stated that the improvement in production, cost, and quality achieved in strip mill finishing departments in the last few years has been almost phenomenal. Pickling speeds in continuous lines have been tripled, and production of tin plate shearing lines has been increased from about 10 tons in 8 hours with poor accuracy to well over 65 tons per 8 hours with an accuracy of 1/64-inch plus or minus.

A large proportion of strip mill buildings is taken up by finishing operations, the speaker stated. Some plants are built with wide aisles and plenty of storage space. At other plants, lifts of material cannot be set down because of lack of finishing space. However, the speaker emphasized that without available space it is difficult to produce good quality material. The speaker recommended that welding equipment should be installed as a separate unit after the pickle line. This arrangement gives the advantage of a better weld.

At one installation a continuous temper tower is operated for continuous annealing of stock thus bypassing the electrolytic cleaning operation. Only small tonnages of strip are being tinned continuously by the electrolytic process though the speaker pointed out that in the future it is possible that some sizable tonnage will be processed by this method.

Variable-Speed Control Gains

The trend in finishing lines is toward variable-speed control. Great improvement must be made in the future to lower the cost and to keep customers satisfied, the speaker contended. While improvements in strip mill finishing equipment have been marked in the past, the demands for future improvements are equally as great and manufacturers will continue along this line without letup, the speaker stated in conclusion.

In commenting on Mr. McArthur's

D. A. McArthur (left), chief engineer, Wean Engineering Co., Warren, O., and A. F. Kenyon (right), steel mill engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

paper, C. L. McGranahan, assistant general superintendent, Jones & Laughlin Steel Corp., Pittsburgh, made a plea that equipment builders give to industry a setup capable of working small orders, say from 10,000 to 15,000 pounds. If many strip mills in this country are to continue to operate economically, it is essential that small lines be available. The speaker expressed some doubt regarding the building of large finishing space, stating that congestion will occur whether the floor capacity be 5 or 10 acres.

That increase in the speed of pickling lines up to 350 feet per minute has been accompanied by an increase of temperature of the pickling solution up to 210 to 220 degrees Fahr., was brought out by L. F. Coffin, superintendent mechanical department, Bethlehem Steel Co., Sparrows Point, Md. This has created a serious mechanical problem. What happens in the pickling line when the temperature exceeds 205 degrees is that the sulphur base cement expands ½ of 1 per cent. This, he explained, creates a pressure on the joint and results in a breakdown. The first indication of trouble is spreading joints.

Operating the tin plate cutup lines at high speed is another burden on the maintenance department. Such operation requires highly trained and skilled operators. We must have accurate gear cutting and grinding equipment, he stated in conclusion for without these, operations are almost impossible.

That Ward-Leonard control is making wide inroads in the field of auxiliary drives for hot and cold strip mills was brought out by E. S. Murray and H. W. Poole, steel mill section, industrial department, General Electric Co., Schenectady, N. Y. Some of the advantages and limitations of this type drive, as compared to constant potential drives are group speed control, speed regulation, practical operating range, acceleration and deceleration, electrical and mechanical maintenance, comparative first cost and relative requirements of control devices. From an operating and maintenance standpoint the speaker advocated this type of drive for slab squeezers, delayed tables, crop shears, flying shears, runout tables and coilers, and processing lines.

Mr. Poole in discussing his part of the paper was of the opinion that since faster pickling is being accomplished it will become necessary to control motors in tandem. He announced that new pickling lines are being built with Ward-Leonard control. In modern electrolytic cleaning lines a speed of 1250 feet per minute is being obtained and speeds as high as 1500 feet per minute are being anticipated.

Inspect Andrews Mill

Monday afternoon was devoted to an inspection trip of the Andrews Steel Co., and the Newport Rolling Mill Co., Newport, Ky. Approximately 250 members and guests made the trip in buses.

Open-hearth operators are facing the keenest competition in their history in the production of cheaper and higher quality steel ingots. This was the opinion of L. F. Reinartz, manager, Middletown division, American Rolling Mill Co., Middletown, O., who spoke at the evening session. Operators are asking for ideas as to how to increase the efficiency of existing furnaces from a ton per hour, cost per ton, and quality of steel standpoint.

Usually general managements have been farsighted enough to see the wisdom of such co-operative activity, and have gladly made available to the operators the services of the mechanical, refractory, combustion, metallurgical and production engineers. After this help has been made available, Mr. Reinartz explained, it is still up to the open-hearth superintendent to operate his shop. He alone can put the spark of enthusiasm into the working crew

to get the best results from the improved equipment and materials that have been provided. The engineer can advise but the operators must perform. The fact that so much progress has been made indicates the high degree of co-operation that has existed between the superintendent, his advisors and the workmen.

Mr. Reinartz used innumerable slides to show the progress that has been made in open-hearth design and operation during the past ten years.

G. D. Tranter, general superintendent, American Rolling Mill, Middletown, O., directed attention to the fact that successful operation and quality product require constant attention to details despite fundamental advantages of the continuous rolling process. Starting with the open hearth he emphasized that analysis limits, teeming temperatures, deoxidation, mold and ladle practice become absolutely essential under continuous mill practice. The same is true of soaking pit practice, he stated, with respect to uniform heating and forming the proper kind of scale jacket on the ingot.

Poor Practice Causes Defects

Mr. Tranter cautioned that roughing mill operation should not be under-estimated as poor practice may cause shape, gage and surface difficulties which cannot be corrected in subsequent operation. Surface and shape defects, he pointed out, depend upon the proper alignment of finishing rolls and guides, maintenance of correct relationship between drafts and mill speeds as well as close attention to roll surfaces. Defects arising from the various units of mill equipment may be greatly minimized by systematic preventive maintenance and detailed inspection.

The second day of the conference was devoted to an inspection of the American Rolling Mill Co.'s by-product coke ovens and blast furnaces at Hamilton, O., and the East Side works at Middletown, O. The group of 300 made the trip from Cincinnati to the various points by buses. Following the luncheon at Hotel Manchester at Middletown, G. M. Verity, chairman, American Rolling Mill Co., spoke. He said:

"There are some who believe that the only requirement for the creation of constructive ability is to get the proper machines and men, start them off and let them go. This is only the beginning. Managerial creative ability is essential to progress as well as to industry. Industry just cannot stand still; it must be going some place, it must be improving processes and products. It cannot be made without creative ability and this is not given to all mankind.

"Creative work comes from education and training and I wish it were possible for the public at large to understand the meaning of this. Some in this country understand it so well that they want to defeat it. The responsibility of management involves the question as to where to start and begin. You men are obliged to show management the things that are essential, the things which should have precedence.

"Two things demand that management be critical: First, environment around the plant and in the community in which the workmen live. Second, to create a fighting spirit in the hearts and minds of the men so that they will contribute their best in the thing in which they have a part."

Organizing a Weldery

(*Concluded from Page* 69)

ably steady market, the degree of its success depends entirely upon the skill, training, experience, resourcefulness and aggressiveness of the men comprising the organization. Such an organization would take time to build. Under favorable conditions, an aggressive competent manager with capable assistants could build a smooth-running profitable organization in about 3 years. Under the conditions which have existed during the past few years, however, it would take longer.

Rubber Mountings

(*Concluded from Page 47*)

mitted not only through the company's own building structure but also through the ground to apartments two blocks away. To eliminate these disturbances, the pump units were placed on rubber mountings with the load calculated to approximately 30 pounds per linear inch of mounting. These stopped the disturbances completely.

A different type of problem was experienced by a steam shovel manufacturer who encountered considerable trouble from breakage of the powerful lamps used in floodlights mounted on the boom. When the shovel picked up a load, the 60-foot boom often vibrated so severely that the lamps were broken. Floodlight reflector weighs 9 pounds and is mounted directly on a cross support of the boom. Five reflectors are used on each boom, spaced every 12 feet.

To overcome this breakage, each reflector now employs a 6-inch length of rubber mounting to eliminate the side-sway which otherwise would occur, Fig. 4. Results have been quite satisfactory as delay in shovel operation caused by breakage of the floodlamps has been practically eliminated.

Rubber mountings may be used to cushion impact as shown in the steam drop hammer installation, Fig. 2. Anvil and foundation weigh 170,000 pounds. The blow is caused by a weight of 6000 pounds falling a distance of 60 inches. Before rubber mountings were applied, hammer transmitted vibration to buildings several hundred feet away in the form of small "earthquakes."

A special base, Fig. 2, was designed using over 300 rubber mounting units so that the entire anvil floats independently of surrounding floor. Amplitude of the ground vibrations is reduced 75 to 99 per cent. After three years' service, these mountings are functioning perfectly, as are numerous others subsequently installed. Either the anvil or the complete hammer can be carried by mountings in such installations.

Relative Movement Necessary

Mountings are installed to *permit relative movement to take place between a mechanism and its foundation.* Of course conduits, pipes, driving connections, control rods and other connections to the mechanism must be arranged to interfere as little as possible with freedom of such movement. Where a supported unit is carried on a vehicle, it is necessary to place the mountings as close as possible to a horizontal plane through the center of gravity of the mechanism if adequate stability is to be provided.

When rubber is stressed in compression for use as rubber springs, provision must be made for the bulge at right angles to direction of the load since rubber is practically as noncompressible as water. Obviously the bulge area of thin slabs is much less than that of thick slabs. Ratio between load-carrying area and bulge area then offers a means of calculating the deflections of slabs of known dimensions and physical properties if reliable data are available.

Like that of any other material, the life of rubber springs depends entirely upon the service conditions encountered. Under favorable circumstances, mountings may be expected to be in good condition at the end of at least six years.

Whether to use rubber mountings or not is largely a matter of economics. While refinements in machinery itself no doubt have lessened vibration, people today demand much lower noise levels with still less vibration. It frequently is less costly to install adequate rubber mountings to provide insulation against noise and vibration than it is to strengthen buildings, increase strength of structural members, install heavier foundations or move to other locations. The field for rubber mountings may expand rapidly as possibilities of these units become better known.

Speeding Shipments

(*Continued from Page* 52)

veyor is delivering fans to the central bridge conveyor, vacuum cleaners may be accumulating on the second floor conveyor. After the second floor conveyor is loaded up to a certain point, a howler sounds in the warehouse signaling the dispatcher that he must relieve the conveyor within 10 minutes or it will stop.

That would make it necessary for the packers to temporarily store the vacuum cleaners on the floor, resulting in extra handling and confusion. So on receiving this signal, the dispatcher pushes a button on the control panel stopping delivery of the fans from the third floor conveyor and pushes another button starting delivery of vacuum cleaners from the second floor conveyor. Control panel above dispatcher's desk is shown in Fig. 4.

On the second floor of the warehouse, W in Fig. 1, is a network of conveyors that connects at the northwest corner to the central receiving bridge conveyor and which discharges to a spiral chute in the southeast corner that carries the merchandise on to the shipping section for dispatch via freight cars and motor trucks. A sketch of the second floor conveyor system is shown in Fig. 5.

No Elevators in Warehouse

The handling system on the second floor has two power driven belt level conveyors running the length of the warehouse. A high level on the west side and a low level on the east side. The west side conveyor can be seen in Fig. 3. These level conveyors are connected by four gravity roller conveyors spaced 96 feet apart and by means of simple hand defectors, the merchandise can be shunted off on any one of these spurs. With this layout, 48 feet is the maximum distance that merchandise is taken from the conveyor for storage or from storage to the conveyor for shipment.

A longitudinal view of the second floor of the warehouse building W is shown in Fig. 6. This picture shows the cross gravity roller spur conveyors that connect to the high and low level power conveyors; also one of the monitor bays previously mentioned. Notice the excellent lighting that this construction provides. The warehouse is heated throughout by unit steam heaters, upper right in Fig. 6.

There are no elevators in this building. A lift, Fig. 7, of a thousand pounds capacity is used for conveying the large fans to the first floor shipping section.

A spiral chute of gravity rollers carries the products from the discharge end of the second floor conveyor system, Fig. 8, to the first floor. This connects to a level power-driven top-roller type conveyor extending 300 feet through the first floor of the warehouse, and the entire length of the train shed. A roller curve can be set at any point on this conveyor to divert the merchandise into the freight cars for loading. The spiral chute conveyor and roller curve with a car of fans under load, is shown in Fig. 9.

A portable section is attached to the extreme end of this conveyor to deliver right into the trucks that also load inside the warehouse.

The first floor of the "W" building is devoted mainly to the storage of air conditioning equipment and renewal parts plus the packing and shipping section.

(Concluded Next Week)

♦

Continuous Casting

(*Concluded from Page* 58)

aluminum and other nonferrous metals; possibility of great economies due to eliminating roughing and slabbing operations; improved grain structure of the ingot elimination of large investment in molds, mold-storage and mold-heating equipment; increased production per square foot of plant area involved; and faster operation of entire casting process. Actual detailed figures of production economies are expected to be available shortly.

What happens if the thin mold wall ruptures? Although there was no indication of any weakening in even the thinnest walls used—there being no wear or abrasion of the metal—the wall was purposely punctured to see what would happen. Due to the water pressure, water was forced up through the molten metal. However, since top of mold is always open, there was nothing approaching an explosion or any other hazard. Since neither the molten metal nor the water is confined during such an occurrence, there is no possibility of trouble.

What happens if water splashes on top of the molten metal in the mold? It simply vaporizes rapidly. It was found in tests that the molding operations could even be performed satisfactorily when molten metal was poured through a layer of water lying on top surface of the ingot being cast.

Thus there are no extraordinary hazards connected with this process. It is fully as safe as ordinary casting methods and perhaps safer because there is no danger of water in a mold generating steam which may be trapped with resulting trouble. At the same time, it is not necessary to employ a large number of molds with accompanying storage, handling and heating problems.

Kitchen Ventilator

■ Vent-A-Hood kitchen ventilator has been placed on the market by the Vent-A-Hood Co., Dallas, Tex. It is available in standard or special sizes for every kitchen plan. It is made of Armco Paintgrip sheets, a galvanized metal with a special bonderized finish to take paint.

Forging Machine with Integral Frame Permits Greater Accuracy

■ A HUGE 8-inch upsetting forging machine said to be the largest produced with a one-piece integral frame has been built by Ajax Mfg. Co., 1441 Chardon road, Cleveland. The rigidity provided by this construction makes the machine more flexible for handling jobs, and allows greater accuracy in the alignment of dies with subsequent closer forging tolerances.

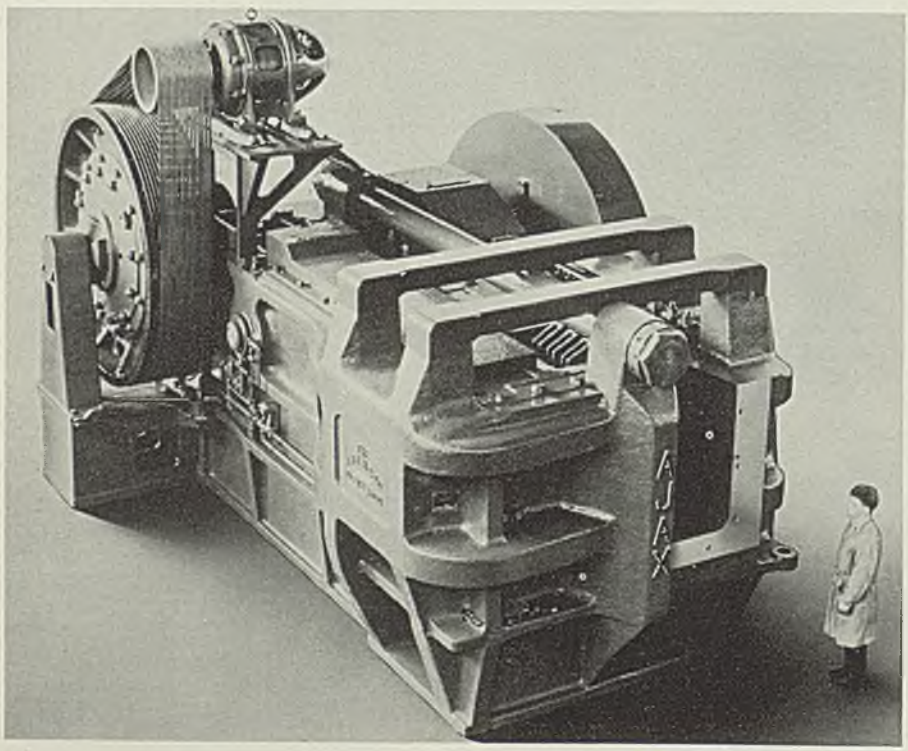
Frame of machine was made integral by eliminating joint between crankshaft and dies. This also provided the longitudinal rigidity. The transverse rigidness is due to the deep C clamp distribution of metal beneath the throat and two heavy transverse tie clamps above.

Dies Have Large Openings

Machine accommodates dies 46 inches high which means that as many as four progressive operations for fabricating heavy forgings from large stock can be handled entirely within the die seat of the machine. Large opening of dies permits transferring large work up and down between various passes without interference. It is driven by a 150-horsepower motor through a V-belt drive to a flywheel and air-clutch assembly. Tripping of a small foot valve engages the air clutch.

Heated stock from furnaces on either side of the machine are fed by means of cranes. These same cranes support the bars in position between the dies for the operator, and return them to the furnace for heating for the next forging.

Illustrated 470,000-pound forging machine is easy to operate in spite of its size. Small foot valve causes air clutch to engage instantly, this response being a factor in scheduling the machine up to its limit



MEETINGS

(*Concluded from Page* 38)

sponsorship of the Chicago section, American Chemical society. First exposition will be held at the Stevens hotel, Dec. 11-15. Emphasis will be placed on chemical products, with scientific exhibits included.

Approximately 32,000 square feet of space will be available, and it is expected that 300 exhibitors will reserve booths. M. W. Hinson, 110 North Franklin street, Chicago, has been named exposition manager.

BROAD PROGRAM FOR A.S.M.E. MEETING IN WORCESTER

American Society of Mechanical Engineers has completed the program for its spring meeting at Hotel Bancroft, Worcester, Mass., May 1-3. Highlights of the meeting will include technical sessions on management, machine shop practice, fuels, iron and steel, materials handling, and hydraulics; luncheons and dinners, and visits to numerous industrial plants.

Dr. John F. Tinsley, president and general manager, Crompton & Knowles Loom Works, Worcester, and president, Associated Industries of Massachusetts, will address the luncheon on May 1. At the banquet on May 2, Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., and past president of the society, will speak on "The Progress Report of an Amateur Economist."

Portions of the meeting program of particular interest to the metalworking industries are as follows:

Wednesday, May 1
MORNING

Management

"A Personnel Program for a Small Plant," by Harold B. Bergen, industrial relations consultant, McKinsey & Co., New York.

"Merit Rating of Employes," by C. R. Dooley, manager, industrial relations, Socony-Vacuum Oil Co., New York.

EVENING

Machine Shop Practice

"Deep Hole Drilling by the Automatic Step Drilling Method," by Eric Hirvonen, Leland-Gifford Co., Worcester, Mass.

"High-Speed Photography and Study of Rapid Machine Motions," by Victor Sepavich and Albert Palmer, engineer, charge of research and development, Crompton & Knowles Loom Works, Worcester, Mass.

Thursday, May 2
MORNING

Fuels

"Purchase and Use of Fuel," by E. Wadsworth Stone, research and consulting engineer, Bigelow-Sanford Carpet Co. Inc., Thompsonville, Conn.

"Effect of Coal Characteristics on Pulverized Coal Firing," by Ollison Craig, engineering manager, Riley Stoker Corp., Worcester, Mass.

"Recent Developments in Oil Burning," by R. C. Vroom, chief engineer, Peabody Engineering Corp., New York.

Iron and Steel

"The Forge of Vulcan," by John W. Higgins, president, Worcester Pressed Steel Co., Worcester, Mass.

"The Aluminum Alloy Aircraft Dome," by Harold T. Burke, chief tool designer, Worcester Pressed Steel Co., Worcester, Mass.

"The Pressed Steel Industry," by Carter C. Higgins, sales engineer, Worcester Pressed Steel Co., Worcester, Mass.

Friday, May 3
MORNING

Materials Handling

"Some New Types of Materials Handling Equipment," by Russell Hastings, chief engineer, Lewis-Shepard Sales Corp., Watertown, Mass.

"Machine Tool Transfer Methods," by A. L. Wilkinson, Leland-Gifford Co., Worcester, Mass.

Iron and Steel

"Factors in Fatigue of Helical Springs," by R. R. Tatnall, metallurgical engineer, Wickwire Spencer Steel Co., Worcester, Mass.

"Combined Tension-Torsion Tests on 0.35 Carbon Steel," by Evan A. Davis, research engineer, Westinghouse Electric & Mfg. Co., Philadelphia.

< < < HELPFUL LITERATURE > > >

(1)—Indoor Transformers

Allis-Chalmers Manufacturing Co.—4 page illustrated bulletin No. B-6043. "Chlorextol" transformers, using the new non-inflammable insulating liquid, eliminate need for fire-proof vaults in interior installations. They have the same electrical characteristics as oil insulated types. By installing them in unused space near load centers, increased economy is claimed in power consumption, installation costs and maintenance.

(2)—Air Compressors

Worthington Pump and Machinery Corp.—6 page illustrated bulletin No. H-620-B22. Balanced-angle, two cylinder air compressors with four inch stroke are described. These air cooled units are available in four sizes and are heavy duty machines. Air cooling eliminates freezing hazard. Design features are set forth.

(3)—Corrosion Prevention

American Chemical Paint Co.—6 page illustrated bulletin No. 13-5. "Clorodine" is an inhibited muriatic acid solution for removing lime deposits and rust from all kinds of machinery and equipment that use circulating water for cooling, and in pipe and water lines. Its action and methods of use are described.

(4)—Molybdenum In Die Steel

Climax Molybdenum Co.—4 page illustrated bulletin No. 2-40, in which die steel of five per cent chromium and one per cent molybdenum is discussed. Said to offer excellent hardenability, freedom from distortion, and comparatively low cost. This is a technical bulletin.

(5)—Metalworking Machinery

Hannifin Manufacturing Co.—22 page illustrated bulletin No. 49, describing and giving specifications of metalworking machinery for punching, shearing, notching, cutting off, squaring, splitting, riveting, bending, forming and straightening.

(6)—Double Crank Presses

Niagara Machine & Tool Works—42 page illustrated bulletin No. 64-F, describing double crank presses. Specifications, uses and detailed descriptions of friction clutches and air clutches are included. Gang punches and press brakes are also covered.

(7)—Turret Lathe Tools

Jones & Lamson Machine Co.—58 page illustrated, wire bound book No. 39-182. Describes universal turret lathe tools, dimensional diagrams and tool numbers for various machines, and tools for flat turret lathes. Conveniently indexed.

(8)—Broaching Machines

The Oilgear Co.—16 page illustrated bulletin No. 24001. Type "XD" fluid power variable speed double slide vertical surface broaching machines with automatic shuttle tables are described. Duplicate, sequent or separate operations can be performed quickly by a single operator on this machine. Full specifications and numerous typical setups in various types of work are shown.

(9)—Fans

Garden City Fan Co.—12 page illustrated catalog No. 370. Describes fans for high temperatures. A number of sizes for handling air and gases as high as 1600 degrees F. are covered. A patented air cooled shaft with heat resist type bearings eliminates need for water cooling.

(10)—Ball Bearings

Nice Ball Bearing Co.—66 page illustrated wire-bound catalog No. 110, which includes information on radial ball bearings, thrust ball bearings, combination type ball bearings, ball retainers, casters, ball bearing sheaves, ball bearing wheels and special types. A price list is included.

(11)—Air Vise

The Larkin Air Vise Co.—Illustrated bulletin describing the Larkin air vise, a unit for production work which eliminates lost time on bench work, drill press work, milling, shaping, planing, and other general machine shop and tool room operations. Specifications and complete price list are given.

(12)—Motor-Generator Sets

Reliance Electric & Engineering Co.—4 page illustrated bulletin No. 502. Motor-generator sets up to 500 kw are described and features of design and construction pointed out. Advantages of various types are given. Shop and installation views are included.

(13)—Sheet Metal Welding

Linde Air Products Co.—16 page illustrated booklet No. 4435. Booklet covers such subjects as design factors, control or expansion and contraction, use of jigs, weldability of material, and welding procedure, for fabricators of light-gage metal.

(14)—Drills

Whitman & Barnes Div., United Drill and Tool Corp.—4 page illustrated bulletin describing and listing six types of high speed jobbers', wire gauge and letter size drills suitable for drilling metals and other materials. A price list is included.

(15)—Die Casting Cleaning

MacDermid Inc.—Technical data sheet describing the "Dyclene" process for cleaning zinc and aluminum die castings. Two methods are possible, one being a two-tank cleaning cycle and the other for plants already having appreciable investment in degreasing or pressure alkali machines. This method is said to eliminate peeling and blistering of plated parts up to temperatures of 300 degrees F. for one hour.

(16)—Laboratory Equipment

C. J. Tagliabue Mfg. Co.—18 page illustrated catalog No. 1100B. Laboratory thermometers and hydrometers of all standard types are shown and described. Methods of manufacture and instructions for use are covered. Specific gravity conversion tables and temperature conversion tables are included.

(17)—Pumps

S. Morgan Smith Co.—20 page illustrated bulletin No. 142, covering axial flow pumps. Performance characteristics, structural details and examples of actual use are included. This pump has an automatically adjustable blade impeller. Fixed blade pumps are also described briefly.

(18)—Die Heads

Eastern Machine Screw Corp.—4 page illustrated bulletin No. 11. Style "MM" insert chaser die heads for rotary die spindles are described. For use on numerous standard make machines. Simplified installation and rapid accurate adjustment are claims made for its use. Low cost and increased production are claimed.

(19)—Precision Switches

Micro Switch Corp.—4 page illustrated bulletin and data sheet No. 20, describing the Micro Switch, a precision unit for loads up to 1200 watts at 600 volts or less. Typical circuits and cut-away pictures show methods of use and construction. Several types of actuators and housings are available.

(20)—Materials Handling

Electric Storage Battery Co.—4 page illustrated bulletin No. 4100, explaining the Exide system of industrial truck analysis in which a special odometer and test unit is utilized to determine electric storage battery truck efficiency.

(21)—Thread Cutting

Landis Machine Co.—8 page illustrated bulletin No. IF. The complete line of thread cutting machines and tools made by this company is illustrated and briefly described. Advantages of using this equipment are set forth.

STEEL

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«« HELPFUL »» LITERATURE

(Continued)

(22)—Metal Surface Treatment

Metallizing Engineering Co., Inc. — 8 page illustrated bulletin No. P-11. "Metcolizing", a process of surface treating iron and steel and sometimes copper and bronze against oxidation and scaling at high temperatures, and for protecting nickel chrome alloys against sulphurous gases, is described and its methods of application outlined. Applications and results of tests are discussed.

(23)—Arch Hanger

Frazier-Simplex, Inc.—16 page illustrated catalog on the features and assembly of this company's patented interlocking suspended arch for arch, nose and suspended wall construction in various types of furnaces. Both interlocking tile and linked type hangers are fully described. Typical installations and diagrammatic drawings are included.

(24)—Electrical Insulation

General Cable Corp.—Data sheet No. COM-S-LCK, describing "Insolozite", a plastic filling compound which is insoluble in oils or compounds used in process of impregnating paper-insulated lead-covered cables. Physical and electrical characeristics are given. "Ozite B" and low voltage "Ozite" are also described.

(25)—Electric Welder

Lincoln Electric Co.—4 page illustrated bulletin No. 308. The 200 ampere "Shield-Arc Junior" electric welder with self-indicating dual continuous control is described. This unit will weld practically all types of metals and alloys and will do hard-facing work. Installation views and specifications are included.

(26)—Heat Treating

American Manganese Steel Div., American Brake Shoe & Foundry Co.—8 page illustrated bulletin No. 99. "Flexboxes", sectionalized heat treating boxes, and other containers of Amsco alloy for carburizing, annealing, malleableizing and other heat treating operations are described. Analyses of six grades of this alloy are covered.

(27)—Direct Drive Coupling

Guardian Utilities Co.—6 page illustrated folder. These couplings are designed for all types of drive for resiliently mounted motors and are available in numerous sizes. Twenty standard sizes are listed and priced. Drawing of typical coupling shows design and construction.

(28)—Metal Cutting Machines

Peerless Machine Co.—12 page illustrated bulletin No. 50, describing several types of hydraulic automatic metal sawing machines for production work. Types of work handled are shown in descriptive sections. Specifications and advantages of use are set forth.

(29)—Gear Finishing

Michigan Tool Co.—16 page illustrated booklet No. 101-165. Discusses various methods of gear finishing. Edited for the practical shop man. Covers rotary and rack shaving finishing methods, and "Curve-Shaving". Uses as well as limitations of "Curve-Shaving" are discussed.

(30)—Electric Motors

The Emerson Electric Mfg. Co.—4 page illustrated folder No. X-3558, picturing and briefly describing their complete line of stock motors, 5 HP and smaller. Performance data, general description and price data on repulsion-induction, capacitor, split phase, polyphase and direct current motors are given.

(31)—Movable Walls

Johns-Manville — 20 page illustrated bulletin No. TR-22A, describing "Transite" movable asbestos walls for industrial and office use. Case histories of installations, construction details and specifications, and descriptive information are given. Walls of both temporary and permanent types are discussed.

(32)—Furnace Firing

Surface Combustion Corp.—4 page illustrated bulletin No. SC-90. "Conjecto-Firing" is a system of furnace heating in which an auxiliary supply of air is intimately mixed with hot products of combustion, resulting in closer temperature control and meeting demands for a furnace with wide temperature range. Operating data and installation information are given.

(33)—Welding Positioners

Cullen-Friestedt Co.—4 page illustrated bulletin No. WP19. Welding positioners in three models, with capacities of 2500, 6000 and 14,000 pounds are described. Safety, economy, speed and accuracy are claims made for the unit. Permits welding on sides, top and bottom without changing set-up.

(34)—Portable Pyrometer

Russell Electric Corp.—6 page illustrated bulletin No. 500, describing the "Hold-Heet", portable, lance type pyrometer, for determining temperature in molten metals or on the surface of billets, slabs, forgings, etc. Thermocouples of various lengths are available. Prices are given.

(35)—Electric Instruments

Foxboro Co.—4 page illustrated bulletin No. DMF-797. "Teletax" electric transmission instruments for measurement and control are described. This system is used for transmitting measurement and control between two separated points and its use for conditions involving temperature, pressure, flow, time-motion, liquid level and other variables is covered. Available in numerous types.

(36)—Fire Extinguishers

Pyrene Manufacturing Co.—8 page illustrated bulletin No. AD214, describing the "Guardene" and "Phomene", new seamless drawn shell fire extinguishers for industrial use. The "Guardene" extinguisher is a soda-acid type and the "Phomene" is a foam type extinguisher. Characteristics of each type extinguisher are given and advantages of each are set forth.

(37)—Dilatometer

Bristol Co.—Illustrated bulletin No. 546, describing the new Rockwell-Bristol Dilatometer. Essential facts on the new development including; split type furnace, rheostat controller; potentiometer controller for temperatures and time element recordings; and the quenching tank; are covered. A sample chart with record is shown.

(38)—Per Cent of Thread Chart

R. G. Haskins Co.—4 page illustrated bulletin No. T-3-9395. This new chart shows tap drill sizes and percentages of threads. Engineering data for obtaining tap drill sizes is given. The Haskins air control tapping machine is described and its features presented.

(39)—Creep Stress Data

The Babcock & Wilcox Tube Co.—Technical data card No. 4, covering relative creep stress data on "Croloys" 2 and 2¼ and other materials in the same range in high temperature tubing field. Arranged in tabular form for easy reference.

(40)—Porcelain Enamel

Porcelain Enamel & Manufacturing Co.—4 page illustrated bulletin showing recently installed materials handling system for improving quality of porcelain enamels, frits, coloring oxides and supplies manufactured by this company.

(41)—Materials Handling

Blaw-Knox Co.—40 page illustrated catalog No. 1696, in which clamshell buckets of several types, dump buckets and ingot tongs are described. All are designed for single drum hoists. Service hints and application data are given.

(42)—Bonded Metals

American Nickeloid Co.—Samples of bright chrome brass, striped chrome tin and satin chrome copper illustrate the title of this bulletin "Showmanship that Sells". The materials are prefinished and require no plating or polishing.

STEEL
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Export orders important support to bookings. Railroad equipment more active. March pig iron output off

MARKET I
TABLOID

Demand
Sustained or trifle heavier
domestic markets.

Prices
Generally steady on mo
products. Scrap down.

Production
Up ½-point to 61½ per cen

■ VARIATIONS in steel buying and production are small but generally are for the better. Seasonal gains in some products and heavier export business are contributing to sustained total business and to the arresting of previous shrinkage in steelmaking.

Ingot production last week recovered ½-point to 61½ per cent, compared with a 1-point drop to 53½ per cent a year ago. Precedent would call for declining operations the next six to eight weeks, but unusual market conditions since last fall have distorted the common seasonal trend of steelmaking. Nevertheless, buying has recovered insufficiently to indicate any marked upturn in output is in immediate prospect.

Steel buyers who have re-entered the market after curtailment of inventories accumulated early this year, are ordering conservatively. With prompt delivery available and higher prices improbable soon, there is little incentive to cover future needs. On the other hand, recent advances in export prices on certain products have been instrumental in driving in some pending foreign business.

Export trade currently is estimated to account for approximately 15 per cent of total finished and semi-finished steel shipments. The percentage has risen steadily since last fall but still is somewhat less than the share represented by foreign deliveries in 1917 and 1918. The past few years exports averaged about 5 per cent of total steel shipments.

Domestic steel consumption is spotty but still heavy in many directions. Automobile assemblies dipped 1715 units to 101,655 last week, and although retail sales continue active, relative large stocks will make unnecessary the sharp bulge in operations which frequently has marked spring months. Output holds nearly 20 per cent higher than a year ago.

Railroad equipment markets are livelier. New York Central has ordered 50 locomotives and will build 1500 hopper cars in a subsidiary's shops. Several thousand additional cars are pending for other roads, while foreign inquiries include 50,000 tons of rails and 15 to 20 locomotives for Brazil and 500 box cars for Siam.

Structural shape awards are heavier. Inquiries are increasing but small jobs predominate. Among larger pending inquiries are grade crossing eliminations at Brooklyn and Syracuse, N. Y., involving 7000 and 6000 tons, respectively. Reinforcing bar orders include 6000 tons for army barracks, Panama Canal. The navy has divided orders for 14,000 tons of various steel products between two producers for miscellaneous requirements.

Tin plate releases from container manufacturers are increasing slowly, and tin mill operations have recovered 4 more points to 60 per cent. First quarter shipments were up to expectations, and the outlook is considered favorable.

Pig iron production declined less rapidly in March than did steelmaking. Average daily output of the former last month was 105,502 net tons, off 7.4 per cent from 113,943 tons in February but 22 per cent larger than 86,465 tons a year ago. Total production the past three months was 10,599,499 tons, an increase of 42.6 per cent over the corresponding 1939 period.

Farm equipment production accounts for relatively heavy steel consumption, although in the Chicago district the industry's operations are receding. Farm markets for wire products are improving slowly. Late appearance of mild weather in many sections has caused some business in fencing, barbed wire and galvanized sheets to be lost for this season.

Scrap prices still tend toward weakness, in view of quiet in domestic demand and in spite of comparatively small offerings. The composite is off 8 cents to $16.09. Four boats carrying 20,000 tons of scrap left New York last week for England, one of the heaviest movements in several months.

Finished steel prices are subject to the irregularities common to a period of moderate demand. However, except for reinforcing bars, which are in a disorganized market, no general break has occurred in quotations.

Steelmaking gains last week included 1 point to 57½ at Chicago, 2½ points to 46½ at Buffalo, 3 points to 81 at Birmingham, 7½ points to 53 at Cincinnati and 12 points to 51 at St. Louis. Wheeling dropped 10 points to 61, and Cleveland and Youngstown each was down 1 point to 68 and 42, respectively. Unchanged were Pittsburgh at 57½, eastern Pennsylvania at 59, New England at 65 and Detroit at 79.

COMPOSITE MARKET AVERAGES

	Apr. 6	Mar. 30	Mar. 23	One Month Ago Mar., 1940	Three Months Ago Jan., 1940	One Year Ago Apr., 1939	Five Years Ago Apr., 1935
Iron and Steel....	$36.83	$36.81	$36.84	$36.83	$37.09	$36.34	$32.29
Finished Steel	56.10	56.10	56.10	56.10	56.10	56.50	54.00
Steelworks Scrap..	16.09	16.17	16.25	16.47	17.48	14.64	10.05

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

	Apr. 6, 1940	Mar. 1940	Jan. 1940	Apr. 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.25c
Steel bars, Chicago	2.15	2.15	2.15	2.25
Steel bars, Philadelphia	2.47	2.47	2.47	2.57
Iron bars, Chicago	2.25	2.25	2.30	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.20
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	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	1.92

Pig Iron

	Apr. 6, 1940	Mar. 1940	Jan. 1940	Apr. 1939
Bessemer, del. Pittsburgh	$24.34	$24.34	$24.34	$22.34
Basic, Valley	22.50	22.50	22.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	24.21	22.21
No. 2 foundry, Chicago	23.00	23.00	23.00	21.00
Southern No. 2, Birmingham	19.38	19.38	19.38	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	22.89	20.89
No. 2X, del. Phila. (differ. av.)	25.215	25.215	25.215	23.215
Malleable, Valley	23.00	23.00	23.00	21.00
Malleable, Chicago	23.00	23.00	23.00	21.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	28.34
Gray forge, del. Pittsburgh	23.17	23.17	23.17	21.17
Ferromanganese, del. Pittsburgh	105.33	105.33	105.33	85.33

Heavy melt. steel, Pitts.	$16.75	$17.05	$18.15	$15.50
Heavy melt, steel No. 2, E. Pa.	15.50	15.90	16.80	13.65
Heavy melting steel, Chicago	15.00	15.50	16.45	13.35
Rails for rolling, Chicago	18.25	18.25	19.05	17.25
Railroad steel specialties, Chicago	18.00	18.35	18.50	15.35

Connellsville, furnace, ovens	$4.75	$4.75	$4.75	$3.75
Connellsville, foundry, ovens	5.75	5.75	5.75	5.00
Chicago, by-product fdry., del.	11.25	11.25	11.25	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.37c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast points	2.60c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30 50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c

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 points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.05c
Chicago or Gary	2.05c
Detroit, delivered	2.15c
Cleveland	2.05c

Buffalo	2.05c
Birmingham	2.05c
Gulf ports	2.40c
Pacific Coast points	2.65c

Iron

Chicago	2.25c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	1.70-1.90c
Gulf ports	2.05-2.25c
Pacific Coast ports	2.05-2.25c

Rail Steel Bars, Base

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	1.70-1.90c
Gulf ports	2.05-2.25c
Pacific Coast ports	2.05-2.25c

The above represent average going prices. Last quotations announced by producers were 2.15c, mill base, for billet bars and 2.00c for rail steel.

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	3.30c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast points	2.70c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

	U.S.S.	S.A.E.
Semifinished hex. ½-inch and less.	67	70
⅝-1-inch	64	65
1⅛-1½-inch	62	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset, 1-in., smaller	70.0 off

Square Head Set Screws

Upset. 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific coast ports	2.90c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.98
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	.....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.) $2.00
Do., over ⅝ to 11/32-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.45.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.35- 4.60
Connellsville, fdry.	5.00- 5.75
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	25.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.§	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	23.50	23.50	23.00	....
St. Louis from Birmingham	†23.12	...	22.62	....
St. Paul from Duluth	25.63	25.63	....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	22.00
Do. barge	22.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, lump and bulk, carlots tide., duty pd. $100.00
Ton lots 110.00
Less ton lots 113.50
Less 200 lb. lots 118.00
Do., carlots del. Pitts. 105.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 32.00
Do., 26-28% 39.50

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 82.00
Do., 75 per cent 126.00
Do. ton lots 142.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon, 103.00
2% carbon, 108.00; 1%, 118.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots 1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls 2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton 142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 84.00c
Do., spot 89.00c
88% chrome, contract 83.00c
Do., spot 88.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $69.50
Ton lots 79.50
Less-ton lots, lb. 3.75c
Less 200 lb. lots, lb. 4.00c
Spot ¼-cent higher.

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	4.16	5.16	3.85	3.85	5.66	3.81	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	4.50	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.75	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.25	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.75	3.35	3.65	8.15	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.60	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	5.00	3.88	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.73	3.54	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.95	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.75	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	....	5.71	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.00	4.00	6.40	4.30	6.50	5.25	....	6.60	10.65	9.80
San Francisco	3.50	4.00	6.00	3.35	3.35	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.20	5.75	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	3.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, any quantity in New York. 150-1499 pounds in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, April 4

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports: £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons: **Quoted in gold pounds sterling: £ s d
Foundry, 2.50-3.00 Si.	$21.36 6 0 0	$32.80	3 17 0
Basic bessemer	....	.....	.....
Hematite, Phos. .03-.05	22 25 6 5 0	.....	.....
Billets	....	$31.95	3 15 0
Wire rods, No. 5 gage	....	59.64	7 0 0
Standard rails	$37.38 10 10 0	$48.99	5 15 0
Merchant bars	2.14c 13 9 0	2.74c	7 4 0
Structural shapes	1.93c 12 2 6	2.81c	7 8 0
Plates, †¼ in. or 5 mm.	2.04c 12 17 6	3.28c	8 12 6
Sheets, black, 24 gage or 0.5 mm	2.70c 17 0 0	2.96c	7 16 0°
Sheets, gal., 24 ga., corr.	3.10c 19 10 0	4.29c	11 6 0
Bands and strips	....	2.66c	7 0 0
Plain wire, base	....	3.23c	8 10 0
Galvanized wire, base	....	3.90c	10 5 0
Wire nails, base	....	3.71c	9 15 0
Tin plate, box 108 lbs.	$ 5.79 1 12 6	.....	.....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reichs §§Mar
Fdy. pig iron, Si. 2.5.	$19.76 5 11 0(a)	$15.92	788	$32.05	940	$25.33 63
Basic bess. pig iron	18.60 5 4 6(a)	.....	.....	30.69	900	27.94 (b) 69.50
Furnace coke	5.63 1 11 8	4.55	225	11.25	330	7.64 19
Billets	33.38 9 7 6	23.49	1.163	43.48	1,275	38.79 93.50
Standard rails	1.77c 11 3 0	1.43c	1,588	2.06c	1,375	2.38c 132
Merchant bars	2.23c 14 0 0††	1.31c	1,454	2.06c	1,375	1.98c 110
Structural shapes	1.97c 12 8 0††	1.27c	1,414	2.06c	1,375	1.93c 107
Plates, †¼-in. or 5 mm.	1.99c 12 10 6††	1.66c	1,848	2.42c	1,610	2.29c 127
Sheets, black	2.78c 17 10 0§	1.97c	2,193‡	2.85c	1,900‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.18c 20 0 0	2.57c	2,850	4.80c	3,200	6.66c 370
Plain wire	3.10c 19 10 0	2.11c	2,340	3.00c	2,000	3.11c 173
Bands and strips	2.35c 14 15 0††	1.47c	1,632	2.18c	1,450	2.29c 127

†British skip-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	15.00
Bos. dock No. 1 exp.	15.00
New Eng. del. No. 1	14.00
Buffalo, No. 1.....	15.50-16.00
Buffalo, No. 2	14.00-14.50
Chicago, No. 1.....	14.75-15.25
Chicago, auto, no alloy	14.00-14.50
Chicago, No. 2 auto	12.00-12.50
Cincinnati dealers..	12.50-13.00
Cleveland, No. 1 ...	16.00-16.50
Cleveland, No. 2 ...	15.00-15.50
Detroit, No. 1	†12.75-13.25
Detroit, No. 2	†11.75-12.25
Eastern Pa., No. 1..	16.50-17.00
Eastern Pa., No. 2..	15.50
Federal, Ill. No. 2..	13.00-13.50
Granite City, R. R..	14.00-14.50
Granite City, No. 2.	12.75-13.25
Los Ang., No. 1, net	11.50-12.00
Los Ang., No. 2, net	10.50-11.00
N. Y. dock No. 1 exp.	13.75
Pitts., No. 1 (R. R.).	17.50-18.00
Pittsburgh, No. 1..	16.50-17.00
Pittsburgh, No. 2..	15.00-15.50
St. Louis, R. R.	†14.00-14.50
St. Louis, No. 2....	12.75-13.25
San Fran., No. 1, net	11.50-12.00
San Fran., No. 2, net	10.50-11.00
Seattle, No. 1	14.50-15.50
Toronto, dirs., No. 1	11.00
Valleys, No. 1.....	16.25-16.75

COMPRESSED SHEETS

Buffalo, new	14.50-15.00
Chicago, factory...	13.75-14.25
Chicago, dealers...	12.50-13.00
Cincinnati, dealers..	12.00-12.50
Cleveland	15.50-16.00
Detroit	†13.50-14.00
E. Pa., new mat. ..	17.00-17.50
E. Pa., old mat. ...	14.00-14.50
Los Angeles, net...	9.00- 9.50
Pittsburgh	16.50-17.00
St. Louis	†11.00-11.50
San Francisco, net..	9.00- 9.50
Valleys	15.75-16.25

BUNDLED SHEETS

Buffalo, No. 1.....	14.00-14.50
Buffalo, No. 2.....	12.50-13.00
Cleveland	11.50-12.00
Pittsburgh	15.50-16.00
St. Louis	†9.00- 9.50
Toronto, dealers....	9.75

SHEET CLIPPINGS, LOOSE

Chicago	9.25- 9.75
Cincinnati, dealers..	8.00- 8.50
Detroit	†9.50-10.00
St. Louis	†8.00- 8.50
Toronto, dealers...	9.00

BUSHELING

Birmingham, No. 1.	13.00
Buffalo, No. 1.....	14.00-14.50
Chicago, No. 1.....	14.00-14.50
Cincin., No. 1, deal.	9.00- 9.50
Cincin., No. 2 deal...	3.00- 3.25
Cleveland, No. 2 ...	9.50-10.00
Detroit, No. 1, new.	†12.25-12.75
Valleys, new, No. 1	15.00-15.50
Toronto, dealers ...	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	5.00
Buffalo	10.00-10.50
Chicago	8.50- 9.00
Cincinnati, dealers..	5.00- 5.50
Cleveland, no alloy.	8.50- 9.00
Detroit	†7.50- 8.00
Eastern Pa.	9.50-10.00
Los Angeles	4.00- 5.00
New York	†6.50- 7.00
Pittsburgh	10.25-10.75
St. Louis	†6.50- 7.00
San Francisco	5.00
Toronto, dealers ...	7.00- 7.25
Valleys	10.00-10.50

SHOVELING TURNINGS

Buffalo	11.50-12.00
Cleveland	9.50-10.00
Chicago	9.50-10.00
Chicago, spcl, anal.	12.50-13.00
Detroit	†8.00- 8.50
Pitts., alloy-free ...	12.00-12.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district....	†3.00
Buffalo	10.00-10.50
Cincinnati, dealers..	3.75- 4.25
Cleveland	9.50-10.00
Eastern Pa.	9.50
Detroit	†7.75- 8.25
New York	†5.25- 5.75
Pittsburgh	9.00- 9.50
Toronto, dealers ...	6.75

AXLE TURNINGS

Buffalo	16.50-17.00
Boston district	†8.00- 8.50
Chicago, elec. fur..	15.50-16.00
East. Pa. elec. fur..	16.00-16.50
St. Louis	†9.25- 9.75
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	7.50
Boston dist. chem...	†7.75- 8.00
Buffalo	10.00-10.50
Chicago	9.00- 9.50
Cincinnati, dealers..	3.75- 4.25
Cleveland	9.50-10.00
Detroit	†7.75- 8.25
E. Pa., chemical ...	14.50-15.00
New York	†7.00
St. Louis	†5.00- 5.50
Toronto, dealers ...	6.75

RAILROAD SPECIALTIES

Chicago	17.75-18.25

ANGLE BARS—STEEL

Chicago	17.25-17.75
St. Louis	†15.00-15.50

SPRINGS

Buffalo	19.50-20.00
Chicago, coil	18.50-19.00
Chicago, leaf	17.50-18.00
Eastern Pa.	20.50-21.00
Pittsburgh	20.50-21.00
St. Louis	†16.00-16.50

STEEL RAILS, SHORT

Birmingham	16.50
Buffalo	21.50-22.00
Chicago (3 ft.)	17.50-18.00
Chicago (2 ft.)	18.00-18.50
Cincinnati, dealers..	19.00-19.50
Detroit	†19.50-20.00
Pitts., 3 ft. and less	20.50-21.00
St. Louis, 2 ft.& less	†18.00-18.50

STEEL RAILS, SCRAP

Birmingham	16.00
Boston district	†14.00-14.50
Buffalo	17.00-17.50
Chicago	15.50-16.00
Cleveland	18.50-19.00
Pittsburgh	17.50-18.00
St. Louis	†15.25-15.75
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	10.00-10.50
Cincinnati, dealers..	9.75-10.25

RAILROAD GRATE BARS

Buffalo	13.00-13.50
Chicago, net	9.50-10.00
Cincinnati, dealers..	8.50- 9.00
Eastern Pa.	15.00-15.50
New York	†10.50-11.00
St. Louis	†10.00-10.50

RAILROAD WROUGHT

Birmingham	14.00
Boston district	†9.50-10.00
Eastern Pa., No. 1..	18.00-18.50
St. Louis, No. 1....	†10.50-11.00
St. Louis, No. 2....	†12.75-13.25

FORGE FLASHINGS

Boston district ...	†10.00
Buffalo	14.00-14.50
Cleveland	15.00-15.50
Detroit	†12.00-12.50
Pittsburgh	15.50-16.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	18.00-18.50

LOW PHOSPHORUS

Cleveland, crops....	21.50-22.00
Eastern Pa. crops..	20.50-21.00
Pitts., billet, bloom, slab crops	21.50-22.00

LOW PHOS. PUNCHINGS

Buffalo	19.50-20.00
Chicago	17.50-18.00
Cleveland	17.50-18.00
Eastern Pa.	21.00-21.50
Pittsburgh	20.00-20.50
Seattle	15.00
Detroit	†13.75-14.25

RAILS FOR ROLLING

5 feet and over

Birmingham	16.50
Boston	†15.75-16.00
Chicago	18.00-18.50
New York	15.50-16.00
Eastern Pa.	20.00-20.50
St. Louis	†17.00-17.50

STEEL CAR AXLES

Birmingham	18.00
Boston district	†16.00-16.50
Chicago, net	20.00-20.50
Eastern Pa.	22.00
St. Louis	†18.00-18.50

LOCOMOTIVE TIRES

Chicago (cut)	18.00-18.50
St. Louis, No. 1....	†15.25-15.75

SHAFTING

Boston district....	†17.00
New York	†18.00-18.50
Eastern Pa.	23.00-23.50
St. Louis, 1¼-3¾"...	†16.50-17.00

CAR WHEELS

Birmingham, iron..	13.00
Boston dist., iron ..	†13.00-13.25
Buffalo, steel	21.00-21.50
Chicago, iron	16.50-17.00
Chicago, rolled steel	17.00-17.50
Cincin., iron, deal...	16.50-17.00
Eastern Pa., iron ..	20.00-20.50
Eastern Pa., steel..	20.50-21.00
Pittsburgh, iron ...	18.50-19.00
Pittsburgh, steel ..	20.50-21.00
St. Louis, iron.....	†15.50-16.00
St. Louis, steel.....	†16.50-17.00

NO. 1 CAST SCRAP

Birmingham	16.00
Boston, No. 1 mach..	†15.00-15.50
N. Eng. del. No. 2..	14.00-14.50
N. Eng. del. textile	17.75-18.25
Buffalo, cupola	16.50-17.00
Buffalo, mach.	17.75-18.25
Chicago, agri. net..	12.50-13.00
Chicago, auto net..	14.50-15.00
Chicago, railroad net	14.00-14.50
Chicago, mach. net.	14.25-14.75
Cincin., mach. deal..	16.00-16.50
Cleveland, mach. ..	20.00-21.00
Detroit, cupola, net..	†15.00-15.50
Eastern Pa., cupola.	19.00-20.00
E. Pa., No. 2 yard..	16.50
E. Pa., yard fdry...	16.50-17.00
Los Angeles	16.50-17.00
Pittsburgh, cupola..	17.50-18.00
San Francisco	14.50-15.00
Seattle	14.00-16.00
St. Louis, breakable	†14.00-14.50
St. Louis, agri. mach	†16.00-16.25
St. L., No. 1 mach..	†17.00-17.50
Toronto, No. 1. mach., net dealers	16.50

HEAVY CAST

Boston dist. break..	†12.75-13.25
New England, del...	15.00-15.50
Buffalo, break	14.50-15.00
Cleveland, break, net	15.25-15.75
Detroit, auto net...	†16.00-16.50
Detroit, break	†11.50-12.00
Eastern Pa.	18.50
Los Ang., auto, net.	13.00-14.00
New York break ...	†13.50-14.00
Pittsburgh, break ..	15.00-15.50

STOVE PLATE

Birmingham	10.00
Boston district	†10.50-11.00
Buffalo	14.00-14.50
Chicago, net	8.50- 9.00
Cincinnati, dealers..	8.25- 8.75
Detroit, net	†9.50-10.00
Eastern Pa.	15.00-15.50
New York fdry.	10.00
St. Louis	†10.75-11.25
Toronto dealers, net	12.00

MALLEABLE

New England, del...	21.00
Buffalo	16.50-17.00
Chicago, R. R.	18.50-19.00
Cincin., agri., deal..	13.25-13.75
Cleveland, rail	20.50-21.00
Eastern Pa., R.R....	21.00-21.50
Los Angeles	12.50
Pittsburgh, rail ...	21.00-21.50
St. Louis, R. R.	†15.75-16.25

Ores

Lake Superior Iron Ore

Gross ton, 51½ %

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer.....	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer..	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract.	9.00-10.00

Foreign Ore
(Prices nominal)

Cents per unit. c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.	14.00-15.00
Swedish low phos. .	14.00
North African low phos.	14.00
Spanish, No. African basic, 50 to 60%..	14.00
Chinese wolframite, short ton unit, duty paid	$23.50-24.00
Scheelite, imp.	$25.00
Chrome ore, Indian, 48% gross ton, cif.	$26.00-28.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%..	48.00-50.00
So. African, 50-52%	48.00-50.00
Indian, 49-50%	nom.
Brazilian, 48-52%..	46.00-48.00
Cuban, 50-51%, duty free	61.20

Molybdenum

Sulphide conc., per lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 86, 87

Pittsburgh—A small increase in releases is seen for April, following a moderate pickup in buying during March. With most of the auto industry's 1940 model requirements already covered, a restricted volume of new business is in immediate prospect. Sheet and strip production continues to taper but may be checked, at least temporarily, this month. Mill operations are around 50 per cent or less. Galvanized sheet output has dipped below 50.

Cleveland—Buying is steady but little changed from the volume a month ago. Moderately heavy shipments continue for automotive use, although some partsmakers express disappointment over releases from motor plants. Orders generally are small, buyers having little incentive to cover beyond early needs.

Chicago — Demand is slightly heavier, with greatest improvement noted from makers of household equipment, including refrigerators, ironers and washers. Automotive requirements are steady, while farm implement demand, although dropping, is still prominent.

Boston — Fill-in buying, with an occasional general replenishment order, dominates narrow cold strip demand. Aggregate business is slightly improved. Shipments, however, are declining, with backlogs of most mills depleted. Finishing operations are lower, but mills hope for a 60 per cent average for April. Sheet buying is light and spotty, with small-lot specifications for prompt delivery slightly more numerous.

New York—Sheet demand is spotty but slightly more active. Revival in building trades has a stimulating effect, principally on warehouse trade, but distributors' stocks still are fairly large. Hot-rolled sheet deliveries still hold at two to three weeks, with cold-rolled and galvanized at three to four weeks.

Philadelphia — Die work for 1941 Studebaker bodies is 50 per cent completed and production is scheduled to start about August 1. Considerable progress also has been made on other 1941 lines. Inquiries have been issued for 1941 steel requirements, apparently to test the market, but only small tonnages have been placed so far, to try out dies. The automotive trade expects prices to hold present levels for 1941 tonnage. Several stovemakers have entered the market for enameling sheets, for the first time in weeks. Some are placing less-carload lots and others as much as 75 tons. Job stampers are busier. A radio maker has purchased a quantity of electrical and hot-rolled pickled sheets. E. G. Budd Mfg. Co. has divided 500 tons of stainless steel 18-8 strip for truck trailers among several mills.

Buffalo — Slight improvement in buying has been without effect on production, although backlogs have been reduced sharply the past few months. Miscellaneous orders are more active, with consumers buying for only immediate needs. Mill schedules are near 60 per cent.

Cincinnati — Demand for galvanized sheets recently surged upward and now matches specifications in other grades at about 50 per cent. Automotive demand lags below seasonal expectations. Forward buying continues light, while immediate needs are fed partly from reserve stocks.

Toronto, Ont.—Sheet demand continues active and is expanding rapidly as new war contracts are placed. It is understood that Chrysler Corp., Windsor, Ont., will receive a large order for trucks from

the war supply board, and soon will be in the market for steel. Canadian mills report no price changes on contracts to end of June, and July deliveries will be at price prevailing at time of delivery.

Birmingham, Ala. — Spring buying has brought demand nearer to normal, although there has not been any outstanding gain. Production remains at about 85 per cent, with little improvement in strip output.

Plates

Plate Prices, Page 86

Cleveland — Miscellaneous plate buying is light and unchanged. Little additional business is in prospect for lake boat repairs, but a moderate tonnage will be required for freight cars placed recently or still pending. Early delivery is available.

Chicago—Moderate gains in tonnage are mainly due to demands from makers of heavy machinery, with oil country needs prominent. Freight car demand is expected to rise. Prices continue irregular. Inquiries are numerous.

Boston — Slight improvement in plate demand is spotty, reflected by more numerous small-lot orders from miscellaneous consumers. More tonnage from warehouses is likely as gaps appear in some stocks. Larger fabricators of plates, however, still operate with small backlogs. Shipyard specifications are maintained, but not widely distributed. Floor plate buying is light.

New York — Following the bulge which developed just prior to the export price advance recently, foreign plate orders have been light; however, there is still considerable miscellaneous inquiry. Higher export quotations helped drive in some tonnage pending for several weeks. Domestic buying has shown little variation, although sellers are more hopeful over prospects for demand for building construction and the oil industry's maintenance requirements. Ship specifications are well sustained, but railroad releases are disappointing.

Philadelphia — Bureau of supplies and accounts, navy department, has placed 4163 tons of plates, sheets and strip, lots 151 and 159, with Alan Wood Steel Co., Conshohocken, Pa., and 9800 tons, bars, plates, angles and shapes, lots 152 to 158, inclusive, and lots 160 to 165, inclusive, with United States Steel Corp., Pittsburgh. This covers navy yard requirements for six months to Sept. 30, but it is understood the navy has the option of increasing quantities 50 per cent if desired. Miscellaneous plate buying has improved slightly and serves to support plate production as ship and railroad releases are slow.

Seattle—About 900 tons of plates is involved in cais ons for dry dock No. 5, Puget Sound navy yard, Wash., bids at Washington, April 24. United States engineer, Bonneville, Oreg., will receive bids April 30 for a steel, gasoline supply, tank type barge, 60 feet long. Fabricating shops report a fair volume of business in small jobs.

Toronto, Ont. — New interest is developing in ship plates and additional large purchases are in prospect. Announcement is made that an order has been placed for minesweepers with a new Toronto firm, totaling upward of $3,000,000. It is understood the company soon will be the market for plates, in addition to other large pending orders. Boiler and tank builders also are showing more interest.

San Francisco — Plate awards totaled 550 tons, bringing the year's aggregate to 16,480 tons, compared with 14,792 tons a year ago. Chicago Bridge & Iron Co. secured three tanks for Wilmington, Los Angeles and Bell, Calif., totaling 150 tons.

Bids have just been taken on 850 tons for a conduit between Leevining creek and Grant lake reservoir for water and power department, Los Angeles. No award has yet been made on 2100 tons of large-diameter welded steel pipe for replacement work on the Los Angeles aqueduct.

Plate Contracts Placed

1185 tons, 31 tanks, Sinclair Refining Co., Houston, Tex., to Chicago Bridge & Iron Co., Chicago.

130 tons, pipe for by-pass, bureau of reclamation, Coram, Calif., to Provo Foundry & Machine Co., Provo, Utah.

Plate Contracts Pending

2222 tons, armor plate, bureau of ordnance, navy department, schedule 235; bids April 30.

850 tons, conduit, specification 3374, water and power department, Los Angeles; bids opened.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 87

New York—Improved weather conditions, with their stimulating influence on building construction, have stiffened sentiment in the bolt and nut market. Railroad requirements also are somewhat more promising, and jobbers, who stocked up heavily last fall, are showing more interest.

Heavy production in the last half of 1939, as in most steel products, accounted for the downward trend this year. Consumers and jobbers, the latter in particular, laid in substantial stocks, which now are being worked down to a point where some turn in specifications and operations is expected.

Bars

Bar Prices, Page 86

Cleveland — A new extra list on hot-rolled carbon steel bars, dated April 1, incorporates higher charges on solid half-rounds and new size brackets on this commodity. Increases range from 5 to 25 cents per 100 pounds. Rewording of extras for cutting to specified lengths clarifies application of these extras but leaves them unchanged from the schedule that became effective last July.

Bar demand is fairly steady but only slightly better than a month ago. Consumers entering the market on reduction in inventories are ordering only small lots. Machine tool needs appear assured of indefinite maintenance at a high level.

Chicago — Carbon bar demand is slightly heavier, with alloys showing a more substantial upturn. Total volume is not large, however. Farm machinery needs are receding although still active, while automotive requirements are steady.

Boston — More replacement orders for cold and hot-rolled carbon bars are appearing. Prompt delivery is wanted and there is no widespread movement to anticipate needs beyond the first half of this quarter. Consumption among larger consumers is well maintained, with others working off stock at a slightly heavier rate. Alloy bars continue relatively active.

New York—Commercial bar tonnage has expanded moderately over the past two weeks, some leading sellers declare. Machine tool specifications are particularly active. Shipyard and government shop requirements still hold at a good level. Airplane requirements, while light tonnagewise in comparison with those of some other industries, are substantial on a dollar basis, because of the special grades involved.

Philadelphia—Navy bureau of supplies and accounts has placed about

700 tons of medium carbon bars, part of it galvanized, with United States Steel Corp. Philadelphia navy yard closes April 9 on 175,000 pounds of rivets, schedule 1187. Miscellaneous demand for carbon and alloy bars shows mild improvement.

Birmingham, Ala. — Output continues to exceed orders, but demand is steady and producers are optimistic.

Buffalo — Demand is sustained by light miscellaneous orders, with little forward buying noted. Mill schedules are steady. Most buying covers spot needs, but indications point to lightening of consumer stocks.

Pipe

Pipe Prices, Page 87

Boston—Merchant steel pipe buying is a shade heavier, but is retarded by backward construction, although several hundred tons are required for expansions at the Charlestown navy yard. Resale prices in some districts are mixed. More cast iron pipe inquiry is coming out, but individual tonnages are smaller than usual for this period. Municipalities are closing annual blanket contracts, Needham and Natick, Mass., with the Everett foundry and Wakefield, Mass., to United States Pipe & Foundry Co.

New York — For yard stocks, New York city will ask bids late this month on close to 9000 tons, cement-lined cast pipe. Export business with South America is becoming increasingly active at premium prices, although French and British foundries have been bidding on some recent inquiries after having temporarily retired from competition. Small-lot domestic buying has gained. Utilities have also re-entered the market, including Public Service, Newark, to cover at least two substantial installations in New Jersey. Merchant steel pipe specifications are responding slowly to seasonal influences.

Birmingham, Ala. — Production continues at a fairly steady pace on the basis of sporadic small orders. A three and four day schedule continues.

Seattle — Business pending approximates 800 tons. Bids are in at Cle Elum, Wash., for 300 tons of 4 and 8-inch, at Vancouver, Wash., for 300 tons of 8 to 14-inch, and at Raymond, Wash., for 100 tons. Pullman, Wash., Evelyn Weeks, clerk, has called bids April 9 for 3000 feet of 6 and 8-inch and fittings.

San Francisco — While cast iron pipe lettings were limited to lots of less than 100 tons, pending business involves over 3500 tons. United States Pipe & Foundry Co. is low on 670 tons of 6 to 12-in. pipe for Pasadena, Calif. Moses Lake, Oreg., on an inquiry for 160 tons of cast iron pipe or transite pipe, purchased the latter type. Awards for the year aggregate 7684 tons, compared with 6641 tons in 1939.

Cast Pipe Placed

580 tons, 30-inch, Panama, to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

670 tons, 6 to 12-in., Pasadena, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.

375 tons, 6 and 12-inch, class C, Pawtucket, R. I.

Steel Pipe Pending

400 tons, 10-inch pipe piling, Bush street connection, Midtown tunnel, New York; bids opened April 5.

Rails, Cars

Track Material Prices, Page 87

Placing of 50 locomotives and 1500 hopper cars by the New York Central is the high light in the railroad market. Locomotives were divided, 35 to American Locomotive Co., and 15 to Lima Locomotive Works, the cars going to the company's subsidiary, Despatch Shops Inc., Rochester, N. Y. These cars will require 31,000 tons of steel and the locomotives 10,500 tons.

Export demand is good. Two Brazilian roads are asking bids on about 50,000 tons of rails and 15 to 20 locomotives. Siam State Railways is expected to place 500 box cars on which bids have been taken.

Pending car business includes about 1600 cars, some of which probably will be placed within a short time.

Virginian railway has asked interstate commerce commission for authority to rebuild a large number of steel coal cars to meet increasing demand. It also asked delay in building an 11-mile branch line in West Virginia, the funds to be used instead for carbuilding.

March freight car awards of 3104 units brought the first quarter total to 4611, against 3062 a year ago, 814 two years ago and 20,933 in 1937. Comparisons follows:

	1940	1939	1938	1937
Jan.....	360	3	25	17,806
Feb.	1,147	2,259	109	4,972
March....	3,104	800	680	8,155
3 mos.....	4,611	3,062	814	30,933
April.....	.....	3,095	15	9,772
May.....	.....	2,051	6,014	4,732
June	.....	1,324	1,178	548
July.....	.....	110	0	1,030
Aug.....	.....	2,814	182	1,475
Sept.....	.....	23,000	1,750	1,216
Oct.....	.....	19,634	2,537	1,355
Nov.....	.....	2,650	1,232	275
Dec.....	.....	35	2,581	275
Total...	.....	57,775	16,303	51,611

Car Orders Placed

New York Central, 1500 fifty-five-ton hoppers, to Despatch Shops Inc., Rochester, N. Y.

Utah Copper Co., ten 100-ton air dump cars, to Pressed Steel Car Co., Pittsburgh.

Locomotives Placed

New York Central, 50 Mohawk type; 35 to American Locomotive Co., New York; 15 to Lima Locomotive Works, Lima, O.

Locomotives Pending

Chief of army engineers, 20-ton gasoline mechanical drive locomotive for Fort Belvoir, Va.; bids April 18.

Navy, two 50-ton diesel-electric locomotives for Philadelphia; bids April 5.

Semifinished

Semifinished Prices, Page 87

Pittsburgh — Semifinished orders are spotty, buying generally being hand-to-mouth. Nonintegrated mills are releasing material in line with immediate needs and are holding down inventories. Export inquiries have been fairly active, with prices at about domestic levels.

Wire

Wire Prices, Page 87

Cleveland — Moderate gains in merchant products activity have not absorbed the previous lag, and some business has been permanently lost this season through the late appearance of mild weather. Demand for manufacturers' wire and wire rods is steady but relatively slow.

Chicago — Buying of wire and wire products is fairly steady though slow. A few increases have been noted in bookings but these usually are result of normal fluctuations in demand. Some improvement in automotive needs recently has been

felt. Farm machinery requirements are decreasing, though demand remains fairly strong.

Boston — Demand for manufacturers' wire is up slightly, with buyers filling gaps in stocks and asking prompt deliveries, which are normal for most products. Seasonal improvement in merchant goods has been slow. Although the furniture trade is placing some tonnage, spring wire demand is rather spotty. Mill backlogs, except for scattered specialties, have practically disappeared, and finishing operations tend downward. Buyers in a few instances are seeking concessions, but on the whole prices are well maintained.

New York — Merchant wire demand is slow, and some tonnage which would normally have been on mill books by this time may be lost for this season. Buying of manufacturers' wire has improved slightly as consumers in more instances are forced to fill gaps in inventories. Rope demand is encouraging, notably from coal mining regions. Government orders for cable are impressive, and shipbuilding also accounts for considerable miscellaneous tonnage.

Shapes

Structural Shape Prices, Page 86

Pittsburgh — Inquiries are fairly large for both private and public construction, with the former dominating awards. This includes housing units and industrial expansion.

Cleveland — Small and medium-size structural inquiries are slow, and pending tonnage still is restricted. Several large contracts are in prospect, including 1300 tons of piling for the Cuyahoga river straightening program.

Chicago — Structural bookings are moderately heavier and well diversified. Orders include 600 tons of piling for a power plant, Genoa, Wis., and 300 tons for an industrial plant, Milwaukee. Bureau of reclamation, Odair, Wash., is inquiring for 1100 tons for dam bulkhead and penstock gates and the war department is inquiring for 640 tons for three bridges in Colorado.

Boston — Structural awards are heavier, including 6600 tons for the South Boston annex to the navy yard, Boston, mostly piling, placed with Carnegie-Illinois Steel Corp., Pittsburgh. Smaller awards, which are more numerous, include a spinning mill, Bristol, R. I., 350 tons, placed with a Providence, R. I., shop. Inquiry is gradually mounting, mostly small projects.

New York — First two sections of the Atlantic avenue grade crossing close April 23, with about 7000 tons of structural steel required. A bascule bridge with plate girder approaches over East Chester creek, New York, is expected out for estimates shortly. Inquiry is led by grade crossing work upstate, including a 6000-ton project, Syracuse, eliminating crossings for the Delaware, Lackawanna & Western rail-

Shape Awards Compared

	Tons
Week ended April 6	14,226
Week ended March 30	9,917
Week ended March 23	16,768
This week, 1939	15,805
Weekly average, year, 1940	18,367
Weekly average, 1939	22,411
Weekly average, March	19,759
Total to date, 1939	321,047
Total to date, 1940	257,138

Includes awards of 100 tons or more.

road. Building construction requiring structural steel is subnormal for this period.

Philadelphia — New work is coming out in slightly larger volume but insufficient to maintain operations of some smaller shops. United States engineer's office, Philadelphia, has completed plans for the long-delayed St. Georges, Del., high-level bridge, which will require several thousand tons of shapes and H-piles. Bids on the substructure are due about June 1.

Buffalo — Interest in the structural market continues to improve, although lettings have been insufficient to increase fabricators' backlogs appreciably. Pending jobs are more numerous. Bridges are prominent among awards.

Seattle — Largest project pending involves about 900 tons for gates for drydock No. 5, Puget Sound navy yard, bids at Washington, April 24. Other business pending includes 800 to 1000 tons, addition for plant structures for Aluminum Company of America, at Vancouver, Wash.

San Francisco — Most structural awards were less than 100 tons. Awards for the week aggregated 733 tons and brought the total to date to 53,823 tons, compared with 36,870 tons a year ago. Bids are in on 450 tons for tunnel supports in connection with work on the Continental divide tunnel, Colorado.

Toronto, Ont.—Fabricators report business somewhat ahead of 1939, largely due to construction in connection with war business. While there was some slowng down in awards for the week, orders pending are mounting steadily. The betterment is reported by plants in practically all parts of the Dominion.

Birmingham, Ala. — Production is supported mainly by spotty orders, although new spring business is expected shortly. Tonnage continues low.

Shape Contracts Placed

5300 tons, including 4500 tons bearing piles; 1500 tons sheet piling, and 300 tons track work, South Boston annex to United States navy yard, Boston, to Carnegie-Illinois Steel Co., Pittsburgh; Merritt-Chapman & Scott Co., New York, general contractor.

1500 tons, building for Chesapeake & Potomac Telephone Co., Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, office building, Westinghouse Electric & Mfg. Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, piling, power house, Tri-State Power Co-operative, Genoa, Wis., to Bethlehem Steel Co., Bethlehem, Pa.

520 tons, state bridge, PSC-6000 Rochester, N. Y., to American Bridge Co., Pittsburgh.

500 tons, arsenal buildings at Valcartier, Que., for Dominion department national defense, Ottawa, Ont., to Horton Steel Works Ltd., 660 Catherine street west, Montreal, Que.

400 tons, building, Forty-third street and Broadway, New York, to American Bridge Co., Pittsburgh.

400 tons, plant addition, for Industrial Rayon Corp., Painesville, O., to Ingalls Iron Works, Birmingham, Ala.

380 tons, extension to diesel locomotive shop, for American Locomotive Co., Schenectady, N. Y., to American Bridge Co., Pittsburgh.

375 tons, recreation building, Albany, N. Y., to American Bridge Co., Pittsburgh.

350 tons, spinning mill building, Bristol, R. I., to James H. Tower Iron Works, Providence, R. I.

340 tons, state bridge, PSC-5?88. Alden, N. Y., to Bethlehem Steel Co., Buffalo.

300 tons, Square-D Co., plant addition, Milwaukee, to Worden-Allen Co., Milwaukee.

300 tons, bridge for city of London, Ont., to London Structural Steel Co. Ltd., Burslem avenue, London, Ont.

285 tons, addition building 348, Dow Chemical Co., Midland, Mich., to Flint Structural Steel Co., Flint, Mich.

270 tons, underpass, East Ninth street, Cleveland, for city, to American Bridge Co., Pittsburgh.

260 tons, bridge C-3, Hoffmans, N. Y., for New York Central railroad, to American Bridge Co., Pittsburgh.

220 tons, building, South Brooklyn Sav-

ings bank Sixty-fifth street, Brooklyn to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, aeronautics academy building, North Beach airport, New York, to Lehigh Structural Steel Co., Allentown, Pa.

200 tons, grade elimination, Wabash railway, Allen Park, Mich., for Wayne county road commissioners, to American Bridge Co., Pittsburgh.

185 tons, addition, pit furnace building, Pittsburgh Steel Co., Monessen, Pa., to Pittsburgh Bridge & Iron Co., Pittsburgh.

155 tons, turbine alterations and supports, United States navy, Pearl Harbor, T. H., to Joseph T. Ryerson & Son Inc., Chicago.

155 tons, Moore Park street bridge, Los Angeles, for city, to Minneapolis-Moline Power Implement Co., Minneapolis.

150 tons, alterations to tower and WGN radio building, Chicago, for Chicago Tribune, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, overpass, Scenery Hill, Pa., for state, to Fort Pitt Bridge Works, Pittsburgh.

140 tons, state bridge FA-216, Des Moines, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

140 tons, building, St. Mary's hospital, Waterbury, Conn., to Standard Structural Steel Co., Hartford, Conn.

120 tons, annexes to air corps hangar, Rantoul, Ill., for United States government, to Bethlehem Steel Co., Bethlehem, Pa.

120 tons, building addition, Saginaw Steering Gear Co., Saginaw, Mich., to Flint Structural Steel Co., Flint, Mich.

120 tons, pit girders, Chicago, Milwaukee, St. Paul & Pacific railroad, Cinder, Iowa, to American Bridge Co., Pittsburgh.

115 tons, curbs, East Side drive Fifty-seventh to Sixty-fourth streets, New York, to Bethlehem Steel Co., Bethlehem, Pa.

115 tons, bridges 1521-1564, Taylor county, West Virginia, to Riverside Steel Co., Wheeling, W. Va.

110 tons, reconstruction of grade crossing elimination, state highway project SS-40-1, Allegany county, New York, to Genesee Bridge Co., Rochester, N. Y.; Hornell Construction Corp., Hornell, N. Y., general contractor, $72,382.25, bids March 20, Albany.

106 tons, building for Great Lakes Carbon Co., Wilmington, Calif., to Pacific Iron & Steel Co., Los Angeles.

105 tons, grade crossing elimination, Long Island railroad, Coram-Patchogue N. Y., to American Bridge Co., Pittsburgh; Tully & Di Napoli Inc., Long Island City, N. Y., contractor, $165,-952.50, bids March 20, Albany.

105 tons, bridge 36.42, New York, New Haven & Hartford railroad, Southport, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

Shape Contracts Pending

7000 tons, first two sections, Atlantic avenue grade elimination, Long Island railroad, Brooklyn, N. Y.; bids April 23.

6000 tons, grade crossing elimination, Syracuse, N. Y., for Delaware, Lackawanna & Western railroad.

2000 tons, superstructure, bascule bridge with plate girder approaches, East Chester creek, New York; bids soon, substructure estimates asked.

1600 tons, apartment building, for Edgewater Tower apartments, Cleveland.

1300 tons, piling, Cuyahoga river straightening, Cleveland; bids April 11.

1100 tons, dam bulkhead gate tracks and penstock gates, bureau of reclamation, Odair, Wash.

1058 tons, galvanized structural steel transmission towers, Columbia-Nashville line, Tennessee valley authority, Knoxville, Tenn.; bids April 12.

900 tons, gates, drydock No. 5, Puget Sound Navy Yard, Wash.; bids to navy department, Washington, April 24.

700 tons, building, Armstrong Cork Co., Millville, N. J.

640 tons, war department, three bridges in Colorado; 125, 230, 285 tons.

625 tons, bridge superstructure for relocation of Atchison, Topeka & Santa Fe railroad, Caddoa reservation, Colorado.

600 tons, I-beam viaduct, Dauphin county, Pennsylvania; bids to state highway department, Harrisburg, Pa., April 12.

550 tons, bridge 3369, Peru, Ind., for New York, Chicago & St. Louis railroad.

550 tons, beam spans, East Norwalk, Southport and Fairfield, Conn., for New York, New Haven & Hartford railroad.

450 tons, tunnel supports, Continental divide tunnel, station 618.39 to 698.39,

Estes Park, Colo.; bids opened.

450 tons, state bridge over Yadkin river, Davis-Forsyth counties, North Carolina.

415 tons, structural steel welded gate anchorages, spillway, Watts Bar dam, Tennessee valley authority, Knoxville, Tenn.; bids April 9.

400 tons, home for Sacred Heart Sisters, St. Joseph, N. B.

400 tons, highway bridge, Kansas City, Mo.

350 tons, underpass, Bush street, New York, for city.

330 tons, building 107, ore storage, for Aluminum Co. of America, Cleveland.

300 tons, subway section D-6-E, Chicago; bids April 18.

300 tons, building addition for Hewitt Rubber Corp., Buffalo; bids April 12.

250 tons, school gymnasium, Abington township, Montgomery county, Pennsylvania; bids April 18.

240 tons, bridge over Lamar river, Gardiner, Mont., for United States government.

240 tons, state highway bridge, Dushore, Pa.

220 tons, bridge, Sullivan county, Pennsylvania; bids April 18.

220 tons, boiler plant and trestle, Hudson, N. Y., for state.

220 tons, store building, Morgantown, W. Va., for Great Atlantic & Pacific Tea Co.

200 tons, bridge 1347, Bunker Hill, Ind., for New York, Chicago & St. Louis railroad.

175 tons, highway bridge, Sleepy Eye, Minn.; bids April 19.

150 tons, bridge Hudson river parkway, New York.

150 tons, grade elimination bridge, Cleveland, for city.

125 tons, bridge 100.87, Omaha, Nebr., for Union Pacific railroad.

125 tons, bridge 5847, Hamel, Minn., for state.

110 tons, bridge, Armstrong county, Pennsylvania; bids April 18.

Unstated, four buildings, navy air station, Tongue Point, Oreg.; L. B. James, Portland, Oreg., reported low at $278,853.

Unstated, various projects, Coulee dam and fish hatchery projects in Washington state; bids to Denver.

Reinforcing

Reinforcing Bar Prices, Page 87

Pittsburgh—Prices are still weak in most sections, billet steel selling at 1.70c to jobbers and up to 1.90c to contractors. The same is true of rail steel, although at certain points prices have been 1.60c or less. Export business, which is fairly active, is bringing 2.15c, the nominal level for domestic business. Inquiries and current lettings are active and several fairly large projects are pending.

Chicago—Subway section D-6-E will require 1050 tons of reinforcing bars. Garage planned for 125 South Wabash will need 250 tons. Other new local jobs are small but numerous. Pending tonnage gained slightly the past week. Feeling is better as spring develops and construction is expected to increase now.

Boston — Concrete bar prices continue subject to buyer pressure and intense competition, with the result concessions prevail even on relatively small lots. Upturn in inquiry is slow due in part to lagging highway and bridge work, with indications such projects this spring will be under normal. Buying is featured by the award of 1300 tons in connection with the extension of the navy yard in the South Boston area.

New York—Bids are in on a vehicular underpass and bridge substructure in the New York district, taking 610 tons, but new inquiry is light. Grade crossing work leads in pending volume, and awards are few. Prices continue soft.

Philadelphia — Considerable material remains to be shipped for the Harrisburg-Pittsburgh express highway job but prospects are none too good for public work this year.

Private alteration and construction jobs are accounting for a fair tonnage. Prices are weak.

Seattle—Local rolling mills are operating at reduced ratio. Backlogs are low but some business is reported from jobbing houses for reinforcing and merchant bars. There is an increase in small tonnages for various construction and building projects. A. A. Prendergast & Associates, St. Paul, are low to reclamation bureau at $109,990 for foundations for the Great Northern railway bridge at Kettle Falls, Wash., 290 tons reinforcing to be furnished by the department.

San Francisco—Awards are fairly active at 2018 tons. This brought the year's aggregate to 31,289 tons, against 56,814 tons last year. Soule Steel Co. booked 635 tons for the Antler bridge in Shasta county, California, for the state. Ceco Steel Products Corp. was awarded 500 tons for a warehouse at Santa Monica, Calif.

Toronto, Ont.—New business continues to appear in volume, while most sales for the week were in lots ranging up to 500 tons. Several large projects for which reinforcing steel will be required, estimated to total about 7000 tons, are expected to be closed within the next few weeks. Orders pending include 500 tons for superstructure and grain elevator at Toronto for Canada Malting Co. Ltd.

Reinforcing Steel Awards

6000 tons, Panama Canal barracks, Pacific side, Balboa, Canal Zone, to Bethlehem Steel Co., Bethlehem, Pa.; Tucker & McClure, Los Angeles, contractors.

1300 tons, South Boston annex to United States navy yard, Boston, to Carnegie-Illinois Steel Corp., Pittsburgh; Merritt-Chapman & Scott Co., New York, general contractor.

750 tons, superstructure, Rainbow bridge, Niagara Falls, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

635 tons, Antler Creek bridge, Shasta county, California, for state, to Soule Steel Co., San Francisco.

Concrete Bars Compared

	Tons
Week ended April 6	10,972
Week ended March 30	11,495
Week ended March 23	7,504
This week, 1939	3,852
Weekly average, year, 1940	7,731
Weekly average, 1939	9,197
Weekly average, March	7,469
Total to date	146,789
Total to date, 1940	109,236

Includes awards of 100 tons or more.

500 tons, warehouse, Bekins Van & Storage Co., Santa Monica, Calif., to Ceco Steel Products Corp., Los Angeles.

350 tons, Marquette Cement Co., Oglesby, Ind., to Inland Steel Co., Chicago.

250 tons, quartermaster department, Fort Mason, Calif., for Alaska, to Columbia Steel Co., San Francisco.

200 tons, power plant, Tri-State Power Co-operative, Genoa, Wis., to Truscon Steel Co., Youngstown.

150 tons, postoffice at Okanogan, Wash., and miscellaneous, to Bethlehem Steel Co., Seattle.

150 tons, Panama Canal schedule 3969, to Youngstown Sheet & Tube Co., Youngstown, O., low bidder.

125 tons, bureau of reclamation, invitation 38,177-A, Kettle Falls, Wash., to Bethlehem Steel Co., Seattle, Wash.

120 tons, paving, Clayton, Ind., to Laclede Steel Co., St. Louis.

119 tons, bureau of reclamation, invitation 48,277-A, Cody, Wyo., to Colorado Fuel & Iron Corp., Pueblo, Colo.

115 tons, vocational school, Owensboro, Ky., to Pollak Steel Co., Cincinnati.

108 tons, bureau of reclamation, invitation 48,272-A, Cody, Wyo., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, hospital for mental diseases, Northfield, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; Golder Construction Co., contractor.

Reinforcing Steel Pending

2000 tons, Atlantic avenue grade-crossing elimination, Brooklyn, N. Y.; bids April 23.

1800 tons, naval medical center, near Bethesda, Md.; bids April 23.

1250 tons, substructure, high level bridge, Chesapeake and Delaware canal, St. Georges, Del.; bids to United States engineer, Philadelphia.

1200 tons, grade crossings, Delaware, Lackawanna & Western railroad, Syracuse, N. Y.; bids April 30.

600 tons, Frederick Douglass housing, Baltimore; bids April 10.

460 tons, vehicular underpass, Bush street, Queens county, New York; bids April 5.

448 tons, highway work, Yolo county, Calif.; for state; bids April 17.

325 tons, bureau of reclamation, Denver, Pro. B-46196, bids April 15.

350 tons, Fullerton dam, Fullerton, Calif.; bids April 25, United States engineer, Los Angeles.

337 tons, state project FAS-428-B-FHP-92-A McCreary county, Kentucky; bids April 5.

321 tons, bureau of reclamation, invitation B-46,196-A, Kremling, Colo.; bids April 15.

305 tons, bachelor quarters, naval air base, Alameda, Calif.; M. H. Goden, San Diego, Calif., low on general contract.

290 tons, piers for railroad bridge, Kettle Falls, Wash.; materials by reclamation bureau.

208 tons, state project FA-201-D2-GS, Greenup county, Kentucky; bids April 5.

186 tons, equipment repair building, invitation 6812-40-83, Hickam Field, T. H.; Robt. E. McKee, Los Angeles, low on general contract.

150 tons, substructure, East Chester creek bridge, New York; Northeastern Construction Co., New York, low.

150 tons, pumping station, Northampton, Mass.

150 tons, Panama, Youngstown Sheet & Tube Co., Youngstown, O., low; bids March 27.

Pig Iron

Pig Iron Prices, Page 88

Cleveland — Consumers steadily are cleaning up old contracts. When required to re-enter the market, foundries are buying only small lots and generally requesting immediate shipment. With foundry operations steady, although spotty, April pig iron shipments are expected to equal or exceed those of March. Last month's deliveries were about the same as in February.

Chicago — Pig iron shipments are the same as a month ago. Coke is slightly ahead. March deliveries of iron showed a small gain, and sellers expect to ship at least as much and possibly more this month. Buying is about equally divided between spot tonnage and forward buying, but total volume is still small.

Boston — Pig iron consumers are doing little forward buying, some melters drawing on stocks while others place small tonnages for prompt delivery. Shipments are steady, but aggregate tonnage shows small improvement. Foundry melt on the whole is holding well, notably with producers of machine tool castings and builders of heavier paper mill equipment. More cast pipe tonnage is appearing.

New York — Demand is featured by two 10,000-ton inquiries, one of which includes basic and foundry grades for Scandinavia. There is also a new export inquiry pending for 5000 tons. Exporters still complain of difficulty in getting ships. However, the situation may be relieved shortly with respect to Scandinavian shipments, as thawing of ice in northern waters releases boats tied up this winter. Domestic demand so far this month is about on a parity with March, which in turn showed a mild gain over February. Sellers generally are more optimistic.

Philadelphia — Little change is evident in the pig iron situation. Jobbing foundries have placed a few small lots and a steel casting interest may close on 1000 tons additional. Stocks of soil pipe are heavy and operations are down to two or three days weekly. Stove foundries are busier, with some melting five days. Several foreign inquiries for lots of several thousand tons are being considered.

Gray iron foundries in the Philadelphia district produced 4777 tons of castings in February, a decline of 11.5 per cent from January but an increase of 41.3 per cent from February, 1939. The jobbing foundries accounted for about 75 per cent of the total. February shipments totaled 4841 tons, a decline of 12.3 per cent from January but an increase of 41.6 per cent from February, 1939. Unfilled orders at the end of the month amounted to 1130 tons, a decline of only 0.1 per cent from January and increase of 67.7 per cent from a year ago.

Buffalo—Business has tended to taper slightly, following a 25 to 30 per cent gain in March shipments. Production is off to 64 per cent of capacity on the shutting down of a Bethlehem stack for relining. Foundry schedules have slackened a trifle, with some plants on a two-day basis, though many are working five days weekly.

Birmingham, Ala. — Production remained fairly steady despite Sloss-Sheffield's taking out a furnace for relining. Demand is fair and more business is expected.

Cincinnati — Specifications are holding March gains despite less than expected demand for automotive castings. Machine tool needs are undiminished. Melters are covering second quarter needs conser-

Behind the Scenes with STEEL

Fast Company

■ These here problems are gittin' to be serious. We forget now how they even got started but it's a cinch it wasn't to show off any mathematical genius of the Shrdlus. We add pretty good, subtract just fair, and divide by guess and by gob. And now here we are in a general free-for-all with a bunch of experts and engineers that move in on a nice juicy formula with all the relish of the grocery cat stalking a visiting mouse.

Head Of The Class

■ H. G. Taylor and J. E. Morelock are the two top men of the class. Neither one has ever flunked and they always unassumingly include a complete solution with some of the fanciest formulas you ever saw. Mr. Morelock even went to work and solved Mr. Taylor's toughie on finding the exact center of a straight line with just a compass.

Quite A Family

■ The cattle problem last week was a lot of fun. MacCulloch Vaughan wrote plaintively *Ye Gods! No Cows!* after solving it at 80 calves ($40) and 20 bulls ($60) and then one of their draftsmen, Clarence Leaman, stopped counting sheep one night and counted cattle instead to arrive at the correct answer of 5 Cows, 94 Calves and 1 Bull, which is a little more like it but still you have to hand it to the bull.

Size 7¼, Please

■ Among many others Earl H. (Unitcast Corp.) Fisher took up our challenge on the drunk and rowboat problem. This is another one we actually figured out ourselves to get an answer of 2 m.p.h. for the stream. The experts say the drunk can then row at any speed, plus, minus or zero. However, Mr. Fisher wants to bet a new spring hat we're wrong and that the correct answer is 1½ m.p.h. for the river and 2¼ m.p.h. for the drunk. After a quick squint at our astrologer's book for this month, we think we'll take that bet.

Shoot The Moon

■ J. W. Goring just finished laboring over A. C. Heffner's coconut problem and reached the conclusion that there were more nuts for which the problem would be responsible than those involved. Maybe this one will add to the total: *If a man up in a balloon should fire a level gun at the moon, and if the bullet and sound both reach the ground at the same time, how high is he?*

Big Business

■ Under the new Erie viaduct in Elmira, "Cyclone" Williams runs a shoe shine stand. His sign in front of the stand reads: *The only shoe shine parlor in the world with a million dollar overhead!*

Safety First

■ Another sign that caught our eye is in a local manufacturing plant. It reads: "Cranemen will please use facilities provided in order to avoid distress to workmen below."

Enviable Product

■ Seeking some product information from manufacturers in STEEL's field, a questionnaire mistakenly went out to the home of reader George W. Evans in Crown Point, Ind. Next day the form was back in the mail with the question on major product manufactured neatly filled in: *Hospitality!*

The Mat Is Out

■ And speaking of hospitality, you probably get into Cleveland every so often. The next time you do, make it a point to drop in and get acquainted. We've got a check for a short beer next door and the chances are we'd have a swell time.

SHRDLU

vatively. Hamilton Coke & Iron division of American Rolling Mill Co. plans soon to increase merchant iron inventory in anticipation of relining its No. 2 furnace this summer.

Toronto, Ont.—Merchant pig iron sales are in better volume with orders for the week exceeding 2000 tons. Most current demand is from small melters. Forward delivery contracts are being closed in a moderate way, with no rush to cover. Prices are firm with no changes announced.

Seattle—For second quarter the price of Columbia iron, Provo, Utah, will remain unchanged at $21 base. Foundry operations are at about 15 per cent of capacity, and demand for pig iron is below normal. Usual seasonal upturn has not developed. Much of the present movement consists of commitments placed six months ago, before prices advanced. New business for spot and future delivery is slack.

Scrap

Scrap Prices, Page 90

Pittsburgh—Brokers' bids are lower on an increase in dealer offerings, but in the absence of consumer buying the latter's quotations are nominally unchanged. Some mills are holding up shipments against old orders, and supplies of some steelworks are ample for some time. Dealer offerings still are far from heavy.

Chicago — No. 1 steel is off 25 cents on a mill purchase at $15.25, with dealers being offered $15. Weakness in the market partially is offset by the fact supplies of heavy melting steel are moderate. Demand from steelworks lately has been confined to one interest.

Boston — With slack domestic buying of iron and steel scrap, prices on several grades continue to sag, including cast and stove plate. While freight costs influence delivered prices on cast grades, small-lot truck deliveries to nearby points are being made at considerably lower quotations. Little scrap is moving to eastern Pennsylvania. With more material available in some districts, brokers are also inclined to ease quotations on heavy melting steel for dock delivery, export. Most activity is centered in export business, with two boats loading, including one at Portland, Me., taking on close to 9000 tons.

New York—Four ships sailed last week with about 20,000 tons of steel scrap for England. This is the largest movement in a week

for a long time. Prices of all grades for barge delivery are unchanged. Domestic demand lags, although most steel mills are taking small shipments but doing little buying. Prices are steady, with few changes.

Philadelphia—Scrap shows no further weakness, with additional small purchases noted at published levels. Material is none too plentiful, and consumers appear willing to take more tonnage at present prices. Moderate activity continues in the export market, with another boat due soon.

Buffalo—Steelmaking grades have been reduced 50 cents as a result of a local sale of about 5000 tons of No. 2 within a range of $14 to $14.50. No. 1 steel is adjusted to $15.50 to $16. This is the first important sale in a month. Brisk demand from Canada is strengthening cast grades, with sales reported at slightly higher prices.

Detroit—Lifting of suspension on scrap shipments by the local consumer, sustained local buying for a Buffalo mill, and continued activity on the part of Canadian steel mills in scrap buying here have joined to improve sentiment until higher prices are justified.

All grades are increased 50 cents per ton, except busheling steel and heavy melting steel, which are up 25 cents, and short rails, which are unchanged.

Cincinnati — Market continues inactive, with no change in prices. Stocks held previously on bullish sentiment gradually are being offered at current prices. Dealers are resisting lower bids. Favorable weather has brought out more country scrap in spite of dull demand.

St. Louis—A leading district steel mill bought approximately 5000 tons of No. 2 heavy melting steel at 25 cents less than the price for the preceding week. This had the effect of cutting other heavy steel grades 25 cents. Some other items on the list were 50 cents a ton less than last week. The sale was made by four dealers, it is understood. Shipment is to be made over 60 days. Inventories of mills are ample for the most part. No other deals are said to be pending.

Seattle — Lack of interest has weakened the local scrap market. Sales are small lots but dealers say no firm prices are quoted. Local mills are out of the market with ample stocks. Exporters can place some business but trans-Pacific space is so scarce and high that it is almost impossible to make deliveries. It is reported that a full scrap cargo has been closed at $17.50 freight, which, if true, represents the highest rate paid in years for trans-Pacific shipment of this commodity.

Toronto, Ont. — Scrap markets show improvement although prices are unchanged. Some improvement also is reported in offerings to dealers although supplies of some materials continue at a minimum. Rural dealers and holders are expected to start shipping within the next week or two. Local holders, however, are cleaned out and little is being offered by automobile wreckers.

San Francisco—A steady flow of scrap continues to mill yards. No new orders for export have been reported. The market shows weakness, and further decline in price is expected. No. 1 heavy melting steel, f.o.b. metropolitan district of Los Angeles and San Francisco, holds at $11.50 to $12 a net ton with No. 2 quoted $10.50 to $11. Compressed sheets continue $9 to $9.50 a net ton.

Warehouse

Warehouse Prices, Page 89

Cleveland—Business holds near the moderately improved volume of late March but is spotty both as to products and types of buyers.

Chicago—March showed a small gain in sales, and prospects for April are good. Possibility is seen April may be the best month so far this year.

New York — Effects of over-buying on the part of some small jobbers late last year is reflected in appearance of more distress material on which prices are shaded. This applies to the more standard lines and finishes, alloys and specialties not being affected. Buying has slackened slightly in the aggregate.

Philadelphia — Daily fluctuations in business are narrow, with April volume to date little changed from a month ago. Some stock replacement is noted, however, and improvement is looked for in May and June. Galvanized sheets are weak.

Buffalo—A diversified flow of industrial orders is holding business at a favorable level. Structural items are lagging.

Cincinnati—Sales still are tending upward, heavier demand for galvanized sheets being a factor. Local prices are unchanged and will not be affected by the new Indianapolis base on certain products, although the latter will influence competition in part of intervening territory now supplied by Cincinnati houses.

Indianapolis—A basing point has been established here for the sale of bars, plates, structural shapes and floor plates out of warehouse. Local prices formerly were predicated on a Chicago-Gary base. The new market per 100 pounds for delivery in the Indianapolis metropolitan district is: Hot-rolled carbon bars and small shapes, $3.60; plates, $3.70; structural shapes, $3.70; floor plates, 3/16-inch and heavier, $5.30. The market for outside delivery in a designated area of central and southern Indiana is 25 cents less on bars, structural shapes and floor plates and 30 cents less on plates, f.o.b., Indianapolis, plus freight to destination.

Omaha, Nebr.—Establishment of new Omaha warehouse base prices on hot-rolled and galvanized products at 50 cents per 100 pounds above Chicago base quotations for outside shipment, results in lower prices to steel buyers in Nebraska and some western Iowa points. Formerly these products were priced on a Chicago base plus less-carload freight to destination. Gate City Iron Works initiated the new Omaha base. Prices per 100 pounds f.o.b. Omaha on 400 to 1999 pounds are: Hot-rolled bar rounds, flats and angles, $3.90; other bar shapes, $4.05; hot-rolled strip, $4; structural shapes, $3.95; plates, $3.95; floor plates, $5.55; hot-rolled sheets $3.75. Galvanized sheets are $5 in lots of 500 to 1499 pounds.

Steel in Europe

Foreign Steel Prices, Page 89

London—(*By Cable*)—Steel and iron output in Great Britain is proceeding at capacity, with no sign of interruption. Iron ore imports from Scandinavia and Algeria are increasing, with further shipments from Spain expected soon. This will enable larger production of pig iron. Imports of semi-finished steel are also improving. Tin plate exports are slightly quieter.

It is expected galvanized and corrugated sheet prices will be increased, retroactive from April 1, by 16s 3d per ton, for 24-gage, to cover increased price of spelter.

New method of distributing steel went into effect April 1. Consumers will apply to government departments concerned with their industry and available steel tonnage will be allotted to government departments for distribution on a quarterly basis. Steel producers will not accept more orders than they can deliver and consumers can arrange programs with knowledge of steel available.

Belgium and Luxemburg report business active with British, French and other nearby markets. Producers are reluctant to book additional orders as domestic markets are also active.

Tin Plate

Tin Plate Prices, Page 86

Tin plate releases are increasing slowly, and production again is higher, last week being estimated at 60 per cent, up 4 points. The general outlook is favorable, following a first quarter in which shipments were in about expected volume. Export inquiries remain good, and producers look for premium prices to appear on foreign trade this quarter if domestic demand is as heavy as looked for.

Ferroalloys

Ferroalloy Prices, Page 88

New York—Ferroalloy shipments are steady, having remained so for

the past two months, and with little important fluctuation expected this month. Prices are firm, ferromanganese holding at $100, duty paid, eastern seaboard, and spiegeleisen at $32, Palmerton, Pa., for the 19 to 21 per cent grade, and $39.50 for 26 to 28 per cent.

Iron Ore

Iron Ore Prices, Page 90

New York—Tungsten ore prices are higher. Recent offerings of Chinese wolframite have been at $23.50 to $24 per short ton unit, duty paid, up 50 cents, with no spot tonnage available. Foreign scheelite is around $25, and domestic scheelite appears about $22.50 to $23.50. Buying is insufficient to test the market. Some South American tungsten has been offered recently at the equivalent of about $22.50, but tonnage has been small and the analysis not satisfactory.

Metallurgical Coke

Coke Prices, Page 87

Seattle—Demand is slow as foundry operations have not improved with advance of the season. British coke is entirely out of the market due to lack of steamship space and other war conditions. Some eastern and Gulf coke is being landed here by water but space is at a premium. Coke from Birmingham and St. Louis is $18.85, delivered. No. 1, from Indianapolis, costs the consumer here $20.10, of which $10.10 is railroad freight.

Coke Oven By-Products

Coke By-Product Prices, Page 87

New York—While production of coke oven by-products is off considerably from the peak, buying is well maintained and releases are steady. Little spot material is available, and distributors are pushed to meet contract demands. The paint and lacquer trade is consuming distillates in good volume. Naphthalene for household needs is active, and industrial phenol requirements are normal. Current production of sulphate of ammonia is being absorbed without accumulations, with spot supplies scarce. Prices are unchanged.

Nonferrous Metals

New York—After weakening further at the beginning of last week, nonferrous metal prices firmed at the close. On Monday lead eased five points while Straits tin declined ¼-cent during the week. Due mainly

Nonferrous Metal Prices

Mar.	Copper Electro. del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
30	*11.25	11.50	11.00	45.75	45.62½	5.05	4.90	5.75	19.00	14.00	35.00
April											
1	*11.25	11.50	11.00	44.75	44.62½	5.05	4.90	5.75	19.00	14.00	35.00
2	*11.12½	11.50	11.00	45.75	45.62½	5.00	4.85	5.75	19.00	14.00	35.00
3	*11.12½	11.50	11.00	45.62½	45.37½	5.00	4.85	5.75	19.00	14.00	35.00
4	*11.12½	11.50	11.00	45.50	45.25	5.00	4.85	5.75	19.00	14.00	35.00
5	*11.25	11.50	11.00	45.50	45.25	5.00	4.85	5.75	19.00	14.00	35.00

*Based on sales by custom smelters; mine producers unchanged at 11.50c.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.50c Conn. copper

Sheets

Yellow brass (high) 18.31
Copper, hot rolled 20.12
Lead, cut to jobbers 8.40
Zinc, 100 lb. base 11.00

Tubes

High yellow brass 21.06
Seamless copper 20.62

Rods

High yellow brass 14.26
Copper, hot rolled 16.62

Anodes

Copper, untrimmed 17.37

Wire

Yellow brass (high) 18.56

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York 7.00-7.25
Cleveland 8.00-8.25
Chicago 7.37½-7.62½
St. Louis 7.75-8.25

Heavy Copper and Wire

New York, No. 1 ..... 8.75-9.00
Cleveland, No. 1 ..... 9.00-9.25
Chicago, No. 1 ..... 8.75-9.00
St. Louis 8.75-9.25

Composition Brass Turnings

New York 6.75-7.00

Light Copper

New York 6.75-7.00
Cleveland 7.00-7.25
Chicago 6.75-7.00
St. Louis 6.75-7.00

Light Brass

Cleveland 4.00-4.25
Chicago 4.50-4.75
St. Louis 4.50-4.75

Lead

New York 4.40-4.65
Cleveland 3.90-4.15
Chicago 4.00-4.15
St. Louis 4.00-4.25

Zinc

New York 3.00-3.25
Cleveland 2.75-3.00
St. Louis 3.25-3.50

Aluminum

Misc., cast, Cleveland 8.50
Borings, Cleveland 6.50
Clips, soft, Cleveland 15.00
Misc. cast, St. Louis 7.75-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .. 11.75
Standard No. 12 aluminum .. 14.25-14.50

to a recovery in the stock market, sentiment improved markedly.

Copper—Custom smelters and resellers competed actively for the light volume of business early in the week, selling at around 11.12½c, Connecticut. By the close, however, electrolytic was not available in any direction under 11.25c. Smelters advanced their bids for red metal scrap to the basis of 9.75c for No. 1 heavy copper. The mine producers' market remained unchanged throughout the week at 11.50c, Connecticut.

Lead — A moderate amount of business was booked each day with the exception of Monday and Thursday but buying was lighter than producers had expected at the 5-cent level.

Zinc — The prime western zinc market has been outstanding recently, due to its unusual steadiness despite light fresh demand. Sentiment has been buoyed the fact that shipments have been outrunning sales by three to four to one and that unfilled orders have dropped below 30,000 tons, a situation which usually is followed by heavier buying.

Tin—Straits spot declined steadily from 45.75c to 45.50c. The movement followed closely the trend in London and Singapore.

Antimony — Only routine carlot spot.

Equipment

New York—Machine tool orders are maintained and with most sellers March volume was slightly above April. Federal Shipbuilding & Dry Dock Co., Kearney, N. J., has purchased a substantial number of fabricating tools. Aircraft factories, active buyers in recent weeks, are expected to place additional orders as soon as expected plane contracts are closed.

Federal government orders are brisk and shops are further jammed by heavy bookings taken recently from England and France, with some machines going to Canada, Australia and New Zealand. Railroads are placing few contracts. Sellers have generally given up the practice of selling tools subject to price adjustment at the time of delivery and are now quoting fixed prices regardless of time of shipments.

Seattle — Electrical equipment, mining machinery and automotive items are in best demand, with volume of business improved over a month ago. Cory & Joslin, San Francisco, have been awarded a $273,785 contract for power equipment for the cold weather army experimental station, Ladd Field, Alaska.

CONSTRUCTION and ENTERPRISE

Ohio

ALLIANCE, O.—Alliance Mfg. Co., Owen L. Lewis, general manager, manufacturer of electric motors, will consolidate its operations, now in three locations. Plant at East Summit street and South Mahoning avenue, formerly occupied by Leigh Potters Inc., has been acquired and alterations are under way.

CINCINNATI—Cincinnati Milling Machine Co. has given contract to the Austin Co., 16112 Euclid avenue, Cleveland, for a new foundry to cost about $100,000.

CLEVELAND — Mueller Electric Co., 1538 East Thirty-first street, will build plant addition for employe service, fireproof die storage and steel warehouse, with space for production expansion. Two or three new machines will be installed soon.

CLEVELAND—Standard Oil Co. will add to laboratory facilities at its No. 2 works, East Sixty-fifth street. Plans are by company's engineering department, Midland building.

CLEVELAND—Best Steel Co. has been incorporated with 250 shares no par value, by D. H. Laurienzo and associates, Engineers' building, Cleveland.

CLEVELAND — Health Dispenser Co. Inc. has been formed to manufacture and distribute vending machines to sell fruit juices in containers. Ignatius A. Sanson, care J. F. Sanson & Sons, 13 Northern Ohio Food Terminal, heads the company.

CLEVELAND—Watco Engineering Inc., manufacturer of fluorescent lamps, has established its works at 5511 Euclid avenue and will expand its output and adapt it to wider uses. Frank W. and George H. Watkins are company officers.

CLEVELAND—Empire Plow Co., 3140 East Sixty-fifth street, will build a 1-story brick and steel addition 22 x 89 feet. Walter M. Haas is president and John M. Rorimer vice president and general manager.

CLEVELAND — Kreidl Physico-Chemical Corp., recently formed, has leased building at 5201 Denison avenue and equipping for laboratory use. Company will carry on investigations for two large manufacturing companies. Dr. I. Kreidl, 15514 Lake avenue, is interested.

GENEVA, O.—Village, W. B. Stocking, clerk, will open bids April 12 for a 300,000-gallon steel tank on tower and 8-inch automatic altitude valve; cost about $30,000.

MANSFIELD, O.—Mansfield Machine Sales Inc. has been formed to manufacture vending machines, by Basil W. Knapp, 171 Bartley avenue and John Villella, 127 Bowman street.

MT. VERNON, O.—Shellman Products Co., D. N. Rabishaw, purchasing agent, West Madison street, will build a factory addition 100 x 225 feet.

WEILERSVILLE, O.—Troyer & Siner Mfg. Co., Adam Troyer, president, will build 1-story brick and steel plant 40 x 80 feet, with boiler room 14 x 18 feet, on South Main street. Company manufactures spraying and potato-growing equipment.

WEST SALEM, O.—Schott Bros., manufacturer of buffers, is erecting a 31 x 65-foot addition to its plant.

YOUNGSTOWN, O.—General Fireproof-

ing Co. has given contract to Gillmore, Carmichael, Olson Co., 1873 East Fifty-fifth street, Cleveland for warehouse containing 45,000 square feet floor space.

YOUNGSTOWN, O.—Cut Steel Abrasives Inc. has been incorporated to deal in steel and iron products. Frank J. Bowers, 160 West Boston avenue, Robert Glasberg, 451 Almanda street and C. L. Robinson, attorney, 1609 Wilson avenue, are interested.

Connecticut

HARTFORD, CONN.—Wiremold Co., manufacturer of lighting and wiring equipment, is building additional plant unit with 27,000 square feet floor space, for manufacture of products recently added to line.

NAUGATUCK, CONN. — Naugatuck Chemical Co. is building a boilerhouse addition to its plant.

NEW BRITAIN, CONN. — Stanley Works is building a 1-story brick addition, 40 x 43 feet.

PORTLAND, CONN.—Standard Knapp Corp., Long Island City, N. Y., manufacturer of case and carton sealing equipment, has bought 1-story building formerly occupied by United States Rubber Co. and will equip for production of its machines.

Massachusetts

CHICOPEE, MASS.—Town has purchased three factory buildings of the A. G. Spalding & Bros. plant and will seek industrial occupants.

IPSWICH, MASS. — Hygrade-Sylvania Corp. has leased two large mill buildings which are being fitted for production of fluorescent lamps.

PITTSFIELD, MASS.—General Electric Co. is planning to erect an additional building for its plastics department.

SOMERVILLE. MASS. — Universal Overland Express Inc., 27 Tudor street, Cambridge, Mass., will build a 2-story 61 x 182-foot repair shop, to cost over $40,000. Harry F. Bryant & Son, 46 White place, Brookline, Mass., are engineers.

New York

GLENHAM, N. Y.—Texas Co., New York, is building an engineering research laboratory at Glenham. Structural steel placed with Lehigh Structural Steel Co., Allentown, Pa.

HUDSON, N. Y.—Department of public works is planning additions to the water supply system at cost of $150,000. Whitman, Requardt & Smith, 11 North Pearl street, Albany, N. Y., are engineers.

SCHENECTADY, N. Y.—American Locomotive Co., North Jay street, will build a diesel engine locomotive shop, 102 x 300 feet, costing more than $40,000.

New Jersey

BAYONNE, N. J.—General Cable Co. is erecting an additional plant building, Belmont Iron Works, Eddystone, Pa., contractor.

NEWARK, N. J.—Celluloid Corp., 10 East Fortieth street, New York, is erecting an additional plant building here.

NORTH BERGEN, N. J.—Monarch Cutlery Mfg. Co., 411 Twenty-fourth street, Guttenberg, N. J., will build a plant on Twenty-eighth street. Bonnano Construction Co., 1827 Bergen turnpike, is contractor.

Pennsylvania

ERIE, PA.—Bulk plant for Sun Oil Co., previously reported, will include 1-story plant building 65 x 75 feet, steel storage tanks, connecting pipe lines, etc. J. O. Craig, district sales manager, Grant building, Pittsburgh, is in charge.

LANCASTER, PA. — Armstrong Cork Co. will build an additional manufacturing building at its plant here, and a glass plant at Millville, N. J.

Michigan

DETROIT — Standard Minerals Inc., 3425 Wight street, has been incorporated to mine and process minerals, with $25,000 capital, by A. C. Winger, 4472 Penobscot building, Detroit.

DETROIT — Pied-Piper Animal Trap Co., has been incorporated to build animal traps, with $6000 capital, by William Colwell, 339 Cortland avenue, Detroit.

DETROIT—Kraetke Tool Co. Inc., has been incorporated to conduct a general toolmaking business, with $50,000 capital, by Ernest F. Kraetke, 5935 Woodhall street, Detroit.

DETROIT—Index Die & Engineering Co., 10633 East Canfield street, has been incorporated to manufacture dies, with $20,000 capital, by Godfrey G. Halleen, 9344 Mendota street, Detroit.

IRON MOUNTAIN, MICH.—Wisconsin-Michigan Power Co. is having a survey made for a dam and power plant in the Michigamme river, to cost $300,000. Holland, Ackerman & Holland, Ann Arbor, Mich., are making the survey.

ST. PETERSBURG, Mich.—Village is

having plans prepared for a municipal waterworks system to cost $100,000.

District of Columbia

WASHINGTON — Bureau of supplies and accounts, navy, will take bids as follows: April 19, schedule 1179, electric motor-driven automatic high-speed screw machine for delivery at San Diego, Calif.; schedule 1181 electric motor-driven, universal ram-type turret lathe, delivery San Diego, Calif.; schedule 1183 mechanical or hydraulic feed horizontal spindle, abrasive surface grinding machine, delivery San Diego, Calif.; schedule 1185 motor-driven single end metal punch and shear, delivery east and west coasts; schedule 1185 motor-driven pipe and nipple threading machine, delivery Puget Sound, Wash.; schedule 1193 motor-driven 12-inch geared head precision screw-cutting lathe, delivery, Quantico, Va.

Missouri

ST. LOUIS—United States engineer's office will receive bids to April 17 for steel pattern storage building, including electrical work, at the United States boatyard, foot of Arsenal street.

ST. LOUIS—Wolff Pipe & Iron Co., Second street and Tyler avenue, has bought a tract of 180,000 square feet at Gratiot street and Spring avenue. Office building and machine shop will be erected and company will move there about May 1. W. I. Wolff is president, Alvin Wolff secretary. Company handles pipe, iron and machinery.

Wisconsin

CHILTON, WIS.—Bids will be called soon for April 11 for new sewage disposal plant. Bond issue will be arranged when cost is determined. Harry L. Thompson is mayor.

KENOSHA, WIS. — Nash-Kelvinator Corp., Detroit, has given contract to Permanent Construction Co., Milwaukee, for 240 x 240-foot addition to plant at Thirtieth avenue and Fifty-second street, Kenosha.

MILWAUKEE—Allen-Bradley Co. is building 1-story shipping room addition to its plant at 1326 South Second street, costing $6000. Present shipping room will be razed to make room for erection of contemplated manufacturing unit.

Minnesota

CEDAR, MINN.City, Harry Edmunds, is having plans prepared for an electric generating plant to cost about $500,000. Stanley Engineering Co., Muscatine, Iowa, is consulting engineer.

SHAKOPEE—City, William J. Thiede, clerk, will take bids early in April for steel water tower and tank. King & Day, 1509 Pioneer building, St. Paul, are consulting engineers.

THIEF RIVER FALLS, MINN.—City, P. D. Pederson, city clerk, I. E. Quist, city engineer, has voted $130,000 bond issue for installation of 1600-horsepower diesel unit for addition to municipal power plant.

Texas

CORPUS CHRISTI, TEX. — Missouri Iron & Metal Co. Inc. has been incorporated with $2500 capital to deal in metals, by Max Goltman, Jacob Goltman and Sam Goltman.

Kansas

MARION, KANS.—Central electric cooperative awaits REA approval for 150 miles electric transmission lines. Paulette & Wilson, Public Utilities building, Salina, Kans., are consulting engineers.

Iowa

CEDAR FALLS, IOWA—City, H. B. Philpot, clerk, is taking bids to April 16 for a powerhouse building, including overhead crane, hydraulic turbines and governors, generators, exciters and general voltage regulator, switchboard panels and accessories, to cost about $185,000. Clark N. Streeter is city engineer.

OELWEIN, IOWA—City will hold election April 25 on $650,000 issue of bonds for municipal electric light plant.

Wyoming

CASPER, WYO.—Bureau of reclamation, Casper, is making survey for transmission line from Casper to Thermopolis, 125 miles, costing about $400,000. A. M. Zuill, Casper, is consulting engineer.

Montana

FORSYTH, MONT.—City, H. V. Beeman, city clerk, F. F. Palmer, city engineer, will take bids late in April for an electric power plant with diesel engines and distribution system.

Idaho

MOSCOW, IDAHO—Moscow Fire Brick & Clay Co., Thomas Hall, manager, has bought additional clay acreage and plans additional plant facilities, including boiler house, machine shop and drying buildings.

California

LOS ANGELES—Superior Tank & Construction Co., 5657 Randolph street, will build an addition to cost $6500.

Washington

SEATTLE—Boeing Airplane Co. plans $4,000,000 expansion program, including large assembly plant addition, giving 1,000,000 square feet floor space additional.

SEATTLE—Century Pipe Co. has been incorporated to manufacture steel products, with $100,000 capital, by P. J. Hart and associates, 1120 Vance building, Seattle.

TACOMA, WASH.—Tacoma Smelter, Eugene A. White, manager, is adding to plant to increase copper output to 1000 tons per day. Buildings will be completed July 1, giving major expansion in electrolytic refining department.

YAKIMA, WASH.—American Graphite & Metals Corp., 208 Holzinger building, has been organized with $150,000 capital by H. E. Carver and associates.

Canada

EAGLE LAKE, ONT.—International Cooperage Co., Haliburton, Ont., will rebuild burned plant here. Equipment loss was about $50,000.

ELORA, ONT.—Fleury-Bissel Foundry, Aurora Ont., has been purchased by Bissell Co. and will be removed to this city.

NEW TORONTO, ONT. — Anaconda American Brass Ltd., Eighth street, has given contract to Carter-Halls-Aldinger Co. Ltd., 419 Cherry street, Toronto, for addition to its plant.

SCARBOROUGH TOWNSHIP, ONT.—Metal Stampings Ltd. has awarded contract to R. J. Hibbs Construction Co., 15 Trent avenue, for erection of plant on Danforth avenue.

TORONTO, ONT.—Dunlop Tire & Rubber Goods Co. Ltd., 870 Queen street East, has been given contract for a plant addition estimated to cost $100,000. J. S. Rankin is engineer.

MONTREAL, QUE.—Robert Mitchell Co. has started large plant addition and installation of new equipment for production of munitions on a large scale for the British government.

ST. ROSE, QUE.—A. F. Byers & Co. Ltd., 1226 University street, Montreal, has been awarded contract for addition to plant of International Braid Co. of Canada Ltd., 999 Aqueduct street, Montreal, for production of woven glass. J. C. Day, 630 Dorchester street, West, Montreal, is consulting engineer.

CLASSIFIED

Bids Wanted

Federal Works Agency, Public Buildings Administration, Washington, D. C., March 30, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Standard Time, May 2, 1940, for construction of the U. S. P. O. at Smithfield, Va. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

Bids Wanted

Federal Works Agency, Public Buildings Administration, Washington, D. C., March 29, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Standard Time, April 19, 1940, for alterations and improvements of the U. S. Custom House and Appraisers Stores at Philadelphia, Pa. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

Bids Wanted

Federal Works Agency, Public Buildings Administration, Washington, D. C., March 22, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Standard Time, April 26, 1940, for construction of the U. S. P. O. at Jenkins, Ky. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

Classified

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Single Insertion—50c per line
Three to Six Insertions—48c per line
Six or more Insertions—45c per line

Seven words of ordinary length make a line.
FIRST LINE IN BOLD FACE TYPE
A box number address counts as one line

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BARGAINS—Demonstrator Arc Welders. Gasoline and electric drive. 30 days' trial. Easy terms if desired. Write Hobart Welder Exchange, Box ST, Troy, Ohio.

Bids Wanted

Federal Works Agency. Public Buildings Administration, Washington, D. C., March 23, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Standard Time, April 24, 1940, for construction of the U. S. P. O., Bluffton, Ohio. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

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Formerly used by large airplane manufacturer. Size 21¾" diameter x 48" deep. 49.5 K.W. capacity each. Alloy work baskets. Maximum temperature 1200° F. Good operating condition.

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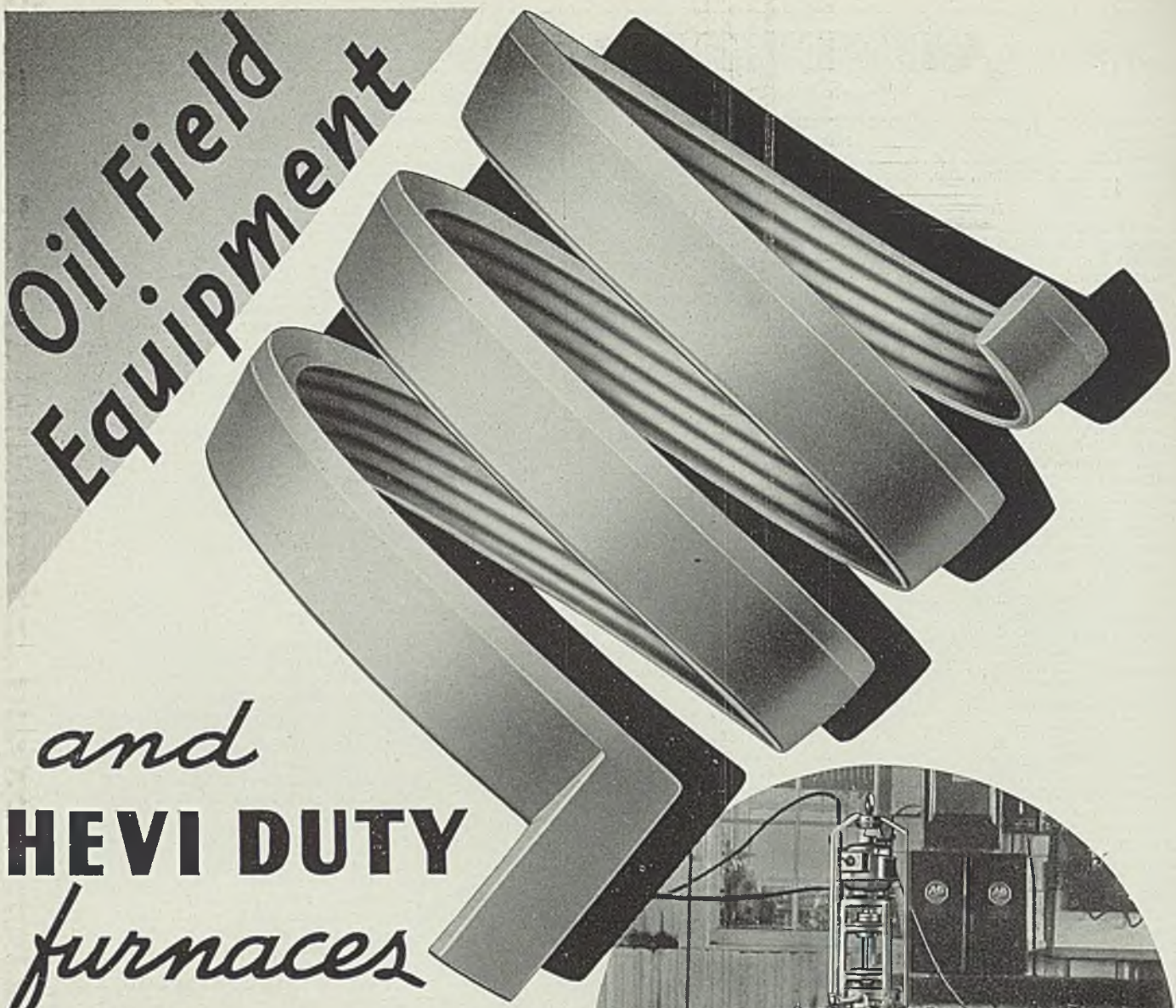
ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

Oil Field Equipment



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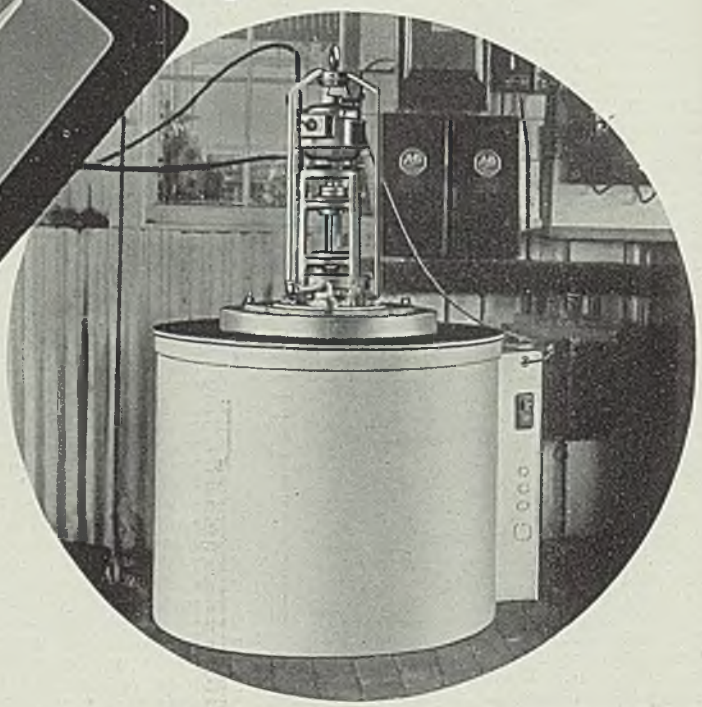

An HD 1020 Vertical Retort Furnace at S. R. Bowen Co., Huntington Beach, Calif.

Send for Bulletin HD 937

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