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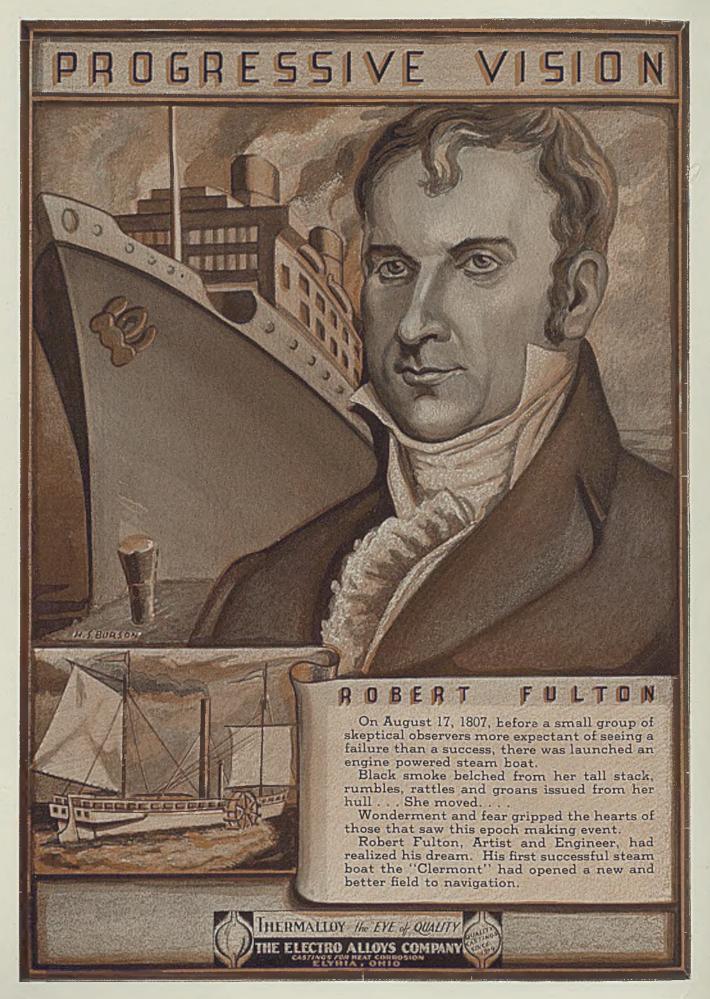
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As the Editor Views

■ STEEL last week regained the slight loss of the week before, rising (p. 27) ½-point to 61½ per cent of ingot capacity. Major steel outlets (p. 85) are maintaining operations, so that the production rate should not reflect any major recession over the next few weeks. At the same time there is no reason to expect any sharp upturn. STEEL's survey (p. 26) reveals that steel inventories at consuming plants did not, as expected, shrink during the first quarter. In fact, steel stocks at consuming plants on April 1 were nearly 5 per cent above the level of three months previous. Seventy per cent of the companies reporting had enough steel on April 1 to last 90 days or less.

Price weakness in sheets and strip appears to have been checked at the recently reduced level and fears of a spread of the weakness to include other prod-

Steel's Best Customers

ucts is less pronounced.... One of last week's developments was a 50-cent reduction on iron ore, bringing ore prices more in line with pig iron. Another market

development was sale of 25,000 tons of pig iron to Europe, with more pending. . . . Scrap prices reflect a somewhat stronger tone. . . . STEEL's carefully compiled statistics on steel distribution during 1939 (p. 21) show the most important consuming groups—in the order named—were automotive, construction, containers and railroads.

Canada's war supply board has been replaced (p. 29) by a department of munitions and supply responsible for placing all Allied war orders in Canada... Brazil (p. 31) has created

Revamp War a commission whose duty it will be to evolve a plan for establishment of an iron and steel industry in that country. . . . War will not

prevent the British Iron and Steel institute (p. 38) from holding its annual meeting this year as usual.

. . . Resistance welder manufacturers (p. 32) will

hold a trade practice conference in Chicago, April 30... New electrolytic process (p. 39) for production of pure iron powder is announced.... J. H. Dillon comments (p. 4) on the new Firestone polonium spark plugs.

Faulty combustion engineering, says J. P. Dovel (p. 60) characterizes 90 per cent of the blast furnaces of today. He describes a method which has been

Improving Combustion

applied to some ten furnaces with resulting important operating economies. . . . Pure hydrogen for use in atomic hydrogen welding is being obtained from anhydrous am-

monia (p. 58) by a process of dissociation which involves simple equipment that operates at comparatively low cost. . . . The oxyacetylene gouging process, originally developed for the steel industry, is finding new applications such as (p. 74) removing unwanted weld metal. . . . Colloidal graphite (p. 70) simplifies many high temperature lubrication problems.

Operator fatigue, says Guy Hubbard, is minimized by modern machine tools whose control elements are designed (p. 50) for comfort and safety. . . . A

Minimizing Fatigue

broader market for stainless steel is resulting from a new electrochemical polishing process (p. 54) which supplements mechanical methods. It further improves the

corrosion resistance of the material. . . . E. J. Stone (p. 68) discusses automatic soldering and electric resistance heating setups as instances of special machines which often yield important production advantages. . . . Dale Augsburger (p. 46) discusses various methods of heating and cooling solutions used in the metal producing and fabricating industries.

EC Krentzberg



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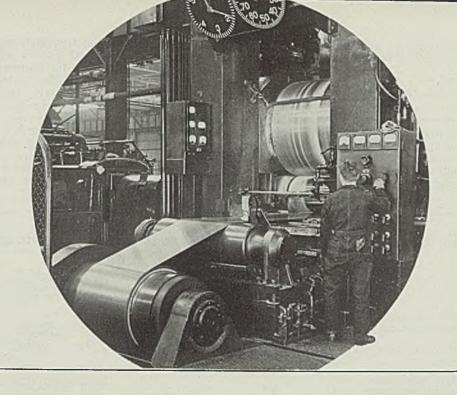
3 Ryerson stocks are complete and diversified. You save time, trouble and money by concentrating

all steel requirements with this one dependable source of supply. Stocks include everything from structurals to stainless — from mechanical tubing to foundation bolts. Many special analyses and unusual sizes are included in the wide range of Certified Steel products in stock for Immediate Shipment.

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Automobiles Retain Lead, Railroads Gain, in Steel Consumption

■ COMPILATION of distribution of finished rolled steel in 1939 shows that the automotive industry for the eighth consecutive year held first place as the largest consumer. Taking 18.10 per cent of the country's finished steel last year, motordom increased its consumption slightly, as compared with 1938 when it accounted for only 16.88 per cent.

Buildings and construction retained the second position with 13.13 per cent. Containers remained third with 9.38 per cent, railroads was fourth with 9.29 per cent, exports fifth with 6.53 per cent.

Conforming to practice initiated by the American Iron and Steel institute and now being adopted by most steel producers, the distribution tabulation for 1939 is presented on a "net ton" basis. In all previous years, or since 1922 when Steel inaugurated the annual distribution compilation, figures were given on a "gross ton" basis. For 1939 a number of companies reported their shipments in net tons; all gross figures were converted to net.

The ranking of principal consuming groups, with tonnages and percentages of steel consumed, is summarized as follows:

Per

			cent
	Consuming		of
Rank	group	Net Tons	total
1.	Automotive .	5,993,590	18.10
2.	Building and		
	construction	4 348 949	13 13

3.	Containers	3,105,462	9.38
4.	Railroads	3,080,286	9.29
5.	Exports	2,162,354	6.53
6.	Oil, gas, wa-		
	ter, utilities.	1,815,017	5.48
7.	Machinery	1,254,113	3.79
8.	Furnishings		
	for buildings	1,196,149	3.61
9.	Agriculture	630,147	1.90
	Jobbers	5,179,660	15.64
	All other	4,356,901	13.15
	Total :	33.122.628	100.00

To make its compilation as complete, and thereby as accurate, as possible, Steel intentionally delayed publication of the accompanying tabulation so as to include certain important reports which companies could not furnish at an

Per Cent of Finished Rolled Steel Taken by Principal Consuming Groups

	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926
Automotive	18.10	16.88	20.04	20.87	24.04	20.87	20.95	18.15	14.78	14.10	17.57	17.76	13.34	15.09
Buildings, construction	13.13	14.77	10.75	12.50	10.68	12.24	11.61	15.77	18.35	18.21	14.89	16.47	17.59	16.01
Containers	9.38	9.92	8.71	8.44	9.30	8.68	12.25	10.79	7.90	5.77	4.67	4.56	5.21	5.24
Railroads	9.29	6.51	11.16	10.52	7.27	12.37	7.29	8.30	12.55	14.97	16.70	14.87	18.70	19.90
Exports	6.53	7.52	6.74	3.79	3.85		3.61	3.31	4.10	4.34	4.83	5.52	5.39	5.29
Oil, gas, water, utilities		5.52		*5.33	*4.29		*4.88		*9.75	*9.48	*9.01	*7.72		
Machinery	3.79	3.55	4.88	4.96	4.37	3.65	3.63	3.39	3.37	3.80	3.81	3.48	2.79	2.65
Furnishings for buildings	3.61	-	3.29	3.90	4.24	3.77	3.70	3.64	2.90	3.11	2.56	2.13	2.13	2.00
Agriculture	1.90	2.22											4.40	0.770
Table	1.90	4.64	3.66	3.57	4.74	2.42	3.01	2.76	3.56	4.51	5.27	6.34	4.42	2.70
Jobbers, distributors	15.64	17.13	13.28	14.13	14.43	14.02	14.91	16.12	12.68	12.21	11.05	10.78	12.82	10.52
All other		12.46	11.65	11.99	12.79	11.72	14.16	12.27	10.06	9.50	9.64	10.37	10.84	13.31
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

^{*}Includes "oil, gas, water" only; figure for "utilities" is included in "All other."

earlier time. More companies are included in the 1939 figure than in

any previous year.

Consuming classifications in the 1939 report remain essentially the same as those employed in 1938. It will be recalled that several changes were adopted in 1938 in an effort to evolve a uniform classification which would conform to the requirements of the reporting companies and at the same time would provide infor-

mation of maximum usefulness to all concerned. These changes were explained in detail in Steel for May 8, 1939, page 15.

In 1938, an attempt was made to set up "utilities" as a separate group under "Oil, public utilities and miscellaneous industries." In 1939, an effort was made to retain this group and to set up another group "water" under the same heading. It has been found, however,

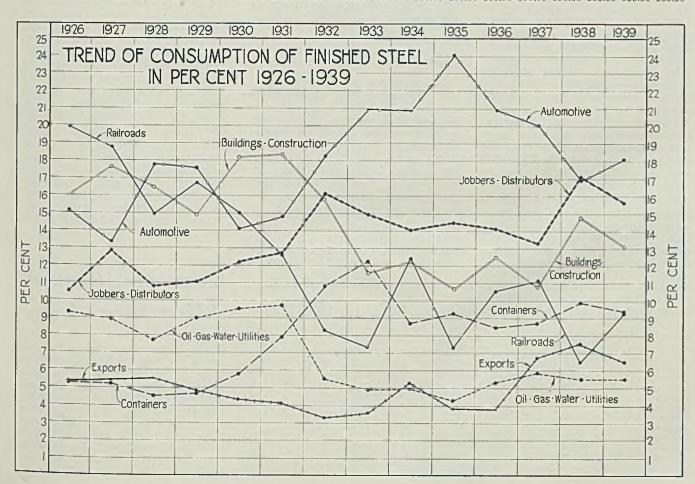
that few reporting companies maintained records which would enable them to enumerate the tonnages shipped to "water" and "utilities," consequently the 1939 tabulation shows these groups as included in "Oil, gas, water, utilities." In the table on page 21 it will be noted that the 1938 and 1939 percentages for this group are not comparable to the percentages for previous years. For the years 1926-1937, "utilities"

Distribution of Finished Steel in Net Tons to Consuming Groups

	Ralls, heavy ar light	steel i d other	e bars, ties and r track ssories I	Plates	Struc- tural shapes (over 3")	Bars, except concrete bars and shapes (under 3")	Concrete bars	Black plate for tinning
1-Steel converting and processing industries:								
a. Bolts, nuts, rivets and screws			7	257	245	254,194		22
b. Forglags				,874	1,070	129,158	17	
2—Jobbers, dealers and distributors	16,037	46,51	5 215	,241	283,235	476,159	302,583	57,032
Construction industries: a. Contractors, fabricators, etc. b. Concrete reinforcing bars, expanded metal		1,59	. 1	,245	1,404,208 11,586	212,073 32,869	349,411 288,835	1,137 75
c. Bullding material and equipment d. Shipbuilders		20-),770),106	134,967 79,058	106,982 35,626	12,883 796	6.876 144
 4—Pressing, forming and stamping: a. Stamped and pressed steel products b. Furniture and furnishings, including heat- 		:	2 93	,135	2,085	59,301	19,202	24,729
ing equipment and refrigerators 5—Container industry	16 103	2'		,097 ,762	5,947 4,063	94,372 12,276	8 111	39,715 2,320,843
6—Machinery and tools: a. Machinery and tools, not including elec-						,		2,020,030
b. Electrical machinery and equipment 7—Agricultural, including implements and	1,481 102	10: 1:		,859 ,632	78,950 19,840	224,850 69,976	591 39	2,813 1,303
equipment	2 31			3,874 3,150	23,685 26,073	206,369 1,381,224	38 1,315	182 4,728
9—Railroads: a. Steam and electrified railroads b. Cars and locomotives and parts	976,188	469,707		,180	75,730	98,067	2,635	29
10—Oil, public utilities, miscellaneous industries: a. Oil, gas, water, utilities	141,825 16,651	53,98° 6,240		,801	153,152	186,740	113	117
b. Mining and lumbering	23,464	7,096		,408	42,473 10,290	39,607 19,623	19,614 669	26.086 447
11—Miscellaneous industries	11,604	5,035			78,770	422,794	21,141	87,888
12—Export, all industries	29,002	11,421			147,674	146,571	118,562	394,309
Grand Totals	1,224,621	602,015	5 2,584,	,057 2	2,583,101	4,208,831		2,968,475
	All other					All ot		Per
	All other black plate and sheets except galv.	Galvanize sheets	d Strlp			All ot finish fire stee fucts produ	ed el Grand	Per cent of total
1—Steel converting and processing industries: a. Bolts, nuts, rivets and screws b. Forgings	black plate and sheets			and 4,3	pipe prod 196 86,	finish fire stee flucts produ	ed Grand Icts totals 07 356.663	cent of total
1—Steel converting and processing industries: a. Bolts, nuts, rivets and screws b. Forgings	black plate and sheets except galv.	sheets	steel 3,787	and 4,3	pipe prod 196 86, 888	finish steel	ed Grand cts totals 07 356,663 141,587	cent of total 3 1.08 7 0.43
a. Bolts, nuts, rivets and screwsb. Forgings	black plate and sheets except galv. 3,348 433	721 68	3,787 1,835	and 4,1 1,8 983,9	pipe prod 196 86, 388 957 1,045,	lire stee produ 679 3,20 854 4,35 367 125,75 148 43,57	ed Grand totals 07 356,663 141,587 5,179,660 1 3,011,484	cent of total 3 1.08 7 0.43 9 15.64 1 9.09
a. Bolts, nuts, rivets and screws. b. Forgings 2—Jobbers, dealers and distributors. 3—Construction industries: a. Contractors, fabricators, etc. b. Concrete reinforcing bars, expanded metal c. Building material and equipment. d. Shipbuilders	black plate and sheets except galv. 3,348 433 668,517 171,759	721 68 857,519 97,459	3,787 1,835 101,741 24,873	and 4,1 1,8 983,9	pipe prod 196 86, 888 957 1,045, 906 89, 409 28, 599 132,	Ire stee tucts produ 679 3,20 854 4,35 367 125,75 148 43,57 651 1,41	ed el Grand totals 07 356,663 141,587 5,179,660 1 3,011,484 6 397,768 9 39,897	cent of total 3 1.08 7 0.43 0 15.64 4 9.09 3 1.20 7 2.84
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a. Bolts, nuts, rivets and screws. b. Forgings 2—Jobbers, dealers and distributors. 3—Construction industries: a. Contractors, fabricators, etc. b. Concrete reinforcing bars, expanded metal c. Building material and equipment. d. Shipbuilders 4—Pressing, forming and stamping: a. Stamped and pressed steel products. b. Furniture and furnishings, including heating equipment and refrigerators.	3,348 433 668,517 171,759 22,179 156,935 9,052 155,154 662,196	721 68 857,519 97,459 9,807 129,322 3,672 46,306 64,455	3,787 1,835 101,741 24,873 691 54,892 15,203 174,707 125,405	4,3 1,8 983,6 59,9 103,5 146,7	196 86, 888 957 1,045, 906 89, 409 28, 599 132, 722 8,	lre ducts finish stee flucts frodu finish stee flucts frodu for finish flucts frodu	ed class Grand totals 07	cent of total 3 1.08 7 0.43 9 15.64 4 9.09 3 1.20 7 2.84 6 1.99 2 1.94
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Distribution of Finished Steel in Per Cent to Consuming Groups

	Rails, heavy and light	Angle bars, steel ties and other track	Plates	Structural shapes (over 3 inches)	Bars, except concrete bars and shapes (under 3 inches)	9	Black plate for tinning	All other black plate and sheets except galvanized	ılze	Strip steel	Tubing and pipe	Wire products	All other finished steel products
1-Steel converting, processing industries:													
a. Bolts, nuts, rivets and screws b. Forgings	****	****	0.01		6.04 3.07	100		0.05	0.04	0.16	0.13 0.06		
2-Jobbers, dealers and distributors	1.31	7.73	8.33	10.96	11.31	26.58	1.92	9.90	52.44	4.25			
3—Construction industries:												00.00	
a Contractors, fabricators, etc b. Concrete reinforcing bars and ex-	0.61	0.26	21,24	54.36	5.04	30.69	0.04	2.54	5.96	1.04	1.81	3.41	3.97
panded metal	0.01	0.01 0.03	0.05 1.58 12.78	0.45 5.22 3.06	0.78 2.54 0.85	25.37 1.13 0.07	0.23	0.33 2.32 0.13	0.60 7.91 0.22	0.03 2.30 0.64			5.44
4—Pressing, forming and stamping: a. Stamped and pressed steel products b. Furniture and furnishings, includ- ing heating equipment and re- frigerators			3.60	0.08	1.41	1.69	0.83	2.30 9.80	2.83 3.94	7.30	0.14		0.58
5—Container industry	0.01		0.80		0.29	0.01	78.18	8.07	1.96	5.24 4.64			
6—Machinery and tools: a. Machinery and tools, not including electrical equipment b. Electrical machinery and equipment	0.12 0.01	0.02	4.68 2.58	3.06 0.77	5.34 1.66	0.05	0.19 0.04	1.68	0.34 0.35	1.21 3.45	0.05 0.54 1.28	0.94	3.52 3.03
7-Agricultural, including implements and								GILL	0.00	0.40	1.20	3.470	3.03
equipment	••••	117.1	0.73	0.92	4.90	****	0.01	1.24	2.74	2.45	0.98	5.07	2.58
8—Automotive Industry	* * * *	***	4.19	1.01	32.82	0.12	0.16	43.86	1.65	49.26	1.45	6,22	8.53
9—Railroads: a. Steam and electrilled railroads b. Cars and locomotives and parts	79.71 11.58	78.02 8.97	4.11 13.54	2.93 5.93	2.33 4.44	0.23 0.01		0.24 1.49	0.12 2.05	0.15 1.73	0.56 0.81	0.71 0.62	7.51 9.70
10—Oil, public utilities and miscellaneous industries:													
a. Oil, gas, water, utilities b. Mining and lumbering	1.36 1.92	1.04 1.18	3.34 0.48	1.64 0.40	0.94 0.47	1.72 0.06	$0.88 \\ 0.02$	0.93 0.08	$0.22 \\ 0.24$	0.33	41.29 0.14	0.88 0.67	10.06 1.28
11-Miscellaneous industries	0.95	0.84	7.28	3.05	10.05	1.86	2.96	6.95	7.49	12.45	6.74	14.47	11.76
12—Export, all industries	2.37	1.90	10.26	5.72	3.48	10.41	13.28	4.64	8.90	3.23	6.37	7.04	10.73
Grand Totals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00



is included in the classification "All other."

To answer questions which readers may have as to the method of compiling the distribution figures, the following explanation is made.

Report blanks, designating consuming classifications and steel products headings as shown in the tables on pages 22 and 23, were sent to all steel producers and rolling mill operators.

Returns were received from 47 integrated companies whose steel ingot capacity totals 78,940,769 net tons, or 96.72 per cent of the steel ingot capacity as of Dec. 31, 1939, of 81,619,496 net tons computed by the American Iron and Steel institute, and from 33 non-integrated companies operating rolling mills but having no steel ingot capacity.

Steel For Further Conversion

The purpose in soliciting reports from non-integrated companies is to obtain an analysis of the distribution of the steel rolled from the tonnage of semifinished steel which the integrated companies reported as having been shipped by them to other companies for further conversion.

Reports from integrated and nonintegrated companies account for the distribution of 33,122,628 net tons of finished rolled steel. This figure compares with the American Iron and Steel institute's reported production in 1939 of 34,687,861 gross tons, or 4,920,055 net tons. An which, however, includes semifinished steel to a total of 4,392,906 gross tons, or 4,920,055 net tons. An accurate comparable figure could be determined only by applying a conversion factor to this tonnage of semifinished material, converting it into terms of finished rolled steel, and adding that figure to the 33,930,349 net tons of finished steel in the institute's compilation.

The semifinished steel referred to consists of 3,486,887 net tons of ingots, blooms, billets, slabs, sheet bars, etc.; 641,828 tons of skelp; and 791,360 tons of wire rods. Conversion loss from ingots to finished steel

Distribution by Percentage of Alloy Steel in 1939

Shown by Consuming Groups and Individual Products

	Hot	Cold			Pipe		Struc-	Hot	Cold		
	rolled	drawn			and		tural	rolled	rolled	Tool	Forg-
Group	bars	bars	Sheets	Plates	tubes	Wire	shapes	strip	strip	steel	ings
Automotive.	66.79	18.74	13.28	13.32	0.96	26.10	0.67	74.72	33.85	16.18	60.57
Machine tool	8.06	5.16	1.60	8.37	8.70	8.99	26.71	1.18	6.58	22.35	5.10
Railroad	1.64	21.82	5.75	33.23	1.41	1.91	25.86	3.45	0.61	2.03	0.01
Agricultural	. 1.96	1.33	0.17	4.30	1111	0.21	25.95	1.08	0.69	1.61	1111
Construction	0.69	20.16	1.19	2.59	1.89	2.24	3.59	0.09	1.15	6.36	0.26
Shipbuilding	0.40	0.01	0.35	18.71	3.77	0.03	14.91	0.01	0.01	1.61	31.36
Oil industry	0.48	0.20	0.17	0.50	23.21	0.28	0.09	0.04	0.48	0.40	0.01
Exports	3.50	0.33	4.71	0.85	1.94	0.46	100001	1.48	1.87	19.20	0.04
All other	16.48	32,25	72.78	18.13	58.12	59.78	2.22	17.95	54.76	30.26	2.65

Totals ... 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00

may be as high as 30 per cent and from wire rods to wire products as low as a few per cent.

If, in view of the preponderance of heavy semifinished tonnage involved (blooms, slabs, etc., including ingots), one can arbitrarily assume a loss of 15 per cent in conversion to finished steel, then the 4,920,055 net tons of semifinished shrinks to 4,182,046 net tons. This added to the 33,930,349 net tons gives a computed total of 38,112,395 net tons, based upon the institute's figures. (The foregoing calculations will be understood more clearly by reference to the institute's figures presented on page 32 of the March 11, 1940, issue of STEEL).

Thus, Steel's reported distribution of 33,122,628 net tons accounts for 86.91 per cent of the total tonnage of finished steel rolled in 1939.

Figures Free of Estimates

No estimates were employed in the compilation. All reports were entered as received, except that in the case of one large and four very small companies where distribution of tonnages was not in sufficient detail to be classified intelligently, the tonnage under each steel product heading was distributed arbitrarily in accordance with the percentages derived from all other returns.

Study of the returns reveals no notable change in consumption from recent years. The only changes in

rank were in railroads and exports, fourth and fifth, respectively, in 1939, which exchanged places, as compared with 1938. This change took place because railroads jumped from 6.51 per cent in 1938 to 9.29 per cent in 1939, while exports were dropping from 7.52 per cent in the former year to 6.53 per cent in the latter year.

The largest change in any classification was in railroads, an increase of 2.78 per cent. Second largest change was in buildings and construction, a loss of 1.64 per cent in 1939, as against 1938. Third largest was in jobbers and distributors, which includes warehouses, with a decrease of 1.49 per cent. Incidentally, the figure for jobbers was 15.64 per cent in 1939 and 17.13 per cent in 1938. Only the automotive industry exceeded the tonnage distributed by jobbers and that by only 2.46 per cent. In 1938, the jobbers' tonnage had topped automotive by a narrow margin and was the first year in which steel sold through jobbers had totaled more than the tonnage of the leading consuming classification.

In the eight-year period in which the automotive industry has held the dominant position, in only one year—1938 with 16.88 per cent—has its comparative consumption been lower than the 18.10 per cent in 1939. Highest point reached was 24.04 per cent in 1935.

Consumption of Alloy Steel Up

■ The automotive industry held securely to top rank and machine tools to second place in the consumption of alloy steel in 1939, according to distribution tonnages reported to STEEL. Automotive continues to stand far ahead of any other group with a percentage of tonnage just slightly larger than that of 1938. Likewise, machine tools retained second position with

Use of Alloy Steel, by Consuming Industry, 1931-1939

	Net Tons	1								
	Reported			Percent	lage of	Consur	nption	by Grou	ıps	
Group	1939	1939	1938	1937	1936	1935	1934	1933	1932	1931
Automotive	468,841	54.65	54.00	59.68	59.78	72.22	53.31	68.28	77.64	72.67
Machine tools	62,708	7.31	6.86	6.75	6.57	4.47	4.88	3.57	3.54	6.17
Railroads	33,625	3.92	2.43	7.01	6.96	2.30	4.11	. 0.92	1.92	1.83
Agricultural	14,250	1.66	1.76	1.88	3.03	2.87	2.42	2.07	1.69	3.30
Construction	14,632	1.71	1.71	0.74	0.45	0.94	1.55	0.66	0.68	1.09
Shipbuilding	31,242	3.64	1.36	0.37	0.44	0.39	1.21	0.47	0.42	0.52
Oil industry	9,189	1.07	1.82	0.94	1.07	1.77	1.52	1.96	0.82	1.16
Exports	27,752	3.23	5.44	1.69	1.00	0.58	0.58	0.29	0.43	0.88
All other	195,699	22.81	24.62	20,94	20.70	14.46	30.42	21.78	12.86	12.38
Totals	857,938	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

a percentage only fractionally higher than in the previous year.

Considerable shifting about in other positions took place in 1939. For instance, railroads, which had been fourth in 1938, moved into third. Shipbuilding swung into fourth rank, jumping from eighth the year before. Exports dropped from third to fifth, while the construction industry jumped one notch from seventh to sixth. Agricultural slipped from sixth in 1938 to seventh in 1939, and the oil industry, which had been fifth, fell to eighth.

Total alloy steel tonnage reported in 1939 was 857,938 net tons, this being an increase of 357,617 tons, or 71.5 per cent, over the 1938 total of 500,321 net tons. Since the production of open-hearth and bessemer steel ingots, and the production of finished steel, both as reported by the American Iron and Steel institute, showed a gain of 65 per cent from 1938 to 1939, it seems certain that the output and consumption of alloy steel in 1939 was higher by a considerably larger margin.

Figures Given in Net Tons

It will be observed that Steel's distribution figures are reported in net tons for the first time. This is in keeping with the newly adopted practice of the steel industry.

Without doubt, STEEL's alloy steel figures for the last three years provide a more accurate analysis of distribution than those presented previously because a larger number of companies producing alloy steel made their tonnages available. In spite of this, however, the figures presented here must be regarded as indicative rather than conclusive, because returns are not thoroughly representative of the alloy steel industry. The breakdown shown in the accompanying tables should be regarded as conclusive only to the extent of the tonnage involved. More complete returns conceivably would show greater diversity in distribution, perhaps at the expense of the automotive industry's proportion.

According to 1939 reports to

STEEL, the automotive industry accounted for 54.65 per cent of the alloy steel total, as compared with 54.00 per cent in 1938. The proportion of this industry appears to be declining gradually. The high point of the past nine years was 77.64 per cent in 1932.

The machine tool industry took 7.31 per cent of the total in 1939, against 6.86 per cent in 1938. Railroads rose from 2.43 per cent to 3.92 per cent last year. Shipbuilding with only 1.36 per cent in 1938 moved up to 3.64 per cent in 1939. Exports dropped from 5.44 per cent in 1938 to 3.23 per cent last year, while construction took 1.71 per cent in both years. Agricultural with 1.66 per cent in 1939 declined from 1.76 per cent in the year before; the oil industry fell from 1.82 per cent to 1.07 per cent.

As has always been the case, an overwhelming proportion of alloy steel is distributed in the form of hot rolled bars. This product rose from 64.82 per cent in 1938 to 66.06 per cent in 1939. Hot rolled bars in 1939 accounted for 566,796 tons of the 857,938 net tons reported.

Forgings rose from third position in 1938 with 5.49 per cent to second in 1939 with 7.92 per cent. Sheets dropped from second with 8.44 per cent to third last year with 7.87 per cent. Cold drawn bars retained hold on fourth place with 4.08 per cent in 1939, against 4.34 per cent in 1938.

Other changes in product rank were unimportant. In 1939, a small increase was shown by wire; losses were registered by plates, pipe and tubes, structural shapes, hot rolled strip, cold rolled strip, tool steel.

FINANCIAL

KEYSTONE'S MARCH QUARTER PROFIT BELOW 1939 PERIOD

■ KEYSTONE Steel & Wire Co., Peoria, Ill., reports \$279,385 net income, equal to 37 cents a share on capital stock, for quarter ended March 31. This was 12 per cent less than net profit of \$317,608 or 42 cents a share earned in corresponding 1939 period, and compares with \$418,489 net income, equal to 55 cents a share, reported for last 1939 quarter.

For nine months ended March 31, Keystone, whose fiscal year ends June 30, earned net profit totaling \$971,797, equal to \$1.28 per share. Net income for corresponding period ended March 31, 1939, was \$516,560, equal to 68 cents per share.

March quarter net sales aggregated \$2,964,653, compared to \$3,229,942 in same 1939 period, a decrease of 10.4 per cent. Sales tonnage declined 12 per cent during the period.

ALLEGHENY LUDLUM'S MARCH QUARTER PROFIT DECREASES

Allegheny Ludlum Steel Corp., Brackenridge, Pa., reports \$1,000,-297 consolidated net profit for first 1940 quarter, equal to 75 cents a share on outstanding common after preferred dividend requirements. This compared with \$206,582 net profit, equal to 12 cents a share on common, earned in corresponding 1939 period.

Reflecting decrease in operating rate, first quarter net income was 29.1 per cent less than \$1,411,423, equal to \$1.08 a share, earned in last 1939 period. Third 1939 quarter net profit was \$327,772, or 21 cents a share on common.

SHARON STEEL CORP.'S FIRST QUARTER PROFIT IS \$309,576

Sharon Steel Corp., Sharon, Pa., reports first quarter net profit, 32 per cent lower than in fourth 1939 period, was \$309,576, equal, after dividend requirements on preferred stock, to 60 cents a share on common. This represents a sharp increase in net earnings over \$7613, equal to 13 cents a share on \$5 preferred, earned in first 1939 period, was the best first quarter since 1937, when company reported \$475,778 net income.

Last year's fourth quarter earnings totaled \$455,497; net loss in third period was \$59,484.

M. A. HANNA EARNS \$390,238 FIRST QUARTER NET PROFIT

M. A. Hanna Co., Cleveland, coal, ore, dock and vessel operator, reports first 1940 quarter net income of \$390,238, equal after preferred dividend requirements, to 22½ cents a share on common. This compares with \$172,105 net income, equal to one cent per common share, earned in first 1939 quarter, and fourth 1939 period net profit of \$835,599, or 66 cents a share on common.

Truscon Steel Co., Youngstown, O., Republic Steel Corp. subsidiary, reports \$11,527 net loss, after deduction for repairs, maintenance expense and provision for depreciation, incurred in first 1940 quarter.

Use of Alloy Steel, by Finished Form, 1931-1939

	Net Tons									
	Reported		——Ре	rcentag	ge of Co	nsump	tion by	Produc	ts	
Product	1939	1939	1938	1937	1936	1935	1934	1933	1932	1931
Hot rolled bars	566,796	66.06	64.82	74.76	77.32	84.62	68.73	69.81	77.28	54.48
Cold drawn bars	,	4.08	4.34	2.64	2.54	4.32	14.99	19.05	11.68	25.65
Sheets	67,488	7.87	8.44	3.56	3.41	2.03	10.20	1.29	1.14	0.69
	31,112	3.63	3.70	2.97	1.76	0.78	1.28	0.59	0.65	1.95
Pipe and tubes		3.00	3.39	0.92	1.11	0.78	1.75	3.57	4.80	8.60
	6,236	0.73	0.68	1.35	1.73	0.31	0.19	0.01	0.12	0.07
Structural shapes	2,254	0.26	0.64	0.71	1.57	1.15	0.25	0.33	0.28	0.06
Hot rolled strip.		3.35	4.32	4.14	6.91	5.01	0.49	2.88	0.66	1.31
OCLID		1.18	1.23	0.67	0.46	0.38	0.35	0.51	0.43	0.04
		1.92	2.95	2.98	2.88	0.42	1.60	0.48	1.07	2.03
Forgings	67,965	7.92	5.49	5.30	0.31	0.20	0.17	1.48	1.89	5.12

Totals 857,938 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00

Consumers' Steel Inventories Show

Little Change in First Quarter

■ TOTAL steel inventories of consumers changed little during the first three months this year. While 44 per cent of all users reduced their stocks, a slightly larger proportion of buyers added to their supplies. This resulted in almost a 5 per cent increase in total inventories. Approximately three-fourths of all consumers regarded their inventories of April 1 as normal or below normal.

These conclusions are reached from results of a survey just completed by STEEL to determine inventory trends, the third study of this type. Previous surveys showed a 12 per cent increase in inventories between Aug. 31 and Oct. 31 and a further gain of 9 per cent between the latter date and Dec. 31.

As was the case during the last two months of 1939, the inventory trend the first quarter of this year varied with the size of the consumer. Small steel users continued to curtail their stocks from the peak which apparently was reached late last fall, while larger buyers added to their supplies.

In some cases the further expansion in stocks resulted from the receipt of material ordered during the war-inspired buying boom, but in numerous instances inventory

holdings since Jan. 1 consider these supplies normal in relation to cur-

In order to make this survey as representative as possible, steel consumers of various sizes and types were queried regarding their inventories. Average inventory of all reporting companies on Dec. 31, 1939 was valued at \$44,611; on March 31 it was \$46,747.

Larger Inventories Rise

To illustrate the difference between inventory changes of large and small companies, average stocks are listed below for consumers with inventories of more than \$100,000, those with supplies of \$50,000 to \$100,000, \$25,000 to \$50,000 and less than \$25,000.

		Per	Cent
	Dec. 31	March 31	Chge
Over \$100,000	\$245,751	\$263,714	+7.3
\$50,000-\$100,000.	63,473	69,157	+9.0
\$25,000-\$50,000 .	38,622	35,463	-8.2
Under \$25,000	9,998	9,488	-5.1
All Companies	44.611	46.747	+4.8

Steel buyers are almost evenly divided between those who increased their inventories and those who cur-

additions were prompted by an upturn in consumption. This is evidenced by the fact certain users who have added extensively to their rent and near-future requirements.

At World's Fair Steel girders weighing 50 tons form framework of the 120-foot water cascade, at Westinghouse Electric & Mig. Co. building, New York World's Fair, which will support 15 waterfalls each 8 feet high set above each other discharging 53 tons of water per minute. Fall is broken into cascades to prevent spray and mist at foot of tower. Each cascade is fed by its own water line

Steel Waterfall

tailed their stocks last quarter. Percentage of each group follows:

	Per	cent
Increased		45
Reduced		44
No change		11

About 70 per cent of all users reported their March 31 inventories represented requirements of three months or less. In the survey conducted three months ago 77 per cent of all reports indicated that stocks as of Dec. 31 covered estimated needs of three months or less.

Thirty-seven per cent of all companies stated their inventories would last one to two months at present and anticipated rate of consumption, while 27 per cent reported stocks of two to three months' duration. Percentages for all periods follow:

		ŀ	er ce
Less	tł	an 1 month	5.5
1 to	2	months	37
2 to	3	months	27
3 to	4	months	12
		months	
Over	6	months	5

Relatively few consumers considered their inventories below normal as of March 31. Percentages of all companies falling into the various classifications, according to the manner in which they rated the size of their inventories, were:

					P	er	cen.
Norma	ı		 				64
Above	normal	٠.	 				26
Below	normal		 				10

Abnormally large stocks of some buyers reflect excessive additions made after last Sept. 1, when threats of higher prices and difficulties in obtaining early delivery from mills prompted extensive forward buying. While these stocks have been pared in numerous instances, further reductions apparently will be made. However, in view of war conditions and the average improvement in steel consumption compared with a year ago, it appears likely inventories will not be permitted to decline to the low level prevailing in late summer of 1939.

Some small consumers, in reporting above-normal inventories, state they are victims of last fall's unusual circumstances. At that time mill deliveries were uncertain and producers of certain products were accepting orders only in quantities that were excessive for smaller users, it is claimed. However, the latter were required to protect themselves with the result stocks of such items now are said to be sufficient in some cases for two or three years.

Another factor held responsible



for abnormally large inventories among some smaller users is the quantity extra. Products affected by such charges must be bought in lots covering requirements of a year or two, if the small consumer is to be competitive, it is maintained.

The fact early deliveries now are available from mills on commoner steel products encourages buyers to allow inventories to shrink. Tendency toward lower steel prices also discourages stock additions in most instances. However, the possibility is seen that the recent sharp cut in sheet and strip quotations, accompanied by doubts as to permanency of the reduction, may result in rather liberal coverage of forward needs and retard a further decline in stocks of flat-rolled products.

Rise in Freight Car Requirements Forecast

■ Freight car requirements for iron and steel products are expected to rise to 357,078 during the second quarter this year, an increase of 13.6 per cent above the 314,210 cars of second quarter of 1939, according to estimates by regional shippers' advisory boards. Second quarter requirements for machinery and boilers are expected to increase 16.5 per cent above the 24,778 cars of last year to 28,877.

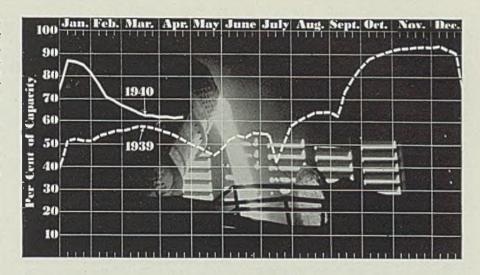
Bethlehem Holds Iron Ore Concessions in Venezuela

The Iron Mines Co. of Venezuela, a subsidiary of the Bethlehem Steel Co., Bethlehem, Pa., holds concessions on iron ore deposits located in the state of Bolivar in Venezuela, near the port of San Felix. Negotiations are being carried on with the Venezuelan government for the issuance of permits necessary for the opening and operation of these mines.

Foundry Equipment Orders Gain Sharply

■ Foundry equipment orders in March, reported by the Foundry Equipment Manufacturers' association, Cleveland, advanced sharply from February and also were well above March, 1939. Shipments and unfilled orders showed a like increase. Comparisons follow, indexes based on 1922-24:

	Mar.	Feb.	Mar.
	1940	1940	1939
Net orders Shipments Untilled orders 3 mos. av. gross orders	179.0 291.0	179.4 184.2 226.5 180.9	146.6 128.1 193.6 134.9



PRODUCTION... Up

■ STEELWORKS operations last week rose $\frac{1}{2}$ -point to 61 $\frac{1}{2}$ per cent of capacity. Four districts made gains, four registered a loss and four continued the rate of the previous week. Last year the rate was 50 $\frac{1}{2}$ per cent; two years ago it was 32 $\frac{1}{2}$ per cent.

Youngstown, O. — Rose 1 point to 43 per cent as one more open hearth was put in service, making 38 in production, with three bessemers. This week probably will see another increase of one furnace. Youngstown Sheet & Tube Co. has blown in a blast furnace at its Brier Hill plant, making 14 active in this district.

Chicago — Advanced 2½ points to 61½ per cent on increases by four producers. One plant showed lower rate, due to furnace repairs.

Birmingham, Ala. — Unchanged at 81 per cent, with 16 open hearths in production. Repairs are expected to cause some decrease in the next few weeks.

Detroit — Dropped 5 points to 72 per cent, two open hearths being taken off. Active units number 19.

New England - Up 5 points to 60

per cent, one producer increasing slightly.

Central eastern seaboard — Off 1 point to 56 per cent, smaller independents being less active.

Buffalo — Declined 2 point₃ to 42 per cent, the lowest rate in nine months.

Pittsburgh — Gained 2 points to 55 per cent, with small further gain expected this week.

Wheeling — Steady at 73 per cent. Will start this week 5 points higher, at 78 per cent, with possible further increases during the week.

Cleveland — Continued at 65 per cent, despite minor changes at some plants.

St. Louis — Held at 45 per cent for the second week.

Cincinnati — Down 6 points to 50 per cent as one plant closed temporarily for inventory curtailment.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

e	Veek nded pr. 20	Change	Sa: we 1939	ek
Pittsburgh	55	+ 2	43	29
Chicago	61.5	+ 2.5	53.5	30.5
Eastern Pa	56	— 1	38.5	28
Youngstown	43	+ 1	43	31
Wheeling	73	None	65	44
Cleveland	65	None	36.5	30.8
Buffalo	42	— 2	46.5	30
Birmingham	81	None	60	66
New England .	60	+ 5	35	25
Cincinnati	50	6	46	45
St. Louis	45	None	44.5	36.3
Detroit	72	— 5	57	18
	_	_		-
Average	61.5	+ 0.5	50.5	32.5

Illium in New Forms Broadens Applications

Ellium, a nonferrous alloy, is now available in strip and rolled stock, according to its manufacturer, Burgess-Parr Co., Freeport, Ill. It is furnished in strip in U. S. S. gages from 8 to 34; in butt-welded tubing and rolled rod for use in screw machines as tie rods, shafting or pins.

Latest interesting application of the alloy is in the form of thermocouple protection tubes suitable for steel mills. Tubes for this purpose have an outside diameter of 1-inch and vary from 0.083 to 0.063-inch in wall thickness. They offer resistance to many acids, soluble oxides and salts.

Survey Shows 7,596,000 Tons Scrap Held by Users, Dealers

■ DOMESTIC stocks of steel and iron scrap at consumers' and dealers' plants and in transit at the end of December, 1939, approximated 7,596,000 gross tons, an increase of 7 per cent over the 7,111,700 tons reported as of Sept. 30, 1939, according to a preliminary report by the bureau of mines, department of the interior.

Estimated consumers' stocks at the end of the year totaled 4,955,000 tons, compared with 4,648,000 tons at the close of September. Stocks reported held by railroads, dealers, auto wreckers, etc., rose from 2,463,701 to 2,640,688 tons, due to larger number of reports from small dealers in December. At the year end stocks in hands of larger suppliers were lower than at the end of September, railroad inventories declining 14 per cent in that period.

Included in the December total are 5,727,000 tons of purchased or market scrap and 1,869,000 tons of home scrap at consumers' plants. Returns from 719 consumers who accounted for 93 per cent of total stocks in 1938 showed stocks of 4,598,000 tons, from which consumer stocks may be estimated at 4,-955,000 tons. Scrap consumption in December was 3,873,000, compared with 3,057,000 tons in September. Known consumer and supplier stocks at the end of the year were equivalent to 8 weeks supply at the December rate of use.

In the accompanying summary of stocks of pig iron and scrap figures are based on returns from 719 consumers, representing 93 per cent of total scrap used in 1938, from 2580 scrap dealers, 1832 auto wrecking establishments, 66 large railroad companies and 202 selected manufacturing plants. These include 1500 dealers and auto wreckers and 202 manufacturers not included in the September survey.

Data on consumers' stocks by classes are incomplete. However, consumers' stocks Dec. 31, 1939. are estimated to have included 3,-086,000 tons purchased scrap, 1,869,-000 tons home scrap, 4,955,000 tons total scrap, and 2,948,000 tons pig iron. Sept. 30, 1939, consumers' stocks included 2,910,000 tons purchased scrap, 1,738,000 tons home scrap, 4,648,000 tons total scrap, and 3,378,000 pig iron. It is of interest to note that, following a period of record steel production, consumers' stocks of purchased and home scrap increased, whereas stocks of pig iron decreased.

Data from the Sept. 30 survey by the bureau appeared in Steel, Dec. 11, 1939, page 33.

Additional Warehouse Chapters Elect Officers

■ Additional chapters of the American Steel Warehouse association have elected officers as follows for the coming year:

Baltimore: President, Harold K. Dell, John J. Greer & Co. Inc., Baltimore; vice president, Thomas P. Walker, J. B. Kendall Co., Washington; secretary, Eugene Mowlds, Scully Steel Products Co., Baltimore; national director, George J. Parke, Eagleston-Parke Inc., Norfolk, Va.

Buffalo: President, D. C. Park, Smith & Caffrey Co., Syracuse, N. Y.; vice president, Robert G. Chapman, Genesee Bridge Co. Inc., Rochester, N. Y.; secretary-treasurer, G. E. Eesley, Service Steel Co., Buffalo; national director, W. H. Kline, Burke Steel Co. Inc., Rochester, N. Y.

Central states: President, M. A. Blessing, Jones & Laughlin Steel Corp., Chicago; vice presidents, H. V. Douglas, Central Steel & Wire Co., Chicago, and L. B. Kidwell, General Steel Warehouse Co. Inc., Chicago; secretary, C. G. Bothwell, Edgar T. Ward's Sons Co., Chicago; treasurer, A. J. Kueber, Steel Warehousing Corp., Chicago; national director, C. H. Bradley, W. J. Holliday & Co., Indianapolis.

Detroit: President, George L. Morin, Central Steel & Wire Co., Detroit; secretary-treasurer, John F. Fulton, Wheelock-Lovejoy & Co. Inc., Detroit. Mr. Morin will also serve as national director.

New York: President, Charles Kramer, Scully Steel Products Co., Newark, N. J.; vice presidents, William C. Hughes, Bright Steel Corp., New York, and H. B. Royer, Jones & Laughlin Steel Service Inc., Long Island City; secretary-treasurer, W. F. Koetzle, Kasper & Koetzle Inc., Brooklyn. Mr. Kramer will also serve as national director.

Philadelphia: President, J. W. Patrick Jr., Peter A. Frasse & Co. Inc.; vice presidents, A. C. Allshul, Joseph T. Ryerson & Son Inc., and Leslie Edgcomb, Edgcomb Steel Co.; secretary-treasurer, James J. Collin, L. Norris Hall Inc.; all of Philadelphia. Mr. Edgcomb will also serve as national director.

Pittsburgh: President, J. M. Hilbish, Jones & Laughlin Steel Corp., Pittsburgh; vice president and national director, J. H. Fogwell, Scully Steel Products Co., Pittsburgh; vice president and treasurer, F. B. Lorenz, Edgar T. Ward's Sons Co., Pittsburgh; secretary, D. Davia, Bethlehem Steel Co., Carnegie, Pa.

Copperweld Pours First Heat at Warren, O., Plant

■ First heat of alloy steel from one of the new 25-ton electric furnaces at the recently completed Warren, O., plant of Copperweld Steel Co., Glassport, Pa., was poured April 18, according to S. E. Bramer, president. First ingots were rolled April 19.

Construction operations at Warren were started early last October, and "considering unfavorable weather conditions during past winter, the speed with which the new plant was erected is remarkable," said Mr. Bramer.

Copperweld's new plant, according to Mr. Bramer, will produce all grades of alloy billets and bars.

Consumers' and Suppliers' Stocks of Scrap

Gross Tons, as of Dec. 31, 1939*

		rs' stocks† In transit	to	' stocks‡ In transit yards or for export and	
Iron and steel scrap:	At plants	to plants	At yards	at docks	Total
Prepared scrap Unprepared or partially	2,723,210	140,301	1,852,312)	***	
prepared			677,421	110,955	5,504,199
Total purchased	2,723,210	140,301	2,529,733	110,955	5,504,199
Home scrap	1,733,246	1,321	*******		1,734,567
Total scrap	4,456,456	141,622	2,529,733	110,955	7,238,766
Pig iron	2,755,041	60,859			2,815,900

*Subject to revision pending final returns.

†As reported by companies that consumed 93 per cent of total scrap used in 1938. ‡As reported; coverage unknown,

Canada Revamps War Supply Roard: Ruying To Ba Eypander

Board; Buying To Be Expanded

TORONTO, ONT.

■ CANADIAN war supply board has been replaced by a department of munitions and supply, which will be responsible for placing Allied forces' war orders in Canada. Wallace R. Campbell, former war supply board chairman, has resigned his position and returned to Ford Motor Co. of Canada Ltd., Windsor, Ont., as president.

C. D. Howe heads new depart-

C. D. Howe heads new department; George Kingsley Sheils has been named deputy minister. Other members of the old board remain in

the new department.

Change in purchasing board's setup caused a lull in war contract awards, but renewed buying activity on an expanded scale in near future is anticipated.

Expect Large Ship Orders

Orders totaling \$60,000,000 will soon be placed by new board, according to reports from Ottawa. New business will include \$35,000,000 for aircraft; remainder to be expended for munitions. This outlay it is understood, will not include motor vehicles or ships, for which further large orders can be expected soon.

Special attention is being given to development of British Commonwealth air training plan, undertaken in Canada at total approximate cost of \$650,000,000. Construc-

tion work on 17 air training stations, of 52 to be established in Canada, is already under way.

National defence department has secured large site on Toronto harbor, will immediately start erection of supply depot for Royal Canadian air force and for air training plan. Storage space for \$25,000,000 of equipment will be provided.

Canadian National railways officials state orders for 180 cars have just been placed, to take care of increased traffic "due to war conditions," with delivery scheduled for midsummer. Orders include 150 convertible ballast cars and five mail and express cars, to be built by Canadian Car & Foundry Co., Montreal, Que.; and 25 baggage cars, to be built by National Steel Car Corp. Ltd., Hamilton, Ont.

Work on Canadian National railways terminal at Montreal, costing between \$3,000,000 and \$4,000,000, it is reported, will soon be awarded. Total project will cost about \$11,000,000, of which \$3,000,000 was expend-

ed last year.

Two Steel Producers Plan Tin Plate Mill Expansions

■ Sheet and tin plate mill expansion, planned by Carnegie-Illinois Corp., Chicago, and Tennessee Coal, Iron & Railroad Co., Fairfield, Ala.,

will materially increase each company's cold-reduced sheet and plate capacity.

Carnegie-Illinois will install additional processing and finishing equipment at its Gary, Ind., sheet and tin mills, to fully utilize plant's capacity for cold-reduced tin plate products. Installation of cold-reduction mill and processing equipment, to increase cold-reduced tin plate output, is planned for corporation's Irvin works, Dravosburg, Pa.

Expansion is planned to round out and balance Carnegie-Illinois' cold-reduced tin plate production in both Chicago and Pittsburgh districts.

Estimated \$5,000,000 will be spent by Tennessee Coal, Iron & Railroad Co. in enlarging its tin plate mill facilities at Birmingham, Ala. Annual capacity will be increased 7000 tons, directly providing work for additional 300 men, plus contingent other work.

Galvanizers Committee Meets in Pittsburgh

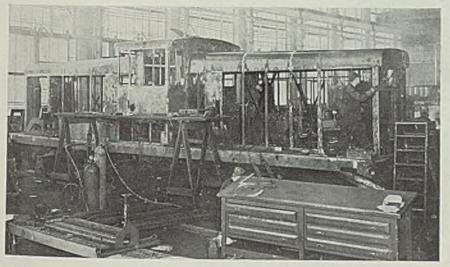
New galvanizing installations at the Steubenville, O., plant of Wheeling Steel Corp., and Weirton, W. Va., plant of Weirton Steel division, National Steel Corp., were inspected April 11 by members of the Galvanizers committee, sponsored by American Zinc institute.

Inspection trip was a feature of the seventh meeting of this group held at Hotel William Penn, Pittsburgh. J. L. Schueler, Continental Steel Corp., Kokomo, Ind., chairman of the governing board of the committee, presided at the evening session April 11, which was devoted to discussion of new developments and new problems in the galvanizing industry.

Two closed sessions were held April 12 following a meeting of the governing board. X-Ray and electron diffraction methods for metallurgical research and a study of tarnish on galvanized sheets by an electron diffraction examination were discussed by F. R. Morral, research metallurgist, Continental Steel Corp., at the morning closed session

In the afternoon, members heard R. W. Hodil, galvanizing superintendent, Youngstown Sheet & Tube Co., Youngstown, O., present a "Review of the Third Coating Survey." Both morning and afternoon sessions were followed by discussion on preselected topics. R. H. Dibble, Carnegie-Illinois Steel Corp., acted as chairman for the morning session while D. A. Russell, chief chemist, Youngstown Sheet & Tube Co., presided at the afternoon meeting of the committee.

Panama To Receive Diesel-Electric Locomotives



■ Frame and cab of this diesel-electric locomotive, one of five now being built in General Electric Co.'s Erie, Pa., shops for Panama Railway Co.. Panama, are fabricated largely by welding. Rated at 1000 horsepower, the 95-ton locomotives are powered by two 500-horsepower diesel-electric generators driving four traction motors and will have top speeds of 70 miles per hour

REDUCE operator fatigue

AND INCREASE PRODUCTION ON HEAVY WORK with a Jones & Lamson 16" Fay Automatic Lathe equipped with a Patent Hydraulically Operated - Quick-Loading - Tailstock

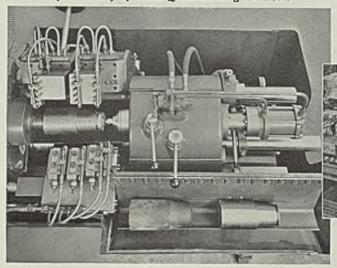
When machining parts made from rough, heavy forgings such as Oil Well Tool Joints, Airplane Engine Cylinders, etc., the loading and unloading of the work into and out of the machine is a factor of major importance. Fatigue of the operator may cause personal injury, or damage to the machine and undoubtedly cuts down broduction.

Jones & Lamson 16 x 33" Fay Automatic Lathe with Patent Hydraulically Operated Quick-Loading Tailstock.

Patent Hydraulically Operated—Quick-Loading -Tailstock Eliminates Operator Fatigue on High Production of Heavy Work

The forging of the Oil Well Tool Joint illustrated, weighs 50 lbs., and the floor to floor time of 3 minutes easily allows two machines to be run by one operator and produce 40 parts an hour. The Patent Hydraulically Operated Quick-Loading Tailstock makes this possible without undue strain on the operator and the average loading time is only 20 seconds. In continuous high production, machines equipped with this tailstock can be run in conjunction with a conveyor system to provide an even flow of finished parts for the next operation.

Submit your problems to Jones & Lamson Engineers for a profitable solution.



Tailstock Open

Rough turning and facing an Oil Well Tool Joint on a 16 x 33" Fay Automatic Lathe with Patent Hydraulically Operated Quick-Loading Tailstock.

Material: Steel Forging Tools: Carbide Tipped Total Length of Piece: 12" Floor to Floor: 3 minutes

& LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT, U.S.A.

MANUFACTURERS OF: SADDLE & RAM TYPE UNIVERSAL TURRET LATHES ... FAY AUTOMATIC LATHES ... AUTOMATIC DOUBLE- END MILLING & CENTERING MACHINES . . . AUTOMATIC THREAD GRINDING MACHINES ... COMPARATORS ... TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS

Windows of WASHINGTON



By L. M. LAMM Washington Editor, STEEL

WASHINGTON

■ RAILROADS, their problems, and effects technology has had on the industry were studied at temporary national economics committee's hearings last week. Committee is conducting investigation of technology and its effects on industry, with especial reference to unemployment allegedly caused by technological advances in recent years.

"To keep abreast of progress, new money will be required," J. J. Pelley, president, Association of American Railroads, told the committee. "It has been estimated," he said, "that railroad industry would be justified in spending \$500,000,000 or more annually for new and improved equipment, rails, ties, machinery for shop and track work, and other capital improvements."

With return to better economic conditions and removal of competitive handicaps now confining the industry, Mr. Pelley declared, railroad traffic "may show so great a future increase that even with increased efficiency in handling it, a greater number of employes will be required."

Mr. Pelley testified he does not believe carriers have reached ultimate in railroad development. He demanded "equality of treatment by the government as between railroads and other forms of transport." Complaining of "subsidized competition" on waterways and highways, he pointed out railroads believed no transport agency should "occupy a position in which it receives special favors from the government."

Another witness appearing last week was George M. Harrison, president, Brotherhood of Railway Clerks. Mr. Harrison called on congress, in his testimony, "to give railroads a fair chance to compete for transportation business."

The railway labor leader, who said he spoke for 1,300,000 workers, asserted federal road-building expenditures for highways and inland

waterways afford direct subsidy to railroads' competitors.

"If these forms of transportation cannot be maintained without subsidies, government might as well take over all transport facilities and operate them as a social function," Harrison declared.

Witness stated technological advances have wiped out 622,426 jobs in rail industry since 1921. Labor's share in railroads' receipts is constantly diminishing. In 1920, he stated, labor received 55.4 cents of every dollar taken in by railroads. In 1938, only 44.4 cents.

Railway labor favors lightweight equipment, capable of giving more frequent service, for combating the industry's competitors and increasing employment, Harrison continued, "while the railway management of today still believes in heavy power age of 20 years ago."

"Our industry has been beset by depression, development of other modes of transportation and discriminatory federal legislation," he asserted. Government has not only helped our opponents but gone into direct competition with us in the parcel post and inland waterways."

Harrison suggested congress might "make a start" on the railway unemployment problem by reducing present work-week and spreading existing employment further.

1939 MACHINERY EXPORTS TO SCANDINAVIA TOTAL \$11,287,861

Scandinavian nations, long steady and valuable customers for American machinery builders, last year imported from United States machine equipment totaling \$11,287,861. Sweden, Denmark, Norway and Finland together purchased from American builders industrial machinery aggregating \$5,875,561; agricultural implements, \$4,271,983; and printing and bookbinding equipment, \$1,040,317.

United States' machinery exports

to Sweden last year totaled \$7,815,021, included: Industrial machinery, \$4,040,838; farm equipment, \$3,187,649; and printing and bookbinding machinery, \$586,534.

Norway's machinery imports from America in 1939 aggregated \$1,910,153, consisted of industrial machinery, \$1,078,238; farm implements, \$621,600; printing and bookbinding equipment, \$210,315.

Totaling \$1,249,608, Finland's machinery imports from United States last year were: Industrial, \$543,906; farm, \$517,363; printing and bookbinding, \$188,339.

Denmark's imports were smallest of the group, totaled \$312,899, included: Industrial machinery, \$212,579; farm equipment, \$45,371; printing and bookbinding machinery, \$54,949.

BRAZIL INSTALLS NATIONAL STEEL PLAN COMMISSION

Brazil's national steel plan executive commission was recently installed in Rio de Janeiro, according to report from Commercial Attache Walter J. Donnelly, Rio de Janeiro. Created by government decree, commission is to make technical studies for establishment of a domestic irou and steel industry; to organize a financial plan for a national company, with both government and private capital participating, and to construct and operate the plants.

Commission's president declared, during installation ceremonies, that solution of Brazil's iron and steel problem would prove greatest factor leading to the Republic's economic emancipation. He pointed out that an enterprise of the magnitude planned, involving construction of extensive plants, could not be achieved in less than five years.

Referring to financing, he said that because of a clear understanding of the value of the enterprise toward the nation's economic progress, private capital would doubtless wish to participate, and that patriotism would cause Brazilians to support it with enthusiasm.

FEBRUARY MANGANESE ORE IMPORTS TOTAL 91,075 TONS

February domestic production of manganese ore containing 35 per cent or more manganese totaled 5100 gross tons. Shipments aggregated 5600 tons; producers' stocks, March 1, were 1500 tons, according to bureau of mines.

Figures are predicated on reports from producers whose output was 86 per cent of 1938's total.

January production and shipments were 4000 tons and producers' stocks at month's end 2000 tons. Shipment rate averaged 2110 tons per month in 1938; year's total was 25,321 tons.

Arkansas, Georgia, Montana and Tennessee contributed virtually all manganese ore shipped in February.

According to bureau of foreign and domestic commerce, February imports for consumption of manganese ore containing 35 per cent or more manganese totaled 81,870 gross tons, containing 37,121 tons of manganese. Union of South Africa supplied 30 per cent, Soviet Russia 20 per cent, Cuba 16 per cent, British India 12 per cent, Gold Coast 10 per cent, Brazil 9 per cent, Chile 2 per cent, and Netherland India 1 per cent. In addition, 21,390 tons, containing 6130 tons of manganese (29 per cent Mn) entered from Egypt and Union of South Africa.

General imports, which represent movement to this country, totaled 91,075 gross tons, containing 40,820 tons of manganese, in February. Union of South Africa supplied 28 per cent, Russia 22 per cent, Gold Coast 15 per cent, Cuba 14 per cent, Brazil 9 per cent, British India 9 per cent, Chile 2 per cent, and Netherland India 1 per cent. In addition, 21,390 tons containing 6130 tons of manganese (29 per cent Mn) moved to this country from Egypt and Union of South Africa.

WELDER MANUFACTURERS PLAN TRADE CONFERENCE

Resistance welder manufacturing industry will hold a trade practice conference in Chicago, April 30, under federal trade commission's auspices. Commissioner Charles H. March will preside.

Conference's purpose is to afford welder industry members opportunity to co-operate in establishment, subject to commission approval, of comprehensive fair trade practice rules. Subjects suggested for discussion are: Misrepresentation of industry products; false representation of rebuilt or second-hand machines or parts as new; false invoicing; substitution of prod-

ucts; defamation of competitors or disparagement of their products; commercial bribery; illegal price discriminations; inducing breach of contract; enticement of employes; and other unfair trade practices.

Conference was authorized at request of and in co-operation with members of the industry to foster and promote full protection of the purchasing public and fair competitive conditions in the industry.

HOUSE AUTHORIZES LABOR, PRODUCTIVITY COSTS SURVEY

Joint resolution authorizing bureau of labor statistics to make studies of productivity and labor costs in industry was passed by the house last week.

Resolution, as it passed house and is now pending in senate states:

"That bureau of labor statistics of United States department of labor is authorized and directed to make continuing studies of productivity and labor costs in manufacturing, mining, transportation, distribution, and other industries.

"For the purpose of making the study, there is hereby authorized to be appropriated, from any money in the treasury not otherwise appropriated, a sum not to exceed \$100,000 for the first fiscal year. The secretary of labor is directed to submit annually to the congress a report of the findings of the bureau of labor statistics in complying with this joint resolution."

SENATE PASSES \$963,000,000 NAVAL APPROPRIATIONS BILL

Navy appropriation bill totaling \$963,000,000 and carrying funds to start construction of two new 45,000-ton super-dreadnaughts, in addition to 17 other warships, passed senate last week by 63 to 4 vote. Bill now goes back to house for acceptance of senate changes in original appropriation.

Senatorial approval came after Admiral Harold R. Stark, naval operations chief, had warned Japan was definitely building four battleships. The navy, he testified before senate naval affairs committee, believes Japan is building eight battleships, possibly as many as 12.

Navy's ranking officer, Admiral Stark repeated his plea that congress authorize a 25 per cent expansion of the nation's sea forces, in order to maintain the 5-5-3 ratio between naval strength of Great Britain, United States and Japan. Development of the Guam base, twice turned down by congress, was also urged by Admiral Stark. Tendency for stabilization of the political situation in Far East, he declared, would be the result.

Present appropriation provides \$41,083,400 for procurement of new aircraft. This includes \$5,000,000 to equip new aircraft carrier Hor-

NET, to be launched in 1942 with full complement of 119 planes. It also authorizes navy to contract for new planes totaling \$25,000,000.

In addition to funds for the two new battleships, bill provides for money to begin construction of one aircraft carrier, two cruisers, eight destroyers, six submarines and five auxiliary ships.

HOUSE CUTS "EDUCATIONAL ORDER" BUDGET \$14,250,000

Army officials had planned to spend during next fiscal year, beginning July 1, \$16,250,000 for educational orders among American manufacturers. However, house has reduced that amount to \$2,000,000 and assigned remainder, \$14,250,000, for purchase of material.

Congress argues there is a large increase in appropriations for purchase of commodities for which educational orders would be preparatory and that production of war orders from abroad is educational to American manufacturers.

Educational orders placed to date by war department have prepared 55 items on a war basis, with total number of problem items estimated at 1200. Members of congress assert industry has passed from educational basis for national defense to actual production basis.

GOVERNMENT WALSII-HEALEY PURCHASES TOTAL \$993,447

During week ended April 6, government purchased \$993,447.66 worth of iron and steel products under Walsh-Healey act as follows: Darby Corp., Kansas City, Kans., \$12,684; Hardie-Tynes Mfg. Co., Birmingham, Ala., \$52,213; Stanley P. Rockwell Co., Hartford, Conn., \$22,500; Diebold Safe & Lock Co., Canton, O., \$27,580.40.

Youngstown Sheet & Tube Co., Youngstown, O., \$18,475; Virginia Bridge Co., Memphis, Tenn., \$26,885; Joshua Hendy Iron Works, San Francisco, \$21,490; Bethlehem Steel Co., San Francisco, \$60,856.80.

Edwards Mfg. Co., Cincinnati, \$79,166.45; Upson-Walton Co., Cleveland, \$12,305; Link-Belt Co., Philadelphia, \$35,579.60; Crucible Steel Co. of America, New York, \$43,100; Pittsburgh Steel Co., Pittsburgh, \$9,610.55 (estimated); Union Wire Rope Corp., Kansas City, Mo., \$11,431; Superior Steel Door and Trim Co. Inc., College Point, N. Y., \$17,205.

Carnegie-Illinois Steel Corp., Birmingham, Ala., \$65,018; Bethlehem Fabricators Inc. New York, \$22,509 (estimated); Jones & Laughlin Steel Corp., Pittsburgh, \$10.535.74; Consolidated Steel Corp. Ltd., Los Angeles, \$107,884; C. H. Cowdrey Machine Works, Fitchburg, Mass., \$174,208.50; National Tube Co., Pittsburgh, \$134,384.25; and J. R. Hunt & Co., Baltimore, \$27,826.37.

AVIATION

AIRCRAFT STEEL DEMAND LOADS ELECTRIC FURNACES

■ HEAVY demand for electric furnace aircraft steels is keeping electric furnace operations at capacity. One producer of these steels has a three-month backlog, although capacity is over 22,000 net tons a month. Approximately 60 per cent of this consists of aircraft steels, with chromium-molybdenum steels of the 4100 series constituting a large portion.

Most electric furnace operators are reluctant to add to capacity because heavy penalties would result if the power demand factor were raised and then not used. With such large tonnages going to aircraft manufacturers, termination of the war would leave expensive overcapacity.

Having made heavy investments in tooling plants to fabricate light metal alloys, and with the present accent on production, planemakers are slow in turning to production of all-stainless steel planes. Pan-American is reported interested in an all-stainless plane but can't find a builder.

More Powerful Fuel?

Plane of the future, one alloy steel maker believes, probably will utilize both light metal alloys and stainless steel, placing metals where their strength-weight ratio is most advantageous. Ideal all-metal plane, he thinks, would use stainless steel in the heavily stressed parts in the fuselage and in wings to about five feet past the engines, aluminum alloy from there to within ten feet or so from the wing tip and magnesium from there to the wing tip.

A major problem confronting aircraft engine designers, due to the advent of more powerful fuels, is how to increase strength of cylinder walls, now mostly of nitralloy, without adding to weight. Short of thickening the walls, the problem

is held to be mainly one of design. Necessity for this improvement in engines was emphasized last week when a mention was made at a meeting of American Chemical society in Cincinnati of a gasoline, "Triptan," which, although still in the laboratory stage, has 50 per cent more power than any present aviation gasoline. As Triptan's extra power is not obtained by addition of lead, there is a possibility of an additional 20 per cent power increase.

Expecting that future airline operations will be in the substratosphere region where temperatures of 50 degrees below zero may be encountered, Hamilton Standard Propeller division, United Aircraft Corp., East Hartford, Conn., has added facilities to permit study and measurement of the effects of extreme low temperatures on proceller performance. Included are a cold room, control room and an intermediate chamber.

Walls Cork Insulated

Control room, shown in illustration at lower right, enables operator to work at room temperature and observe cold room through a window. Five layers of plate glass in window prevent frosting from a potential 150-degree temperature difference between the control room and the test chamber.

Entrance to cold room is through the intermediate chamber, 8 x 12 feet, insulated with 8 inches of cork on the floor, walls and ceiling.

Cold room, shown below at left, is 12 feet square, is insulated on all sides by cork 12 inches thick. Two-stage ammonia system with 1138 linear feet of piping around walls and ceiling is used for refrigeration. Room can be cooled from normal

Hubs for feathering propellers as large as 18-foot 3-blade and 15-foot 4-blade are tested, left, for performance at temperature of 50 degrees below zero in new cold room of Hamilton Standard Propeller division, United Aircraft Corp. Right, control of tests in cold room is centered in this bench under window of cold room

temperatures to 50 degrees below zero in about 24 hours.

Special propeller test rig in cold room permits testing propeller feathering mechanisms without necessity of attaching blades. Large bevel gears carrying "off-center" weights are mounted on short, cylindrical stubs in the hub. Combined mass of stubs, gears and weights simulates actual centrifugal loads imposed upon the hub by full-size

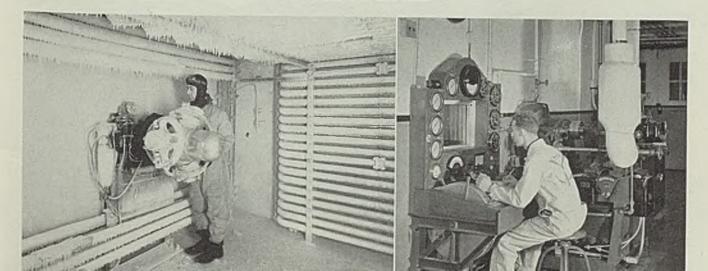
Allison Expands

Work was started last week on a 350,000-square foot addition to plant of Allison Engineering division of General Motors Corp., Indianapolis. To cost \$500,000, the structure will house the assembly department and is scheduled for completion in 140 days. Completion of this program may double Allison's capacity, now estimated at 3500 engines annually. Allison engines are used on at least three pursuit planes made by Curtiss, Bell and Lockheed, which Allies are seeking to buy as a part of their procurement program and for which contracts are in final stages of negotiation.

Completion of an expansion program at plant of Wilcox-Rich division, Battle Creek, Mich., of Eaton Mfg. Co., Cleveland, is expected to double production of sodium-cooled valves for aircraft engines. This is the third time within two years that capacity has been doubled.

Wright Aeronautical Corp., Paterson, N. J., has purchased Fair Lawn plant of Textile Dyeing & Printing Co., Paterson, including 450,000 square feet of floor space and 46 acres, in which it will place connecting rod and crankshaft machining departments and additional foundry facilities. More than 1000 employes will be transferred from the Wright plant in Paterson.

Finding this country has reasonable access to sufficient supplies of aluminum, United States army and navy have transferred the metal from the list of strategic metals, mostly imported metals, to that of critical metals.





How would you tap a deep through hole in tough forged steel parts like these - speed being a major factor?

This is the way a G. T. D. Greenfield Engineer did it. A special high speed steel tapper tap to save "backing out" time - a pilot point for accuracy, a short thread to reduce resistance, two flutes for a strong cross section able to stand the high speed and torque.

Result - no more worries on this job - where incidentally, accuracy is checked by the G. T. D. Greenfield thread gage shown in the picture. See why it is so often good business to call in a G. T. D. Greenfield Engineer?

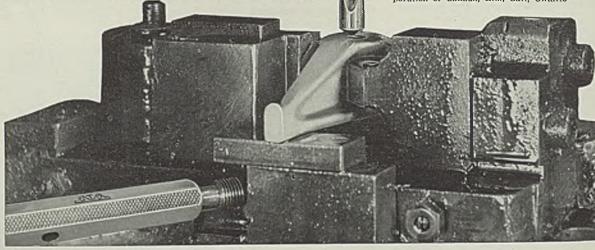


TAPS . DIES . GAGES . TWIST DRILLS . REAMERS . SCREW PLATES . PIPE TOOLS

GREENFIELD TAP & DIE CORPORATION Greenfield, Massachusetts

Detroit Plant: 2102 West Fort St.

Warehouses in New York, Chicago, Los Angeles and San Francisco In Canada: Greenfield Tap & Die Cor-poration of Canada, Ltd., Galt, Ontario



Mirrors of MOTORDOM

By A. H. ALLEN Detroit Editor, STEEL



DETROIT

SPEAKING before Chrysler stockholders at the corporation's annual meeting last Tuesday, K. T. Keller, president, confirmed unofficial reports circulated around Detroit for the last few weeks, to the effect Chrysler divisions in the first three months of this year broke all sales records in the 15 years since Chrysler Corp. was formed. His announcement, as a matter of fact, came 15 years almost to the day after assets and properties of the old Maxwell Motor Corp. were transferred to the new Chrysler Corp. by exchange of stock, the original agreement being on April 15, 1525.

Reviewing the annual report of the corporation, Mr. Keller called attention to an item of \$16,241,106 representing expenditures for property, plants and equipment. This money he likened to the "new blood" of the business, essential to keep it young and vigorous, All automotive companies find it necessary to use copious quantities of this vitamin E (equipment) to provide, as Mr. Keller says, "free scope to engineering genius for its creative imagination, for its courage and vision, plus the best facilities that modern science can provide."

And the millions continue to be poured out for improvement of automotive plant facilities. As an example, one of the automotive forge shops currently has on order some \$500,000 worth of new equipment, including hammers, presses, heat treating furnaces and the like, all to be installed within the next three months. This shop, even without the additions now being made, is considered by some as the finest production forging plant in the world, but the pressure of greater demands on output, need for addi-

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tional reserve equipment, and the outmoding of present types of equipment have dictated the heavy investment being made. A mere 10,000-12,000 tons of forging steel per month is the current appetite of this plant's forging equipment.

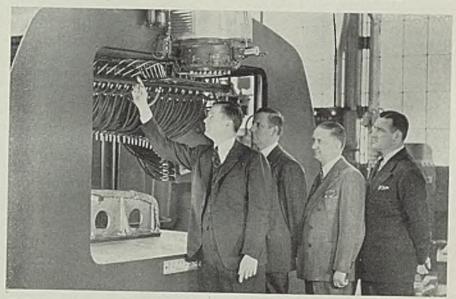
Go down the line of other manufacturing divisions in plants of all the major car builders and you will note large sums earmarked for new machinery and equipment. Small wonder that the automotive industry has the smallest percentage of equipment over ten years old of any industry in the country. Few other businesses are faced with the yearly task of completely overhaul-

ing and rearranging their production plants.

To this extent the policy of yearly model changes is a healthy one, despite its condemnation on various other scores.

TO COMMENT here last week on metallurgical developments might have been appended one more which is both new and significant, although metallurgists themselves admit they know little about reasons-why or about future possibilities. This is the treatment of open-hearth steels with a material known as Grainal, a ferroalloy with 25 per cent vanadium, 15 per cent

To Make 6000 Welds an Hour on 1941 Cars



In this ultraspeed "Progress-O-Matic" welder, capable of making 6000 welds per hour, soon will make its appearance in automotive plants for 1941 model production. New welding machine was recently displayed by manufacturer, Progressive Welder Co., Detroit. Shown before the machine, left to right: L. M. Benkert, general manager; William H. Martin, secretary-treasurer; Fred Johnson, president and T. M. Cummings, sales manager, Progressive Welder Co.

titanium, 12 per cent aluminum and minor amounts of carbon and silicon. Added to open-hearth ladles in the proportions of about 4 pounds to the ton, it gives a steel showing about 0.03 per cent vanadium, and vastly improves physical properties, hardenability and other characteristics.

Experiments on the Grainal treatment have been made by most of the leading steel companies, and a fairly consistent duplication of results appears possible. The deduction seems logical that the treatment will permit further lowering of alloy content, with no sacrifice in properties, and the guess even may be hazarded that it is possible to make a carbon steel perform like an alloy steel by the treatment. Much exploratory work remains to be done, and competent metallurgists as yet prefer not to be quoted as to their convictions.

Treatment with Grainal reportedly involves an extra charge of 25 cents per 100 pounds; hence a steel so treated would in effect be an alloy steel from the price standpoint. Suffice it to say, automotive metallurgists are aware of the possibilities of such steel, and are awaiting more data with interest.

Grainal in Low Carbon Steel

Little appears to be known about the effect of Grainal treatment on low-carbon steel for flat rolled products-sheet and strip for deep drawing. In the latter field the most important development, about which detailed information is scarce, is the change to a fully killed steel instead of a rimmed steel, for the purpose of producing a nonaging sheet. Hitherto, sheets for automotive stampings have been subject to age hardening and on occasion have introduced plenty of trouble in severe draws such as required by the threein-one front fender stamping used by Buick this year.

Change to a fully killed steel, involving addition of aluminum and possibly some titanium or selenium, to the open-hearth ladle, has eased the path to such complicated stampings. It is understood several steel mills supplying this type of material are now using this practice.

Said to have evolved from research in connection with nonaging sheet steel is a new entrant in the high-tensile steel field—Ductiloy—being produced by Great Lakes Steel Corp. here. Having exceptionally fine grain, the material contains around 0.50 chromium, 0.75-1.00 silicon, 0.60-0.70 manganese, small amounts of nickel and copper, 0.10-0.15 carbon, and has shown interesting possibilities in such parts as automobile wheels and in cold-forming applications.

Effect of cold working on steel, involving the immediate sharp reduc-

tion of the elastic limit to the point where the material is almost plastic, has suggested some practical applications of the phenomenon. Although the softening effect is dissipated rather quickly and the cold worked material becomes harder than originally after a day or two, if the steel can be processed further immediately after the first cold working, it seems to handle well.

Extension of the principle to cold forming of coil springs has been envisioned by Buick engineers. At present, silicomanganese steel rods are heated, then coiled at about 1500 degrees Fahr., then heat treated, cleaned and tested. It is reasoned that if the rods could be cold drawn, then immediately transferred to the coiling machine, they could be

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

(Analysis of automobile production by producers, formerly carried in this table, has been abandoned by Ward's Reports. Hereafter, Steel will carry only total production.)

Week ended:	1940	1939†
Mar. 23	103,395	89,400
Mar. 30	103,370	85,980
April 6	101,655	87,019
April 13	101,940	88,050
April 20	103,725	90,280

†Comparable week.

formed cold, eliminating the initial heating operation.

Much the same principle is involved in wire drawing attachments developed for installation on cold headers. These attachments cold draw hot-rolled rods and feed the material directly into headers where the steel flows much better than if allowed to age before heading. The cold working effect need not necessarily be obtained by drawing. It has been observed that shotblasting involves a "peening" action which is primarily cold work on the surface and not a matter of artificially roughening or etching the surface such as is accomplished in

pickling. Shotblasting is being used to condition steel rods for subsequent cold work.

- REPORTS were current around Detroit last week that the Ford 6cylinder engine program has been shelved in its entirety, apparently on orders from Mr. Ford himself. Despite the low proportion of total production to which the V-60 engine has dropped, present rate being 185 engines per day, it becomes evident that Mr. Ford is not of a mind to suspend production on the 60 in favor of a new and unproved motor. It is suggested that the 60-engine may appear next year in a new and lighter chassis, better adapted to its performance, characteristics and more sharply differentiated from the V-85 model.
- NEW design of connecting rod bearing likely will make its appearance on some of the 1941 models. Said to embody a number of important advantages, particularly from the standpoint of strength, the bearing comprises a backing of steel strip to which is bonded a mixture of fine copper and nickel powder. The fine powder is distributed evenly over the strip, which has previously been cleaned thoroughly, and the steel is passed through a sintering furnace, where the powder agglomerates and bonds to the backing, forming an ideal base for subsequent application of a thin layer of babbitt.

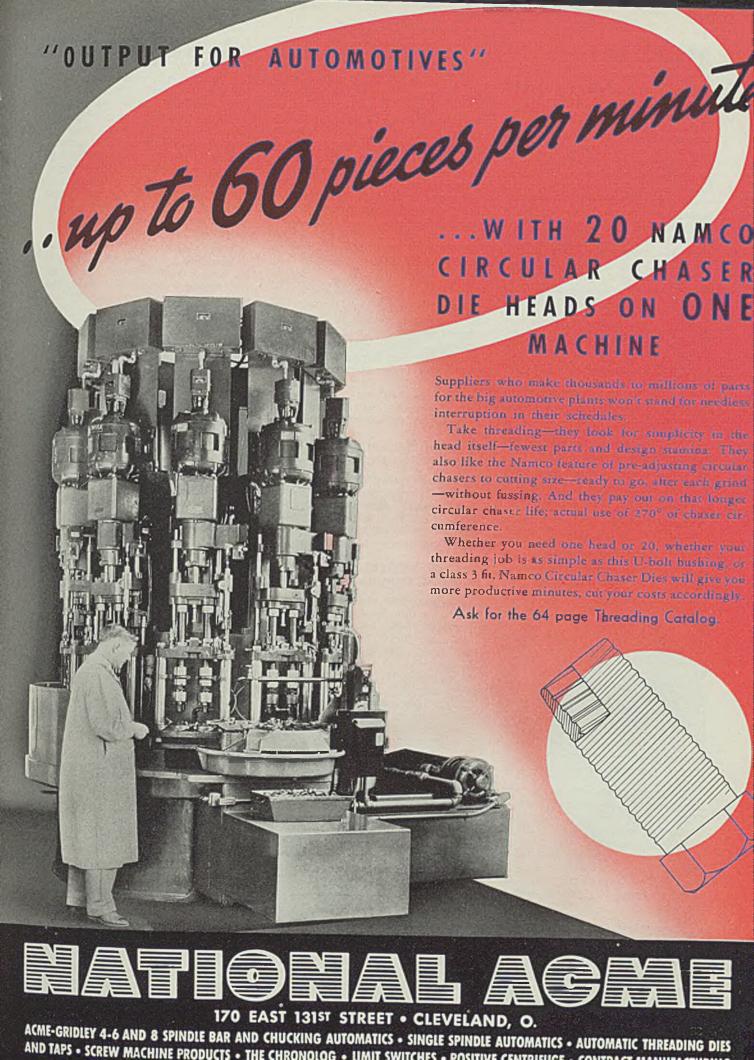
Careful control of atmospheric conditions is essential to proper sintering of the copper-nickel layer and to prevent caking. Production equipment now is being installed in a Dayton, O., plant. Extent of application of the bearing on new engines probably will be limited by the capacity of this equipment and the speed with which it can be placed in operation.

Adds Annealing Furnace

McLouth Steel Corp. here, in the face of mounting demands for coldrolled strip, has started a 101 by 103-foot addition to its plant to house a new coil annealing furnace with three bases. When two-high and four-high mills were installed a few years ago, two annealing furnaces and six bases were provided. More annealing capacity soon was indicated, so another furnace and two bases were added. Present installation will give a total of four furnaces and 11 bases.

City Auto Stamping Co., Toledo, O., this summer will complete construction of a new \$50,000 plant to house its die division. For many years the company has rented quarters for its automotive die production work, but the latter has expanded to the point where new fa-

(Please turn to Page 84)



MEETINGS

BRITISH STEEL INSTITUTE HOLDING ANNUAL MEETING

ANNUAL meeting of the British Iron and Steel institute will be held at the offices of the organization in London, May 2-3. Nonmembers will be welcome, but to meet wishes of the press and censorship bureau must have a letter of introduction signed by an institute member. Members and nonmembers will be requested to sign a declaration that they will treat proceedings as confidential. The formal announcement states: "Air raid shelter accommodation will be available in surface shelters in the Gardens immediately outside the main entrance to the institute's offices."

John Craig, chairman and managing director, Messrs. Colvilles Ltd., will be installed as the new president of the institute. Several medals, prizes and honorary memberships will be awarded at meeting sessions.

Technical sessions schedule the following papers: "Researches Into the Structure of Alloys," by A. J. Bradley, W. L. Bragg and C. Sykes; "Manufacture of Pig Iron in America," by William A. Haven; "Report on Corrosion Research Work at Cambridge University Interrupted by the Outbreak of War," by U. R. Evans; "Damping Capacity of Steel and Its Measurement," by G. P. Contractor and F. C. Thompson; "Estimation of Hydrogen in Steel and Other Metals," by W. C. Newell; "Anti-Piping Compounds and Their Influence on Major Segregation in Steel Ingots," by E. Gregory; "Heat Transfer in the Flow of Gas through the Interstices of a Bed of Solid Particles," by O. A. Saunders and H. Ford; "Method of Sclero-Grating Employed for Study of Grain Boundaries and of Nitrided Cases; Grain Structures Revealed by Cutting," by Bo O. W. L. Ljunggren.

FOREIGN TRADE EMPHASIS DURING WEEK OF MAY 19.25

The week of May 19-25 has been designated as "National Foreign Trade Week" by the Chamber of Commerce of the United States. Radio broadcasts and local meetings throughout the country are being sponsored and scheduled by the chamber's foreign commerce department to center interest on this subject.

U. S. CHAMBER TO SURVEY BUSINESS AT ITS MEETING

Chamber of Commerce of the United States of America has announced details of its annual meeting in Washington, April 29-May 2. Among speakers who will address sessions on various phases of business are W. Gibson Carey Jr., president, Yale & Towne Mfg. Co., New Haven, Conn., and chamber president; John Morrow, president, Pittsburgh Coal Co., Pittsburgh; Lewis Douglas, president, Mutual Life Insurance Co. of New York; H. W. Prentiss Jr., president, National Association of Manufacturers, New York; Gen. Charles G. Dawes, Chicago; and Charles E. Wilson, president, General Electric Co., Schenectady, N. Y.

REINFORCING STEEL GROUP WILL APPRAISE BUSINESS

Thomas S. Holden, vice president, F. W. Dodge Corp., New York, will speak on "The Business Outlook" at the opening session of the sixteenth annual meeting of the Concrete Reinforcing Steel institute at the Homestead, Hot Springs, Va., April 26-27. The major portions of other sessions will be given over to reports of committees. The annual golf tournament will be conducted on the afternoon of the second day.

WAREHOUSE GROUP ANNUAL CONVENTION IN NEW YORK

American Steel Warehouse Association Inc. will conduct its thirty-first annual convention at The Plaza, New York, May 21-22. Walter S. Doxsey, 442 Terminal Tower, Cleveland, is executive secretary.

ZINC INSTITUTE'S ANNUAL MEETING PROGRAM ARRANGED

A variety of topics will be discussed at the twenty-second annual meeting of the American Zinc institute at Hotel Statler, St. Louis, April 29-30. The opening session on the morning of the first day will feature reports of institute activities during the past year, and an objective discussion of the reciprocal trade agreements program, introduced by Walter R. Peabody, secretary, American Tariff League.

At the afternoon session, R. S. Smethurst, assistant counsel, National Association of Manufacturers, will report on the legislative situation in Washington. The domestic zinc market and certain aspects of the foreign zinc ore supply will be covered. C. R. Maxon, New Jersey Zinc Co., will review the past ten years' progress in zinc alloy die castings.

Topics for the morning session of the second day will include several phases of the farm market for galvanized products. Paul Huey, Progressive Farmer, will speak on "Significant Changes in the Farm Market." "Developments in Metal Farm Buildings," will be discussed by Stephens Mahon, James Mfg. Co.

T. W. Billings, representing Co-operative G.L.F. Farm Supplies Inc., will speak on "Steel Distribution in the Farm Field." A progress report on the institute's farm stock tank tests also will be presented.

Technical subjects listed for the afternoon session include "Progress in Electrogalvanizing," by J. A. Singmaster; "Developments in Hot Dip Galvanizing," by J. L. Schueler, general superintendent, Continental Steel Corp.; and "Differential Density Process," by Elmer Isern, chief metallurgist, Eagle-Picher Mining & Smelting Co.

Annual dinner and entertainment is arranged for the evening of April 29, and a buffet supper party on the second evening will mark the convention close.

Convention Calendar

- April 24—American Society for Metals. Annual tri-chapter meeting of Cincinnati, Dayton and Columbus chapters at Battelle Memorial institute, Columbus, O.
- April 24-25—American Management association. Annual marketing conference at Hotel Roosevelt, New York, Alvin E. Dodd, 330 West Forty-second street, New York, is president.
- April 24-26—American Institute of Mining and Metallurgical Engineers, Conference of Open Hearth committee and Blast Furnace and Raw Materials committee at William Penn hotel, Pittsburgh, John T. Breunich, 29 West Thirty-ninth street, New York, is assistant secretary.
- April 24-27 Electrochemical society. Spring meeting at Galen Hall, Wernersville, Pa. Dr. Colin G. Fink, Columbia university, New York, is secretary.
- April 26-27—Concrete Reinforcing Steel institute. Sixteenth annual meeting at the Homestead, Hot Springs, Va. H. C. Delzell, 2257 Builders building, Chicago, is executive secretary.
- April 29—American Trade Association Executives. Spring meeting in Washington, Silvia L. Pacelle, 726 Jackson place, N.W., Washington, is secretary.
- April 29-30—American Zine Institute. Twenty-second annual meeting at Hotel Statler, St. Louis. Ernest V. Gent, 60 East Forty-second street, New York, is secretary.
- April 29-May 2—Chamber of Commerce of the United States of America, Annual meeting in Washington, Ralph Bradford, 1615 H street N.W., Washington, is secretary.
- April 29-May 3—American Mining congress. Seventeenth annual coal convention and exposition at Music Hall, Cincinnati, Julian D. Conover, 309 Munsey building, Washington, is secretary.
- May 1-3—American Society of Mechanical Engineers, Spring meeting at Hotel Bancroft, Worcester, Mass. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.
- May 2-3—Iron and Steel Institute (Great Britain). Annual meeting at institute offices. K. Headlam-Morley, 4 Grosvenor Gardens, London, S.W. 1, is secretary.
- May 6-8—Machine Tool Electrification conference. At Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

What's New at Pittsburgh . . .

By R. L. HARTFORD, Pittsburgh Editor, STEEL

ESEVERAL years ago National Radiator Corp., Johnstown, Pa., established a fellowship at Mellon institute here to investigate possibility of making radiators by electrodeposition of metals. It was found such a process wasn't commercially feasible. In the process of research, however, the senior fellow, Dr. J. L. Young, discovered something el.e, which now appears to be more important than the object of original research.

The discovery was an electrolytic method for production of pure iron powder, and National Radiator has established a subsidiary, Plastic Metals Inc., to handle the process.

Plastic Metals Inc. has established a multiple fellowship at the institute which is developing details of the work. For nearly six years subcommercial work has been done on the material, which is notable for a high degree of purity and which can be produced from iron and steel scrap, ore, rust and other ferrous wastes. This subcommercial work has resulted in development of several important commercial applications. Basically, the commercial process consists of compression of the metallic powder into the desired shapes and sintering to form the articles. Plastic Metals Inc. has been granted broad process patents in the methods, and the trade name "Plast-Iron" has been adopted. It is understood the company will also introduce powders made of metals other than iron and alloys of the various metals. Although details on the electrolytic process as well as the commercial applications are not yet available, it is understood complete descriptions will be published soon.

Additional work now under way at the Mellon institute includes two fellowships new this year, one established by the Cemenstone Corp. to study chemical and physical properties of precast concrete slabs and other formed pieces. The other new fellowship has been set up by Wm. B. Scaife & Sons Co., to investigate problems arising in fabrication and use of metal tanks, pressure cylinders and water softening equipment.

Heppenstall Co. is in the process of installing new furnaces and new metalworking equipment. Of particular interest are the new heat treating furnaces, six of which are

being installed. These units are pit-type recirculating furnaces, designed by Heppenstall and being built by Pennsylvania Engineers. Believed to be the largest furnaces of this type thus far constructed, they are 8 feet in diameter and 10 feet deep. The installation will increase the heat treating capacity of the company by approximately 20 per cent. Another furnace installation now in the news is to be made at the Lackawanna plant, Bethlehem Steel Co., by Rust Furnace Co. of Pittsburgh. Four billet heating furnaces will be put in there, two serving the 12-inch mill and two serving the 14-inch mill. They will be of the recuperative type, zone fired.

Metals Society Occupies Its New Cleveland Office

■ American Society for Metals, Cleveland, is now occupying its new national office quarters at 7301 Euclid avenue. Early in 1939 the society purchased a 24-room 3-story stone residence and altered it to society headquarters needs. It will occupy the property exclusively.

Affording about three times the

previous office space, the new location will not only meet future requirements but will care for the collection and storage of the society's property which had been scattered. The added space also will provide a conference room for out-of-town members.

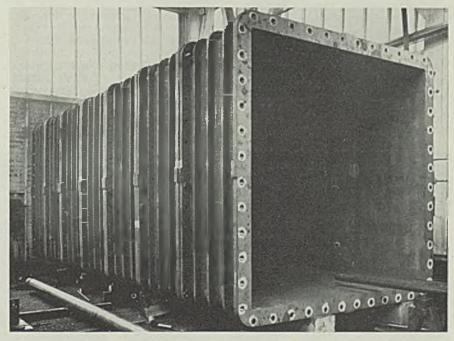
Aluminum Co. Takes New Block Bonneville Power

Aluminum Co. of America has signed an additional contract with the Bonneville power administrator which will permit doubling capacity of the new metal producing plant now under construction at Vancouver, Wash.

Due to the unusual conditions existing at present the new contract, which is for 32,500 kilowatts of additional power, is limited to a five-year period. The new plant now being built at Vancouver will have capacity to produce 60,000,000 pounds per year.

Sixty-four employes of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., received United States Steel Corp. medals for long service, during the first quarter of 1940. Their aggregate service amounted to 1925 years, an average of 28.3 years per employe. Oldest in point of service among the group was Neill Hutchings, comptroller, who received 45-year service medal.

Steel Tunnel Lining Fabricated in Sections



M Steel lining for upper portal of 9-foot tunnel in gate system of Mud Mountain dam, near Seattle, is being fabricated into sections to be bolted together on dam site. View is of shop assembly in plant of fabricator, Pacific Car & Foundry Co., Seattle. Photo by United States army engineers. Seattle district

MEN of INDUSTRY

■ W. L. CRESSMAN has been appointed Pittsburgh district sales manager, American Rolling Mill Co., with headquarters in the Henry W. Oliver building. He succeeds the late Harry A. Lord. Mr. Cressman has been with Armco's New York office over ten years. He joined the company in 1928, soon after graduating from Cornell university as a civil engineer. After taking a sales training course he went into the Armco general sales offices in Middletown, O., and from there was transferred to New York.

George S. Warren, chief engineer, Sharon Steel Corp., Sharon, Pa., has resigned after 35 years of service.

Ray H. Luebbe, counsel for General Electric Co.'s appliance and merchandise department in Bridgeport, Conn., has been made assistant general counsel of the company, and will continue to make his headquarters in Bridgeport.

L. A. Schmidt, vice president and chief engineer, National Tool Co., Cleveland, and J. Victor Loewi, Loewi & Co., Milwaukee investment firm, have been elected directors of National Tool.

E. F. Meyer, associated with Cutler-Hammer Inc., Milwaukee, in the experimental, testing and sales departments, and recently as a sales engineer in the St. Louis territory, has been placed in charge of the company's Houston, Tex., territory, with headquarters in that city.

Archie Chandler has been elected vice president in charge of sales, American Pulley Co., Philadelphia. He joined the company in 1915 as district sales manager in charge of



W. L. Cressman

the Pacific coast territory, and in 1928 was named general sales manager.

F. E. Doty, formerly tool supervisor for a large Houston, Tex., machine shop, has been placed in charge of sales in the Houston, Tex., territory for McKenna Metals Co., Latrobe, Pa., while C. W. Moore has been placed in charge of the company's Atlanta, Ga., branch office.

E. T. Asplundh has been elected a vice president, Pittsburgh Plate Glass Co., Pittsburgh, in charge of the company's chemical and cement operations. He succeeds Hugh A. Galt, retired. Previously, Mr. Asplundh was assistant to Mr. Galt. He joined the company in 1919.

Thomas E. Cocker has been appointed manager, Detroit office, Chain Belt Co., Milwaukee, succeeding G. A. Gunther. He has been with the company since 1921 and has

served as district manager of both the Cleveland and Buffalo offices. He has been succeeded as manager of the Buffalo office by W. W. Klemme, who has been with Chain Belt since 1935 serving in both the engineering and sales departments. Robert Potter, a member of the home office sales staff, has been transferred to Pittsburgh to assist Gayle Sherratt, district manager.

Hugh B. Scott has been appointed assistant vice president, Wheeling Steel Corp., Wheeling, W. Va. E. Tyler Davis has been named assistant to vice president; Nathaniel C. Reed, general manager of sales, with W. M. Hall, assistant general manager of sales, and R. F. Sentner, manager of tin plate sales division.

E. E. Reagle, general superintendent, Sharon Steel Corp., Sharon, Pa., has been named assistant to the vice president. Walter Jackson has been appointed manager of Sharon works; Lloyd Wilson, assistant manager, and W. W. Schofield, the past several years superintendent of the company's steelworks and blast furnace at Lowellville, O., has been appointed manager there.

Lee D. Harmony has been appointed sales manager, Streine Tool & Mfg. Co., New Bremen, O. He joined the company in 1928 as cost accountant and the past ten years has been purchasing agent.

Joe E. Kiefer, the past four years chief engineer, has also been placed in charge of all sales engineering for the company.

E. H. Dix Jr., chief metallurgist, Aluminum Research Laboratories,



Archie Chandler



Thomas E. Cocker



L. D. Harmony



Joe E. Kiefer

and F. C. Pyne, sales engineer, Aluminum Co. of America, New Kensington, Pa., spent the greater part of last month visiting aircraft companies on the West coast. Mr. Dix addressed over 600 engineers in the southern California district and presented an illustrated discussion of the theory and practice of heat treating aluminum alloys.

W. C. Swalley has been appointed assistant general sales manager, Wellman Engineering Co., Cleveland. In addition to handling sales of the "Williams" clam-shell and dragline buckets, as in the past, he assumes the broader duties of assisting in the sale of all Wellman equipment.

Louis M. Benkert, associated with Progressive Welder Co., Detroit, since its organization in 1935, and successively head of service, engineering, estimating and sales departments, has been appointed general manager. Before his association with Progressive, he was assistant to Fred Johnson, now president of



Louis M. Benkert

Progressive, when the latter was in charge of welding operations at a Detroit automobile plant.

Herbert Morley, heretofore manager, heating and air conditioning division, Norge division, Borg-Warner Corp., Detroit, has been named plant manager for all Detroit manufacturing units of Norge. He will take over management of the aircraft parts division and hermetically sealed compressor division, as well as manufacture of special gears and transmission parts.

F. L. LaQue, associated with International Nickel Co. Inc., New York, since 1927, recently as assistant director of technical service on mill products, is now engaged in development activities on all applications of both ferrous and nonferrous nickel-containing alloys. Dr. William A.



W. C. Swalley

Mudge, formerly works metallurgist at the company's rolling mill in Huntington, W. Va., and who recently joined the technical service section of the development and reseach division in New York, has been named assistant director of technical service, to succeed to Mr. LaQue.

Carle C. Harris, the past ten years with Wickwire Spencer Steel Co., New York, as sales engineer, has joined the Cuyahoga works of American Steel & Wire Co., Cleveland, as assistant industrial engineer. Following graduation from Cornell university in 1926, he worked in the open-hearth department of Corrigan, McKinney Steel Co., the wire mill at the Newburg works of American Steel & Wire, and in 1929 was transferred to New York in a sales capacity where he remained until 1930, when he joined the Wickwire company.

John J. Crowe, formerly manager, apparatus research and development department, Air Reduction Co., New York, has been appointed assistant to Herman Van Fleet, vice president and operating manager. He will direct activities of the apparatus



Herbert Morley

research and development department and will coordinate these activities with similar activities for Wilson Welder & Metals Co. Inc., New York. In addition, he will handle apparatus patent matters for Mr. Van Fleet.

H. E. Landis Jr., heretofore assisttant to Mr. Crowe, has become manager, apparatus research and development department. C. G. Andrew has been named manager of gas plants.

David C. Prince, since 1931 chief engineer, switchgear department, General Electric Co., Philadelphia, has been made manager, commercial engineering department, succeeding the late E. W. Allen. He has also been named a member of the company's advisory committee and the apparatus sales committee, and will make his headquarters in Schenectady, N. Y.

Died:

CLIFFORD D. CALDWELL, 67, president, Interlake Iron Corp. since Jan. 1, 1930, in Chicago, April 16. Mr. Caldwell joined By-Products Coke Corp. in 1914, was elected vice president in 1918, and president in 1921. He was instrumental in organizing Steel & Tube Co. of America, now part of Youngstown Sheet & Tube Co. He also was associated with interests in Interstate Iron & Steel Co., Chicago, being a director until its absorption by Central Alloy Steel Corp., Massillon, O., now part of Republic Steel Corp. He was a director, Consumers Co., Black Mountain Corp., Kingston-Pocahontas Co., and Chicago Short Line Railway Co.

Thomas A. McGinley, 59, chairman and president, Duff-Norton Mfg. Co., Pittsburgh, April 13 in that city. He was also a director, Westinghouse Air Brake Co. and Union Switch & Signal Co.

William W. Leopold, 38, general superintendent, Superior Sheet Steel Co., division of Continental Steel Corp., Canton, O., March 26 in Youngstown, O., from injuries sustained in an automobile accident.

Arthur Milton Johnston, 39, for a number of years Milwaukee district manager for Greenfield Tap & Die Corp., Greenfield, Mass., April 11 at his home in Wauwatosa, Wis.

Nathan F. Kepner, 59, vice president in charge of scrap metal purchases, H. Kramer & Co., Chicago, in Chicago, April 15. He had been associated with the Kramer company 35 years.

It's an Old, Old Story

■ SOME 40 years ago an elderly man and his two sons made a living in a Vermont village by cultivating two trades. One was that of "bucking up" four-foot cordwood into stove lengths for numerous families in town who depended on wood for heating and cooking. The other was the more skilled trade of laying and patching wooden shingle roofs.

All went well until a couple of technological developments wiped out the demand for the specialized talents of this man and his sons. First, there appeared in town a portable saw rig driven by a noisy "hitand-miss" gas engine. This would pull into a backyard and—operated by one man—saw up enough firewood in half a day to supply an average family for an entire winter.

Then, to cap the climax, there appeared a new product known as composition roofing. This material came in wide rolls from which strips of required length were cut and nailed in place by any carpenter or even by an amateur. The skilled shinglers found themselves less and less in demand.

Progress Is Inexorable as People Grasp Opportunity To Live Better

In the meantime their competitor with the power-driven saw rig—after enjoying a landoffice business for awhile—began to have his troubles with technological advancements. First the more affluent citizens, and then the plain ordinary folks, installed central heating systems fired—not by wood which was growing scarce and expensive and which otherwise was unsuitable—but by coal, coke and finally by oil. He joined the old man and his sons in the chorus of bitter objection which since the beginning of the machine age has been raised against

technological progress by those adversely affected by it.

The process inherently is inexorable. People want to live better. They welcome the new, the improved—and without stopping to worry as to whose job is affected. People bought motor cars without thought of the horse breeder, the hay and oats farmer, the carriage maker. They buy electric refrigerators without compunctions as to the effect on the harvester of natural ice.

Increased Employment, Purchasing Power Follow Mechanization

The federal communications commission cannot long hold up television, for the people want television just as they have wanted all the other wonders of modern industry. And the people demand these wonders at a price they can afford to pay. Measures such as the O'Mahoney bill that would tax machine-made products in favor of hand-made products will not be acceptable to the public when the public finds out that the real effect would be to raise selling prices unnecessarily and thus reduce the individual's purchasing power.

Industry is making progress in telling the truth about the effect of the machine on the plane of living by increasing employment and thus increasing the purchasing power of the individual. Much work still remains to be done, however, toward awakening the public in general to the fact that there is nothing wrong about the machine—that the problem essentially is one of economics. In other words, the problem is to provide new jobs for workers displaced by machinery. As in the past, that can be accomplished only by permitting capital to be enticed into industry in the hope of earning a profit.

The BUSINESS TREND



Activity Index Recovers Part of Recent Losses

■ MODERATE improvement in domestic demand has developed in some industrial lines, reflecting the replenishing of inventories in most instances. The greatest percentage increase in new orders, however, has originated from foreign sources and there are good indications that our export trade may further expand throughout the coming months.

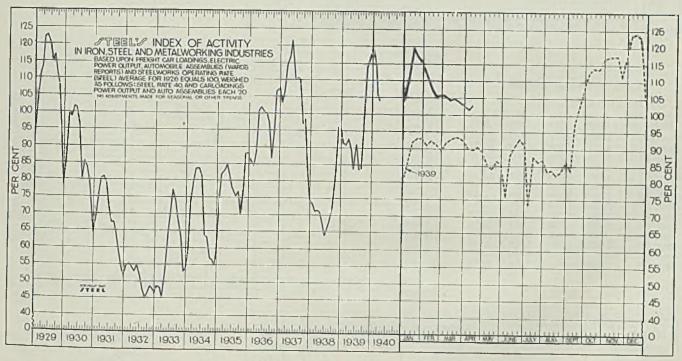
There have been some signs of a slight improvement in the genbusiness situation although

there is still no definite evidence that the slight downward tendency has been halted. Current consumption is at least as great as production and is an important sustaining factor so far as output is concerned. The near capacity operations being maintained in the machine tool, aircraft and ship-building industries are important factors in the current outlook.

Steel's index of activity recorded a moderate gain to 102.9 in the

week ended April 13. This represents an increase of 1.1 over the 101.8 level reported in the previous week and compares with 89.7 in the corresponding week last year.

Slight increases in electric power output, automobile assemblies and revenue freight carloadings more than offset the moderate decline in steelmaking operations during the latest period. Retail demand for automobiles has recorded good seasonal improvement.



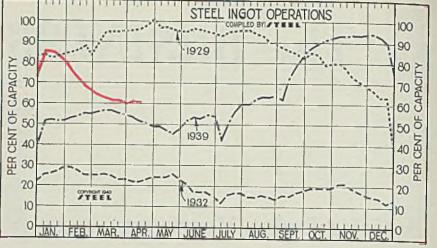
STEEL'S index of activity advanced 1.1 points to 102.9 in the week ended April 13

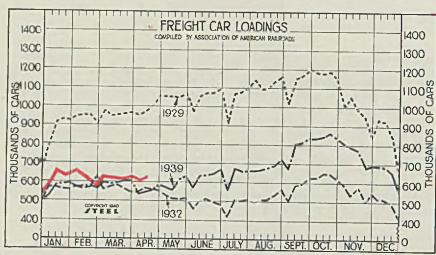
Feb. 3	1939 1938 91.1 73.3 90.8 71.1 92.6 71.2 89.8 70.8 83.4 67.4 90.9 63.4 83.5 66.2 83.9 68.7 72.5 114.0 116.2 95.9 118.9 95.1	1937 102.9 106.8 114.4 116.6 121.7 109.9 110.4 110.0 96.8 98.1 84.1 74.7	1936 85.9 84.3 88.7 100.8 100.3 100.1 97.1 86.7 94.8 106.4 107.6	1935 74.2 82.0 83.1 85.0 81.8 77.4 75.3 76.7 69.7 77.0 88.1 88.2	1934 58.8 73.9 78.9 83.6 83.7 80.6 63.7 63.0 56.9 56.4 54.9 58.9	1933 48.6 48.2 44.5 52.4 63.5 70.3 77.1 74.1 68.0 63.1 52.8 54.0	1932 54.6 55.3 54.2 52.8 51.4 47.1 45.0 46.5 48.4 47.5 46.2	1931 69.1 75.5 80.4 81.0 78.6 72.1 67.3 67.4 64.3 59.2 54.4 51.3	1930 87.6 99.2 98.6 101.7 101.2 95.8 79.9 85.4 83.7 78.8 71.0 64.3	1929 104.1 111.2 114.0 122.5 122.9 120.3 115.2 116.9 110.8 107.1 92.2 78.3
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Steel Ingot Operations

(Per Cent)

Week	ended	1940	1939	1938	1937
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
	10	71.0	54.0	30.0	81.0
	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
Apr.	6	61.5	53.5	32.0	91.5
Apr.	13	61.0	51.5	32.0	91.5





Freight Car Loadings

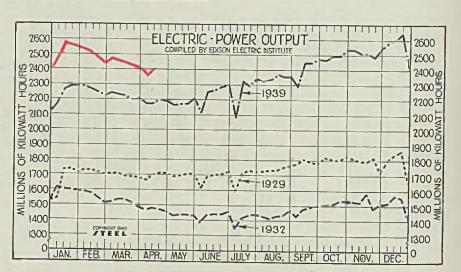
(1000 Cars)

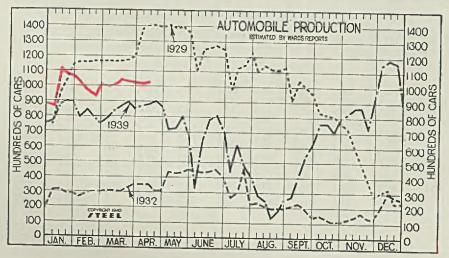
Weel	k ended	1940	1939	1938	1937
Jan.	13	668	587	581	700
Jan.	20	646	590	570	670
Jan.	27	650	594	553	660
Feb.	3	553	577	565	675
Feb.	10	627	580	543	692
Feb.		608	580	536	715
Feb.		595	561	512	697
Mar.	2	634	599	553	734
Mar.	9	621	592	557	749
Mar.		619	595	540	759
Mar.	23	620	605	573	761
Mar.	30	628	604	523	727
Apr.	6	603	535	522	716
Apr.	13	619	548	538	751

Electric Power Output

(Million KWH)

Week	cended	1940	1939	1938	1937
	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
Apr.	6	2.381	2,173	1,990	2,176
Apr.	13	2,418	2,171	1,958	2,173
				,	

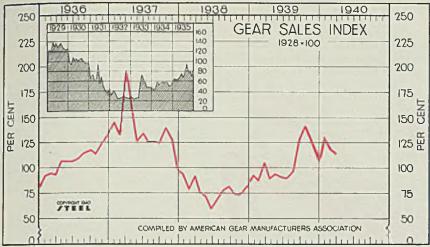




Auto Production

(1000 Units)

	(200	o Omits	,		
Week ei	nded 19	040 1	939	1938	1937
Jan. 13	3 11	1.3 8	36.9	65.7	91.7
Jan, 20) 10	8.5	0.2	65.4	81.4
Jan. 27	7 10	6.4 8	9.2	59.4	74.1
	10:	1.2 7	9.4	51.4	72.3
	96	6.0 8	4.5	57.8	72.8
	95	5.1 7	9.9	59.1	95.7
		2.6	5.7	57.0	111.9
Mar. 2		0.9 7	8.7	54.4	127.0
	10:	3.6 8	4.1	57.4	101.7
	10:	5.7 8	6.7	57.5	99.0
Mar. 23		3,4 8	9.4	56.8	101.0
Mar. 30		3.4 8	6.0	57.5	97.0
Apr. 6	101	1.7 8	7.0	70.0	99.2
Apr. 13	102	2.9 8	8.0	62.0	125.5



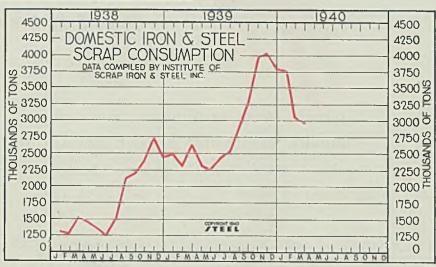
Gear Sales Index

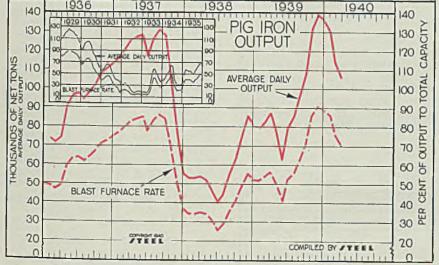
		(1928 =	= 100)		
	1940	1939	1938	1937	1936
Jan.	123	91.0	93.0	144.0	90.5
Feb.	116	86.0	77.0	130.5	93.0
Mar.	114	104.0	91.0	195.0	92.0
April	11111	88.0	74.0	164.0	105.0
May		93.0	70.0	125.5	105.0
June		90.0	58.0	134.0	105.0
July		89.0	67.0	124.0	107.5
Aug.		96.0	76.5	125.0	113.0
Sept.		126.0	80.5	123.0	115.5
Oct.		141.0	72.5	139.5	112.5
Nov.		126.0	72.0	127.5	122.5
Dec.		111.0	81.0	97.0	132.5
		_	_	_	_
Ave.		103.5	76.0	135.5	107.5

Iron and Steel Scrap Consumption

Gross Tons

	1940	1939	1938
Jan	3,775,000	2,495,000	1,332,000
Feb	3,054,000	2,313,000	1,306,000
Mar	2,932,000	2,634,000	1,543,000
Apr		2,317,000	1,477,000
May		2,263,000	1,387,000
June		2,428,000	1,257,000
July		2,551,000	1,520,000
Aug		2,919,000	2,133,000
Sept,		3,282,000	2,218,000
Oct		3,974,000	2,393,000
Nov		4,025,000	2,740,000
Dec		3,805,000	2,441,000
Total		35,006,000	21,746,000





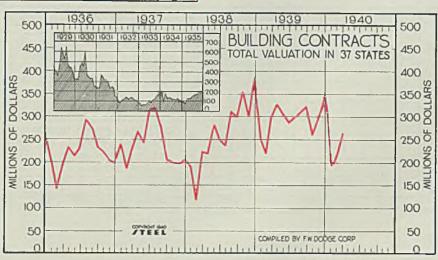
Pig Iron Production

Di	Blast furnace					
	Net Tons	-Rate (%)-				
1940	1939	1938	1940	1939	1938	
Jan. 129,825	78,596	52,201	85.4	51.0	33.6	
Feb. 113,943	82,407	52,254	75.0	53.5	33.6	
Mar. 105,502	86,465	53,117	69.5	56.1	34.2	
Apr	76,732	51,819		49.8	33.4	
May	62,052	45,556		40.2	29.4	
June	79,125	39,601		51.4	25.5	
July	85,121	43,827		55.0	28.2	
Aug	96,122	54,031		62.4	34.8	
Sept	107,298	62,835		69.7	40.5	
Oct	131,053	74,697		85.2	48.0	
Nov	138,883	85,369		90.3	55.0	
Dec	136,119	79,943		88.5	51.4	
Av	86,375	51,752		62.6	37.3	

Construction Total Valuation In 37 States

(Unit: \$1,000,000)

	1940	1939	1938	1937	1936
Jan	\$196.2	\$251.7	\$192,2	\$242.7	\$204.8
Feb	200.6	220.2	118.9	188.3	142.1
Mar	272.2	300.7	226.6	231.2	199.0
April.		330.0	222,0	269.5	234.8
May		308.5	283.2	243.7	216.1
June		288.3	251.0	317.7	232.7
Јшу		299.9	239.8	321.6	294.7
Aug.		312.3	313.1	281.2	275.3
Sept.		323.2	300.9	207.1	234.3
Oct	. 1111	261.8	357.7	202.1	225.8
Nov		299.8	301.7	198.4	208.2
Dec		354.1	389.4	209.5	199.7
A		_	-	-	-
Ave	22.00	\$295.9	\$266.4	\$242.8	\$222.3





External heat exchangers give close temperature control, eliminate hot spots, prevent damage to tank, permit small tanks. Other methods are best for certain applications

■ HEATING of solutions for pickling tanks, plating tanks and similar metal processing equipment can be divided roughly into two classes. The first, internal heating, utilizes some method to heat the solution from inside such as steam jets, electric immersion units, gas-fired submerged combustion burners protecting combusting gases from direct contact with the solution, or other means.

Alternate method is to heat the

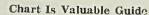
By DALE AUGSBURGER

Engineer Duriron Co. Inc. Dayton, O.

solution extremely by running them through heat exchangers of some type.

With internal heating of tank solution, direct injection of steam into the solution is a heating method possessing high thermal effi-

ciency. In many such installations, however, it is quite essential that vibration and pounding from the open steam jet be prevented. Then an injector-type unit such as shown in Fig. 2 can be utilized effectively. In addition to preventing vibration and pounding, such a unit helps assure uniform temperature throughout the solution as it greatly agitates and efficiently circulates the solution. To attain maximum agitation, the jet usually is placed in one corner of the tank and di-rected diagonally to the opposite corner at opposite end of the tank. Special alloys have been developed for such units for use in corrosive solutions such as encountered in pickling work. These alloys are detailed further on.



To determine jet and steam requirements, Fig. 1 shows a curve which may be valuable to serve as a guide. Note steam consumption values are based on amount required to raise the temperature of a solution of water 100 degrees Fahr. in one hour. For each 25-degree change above or below this 100-degree Fahr. figure, approximately 15 minutes increase or decrease in time can be allowed

As this chart is based on heating

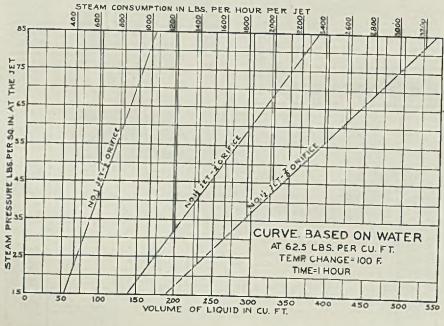


Fig. 1—Chart showing steam consumption of open jets discharging into tank solution to be heated

water weighing 62.5 pounds per cubic foot, to figure heating solutions which may differ in weight as much as 10 pounds per cubic foot involves only about 6 additional minutes in heating time. Greater differences require consideration of the specific heat of the liquid. To use chart, Fig. 1, first locate the vertical line equal to the volume of liquid in cubic feet in the tank to be heated. Second, locate the horizontal line for the steam pressure at the jet. Then note the point of intersection. The jet size indicated on the curve to the right of this intersecting point is the correct size to use under the conditions given on the chart.

A vertical line from the point of intersection to the top of the chart will indicate steam consumption in pounds per hour per jet. Of course for large size tanks more than one jet will be employed.

While curves for ½, ¾ and ¾-inch orifices only are shown, curves for ¼, ¾ and 9/16-inch orifices can be estimated easily with reasonable exactness.

Heating Coils Used Widely

Direct injection of steam rarely involves dilution of the solution especially if live steam is used. Evaporation from the tank, together with losses entailed by lifting work from the tank, usually takes care of the condensation of the steam. However, in many cases, especially where low temperature or exhaust steam is used, and where no dilution at all can be permitted, other heating means must be employed.

Heating and cooling coils are quite widely used as they are relatively inexpensive and fairly efficient. Many such units are made by welding special acid-resistant pipe fittings to the particular shape desired. The coils are useful where dilution may occur but is not permissible in the solution and where the tank is large enough to permit use of space occupied by the coil.

Immersion tubes as shown in Fig. 3 often are used to heat small, deep tanks or comparatively wide, shallow tanks. They are most often used in tube diameters of 1, 1½, 2 and 3 inches and in lengths up to 5 feet, depending upon the diameter of the tube. Two most common types are known as the straight bayonet and L-type. Two or more L-type can be manifolded as in Fig. 3. The lengths of legs of the L-type vary from 3 to 5 feet, depending on tube diameter,

External heat exchangers appear particularly desirable for many such installations. Advantages of external heating include: Elimination of hot and cold areas as many external heating installations have no greater than 2-degree Fahr. temper-

ature variation between any two portions of the solution; no possibility of damage to tank linings as hot coil areas are eliminated; no loss of production time since coil repairs and replacements are unnecessary; fewer rejections because of closer temperature control, which also increases production for any given installation; smaller tanks as allowance for space occupied by heating coil is unnecessary.

In addition, greater heating efficiency is possible. Reason for this is that in heat exchanger, a heat transmission efficiency almost double that of heating coils is attained by means of the turbulent flow of the solution over the heating surfaces due to specially designed passages in the exchanger (see Fig. 6). This turbulence partially destroys the insulating film that forms over any heating surface, cutting down the heat transfer efficiency.

Use of heat exchangers also eliminates loss of solution by syphoning through concealed leaks. In addition, with particular reference to plating solutions, general flow of the solution through the work tank obtained by circulating through a heat exchanger permits use of

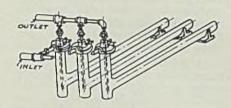


Fig. 3 — Immersion tubes may be grouped as shown here

higher current densities which often allows the plating time to be reduced considerably.

Another advantage is that for solutions where continuous or intermittent filtering is required, such as in bright nickel work, the heat exchanger can be cut in on the filter discharge line, thereby eliminating duplicate pumping equipment. In such an installation, plating solution is pumped from the plating tank to the filter press and through the heat exchanger, where it is brought back up to proper plating temperature before it is returned to the tank. By this method, the plating solution is clarified of any dirt or other foreign matter, thus reducing the number of rejections from dirt inclusions. The maintained constant temperature also reduces costs by increasing efficiency of the plating operation.

Heat exchangers appear particularly suitable for electroplating installations where they permit closer temperature and pH control. These,

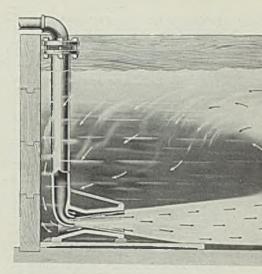


Fig. 2—Inspirating type steam jet strongly agitates solution

in turn, permit higher quality work to be done.

Heat exchangers also can be used efficiently as coolers where the temperature differential is sufficiently great to allow efficient transfer.

One of the uses for cooling units is in chromium plating work where conditions often require cooling to Also in the anodizing be done. process where an operating temperature between 68 and 72 degrees Fahr, is most desirable, some means for cooling the solution often is employed. Because in this work there is a low temperature differential, cooling coils usually are made up of split-flanged pipe and fittings as this produces a more economical unit. Good efficiency is obtained by installing these coils in a separate tank and pumping the anodizing solution through the coils with cold water circulating on the outside of the coils.

Heating Requirements Vary

Recommendations for general heating requirements of various solutions used in the steel and automotive industries would include: For acid pickling solutions operating within 140 to 180 degrees Fahr., heating can be done with circulating steam jets for straight pickling work, or with heat exchangers where special conditions require closer temperature and pH control; for nickel, copper and chromium plating solutions operating within 120 to 180 degrees Fahr., heat exchangers are recommended; for anodizing solutions which must work within 68 to 72 degrees Fahr., cooling coils in a separate tank appear most desirable.

In estimating heating requirements for external heating, there is one point to remember. A heat exchanger which has sufficient capacity to meet initial heat require-

ments by giving a reasonably short starting-up period also will have sufficient capacity to maintain operating temperatures. The following formula will serve to determine the right size heat exchanger for a particular installation.

Let:

V=volume of solution (in 100's of gals.)

T=desired operating temperature, degrees Fahr.

t=initial temperature, degrees Fahr.
C=indicated capacity at available
 steam pressure, B.t.u. per hour.
Then:

Total heat required in B.t.u.'s = 916V (T—t).

The heating time required is figured from the fact that this period in hours equals the total number of B.t.u.'s divided by C.

As an example, where:

V = 3000 gals.

T=135 degrees Fahr.

t=70 degrees Fahr.

Steam pressure=40 pounds per square inch.

Then total heat required is 30 x 916 x 65. Latter figure is the temperature differential, T—t.

Result is found to be 1,786,200 B.t.u.'s.

Pumping Rate Is a Factor

Now reference is made to the curves, Figs. 4 and 5 in selecting the correct heat exchanger. Fig. 4 is for a smaller size heat exchanger of the type shown in Fig. 7 with approximately 2.5 square feet of heat-exchanging surface. Fig. 5 is for a larger heat exchanger unit with approximately 14 square feet of heat-transfer surface, see Fig. 6.

Referring first to Fig. 4, the capacity of this unit at 40 pounds steam pressure is approximately

Fig. 4—Heat-transfer rates for a medium size heat exchanger at various steam pressures and pumping rates. Exchanger is of type shown in Fig. 7, has about 2.5 square feet of heat exchanging surface

TABLE I-Correction Factor

De	gree	s F	ture 'ahr. Liqu	of					B.t.u. Factor	
	100	ог	less		 		 	 	. 1.1	
									1.0	
	130	to	150		 		 	 	. 0.9	
	150	to	180		 	٠.	 	 	. 0.8	
	180	to	200		 		 	 	0.7	

TABLE II-Friction Loss

Flow in Gallons	Friction Loss in
per minute	Feet of Water
15 20 35	0.50 1.00 1.82 5.10 10.00

147,000 B.t.u.'s per hour. When divided into the total B.t.u. requirement of 1,786,200, this gives a time of 12.1 hours which is required to bring the tank up to temperature. This is for maximum pumping capacity of 18 gallons per minute. Lower pumping rates, of course, give lower B.t.u. transfer rates.

Consider the larger unit diagrammed in Fig. 5. At 40 pounds steam pressure its maximum capacity at pumping rate of 50 gallons per minutet is 358,000 B.t.u.'s. Divided into the total heat required, 1,786,200 B.t.u.'s, it is found that this unit would heat the complete tank solution in just 5 hours.

As 5-hour heating up period is more nearly that required, this heat exchanger would be utilized in the particular installation under consideration. It is possible to figure heating requirements for various other installations and other size heat exchangers by a rough interpolation from the curves in Figs. 4 and 5 and by utilizing the method shown above.

Of course, thermal capacity of any particular heat exchanger is dependent upon the solution to be heated, temperature desired, heating medium available, type of heating surface, amount of agitation given the liquid passing through the heat exchanger and other factors. Where capacity requirements are greater than that of one unit, additional units may be manifolded for series or parallel flow.

Charts Figs. 4 and 5 are based on heating liquid with the same specific heat and specific gravity as water, with the entering temperature at 100 degrees Fahr. Where entering temperature is different, the correction factors shown in Table I may be employed to determine the capacity.

Friction Loss Varies

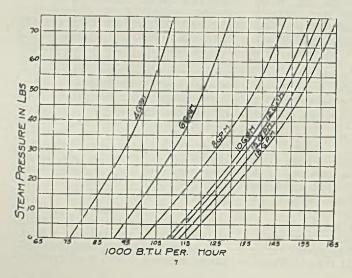
For example, if temperature of liquid is 140 degrees Fahr., rate of flow is 20 gallons per minute, steam pressure is 75 pounds per square inch, the correction factor would be 0.9 for 140 degrees Fahr.

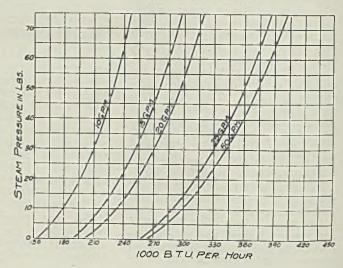
From Fig. 5, the indicated capacity for 100-degree water at 20 gallons per minute and 75 pounds steam pressure is 315,000 B.t.u.'s per hour. Multiplying this by the factor 0.9, actual capacity is found to be 283,500 B.t.u.'s per hour.

Fig. 6 shows dimensions and arrangement of a typical heat exchanger with an approximate maximum capacity of 400,000 B.t.u.'s per hour, the unit diagrammed in Fig. 5. Recommended steam pressure for such a unit is not over 75 pounds per square inch. Friction loss through the exchanger, of course, varies with rate of flow. Table II, however, gives pressure loss through heat exchanger shown in Fig. 6, which may be taken as typical of a 400,000-B.t.u. capacity unit.

External heating of pickling and the more corrosive plating solutions

Fig. 5—Heat-transfer chart for a larger size heat exchanger than Fig. 4, with about 14 square feet of heat-exchanging surface and of type shown in Fig. 6





would not be as economical if heat exchangers were available only in ordinary metals. Fortunately, a number of special alloys have been developed for these particular applications.

One of these alloys is Duriron, a high-silicon alloy containing approximately 14.5 per cent silicon. It satisfactorily resists almost all corrosives, thus enabling the plant to standardize on one type of material for corrosive surface, obviating necessity of stocking variety of spare units of various materials. Duriron is utilized not only in heat exchangers but also in auxiliary equipment including pumps, valves, pipe and The material is practically fittings. unaffected by sulphuric, nitric, acetic and most other commercial acids at ordinary strengths and temperatures.

Material Hard to Thread

It is not recommended for handling bromine, fused alkalies, hydrofluoric acid or sulphurous acid. Also strong hot caustic solutions and certain sulphites require consideration of the specific application.

This particlar alloy weighs 0.255pound per cubic inch, melts at 2300 degrees Fahr, and has a thermal conductivity of 0.125 at 0 degree Cent. Hardness is 52 Rockwell C, tensile strength on 1/2-inch diameter bar 16,000 pounds per square inch. Coefficient of expansion between 32 and 212 degrees Fahr. is 0.0000036inch per inch. Because of its hardness, it is machined by grinding but cannot be threaded. However, softer material can be cast in to make threaded connections. It can be drilled with difficulty by using a special hardened flat drill at a low cutting rate and with a coolant. Welding is readily accomplished by the oxyacetylene torch, but careful preheating and after-cooling are necessary. The weld is as acidresistant as the rest of the casting. Molten Duriron is quite fluid so the torch must be handled somewhat more rapidly than in welding cast iron. Rod of the same alloy content, of course, must be used in welding. Large flat surfaces usually cannot be welded.

Another alloy developed for these special applications is known as Durichlor, almost entirely resistant to hydrochloric in all concentrations and at all temperatures up to the boiling point. It also is a high-

Fig. 6—Fairly large heat exchanger, 14 square feet of effective surface, approximate maximum capacity is 400,-

000 B.t.u. per hour
Fig. 7—Smaller heat exchanger. 2.5
square feet effective surface, approximate maximum capacity of 166,000
B.t.u. per hour

silicon iron alloy with physical characteristics similar to Duriron. Its main application is in handling hydrochloric acid and other chlorine compounds.

Stainless steel castings, of course, are particularly suited for a number of corrosion-resistant applications. The stainless may be a straight chromium alloy, a ferrous chromium nickel, a nickel-chromium alloy or one of the complex alloys containing nickel, chromium, molybdenum, tungsten, etc., in which iron is present only as an impurity.

There are three groups of stainless steel alloys based on microstructure: Ferritic, martensitic and austenitic.

Ferritic alloys.—Alloys substantially ferrite are called irons. The low-carbon straight-chromium alloys which are not hardenable by heat treatment fall in this group.

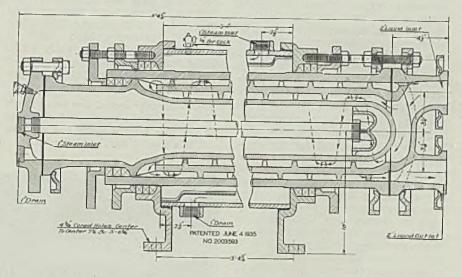
Martensitic alloys.—Only alloys which are hardenable by heat treatment are properly called steels. High-carbon straight-chromium alloys constitute this group.

Austenitic alloys.—Alloys which are austenitic at room temperature and which remain in this state after all kinds of heat treatment are called austenitic steels or austenitic alloys. In alloys con-

taining 16 per cent or more chromium, a nickel content of 8 per cent or more usually results in an austenitic structure which is essentially nonmagnetic. The 18 per cent chromium, 8 per cent nickel is the most widely used austenitic stainless steel.

Adequate heat treatment with low carbon content is Duriron company's answer to intergranular corrosion problem in austenitic stainless steel. When carbon content is high, carbides precipitate at the grain boundaries when the metal is heated for even a short time within the range of 800 to 1600 degrees Fahr. Active electrolytes corrode the metal in the zone of the precipitated carbides and gradual disintegration or sudden failure occurs eventually, due to intergranular attacks.

Often there is no surface indication that corrosion is progressing. Carbon content of 0.07 per cent and lower reduces the amount of carbide that can be precipitated, thereby assuring maximum corrosion resistance and lasting strength and ductility. Carbon content of the straight chromium alloys as a rule need not be as low as 0.77 per cent. In both the hardenable and nonhardenable groups, however, close control of carbon is necessary if consistent results are to be obtained.



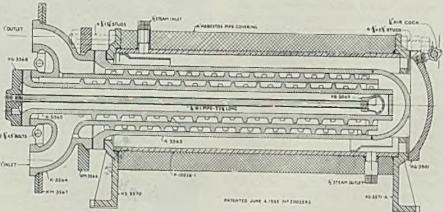




Fig. 1—This Oilgear broaching machine with special tools and quick-operating work-holding fixture enables one operator to machine both sides of 600 rifle receivers per hour

■ IN THE early days of the railroads, locomotives had no cabs. As in the case of the operating staff of certain types of chauffer-driven automobiles still in vogue, the engineers and firemen of the early locomotives had nothing between themselves and the elements except a windscreen. The idea was that men who operate a machine would be unable to stay awake if they were made comfortable.

It was not so many years ago that machine tools were designed with about as little regard for the comfort of their operators as was shown by oldtime locomotive builders and by some more recent builders of town cars. It probably was not so much that the machine tool designers deliberately undertook to design operating discomfort into their machines. Rather, they paid no particular attention to operating convenience because in the misnamed "good old days" no one paid much attention to that sort of thing anywhere in a machine shop.

However, the fact that inconvenience of operation was common did not make it justifiable or profitable any more than was true of poor lighting and bad ventilation, which were two of its contemporary evils. When men like Frederick W. Taylor and Frank Gilbreth began to delve into the fundamental principles of machine shop management, motion study and kindred subjects, the importance of tailoring industrial equipment to fit operators began to dawn upon management. Man-

Is Minimized By

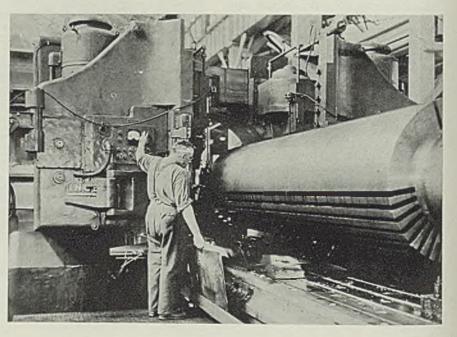
agement, in turn began to demand such equipment from machine tool builders, of whom some of the more forward-looking already had been paying some attention to this phase.

Early machine tools, like all other pioneer machines, were extremely simple mechanisms in most cases. There were a few, such as the Gleason bevel gear planer, which translated a refined theory into practical form and which sprang into being in a surprisingly high state of development when originally built. Most machine tools, however, have gone through a long period of evo-

Fig. 2—Electric control has taken much of the physical strain out of operation of machine tools of large size such as this special dual-head Ingersoll lution and in their present form are the outcome of step-by-step improvements upon something which 75 or 80 years ago was very rudimentary and also very unhandy.

The writer recalls an engine lathe which was built in the early 1850's and which 25 years ago was still in active operation in a by-nomeans obscure plant. This machine, which was one of the finest ones available when it was built, really was a mechanized speed lathe. All of its refinements, including back gears, feed works and thread-cutting apparatus looked like experimental attachments rather than integral mechanisms. The saddle was not gibbed to the bed but was held down by a big cast iron weight. Location of control handles was dictated by mechanical expediency and not by convenience. When it was desired to advance the saddle toward the spindle by hand, the ball crank on the apron was turned away from the spindle (that is, clockwise).

To have provided a "natural" or "instinctive" direction of rotation,



Talique

Modern Machine Tools

it would have been necessary for the designer to have introduced an idler gear between the ball crank pinion and the feed rack on the bed, which would have seemed at the time to have been an unnecessary refinement. By the same token it probably would have been a refinement for which the machine tool buyer of that era would have been unwilling to pay.

Pretailoring a Future Model

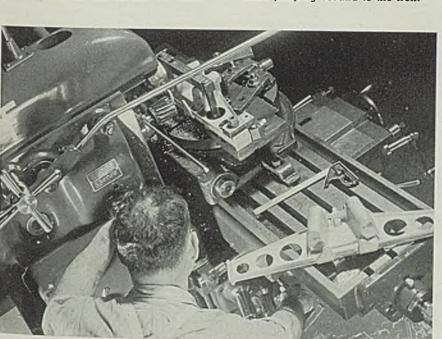
Some of the early machine tool builders who were inclined to be ahead of their times tackled the control location problem in a simple but at the same time a very logical manner, one which still is worthy of consideration. They did it through the use of the vertical black board, or a large vertical drawing board, on which an elevation of the machine could be laid out full size and the controls felt out by operators standing in front of the board. Fifteen minutes of that actual feeling out process was better than fifteen hours of theo-

retical "drafting room argument."

Today this system of practical trial has been augmented by the use of full-size wooden models of the machine made from the preliminary layout before detailing has been started. Within the past few weeks the writer has seen a full-size wood and clay model of a multiple spindle automatic, which a few feet away looks exactly like the real thing—the machine to be.

Actual operating levers, etc., have been applied to this model, which originally was constructed for consideration of appearance factors, and a number of experienced operators have been called in to try the controls. As a result important alterations have been made in the

Fig. 3—Milling operations often demand that progress be watched from a position other than that at the front of the table. This Cincinnati dial-type machine has an auxiliary group of control levers which eliminates the tiresome jumping around to the front



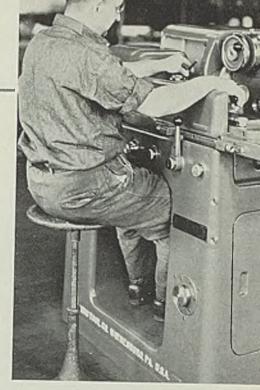


Fig. 4—Some large machine tool operations do require standing up to the work, but many small, repetitive jobs could be turned out much more effectively if the operator could sit down—as he can at this Landis grinder

size, shape and location of these control elements, so that there will be nothing tiring or unnatural in the operation of the machine when it eventually is built. These changes can readily be made in the design at the present stage of its development, but at a later stage they would become very difficult and expensive, if not impossible. This machine is going to be tailor made, and not one which is going to call for wholly unnecessary mental and physical twists and strains.

Retailoring a Current Model

In another instance recently the writer was shown an effective method whereby the controls of an existing design can be revamped effectively and at small cost. The machine in question was a turret lathe. During a meeting of district representatives and demonstrators, one of the machines was fitted up with special levers having steel shanks which could be lengthened, shortened or bent into new shapes. When the majority of the operating experts decided that one of the levers was not quite as it should be, it was modified until it suited the majority. Thereupon it was taken to the engineering department and a new, permanent lever was "designed around it." When fitted up with the new permanent levers, the machine received wide acclaim out in the field by operators who

found themselves much less tired at the end of the day and who supposed that major changes had been made in the basic design of the machine.

Those who persist in believing in the simpler designs of other days lose sight of the fact that conditions of today would not permit the use of such simple designs even if workmen of today would put up with their inconvenience. Modern speeds and feeds are such that the oldfashioned systems of belt drives would not carry the load, and belts heavy enough to carry the load would be too heavy for easy handling. As a matter of fact, it was not any too easy to shift the belts in the old days and many a job was run at low efficiency at the wrong speed for that very reason.

Another thing which must be taken into account when comparing modern machine tools with older models is that of the comparative mental and physical hazards involved in operation. There are two kinds of mental hazards in the shop. One is that involved in computations which are taken care of automatically by modern machines but which with older models mean actual figuring with pencil stubs. Thread cutting—new and old—is a good example. Selection of speeds and feeds is another.

Fear of Machine Cuts Efficiency

The other is that involved in "fear of the machine." The writer recalls a good example of that in connection with the 1850 model lathe mentioned earlier in this article. Everyone who ran it had in the back of his mind a feeling that the big weight hanging on the saddle one day would drop on his toes. That fear may have been groundless, but due to the basic design it always "haunted" the machine and lowered whatever efficiency the machine might otherwise have had—which was not much.

Cranks and handwheels which spin dangerously when power feeds are applied are another source of both mental and physical hazardsmental because they constantly worry the operator and physical because many a wrist and arm has been fractured by them. These things could happen with some old model machines because of the feeling on the part of designers that it was the responsibility of the operator to avoid the danger. That was before the days of widespread safety campaigns which have done so much to cut the once appalling tool of industrial accidents. There is no justification today for an unsafe machine.

To be efficient a man must be master of his machine. If he works in constant fear that the machine may in some way hit at him unexpectedly, he never is its master. If he is confident that through mechanical or electrical interlocks and other built-in safety devices, every possibility of the machine's striking at him has been eliminated, he will turn out a full day's work without four-o'clock or five-o'clock or any other kind of fag. Modern machine tools are as safe as any piece of machinery possibly can be. When the purchaser pays for this safety he simply is buying added efficiency and bigger profits.

New Controls Banish Old Hazards

In justice to the old-time machine tool designers, it should be mentioned that what they often found difficult to do mechanically in the way of insuring safe operation, today can be done electrically or hydraulically easily and at no great cost. Great stress is laid on the convenience of electrical and hydraulic control but not so much has been said about the great extent to which it has eliminated mental and physical hazards of machine tool operation. It was not a pleasant experience in the old days to get "wound up" in a machine tool and not be able to reach the overhead belt shipper. Today, in a similar emergency a quick slap at a conveniently placed push button or small, easily worked control lever, stops the machine almost instantly.

The writer, who at one time was a lathe operator, recently was the guest of one of the well-known lathe manufacturers. While in the demonstration room of the plant, he was invited to try out one of the latest models, a motor-driven geared head machine. Acting instinctively in line with experienced gained in 1915, there was much reaching in the air for a belt shipper which wasn't there, and which in 1915 wasn't always where one thought it was when it was needed the most.

when it was needed the most.

When the "hang" of the new machine was caught onto, the ease and convenience of pushbutton starting and stopping, spindle control through a lever on the head, feed and threading control through quick change gears, and tool settings by use of dependable micrometer dials, were simply astounding. The contrast between the old and the new was fully as striking as that between the automobile of 1915 and one of today. Those who become enthusiastic in selling modern machine tools have every reason to do so.

In the selection of photographs to illustrate this article on elimination of physical and mental fatigue through use of modern machine tools, thought has been given to the part played by tooling engineers as well as machine designers. For instance, take the case shown in Fig. 1. Here we have an Oilgear

single-slide vertical-surface broaching machine with its various hydraulic and electric controls, including a pressure gage, grouped within easy reach of the operator when in normal working position. Not one, but two, palm-operated pushbuttons are provided so that one always is within easy reach.

As in the case of most broaching jobs, the tooling here is of special character. The part is a forged carbon steel rifle receiver and the holding device and broaches are so designed that three at a time are finish broached on both sides at each stroke of the ram.

The operator simply locates three rough parts in the fixture and then depresses the dual safety control buttons. Thereupon the "shuttle table" moves into broaching position and the slide is pulled down, thus removing 0.120-inch of stock and finishing the parts to a high degree of accuracy. Without undue exertion and without lost motion the operator is able to handle 600 parts per hour with this setup. Unloading and loading of the fixture is accomplished during the upstroke of the ram, the shuttle table automatically moving outward to loading position.

Headwork Instead of Footwork

Fig. 2 serves as an excellent example of how electric control has eliminated hazards and fatigue in connection with the operation of machine tools of great size. The setup here is that of slotting the steel core of a turbine generator in a special Ingersoll machine with two heads, each driven by a 20-horsepower motor. The work is carried on a traveling table between the heads and the heads themselves are fed in from the sides.

Mechanical control for a machine of this size and type would be complicated and difficult to handle. As it is, however, the operator stands at strategic position with a control panel with instrumentation within easy reach. This gives precise and instant control to every function and eliminates most of the running and climbing around which used to make operations of this kind a sort of marathon race.

Efficiency on small work is well exemplified by Fig. 3, which depicts a Cincinnati plain dial-type milling machine operating on an aircraft part. The point to be emphasized nere is that the dual system of controls on this machine makes it possible for the operator to stand at the usual position in front of the table, or—as in this instance—at the rear of the table. He is thereby enabled to watch the cut from the best position and at the same time retain control without having

(Please turn to Page 83)

Sower Stainless Fabricating Costs

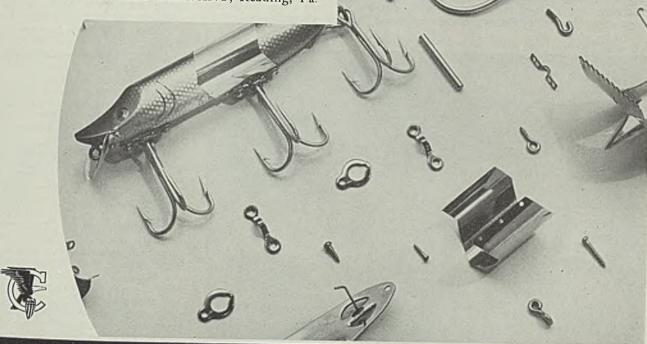
are GOOD NEWS for Everyone but the FISH

Many an angler this Spring will sport more Stainless equipment than ever before—thanks to the manufacturer's ability to reduce Stainless fabricating costs.

By making Stainless easier to use, Carpenter has made it cost less to use. Many of the old production difficulties have been eliminated by Carpenter Stainless Steels. The strip blanks clean as a whistle, yet is soft and ductile enough to form easily into intricate shapes. It is easier on dies and tools, and allows faster press speeds because of uniform temper and absence of hard spots. The free-machining grades of Stainless, invented by Carpenter, greatly increase the cutting speeds.

Tell your Carpenter representative the degree of corrosion resistance you require, and ask him for a testing sample of Carpenter Stainless Steel. Then demonstrate, to your own satisfaction, its ability to reduce your fabricating costs.

THE CARPENTER STEEL COMPANY, Reading, Pa.



Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland. Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia.

A Chemical Polishing Method

In new electrochemical process, stainless steel is polished by an anodic treatment where part of surface is removed with discoloration, scale. Supplements mechanical methods

■ A BROADER market for stainless steel is envisioned as the result of new electrochemical polishing processes particularly adapted to the finishing of fabricated articles to which mechanical polishing can be applied only with difficulty if at all. In such processes the article to be polished undergoes anodic treatment and to this extent is the reverse of electroplating.

Polishing always has been a major cost in producing a finished article. Every production engineer has been confronted with this problem for many years. Electrolytic polishing is regarded by its sponsors as an important addition to the

By ALEXANDER L. FEILD

Director of Chemical Research

IRVINE C. CLINGAN

Research Chemist
Rustless Iron & Steel Corp.
Baltimore

finishing art not only as a new finishing method but as a supplement to mechanical methods such as buffing, polishing, burnishing.

The new method makes stainless steel competitive in many markets by cutting finishing costs. Witness General Electric Co. using approxi-

mately 8 pounds of stainless steel wire per unit for shelves in its current line of refrigerators.

Electrolytic polishing as such is is not new. A French patent was issued in 1931 to P. A. Jacquet who describes a method of anodically treating metals in certain electrolytes with an anhydrous solution of glacial acetic acid and perchloric acid as the preferred medium.

Use of this solution involves definite hazards, not only because of its corrosive properties and toxic fumes but also because it is apt to explode when brought into contact with organic substances such as oil or grease.

Considerable work has been done in this country since then. Some half dozen processes are now in various stages of development. Described here is a process in commercial operation which was originally developed by the late James N. Ostrofsky of Rustless Iron & Steel Corp., 3400 East Chase street, Baltimore.

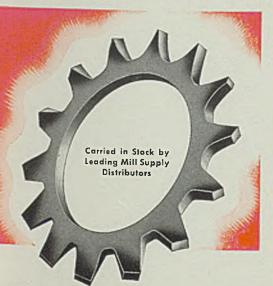
This process is being employed on a commercial basis under license at L. A. Young Spring & Wire Co., Detroit, and Wall Wire Products Co., Plymouth, Mich., as well as by others. It is fully covered by patent applications. The present installations in both of the abovementioned plants were engineered with Hanson-Van Winkle-Munning Co., Matawan, N. J., co-operating and have been in successful operation for about six months. A smaller production unit was previously in commercial operation at the L. A. Young plant as early as January, 1939. It was used in polishing about half a million meat saver trays

Essentially, electrolytic polishing comprises an anodic treatment in

Stainless steel valve forging and hotrolled feed screw for a coal stoker polished electrolytically

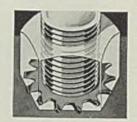
Grandpa never worried about Lock Washers!

N the gay 90's, a "helical spring" with the help of paint and rust was good enough to hold the bolts on grandpa's buggy. But, the modern high speed automobile had to have something more efficient—a means of actually locking each nut and screw absolutely tight. Shakeproof Lock Washers were developed to do this job, and the millions and millions that have been used by every leading car builder to protect vital connections are positive proof of their superior locking power. Today, Shakeproof is generally accepted throughout the metal working industries as the standard of Lock Washer efficiency!



THREAD-TENSION ALONE IS NOT ENOUGH

The success of Shakeproof Lock Washers is due to the tapered-twisted tooth principle which not only provides for full thread-tension, but also sets up a powerful strutaction that keeps any nut or screw from even starting to loosen. The multiple teeth form an impenetrable bulwark of separate locks around the entire circumference of the nut or screw head. No wonder Shakeproof "never lets go!"



Leading Industrial Distributors in all important cities stock Shakeproof, Or, write direct for free testing samples!

SHAKEPROOF LOCK WASHER CO.

Distributor of Shakeproof Products Manufactured by ILLINOIS TOOL WORKS

2525 North Keeler Avenue, Chicago, Illinois

Plants at Chicago and Elgin, Illinois

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5HAK

SEMS Fastener Units . . . Lock Washers . . . Locking and Plain Terminals

"Fastening F P Headquarters"

ROOF

Thread-Cutting Screws . . . Locking Screws

an electrolyte composed of citric acid (30 to 70 per cent by weight). sulphuric acid (10 to 30 per cent), and the remainder water. Sum of both weights is about 75 per cent.

Neither citric nor sulphuric acid is volatile. Therefore there is no loss of these ingredients by evaporation. There is a slight loss of electrolyte as a small amount adheres to cleaned articles upon removal from the tank. Even this small loss is partly recovered since the first rinse water is used for electrolyte additions when needed.

The life of the electrolyte has not as yet been determined but there are solutions which have had more than a year of continuous service and are still in operation unimpaired. Under operating conditions, the electrolyte has a slight sweetish smell but no obnoxious fumes. Hoods and ducts are unnecessary but may be advisable in the case of large installations if the roof is unusually low due to the fact that hydrogen is evolved from the cathode as in all acid baths.

The solution is less severe on work-rack contacts than certain other solutions which have been proposed. These anodic contacts which hold the work are usually submerged and hence are subject to electrolytic attack. A well-known

Miscellaneous parts from sheet material, all stainless and polished by new process. Includes bezels, sink strainer, tablespoon, stew pan, etc.

copper-silicon alloy is preferred as contact material. Work racks are coated with a chromium-rubber compound except at contacts.

The bath is operated between 180 and 190 degrees Fahr., heat being supplied when necessary by electric immersion heaters. Usually, additional heat is not needed since operation of the process itself maintains bath temperature.

Direct current is provided in the two Michigan installations abovementioned by a 7500-ampere 12-volt motor-generator set operated between 6 and 9 volts, depending upon conditions of the solution, with 7.5 as normal operating voltage.

Current density ranges from 0.5 to 1.5 ampere per square inch of surface metal, according to size and surface condition of article being polished. Generally, 1 ampere per square inch is recommended.

Articles being polished, of course. constitute the anodes and a small amount of their surface, usually 0.001-inch, is removed. The metal removed from the surface of the article naturally forms metallic salts which fall to the bottom of the lead-lined tank and are subsequently raked as sludge to a free space at end of tank and removed.

In the Michigan installations, the treatment tanks are 33 feet long, 5 feet wide, and 3 feet deep. Work being treated is carried around the tank by a moving carrier with 24 hangers. Articles are placed on and taken from the carrier at one

point by a single operator. However the process may be conducted in ordinary stationary lead-lined tanks of the chromium or nickelplating type.

After the work has passed through the electrolyte in the Michigan setups, articles are dipped in the so-called reclaim rinse. As previously mentioned, this is used as water addition to the electrolyte. Next follows an alkali rinse which serves as a neutralizer. Articles then receive a final hot water rinse.

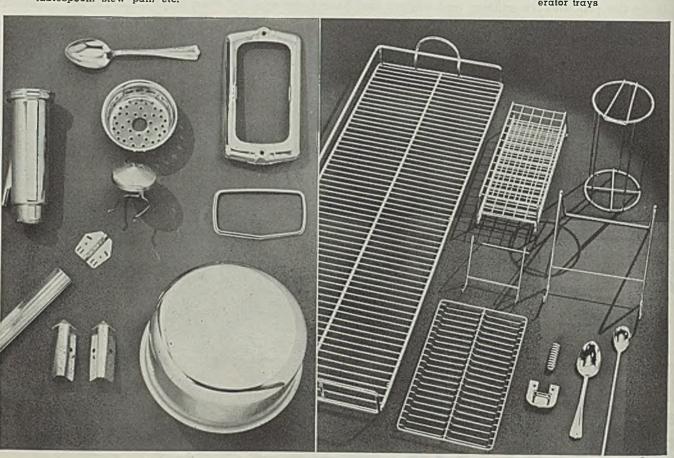
Time required in the electrolyte depends upon surface condition, size and shape of article. The time required for such articles as 18-8 meat-saver trays is about 4 minutes, whereas in the case of 17 per cent chromium General Electric refrigerator shelves the time is about 7½ minutes

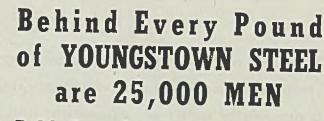
The process admittedly has limitations but so far has been employed successfully in polishing a wide range of fabricated products, such as refrigerator shelves, meat savers, sink strainers, bezels, drainer trays, fuse holders, test tube racks and the like. A number of these are shown in accompanying illustrations.

In the treatment of fabricated wire articles it has not been neces-

(Please turn to Page 64)

The method is especially suitable for fabricated wire products such as refrigerator trays





Behind each one of these men is an investment of \$11,346.

You hear some people say "all steel is alike--it's made to specifications." But specifications can't include men, and the men who make it stand behind it. They are the most important factor in any steel you buy.

If you could see the pride of our Youngstown workmen as their steel takes form under watchful care, the painstaking caution of the chemist checking every heat as exactly as an airplane pilot checks his ship, the thoroughness with which the inspectors examine the detail of each product before they stamp their "O K" -- and our name and reputation -- on it if you could see all this and more, every hour of every day, you would know why we are proud of our products and proud of our men. Thousands of users know they can depend on the uniformity and quality of the steel to which these Youngstown workmen are devoting their lives.

Sheets - Plates - Pipe and Tubular Products - Conduit -Tin Plate - Bars - Wire - Nails - Tie Plates and Spikes.

25-19C

YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO



Hydrogen Dissociated Ammonia

To obtain pure hydrogen at flow rates up to 900 cubic feet per hour required by modern atomic-hydrogen welders, anhydrous ammonia is dissociated in simple equipment and at comparatively low cost

■ WITH THE advent of the multiple-arc atomic hydrogen welding head, demand for hydrogen in large quantities at low costs was introduced. Some installations in this country require a flow of from 400 to 900 cubic feet per hour. Hydrogen in bottled form is neither practical nor convenient to supply such demands.

Certain methods, however, have been developed to a high degree in recent years whereby hydrogen is extracted from compounds high in hydrogen content and low in dissociation cost. Such a method is the dissociation of anhydrous ammonia wherein the ammonia is passed By J. H. GETTIG Housing Engineer Clark Equipment Co. Buchanan, Mich.

through a "still" or coil, surrounded by a furnace, the temperature of which may vary from 1100 to 1600 degrees Fahr., depending upon requirements and permissible residual ammonia.

Before going further, a glance at the ammonia radical— $2\ NH_3$ —indicates that upon dissociation it will break down into its chemical constituents— $3\ H_1 + N_3$. The high hydrogen content can be seen readily.

There also is nitrogen in the resulting gas mixture. Nitrogen is inert, however, so will not recombine with the hydrogen to form ammonia; neither does it do any harm when such gas is used as a hydrogen source in atomic hydrogen welding. In fact the inert nitrogen serves as an envelope, excluding oxygen.

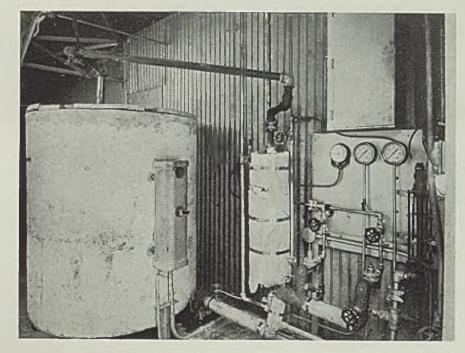
Ammonia to be used as a source of hydrogen must be of the highest purity. It must be absolutely free from water, oil or other forms of foreign matter. The reason for such purity can be appreciated when it is realized that one pound of liquid ammonia generates approximately 22.7 cubic feet of ammonia gas. Upon dissociation, the 22.7 cubic feet of ammonia gas becomes 45.5 cubic feet of cracked gas at 70 degrees Fahr.

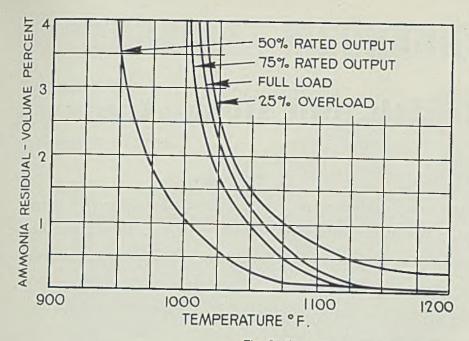
Residue Clogs Regulator

In drawing the gas through piping and reduction valves necessary for handling such amounts as 400 to 900 cubic feet per hour, even low percentages of impurities become large amounts of residue. This results in stoppage, clogging and improper operation of regulating control.

Atmospheric pressure anhydrous ammonia boils at 28 degrees Fahr. below zero. Any rise in temperature must be controlled by an increase in

Fig. 1—Ammonia dissociator is at left. The cage covers a pyrometer mounting. Vaporizer or heat exchanger is at center. At extreme right is flow meter. Large storage tank is behind corrugated sheet steel wall. Inlet from this tank is visible just above and to the right of vaporizer unit





pressure, and, conversely, a decrease in pressure must be met with a decrease in temperature. Therefore it can be said that for best performance, reasonably uniform temperature conditions should be maintained around the generating equipment throughout the year. This will eliminate the variable from winter's occasional —20 to summer's occasional 104 degrees. Such temperature changes require constant adjustment of regulating equipment and in some cases extreme changes even may be beyond the capacity of the regulating devices.

Principle Remains the Same

Volume requirements mean engineering differences. However, the principle of dissociation remains the same. The following is a description of one of the largest units in this country employed for such welding work. Ammonia from a storage tank is valved from the bottom of the tank at a pressure corresponding to the pressure generated by the ammonia itself at existing temperatures. At room temperature the tank pressure is generally around 125 pounds when pulling full load. This pressure, of course, varies with weather changes, but a pressure necessary to force the ammonia through the equipment is always present. At low fall and winter temperatures artificial heat must be applied either to the storage room or the tank itself to keep the pressure at working limits.

The raw ammonia is piped first to

Fig. 3—Cross section of electric ammonia dissociator unit with coiled stainless steel tube dissociating element. Courtesy General Electric Co.. Schenectady, N. Y.

Fig. 2—Amounts or percentage of residual ammonia in cracked gas at various loads and temperatures

a vaporizing unit. A vaporizer is a chamber housing a tube or coil through which the hot cracked gases pass, lending their heat to the process of vaporization.

Gas leaving the vaporizer enters a reducing valve, similar to an acetylene or oxygen valve except that it is made of steel instead of brass. Brass cannot be used in connection with ammonia due to corrosion

The ammonia gas leaves the reducing valve at pressures varying from 10 pounds to 25 pounds per square inch and enters the "cracker" or the dissociater itself. This unit consists essentially of a circular type electric furnace housing an oil of helically wound pipe of stainless steel. The extending ends of this coil pierce the furnace walls top and bottom. The gas from the vaporizer enters the bottom end of the dissociater coil and leaves as "cracked"

gas at the top. The coil is filled with coated refractory balls, each about ¾-inch diameter. These balls act as a catalytic agent to speed up the process of dissociation.

The hot cracked gas leaving the dissociater passes through a second chamber in the forementioned vaporizer and it is at this time that it gives up its heat to the vaporizing chamber.

Furnace temperature is held at 1600 degrees by automatic pyrometric control. The cracked gases leaving the unit are ready for use as the heat transfer medium of the electric arc in the atomic hydrogen process of welding.

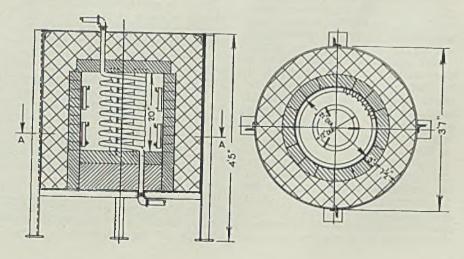
This welding process is not the only use for such gases, however. Hydrogen annealing, the production of nitrogen, controlled atmospheres and many other fields where these low cost gases find application also find this source of hydrogen of value.

The entire dissociation process is simple and the control equipment, while elaborate, is not costly. The greatest expense involved is the installation of storage space when large quantities of ammonia are necessary.

Pulley Covering Keeps Belts From Slipping

■ A special material for covering pulleys to prevent belt slippage now is being manufactured on a commercial scale by Nonslip Pulley Covering Co., 777 Hertel avenue, Buffalo. The product, Nonslip Pulley Covering, comes in sheets 9 feet square.

It is applied by tearing covering in strips of proper width and length to go twice around the pulley, including the lapping. A single application of the covering usually lasts two years.





Hearth and Bosh Areas

Creating new paths of low resistance near walls by enlarging proper areas permits flue dust reductions up to 90 per cent. Coke consumption cut as much as 400 pounds per ton. Outputs increased 30 per cent

THE HEARTH section of a blast furnace is merely a crucible for receiving and containing the molten metal and slag. It should be of sufficient area to accommodate the desired cast and maintain a suitable slag bath at a point from 15 to 20 inches below the tuyeres. No reason can be found why it should be any larger as excess area in this section only tends to cool the metal.

Diameter of this crucible is generally the same as diameter at nose of the tuyere coolers. If diameter at this point is not considered large enough to produce a suitable bosh area, the bosh should by all means be extended a little higher up to get the desired value. Reason for this is that direct combustion of the coke will take place within 24 inches of front of the tuyeres.

Center of Circle Cooler

This most intense heat area forms a circle extending inward about 24 inches from the outside diameter of the tuyere section, thus leaving the inner portion much cooler and permitting a large portion of the molten iron and slag to escape the intense heat zone on its way downward. It naturally follows that more ferrite (partially reduced ore) will find its way into the crucible.

Bosh and tuyere section is to a blast furnace as the fire box is to a locomotive. No reason can be found why this bosh area should be larger than the space required to burn a given amount of coke and there is a sound reason why it should not. It is a well established principle that the smaller the area in which a given amount of fuel can be burned, the higher will be the temperature. Also it is well known that the higher the temperature at which a given number of heat units are applied to the work

By J. P. DOVEL

James P. Dovel & Co. Inc. 1415 North Thirtieth Street Birmingham, Ala.

to be performed, the higher will be the efficiency.

Stock in entire upper section of a blast furnace also can be compared with a locomotive as this stock is to a blast furnace as tubes are to a locomotive. In a blast furnace, surface area of all the stock is in a position to absorb heat generated in bosh for heating and reducing ore. In a locomotive, tube surface area transfers heat from fire box to the water in the boiler, producing steam. The greater surface area exposed to this heat, the higher is the efficiency.

At this point we have a sound reason for increasing the volumetric area above the bosh and for crushing ore to finest degree possible within practical limits. This will be discussed later in this article.

Compared to Locomotive

There is another comparison that should be made at this point. Suppose commencing at the back flue sheet of a locomotive we would start to reduce surface area of the tubes clear on through to the front flue sheet. This would be considered poorest possible combustion engineering. Yet this is exactly what is being done in 90 per cent of the blast furnaces today since, commencing at top of bosh surface, area of the stock in the furnace is reduced to a degree even smaller than that of the tuyere area and to about half the area at top of bosh.

In a blast furnace operating normally, about one-fifth of the coke charge will be consumed in satis-

fying oxygen in the ore by direct combustion and about one-third in recarbonizing carbon-dioxide gases produced by direct combustion and from the limestone. This leaves a little over one-half the coke charge to be burned by direct combustion in the heat-generating section of the furnace. Of course, about 40 per cent of the coke used for recarbonizing the gases can be returned through the hot blast system at the tuyeres at 100 per cent efficiency.

Void Area Greatest in Center

Having the above deductions in mind, we are in a position to take up other important physical conditions which must be made to dovetail with the above principle.

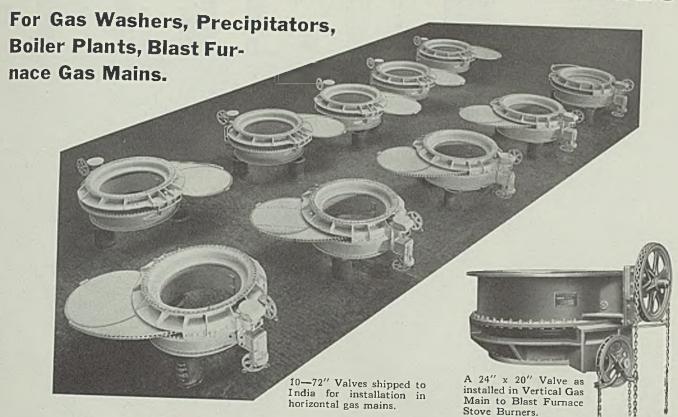
From the very conception of the art, it was found absolutely necessary to place the stock in the blast furnace in such a manner that void area is greatest through the center. The reason is obvious. A uniform distribution of the stock clear through the furnace would undoubtedly cause the furnace to work onesided. Path of least resistance would be along the wall. Consequently the blast would break through some place along the wall.

By producing a path of least resistance through the center, the blast is made to work through the center. If for any cause the furnace began working badly, it would right itself by finding this path of least resistance at the center.

This is why the stock is dumped into the furnace over a bell valve, thus causing the coarser and lighter particles to roll towards the center. This fundamental principle of blast furnace construction must not be changed although it will admit of variation.

Actual result of applying this prin-

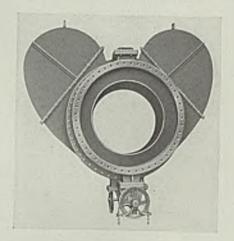
DEPENDABLE MECHANICAL VALVES





- 20" Diameter
- 24" Diameter
- 30" Diameter
- 36" Diameter 42" Diameter
- 48" Diameter
- 54" Diameter
- 60" Diameter
- 66" Diameter
- 72" Diameter

Write for our Valve Bulletin.



View—Showing Machined Goggle Plate with Chain welded thereon. Sprocket Wheel engaging with chain also cleans the chain if this becomes clogged with dust.

With Totally Enclosed Goggle Plate. No gas escapes to atmosphere when plate is swung to opposite position, providing safe working conditions for your men.

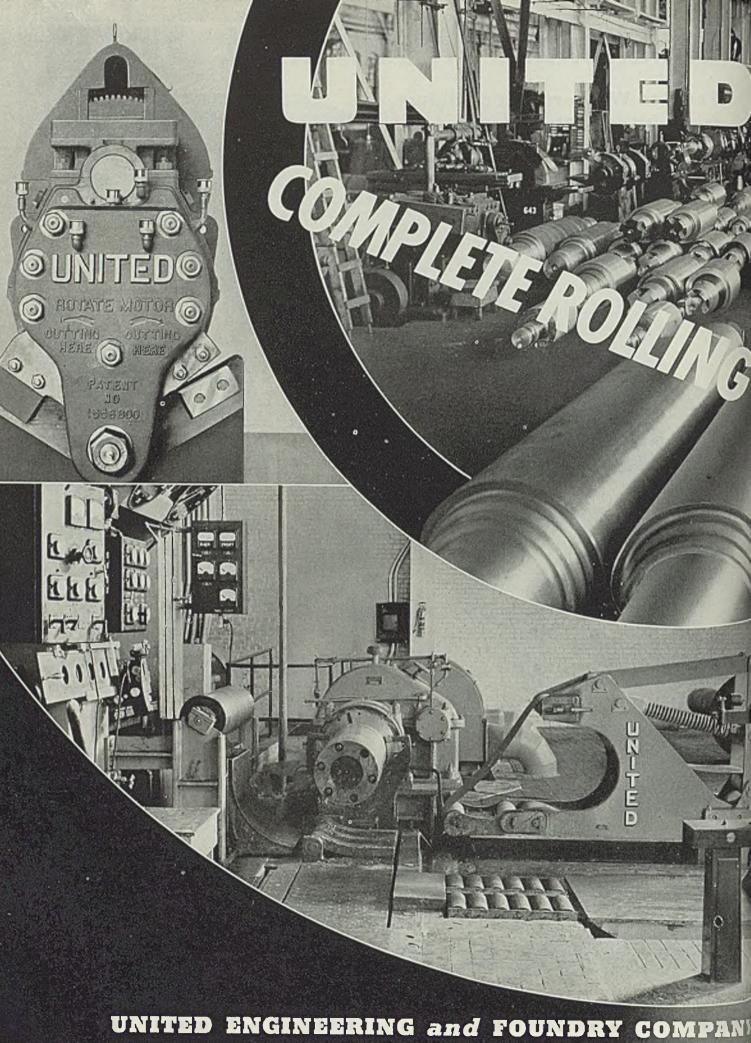
WILLIAM M. BAILEY COMPANY

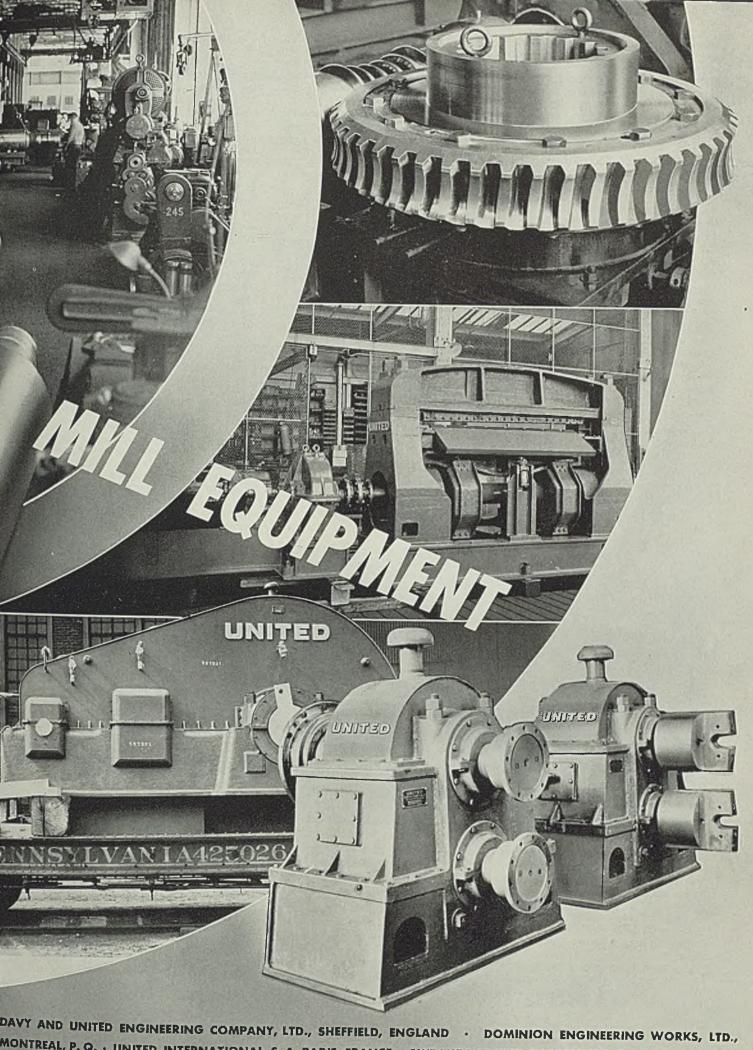
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ciple is to produce a more dense condition of the stock around the wall, causing the gas to flow through a restricted area at the center. Gases through this restricted area flow rapidly and tend to carry out great quantities of dust with a tendency to open up a crater through the center.

This may, however, cause the more dense portion of stock around the wall to fall into this crater in a more or less irregular manner and so may result in irregular working. Also it may cause the furnace to blow through at frequent intervals. This condition also produces large quantities of dust.

After a long line of research and observation of the workings of a great number of blast furnaces, I find that the best way to approach this subject is not interfere in any way with the existing path of least resistance through the center but to create a path of low resistance around the wall equal to that through the center, thus causing the stock to settle uniformly as it is reduced in volume.

Observations leading up to this conclusion came from noting that

a number of furnaces with the top section almost completely worn out and ready for relining were producing better tonnage and not throwing half as much dust as it was throwing previously.

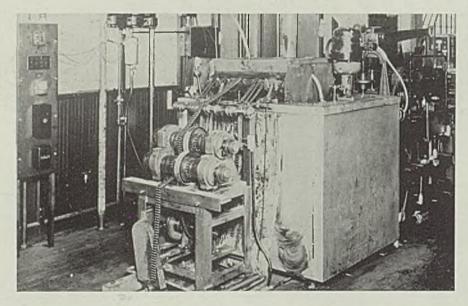
This furnishes a sound reason for creating mechanically an increased area at the top and, in fact, clear through the furnace. Of course it should be done in a proper and permanent manner to obtain the best possible results.

About 10 furnaces have been changed to this method and have produced more flattering results than could have been anticipated. These benefits include an 80 to 90 per cent reduction in flue dust produced and greatly increased thermal efficiency as evidenced by saving 400 pounds of coke per ton of iron produced.

Output was increased 30 per cent and better quality iron was made at lower cost.

Note: Figures as to actual deposition of coke in the furnace are only approximate as this will vary greatly under different conditions. They are only given to set out the principle.

Electrically Heated Oil Lubricates Chains



■ To assure lubrication before packing for shipment, chains made by Diamond Chain & Mfg. Co., 402 Kentucky avenue, Indianapolis, are immersed in a preloader containing a tank of electrically heated oil. Tank is ¼-inch steel sheet with 3 inches of magnesia on bottom and sides.

The heat is provided by 66 strip heaters with a total rating of 39 kilowatts clamped to bottom and walls of tank in six sections. As chains leave lubrication tank, excess oil is removed by a blast of compressed heated air. Before compression, air is heated electrically in a small cylindrical tank containing two 500-watt immersion heaters. A 3-heat switch with an automatic thermostat eliminates necessity of manual temperature control. Photo courtesy General Electric Co., Schenectady, N. Y.

Polishing Method

(Concluded from Page 56)

sary to use cathodes conforming to the shape and size of the former. In the case of deeply recessed articles fabricated from sheet or strip, of the type of cooking pans for example, cathodes conforming generally to the shape of such articles are advisable.

In treating broad surfaces it is difficult to obtain as flat a mirror finish as is possible by mechanical methods due to problems of current distribution and nature of the original sheet finish. This characteristic, however, is hardly noticeable when sheet or strip is fabricated into small articles with curved surfaces. The method actually reveals defects such as pits and scratches, but in some instances this fact may be used to advantage for inspection purposes or as the first step preliminary to mechanical polishing.

High Spots Removed

High spots and sharp projections are removed as the current tends to concentrate at those points, resulting in a greater metal loss.

The process is especially suitable for fabricated wire products such as refrigerator shelves. Most wire products are spot welded, and at the point of joining there is a discoloration and a light scale. Both the discoloration and the scale are removed during electrolytic treatment and the underlying metal is polished along with the rest of the metal surface. Polishing costs by usual mechanical methods would be prohibitive.

Many other products with irregular or hard-to-get-at surfaces not within wire classification can utilize the process to great advantage.

Some work also has been done on electrolytic polishing of stainless forgings and castings. The treatment does not provide a smooth finish, but it imparts to the surface a high intrinsic luster.

The finish obtained by use of the Rustless process imparts to the surface improved corrosion resistance due to the oxidizing action at the anode.

Show Display Board Designed by Appleton

Appleton Electric Co., 1707 Wellington avenue, Chicago, manufacturers of Unilets and other electric products, has designed an interesting 3-panel display, electrically lighted, for use at various trade shows throughout the country. The board is 36 x 48 inches and is interchangeable with eight different boards made up according to the particular requirements in the locality where the show is to be held.



SPADEWORK...

THERE'S simply no getting away from it. If Adolphus Q. Bickle wants to win that tulip award he's after, the only way he will do it is by more and better spadework.

Here at Shell our lubrication men

never try to get away from the preliminary digging that cuts the cost of friction in industry. Every day they go out in search of it. You will find Shell lubrication men in a Detroit machine shop conducting a test run with an improved cutting lubricant... in a Carolina paper plant studying the possibility of improving dryer-roll lubrication. Or

checking the effect of lubricating oil in relation to exhaust-port carbon formation and operating temperature in a marine Diesel. Or

you will find them investigating the reaction of a new type of extreme pressure lubricant on screw-downs on a blooming mill.

It's this first-hand digging that enables Shell refineries to produce lubricants keyed to the needs of your machines today.

Perhaps Shell can help with your lubrication problem. Why not call in your Shell man today?

SHELL INDUSTRIAL LUBRICANTS

BETWEEN HEATS

WITH Shorty



■ Say fellers:

Rode by the tin house of an Ohio steelmaker the other day. Remember the ol' brick stacks on the outside of the building? They're still using 'em. Still got the terne plate roof and there's not a break in 'er. Must be 40 or 45 years since they put the roofin' on, I guess.

Down at the end of the plant, saw riggers up on one of the open-hearth stacks usin' a cuttin' torch on the top sheet. Sparks were flyin' in good shape and when I came by the plant that night, they had er all down. Understand they scrapped their steel-makin' shop and are puttin' in some cold reducin' mills to roll plate for the tin pots. Goin' to buy their hot rolled up Pittsburgh way, one of the boys tells me.

Jus' as we got into town pretty well, bus driver slowed down 'cause of a youngster placin' a dummy policeman in the center of the street askin' people to drive slowly on account of school.

You needn't laugh, old topper. Your doin' jus' as simple a job as the kid did puttin' your safety program across in the plant.

Intelligent lookin' lad he was and I sez to myself, "who knows but what that kid some day will be one of the big guns up at the mill."

You see, he had a job to do and he did it. Lots of boss' in the front offices got there by doin' jus' as meager a thing as this kid. Know some of 'em? You don't, huh? Well, sir, over in Pittsburgh there's one in the Koppers building, and a couple in the Grant building. You'll find some more in

Cleveland, Middletown and Bethlehem. They may never have put a polish on the handle of a sledge but all of 'em knows what a sweat shirt feels like. They've got jus' as many headaches as you and me, and I sometimes wonder if they don't have more.

Passed a little coal minin' town not far from the Ohio plant. One of the miners' shacks had a wreath of flowers hangin' in the middle of the front door. Jus' shows it don't make any difference where you live; death stalks over the door mat without knockin' jus' the same. No respector of persons, I guess.

Across the river smoke was belchin' out of a brick stack that had its crown stickin' high in the air. Little ways down from the top were some glazed white brick which formed the 'nitials of a steel concern gobbed up by a merger.

If any one at Washington ever decides to take a fishin' trip down the river and sees them 'nitials-well, it's good bye stack. The alphabet boys restin' beneath the cherry blossoms probably could use some more I's and S's and W's,

Better add a P. S., fellers, to let you know the 'nitials are a little out of order in case you'd like to put 'em together. Seems as though nothin's in order today anyway, so what's the difference?

Time to check out. I'll be seein'

Shorty Long

Arc Welding Handbook In Sixth Edition

Procedure Handbook of Arc Welding Design and Practice; semi-flexible simulated leather, 1125 pages, 5% x 9 inches; published by Lincoln Electric Co., Cleveland; supplied by STEEL, Cleveland, for \$1.50 in the United States, \$2 outside the United States.

This is the sixth edition of this complete work on arc welding, the first having been issued in 1933, successive editions and reprintings following rapidly, each being revised and enlarged to cover new developments and a wider field.

Rapid progress in development of arc welding and its applications has made available much new information and as a result the fifth edition text has been largely rewritten and expanded. The new issue contains the results of two years of fact finding by a staff of 200 arc welding engineers, contacting every industry throughout the world.

Physical changes have been made in the book by rearrangement of text and illustrations to avoid space waste. Lighter paper stock has reduced its size from that of the flfth edition despite inclusion of 20 per cent more material. A total of 1557 illustrations, photographs and draw-

ings is included.

The work is divided into eight sections. Part I covers welding methods and equipment; Part II, technique of welding; Part III, procedures, speeds and costs of welding mild steel; Part IV, structures and properties of weld metal; Part V, weldability of metals; Part VI, designing for arc welded steel construction of machinery; Part VII, designing for arc welded structures; Part VIII, typical applications of arc welding in manufacturing, construction and maintenance.

Scope of the volume is encyclopedic, a complete reference guide to arc welding. It is written especially for use by designers, welding supervisors and operators, engineers, architects, steel fabricators and erectors and similar professions. By its use anyone concerned with welding in any way may keep abreast of the rapidly expanding field of welding development.

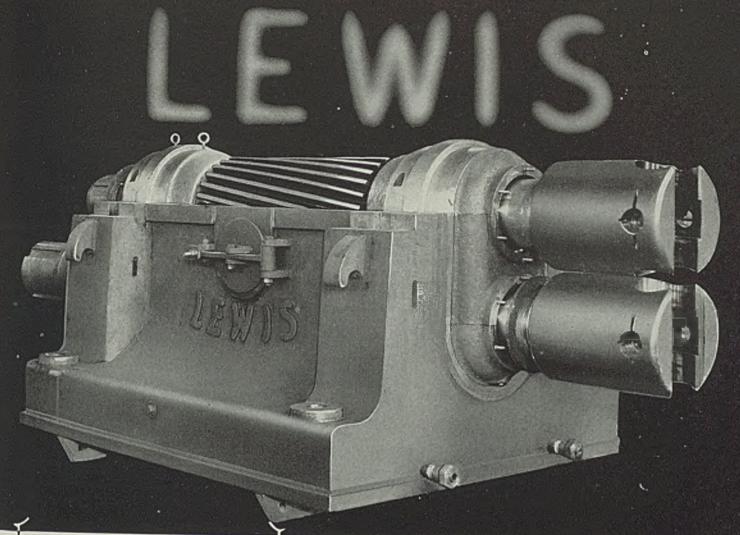
Metals Are Analyzed By Electrolysis

Device for electrolytic determination of metals is the WACO electrolytic apparatus, manufactured by Wilkens-Anderson Co., 111 North Canal street, Chicago, for analysis of ores, alloys and metals, and is used by processors of foods to determine presence of harmful metal in foods. Since electrolytic tests are carried on with strong acids and the liberation of strongly corrosive fumes, the apparatus is housed in a cast aluminum case. Seamless construction of aluminum housing prevents fumes from attacking and destroying delicate electrical equipment and connections.

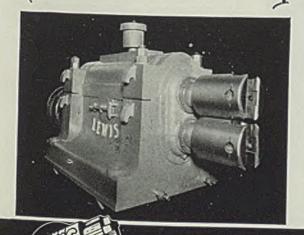
This device is fitted with two scales - a microampere meter for use in connection with small depositions, such as the harmful metal content of foods, and an ampere scale for large depositions, such as ore and metal analysis. A glass slide covers the only opening which

is not permanently sealed.

TRANSMITTING 2500 HORSEPOWER IS AN EXPERT'S JOB....



Lewis Pinion Stand—20"x50", single helical cut teeth, totally enclosed with anti-friction bearings, 2500 H. P. Stand and cap made of semi-steel, cast steel or welded steel as required. Bearings and teeth flood lubricated. Range in size from 8" diameter to 42" diameter.



The transfer of thousands of horsepower through gears, from a prime mover to a mill or other machine, is a job for Lewis.

Lewis gears and pinions are made to meet tremendous power requirements (8000 H.P. and over). Single gears made by Lewis up to 8000 pounds are balanced within approximately one inch pound and accurate to within .002 inch pitch diameter. They are in use on some of the largest and most important mills in the steel and non-ferrous industries. To the trade the name LEWIS is coupled with the highest quality.

A Lewis engineer is always ready, without obligation, to go into the matter of gear design with you to meet your special drive requirements.

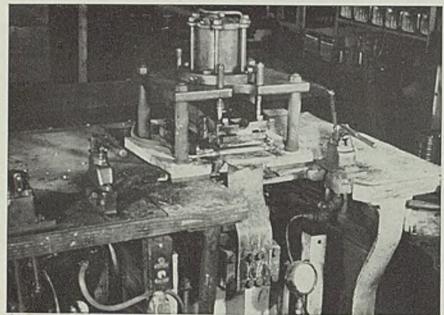
LEWIS FOUNDRY & MACHINE

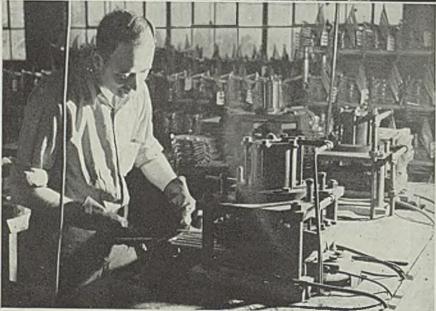
DIVISION OF BLAW-KNOX CO.



Automatic Soldering

A comparatively simple arrangement of fixtures, torch and solder feed permits operator to more than triple his output. Electric resistance heating setup works well on another job





By E. J. STONE

Manufacturing Engineer Westinghouse Electric & Mfg. Co. East Springfield, Mass.

■ QUITE often it pays handsomely to build special machines where the operations ordinarily would be done by hand. Such machines, in addition to producing a better job, often permit increased output and lower costs as well. Perhaps typical of the work which can be mechanized to advantage are certain joining op-erations formerly thought of as necessitating soldering of individual units by hand. This method of handling the work, of course, does not give absolutely uniform results, often is quite costly and usually involves a limited output per operator. By building special equipment similar to that described and illustrated here, such work often can be done to much better advantage.

Figs. 1 and 2, for instance, show a special setup developed to solder automatically a coiled copper tube onto the underside of a bronze refrigerator shell in manufacture of electric refrigerators. The somewhat unusual appearing machine shown here handles the work fast, efficiently and at low cost.

The method of soldering em-

Fig. 1. (Upper)—View of automatic soldering setup from operator's side. Note air cylinder on top for clamping work, air valve on table at right, heavy connections to welding transformer at front with air gage nearby

Fig. 2. (Lower)—Operator inserting assembly into automatic soldering setup. Work first is dipped in flux, then sprinkled with pulverized solder ployed first involves dipping the copper coil in flux. After this, pulverized solder is sprinkled on the coil, sticking to it because of the flux coating. Next the coil is pressed into contact with the sheet. Then three clamping lugs are attached, tightened and the unit placed in the machine.

This machine includes a resistance welding transformer and electrodes arranged in such a manner as to heat the work at the points required. A vertically mounted air cylinder presses the sheet downward against the electric contacts at front and rear of the machine to hold the copper tube firmly against the bronze sheet. The welding transformer is connected to an automatic timer which determines the period that current is applied and thus the amount of heat that is developed.

Interval Timer Applies Current

When the operator places the assembly in the machine, he opens an air valve mounted on the bench causing the air cylinder of the machine to clamp the assembly in place. Then he touches a control button under the bench which starts the interval timer and which automatically applies the electric current to the work. When proper time has elapsed, timer automatically shuts the current off. Sufficient heat is developed to solder the entire contacting surfaces of the tube and bronze sheet. A rubber tube then is attached to the coil and air blown through the coil to cool it for handling.

This setup has increased the output of the operator tremendously in addition to giving a more uniform and better job of soldering.

Figs. 3 and 4 show another special setup arranged for automatic soldering by a different method. Here a number of gas torches are grouped in a movable head to furnish the heat required for the soldering operation. The solder and flux also are applied in a different manner.

The soldering operation in this instance consists of joining two parallel copper tubes which are placed on a traveling work table underneath the torch head and which traverse under the head during the

Fig. 3. (Upper)—Special setup here uses gas torches for heat supply, feeds strip solder into joint automatically as work traverses from right to left under head of machine

Fig. 4. (Lower)—Operator simply places tubes in pairs on traverse table from trough at rear, lowers work head over tubes and automatic soldering cycle handles remainder of operation without attention, enabling operator to more than triple his output

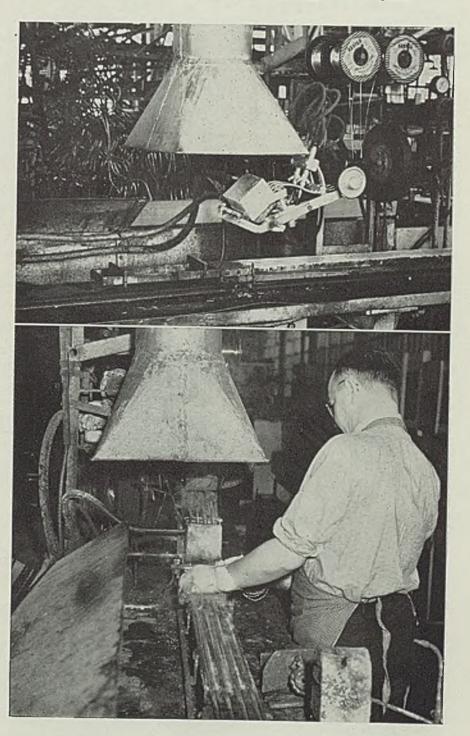
soldering operation. The work table is arranged with four sets of grooves so eight copper tubes are soldered in pairs automatically at (Please turn to Page 83)

Monograph on Storage Batteries Revised

■ A new edition of the educational monograph on the nickel-iron-alkaline storage battery, published originally in 1916 as an aid to instruction in science and engineering schools, is being distributed by Thomas A. Edison Inc., West Orange, N. J. It was prepared mainly to answer the

growing demand for a discussion of industrial applications of the nickeliron-alkaline battery and practical value of its operating characteristics. At the same time, the presentation of the manufacture of the cell has been completely revised.

The monograph is divided into four sections dealing with such subjects as "Storage Batteries in Industry," "How Edison Improved the Storage Battery," "In Science and Engineering Laboratory Use" and "A Trip Through the Factory." Distribution of the monograph is expected to be primarily among educational institutions although commercial users of storage batteries will be supplied on request.





Conveyor Lubrication

Lubricating with colloidal graphite cuts maintainance costs of furnace conveyors and kiln cars operating at high temperatures, appears suitable also for lubricating any metal surface at high temperature

■ MAINTAINING smooth operation of heavily loaded conveyors and kiln cars carrying parts through high-temperature furnaces always presents more or less difficulty. At plant of Champion Spark Plug Co., ceramic division, 8525 Butler avenue, Detroit, an innovation in lubricating methods has proved beneficial.

Here two identical continuous

chain-driven conveyors with a total length of 275 feet carry spark plug insulator "decorating setters" up to and away from an 1800-degree kiln for the firing on of type and trade marks in overglaze colored enamel. Conveyors are fitted with flat plates designed to support special nickel-iron trays loaded with insulators.

These plates slide on horizontal

guides on both sides of the entire length of the conveyor—from loading stations through the kiln and back through a cooling zone to final inspection where insulators are removed and trays reloaded.

Driven by a 2½-horsepower motor, the slow-moving conveyors had a tendency to move in small jerks rather than smoothly when first installed.

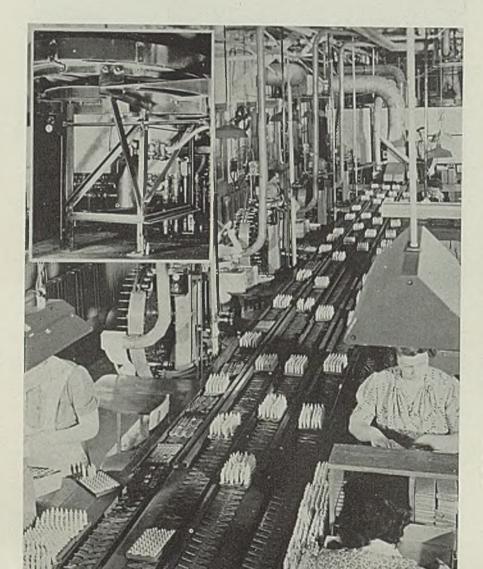
Many complaints of headaches on the part of operators who sat facing the conveyor to inspect insulators were suspected of being traceable to this motion.

Dry Lubrication Successful

Normally, conventional lubrication of the guides might have taken care of the situation. Two factors, however, obviated the use of customary oil or grease lubrication: Grease or foreign matter could not be permitted where it might get on the ware; conventional lubricants would burn off, carbonize and flake as the red hot setters were carried from the kiln to the cooling chamber.

The difficulty was eliminated through the development of a methof "dry" lubrication, using a lubricant impervious to heat. At a point just beyond where the conveyor leaves the kiln, two automatic Norgren lubricators of the air-operated spray type were installed in such a manner as to spray "dag" colloidal graphite suspended in carbon tetrachloride directly on the lower bearing surfaces and chain links (Please turn to Page 84)

Conveyors carry work through furnace at 1800 degrees Fahr. Insert, automatic air-operated lubricators spray mixture of colloidal graphite, carbon tetrachloride, kerosene and oil



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FOR INFORMATION WIRE OR WRITE THE MANAGEMENT OF THE PRODUCTION AND MACHINE TOOL SHOW, GRAFTON, WIS.

* MACHINE TOOL SHOW

CLEVELAND PUBLIC AUDITORIUM . CLEVELAND

Acetylene Industry Sees Many Applications Rapidly Expanding

■ TECHNICAL program of the fortieth annual convention of the International Acetylene association, held April 10, 11 and 12 in Milwaukee (for additional details on this meeting see Steel of April 1, p. 76, and April 15, p. 27), was designed to present complete possibilities of the oxyacetylene processes as well as details of more recent developments, notably machine flame cutting.

Other subjects that were clarified included low-temperature brazing with silver alloys; oxyacetylene welding of carbon-molybdenum pipe for high-temperature high-pressure service; applications of oxyacetylene processes to shipbuilding, railroad and agricultural equipment as well as foundry and heavy industry applications such as flame cleaning, descaling and gouging. Methods of speeding fabrication and production were reviewed in papers describing outstanding practice in a number of plants.

In his address as retiring president, H. P. Dolisie, managing director, Canadian Liquid Air Co. Ltd., Montreal, recalled the condition of the industry at the inception of the association some 40 years ago when acetylene was used primarily for illumination and oxyacetylene welding had not even been conceived. He pointed to the close connection between the prosperity of the acetylene industry and world conditions.

Brazing Alloys Classified

The standard silver brazing alloys now used extensively in industry were described in detail and their development reviewed by Robert H. Leach, vice president, Handy & Harman, Bridgeport, Conn. Amount of joining being done with such alloys is impressive. Eight grades of standard silver brazing alloys were specified as to amount of silver, copper, zinc, cadmium, impurities and melting point, flow point and color. These cover the range needed to meet industrial requirements. Increased use of silver brazing alloys is due to demand of fabricators of sheet metal and tubing for a better and quicker method of joining. Also important are the comparatively low melting points of these alloys, their free flowing properties and high strength of resulting joint. Each of these eight alloys was described as well as best method of utilizing it.

Describing the part played by welding schools in helping to meet the increasing demand for highly

skilled welding operators, A. P. Haller, Haller Welding School, Brooklyn, N. Y., detailed training program for beginner and advanced student. He said all branches of the welding art have made such phenomenal strides in recent years that welding developments have far outstripped available man-power with an insufficient number of capable operators resulting. He listed individualized instruction and training the man for a specific job as the two most important factors in a successful training program. An example of the latter would be training the student in maintenance of typewriter parts.

Alloy Pipe Investigated

Oxyacetylene welding of carbonmolybdenum pipe for high-pressure high-temperature service was discussed from the laboratory development standpoint by R. M. Rooke and F. C. Saacke, Air Reduction Sales Co., New York, and from the field testing and application standpoint by A. N. Kugler of the same company. Even though no chipping, peening or chill rings are needed with the oxyacetylene process, and with preheating an inherent characteristic, first attempts to weld carbon - molybdenum steel piping were unsuccessful. This indicated desirability of laboratory investigation as to development of suitable welding rod, determination of most satisfactory welding techniques and preheat and postheat applications. Procedure recommended as result of these investigations includes either continuous or intermittent preheat on all pipe with wall thicknesses over 5%-inch. Pipe should be beveled to an angle between 30 and 45 degrees, 371/2 being preferable. Pipe ends should be spaced approximately 3/16 to 1/4-inch. Use 1/4 to 3/16inch welding rod for first two layers of multilayer welds for all wall thicknesses over %-inch and allowing at least one layer of weld for each 5/32-inch of wall thickness. Heat treatment includes normalizing entire weld after completion with a subsequent stress relief. This procedure when followed by a competent welding operator should produce welds of high strength and ductility.

Mr. Kugler summarized the results of 20 field tests. Results of tensile, free bend, restricted bend and nick-break tests indicate current requirements are readily exceeded by welds made as specified above. He also included a descrip-

ton of the recently developed technique known as "short-time stress relief." An important portion of this paper was a complete process specification for oxyacetylene fusion welding of carbon-molybdenum steel pressure pipe lines with recommendations for rod sizes, number of layers for various metal thicknesses, etc.

The many applications of flame cutting in construction of a ship's hull, cabins, deckhouses, machinery and machinery foundations as well as installation of ship's piping and electric equipment were detailed by Robert E. King, engineer, Manitowoc Shipbuilding Co., Manitowoc, Wis. Machine cutting of pipes for webs on bulkheads of tankers is done easily by using a track of aluminum 1/4-inch by 7/16-inch in section and formed to desired contour and screwed to a wooden table. Cutting machine easily follows this track to duplicate accurately the shape desired. Where paper layouts are used, these are made on a large vertical drawing board 10 feet high and 40 feet long and subsequently transferred directly to the cutting table. These methods greatly facilitate cutting the shapes desired.

Improve Track Conditions

Present high-speed trains require better track conditions than formerly, according to G. M. Magee, research engineer, Engineering division, Operations and Maintenance department, Association of American Railroads, Chicago. He detailed use of the oxyacetylene torch in building up frogs, switches, battered rail ends and joint bars and butt welding of rails. Considerable cost information was included. At a cost of 10 cents per plate, one railroad welds shoulders on frogs and switch plates. Done on an extensive scale, this has been found extremely effective in maintaining frog and switch points in line. These shoulders take the thrust from upper portion of the spike and transfer it to a point just above the tie surface, thus greatly reducing bending movement upon the spike and increasing its holding power.

Importance of a welding shop in an agricultural community, types of repair work and procedures involved were detailed by Donald K. Struthers, extension agricultural engineer, Iowa State College, Ames, Iowa. Since average farm machine spends only about 4 per cent of its life in useful work, it is extremely important that breakdowns be repaired quickly to minimize loss of quality and quantity of crop as well as working time. On many occasions, a welding operator is more urgently needed than the family doctor. The welder in an agricultural community, however, must be ready to meet any one of 100 different situations. Maintenance work can be classified roughly into three types—that due to natural and expected wear of frictional surfaces, that from accidents and that caused by breakage due to excessive stresses resulting from shock.

Accidents are common. An illustration was shown of a corn planter shoe and casting broken when the team of horses ran away burying the point of the shoe about two inches in an oak stump. Planter was repaired by straightening the frame and brazing the broken casting.

Rubber Cuts Impact

A table was presented showing number of shocks received by frame and rear wheel of a manure spreader during 5 miles of travel over gravel roads. At 21/2 miles per hour there were 3609 shocks of 350 pounds impact and others varying down to two shocks of nearly 2000 pounds impact. At 5 miles per hour, 8598 shocks at 1050 pounds impact were encountered and others up to 89 shocks of 3425 pounds. At 10 miles per hour, number of shocks was reduced but impact values had greatly increased as some 3581 shocks were recorded at 2250 pounds impact and others up to one shock of 10,688 pounds impact.

These values were recorded during a 5-mile run using steel wheels and were in addition to the dead load of 1250 pounds. These same tests made with rubber tires showed that steel wheels averaged 4.7 times as many shocks of some impact value at 2.5 miles per hour; 41.8 times as many shocks at 5 miles per hour and as high as 90 times as many shocks at 10 miles per hour as with rubber tires.

During the past year much work has been done in cutting down steel wheels, welding drop rims to the hub and spokes and then mounting used automobile tires unfit for further use at high speeds on automobiles. Many welding shops are doing this work but have not taken full advantage of such opportunities afforded in an average farming community.

Persistent fire prevention efforts and safety activities sponsored by the association were reviewed by Mr. J. I. Banash, the association's consulting engineer, Chicago. In ortain plants it is not uncommon to find structures of 20,000,000 to 30,000,000 cubic feet in a single area without partitions. In such a building, venting a hydraulic seal outdoors, as required by rule 33 of regulations of national board of fire underwriters covering "gas systems for welding and cutting," would result in complexity of piping not logically necessary because outdoor conditions practically prevail

within the structure due to its immense size. Another rule limits the manifolding of cylinders to values which appear impractical at the present time. Some broadening of the base on which regulations are founded was believed to be quite proper.

In his report, H. F. Reinhard, Union Carbide Co., New York, and secretary of the association, mentioned the practice of identifying content of gas cylinders by means of a standard color scheme. The only logical way to identify contents of gas cylinders, he said, is to require that the manufacturer stencil the cylinder with the wording "This

cylinder contains ——."

Regarding the health aspects of oxyacetylene processes, Dr. A. G. Cranch, industrial toxicologist, Union Carbide & Carbon Corp., New York, reviewed the subject on the basis of experience rather than theory or surmise. Such gases as carbon monoxide are encountered so rarely in oxyacetylene processes as not to be a health hazard. Fumes, however, may originate in the metals worked upon and the rods used in welding or even in the fluxes. Zinc fumes, for instance, result in what is commonly known as zinc chills, usually developing a few hours after exposure and seldom lasting over 24 hours. These are selflimiting as daily exposure appears to produce immunity to further attacks. Lead fumes are a real hazard in welding or cutting leadcoated material. Similarly, cadmium fumes are a definite hazard.

Ventilation Eliminates Hazards

Thus real hazards are limited to inhaling fumes of zinc from work on brass or bronze or with bronze rod or with galvanized surfaces, irritation of air passages from exposure to cadmium fumes or fluxes containing fluorides or lead poisoning from welding or cutting lead-coated material. Also various waste sludges found on the material may give off harmful fumes when heated.

The answer to these hazards is ventilation. Much can be done along this line by intelligent co-operation of the operator. It is only common sense to stand in such position as to utilize any available air currents to carry away fumes from the breathing area. Several portable exhaust or ventilation units are available for local exhaust. The new metal fume filter respirators also :ffer a considerable degree of protection. In confined spaces the only satisfactory ventilation is use of air supply masks. For cutting or relding lead-painted scrap or other work, the air supply mask appears the only adequate protection available. Air for such masks should be drawn from a nearby location and not from a compressed air system which may contain oil fumes or possibly carbon monoxide.

Working in confined spaces should never be done unless the space can be ventilated freely so fume concentrations are avoided or else a good air supply mask is available for protection. Except for occasional cases of zinc chills, lead poisoning or irritation from fluoride flux vapors, practically all ill effects on health have resulted from working in confined spaces with inadequate ventilation. The simple precautions outlined offer means of effectively avoiding this hazard.

Round-Table Interest High

Some 1267 attended demonstrations of multiflame pipe welding, flame descaling, plate edge preparation, wrinkle bending, flame cleaning, machine flame cutting and heating for bending and straightening at the general meeting preceding the round table discussions. Many present stayed to attend the 13 .rcup round-table meetings which covered in some manner or other almost all phases of the oxyacetylene processes.

A feature of the convention again was a technical lecture and panel discussion. The lecturer was H. C. Boardman, research engineer, Chicago Bridge & Iron Co., Chicago, who presented a general survey of the oxyacetylene machine flame cutting and flame machining processes. Not only were all of the various operations discussed in detail, but recommended procedures were presented. This was followed by a panel discussion in which Richard W. Sternke, shop superintendent and production manager, Lakeside Bridge & Steel Co., Milwaukee, Chester Mott, National Cylinder Gas Co., Chicago, and Dr. George V. Slottman, manager, Air Reduction Sales Co., New York, brought out important phases of the subject such as cutting techniques, special shop setups, economic factors and elements of design involved, etc. Mr. Boardman's paper will be presented at length in an early issue of STEEL. E. K. Carlson, superintendent,

E. K. Carlson, superintendent, Chicago Bridge & Iron Co., Chicago, in discussing efficiency control in oxyacetylene cutting regarded use of proper distribution system for oxygen and acetylene with central generating plants as important economy factors since such a system eliminates cylinder handling and residual gas loss as well as increases safety by eliminating obstructions throughout the shop and accidents incident to handling the cylinders.

A most important factor contributing to successful use of oxyacetylene cutting is educating the designing staff to visualize the work at hand in terms of applica-

tion of the torch. Then it is an easy matter to utilize standard machines or to design special attachments to accomplish desired results.

Advantages and procedures recommended for flame cleaning, dehydrating and descaling were detailed by J. G. Magrath, Air Reduction Sales Co., New York. Combination pickling and flame descaling has proved of advantage in a number of instances. Flame descaling reduces the tonnage removed during pickle and thus simplifies problem of disposal of pickle waste by reducing amount to be handled. One steel plant, for example, uses flame descaling to supplement pickling operations, effecting important savings in time and costs. In the original 100 per cent pickling operation in new 10 per cent acid solutions, fair results were obtained within immersion time of 1 hour and 15 minutes, the average cost being 75 to 90 cents per ton. A combination pickle and flame descaling operation was substituted and gave much cleaner work with only a 1 per cent new acid solution. o iron content was discernible in the solution after 100 tons were run through. Only 15 minutes' imiersion was required at a cost of 20 cents per ton. As flame descaling costs only 14 cents per ton, total cost of the combined operation was only 34 cents per ton, giving an important saving.

Relieves Pickling Load

Wherever production is heavy, combining the processes relieves the load at the pickling tank and allows more thorough pickling of those steels with extremely tenacious scale requiring subsequent grinding. Order of the operations depend upon the scale formation. With a hard unbroken scale surface, a short pickle should be provided first to break down the tight surface layer. Flame descaling follows to remove the disintegrated remaining scale. Where a crazed or cracked surface scale occurs but without a definite break at the scale-steel interface, then flame descaling to remove the loose scale should precede pickling which then ...oduces a clean surface in a short time.

Many of the uses of oxyacetylene torches in a large steel mill were pointed out by B. S. Burrell, general master mechanic, Inland Steel Co., Indiana Harbor, Ind., who also discussed use of welding and cutting in repair and maintenance, in new construction and in scrap opgrations. Equipment used and organization of welding operators was described.

Oxyacetylene gouging process, a rapid and economical method for removing a U-shaped groove of surface metal from rolled, drawn,

forged or cast steel, was discussed by R. F. Flood, service engineer, The Linde Air Products Co., Chicago. The gouging process was developed to meet need for equipment to remove weld metal from underside of electric arc welds and for removing weld defects revealed by visual, X-ray or gamma ray examination-operations normally involving a great amount of chipping with pneumatic hammers. Originally designed for use in the steel ndustry, flame gouging now finds applications in machinery manufacturing, oil refineries, steel foundries, shipyards and many other industries, in addition to any number of maintenance operations. In all gouging work a special nozzle is designed to deliver a relatively large volume of oxygen at low jet velocity. When coupled with proper preheat flame distribution and properly guided, such a nozzle cuts a smooth accurately defined groove which can be varied in width and depth at will by use of different nozzles and manipulations.

Gouging Saves 60 Per Cent

In general, gouging can be classified into four groups: Progressive gouging of underside of electric arc weld, spot-gouging to remove defective weld metal and temporary tack welds, plate-edge preparation for welding, maintenance and scrapping operations. Many welded structures require removal of root of initial weld before the back weld is made on thick plate. Flame gouging appears particularly well suited for such work. For instance, a recent survey in a shipyard which standardizes on gouging for removing reverse side of arc welds, showed a 60 per cent direct saving in labor and material costs compared to chipping. Output per operator was stepped up four to five times as an average gouging operator can process that much more footage of weld seam than an average chipper in same time.

Typical of spot-gouging work is removal of threaded studs from surface of large diameter fabricated pipe without cutting into surface of the pipe. These studs were welded temporarily to the pipe for holding end plates in position while making a hydrostatic test on the fabricated shell. Removal by gouging took only two minutes per stud while removal by chipping required 21 minutes to accomplish the same work.

Rapidly gaining in importance is preparation of plate edges for welding by gouging. This can be done by any one of three methods: Full U-grooving of abutting plate edges, J-grooving of a single plate edge for plate up to 1¼ inches in thickness or combination of beveling and gouging to produce U or J-

grooves in plate over 1¼ inches in thickness. Concentric rivet cutting nozzles and other low-velocity oxygen nozzles also have been found useful for edge preparation, particularly on the heavier plate.

Time Cut to One-Twelfth

A fabricator of small tanks, each 8 feet long, 6 feet in diameter with approximately 25 feet of seam to be welded and with wall thicknesses of %-inch, was able to prepare the edge which had been abutted together with a single pass of the gouging blowpipe. Each tank was processed in 30 minutes using the gouging method as compared with 6 hours required for chipping.

Example of gouging in a steel foundry is a 12-ton rectangular steel section found to have sand scabs and other defects where the surface of the casting contacted the mold. It was estimated three days would be required to clean the casting by chipping. After small portion had been chipped, a gouging operator was put on this job and went over the cleaned portion again, where it was proved to the plant foreman that the chipping operation peened the metal over defective areas with the result that large sand inclusions remained. Gouging time in preparing the casting for welding was only 3 hours.

Standard gouging nozzles besides fitting standard blowpipes with 75 and 90-degree heads also can be used with a special 180-degree straight blowpipe designed for gouging only. It has been observed that new operators unfamiliar with all phases of oxyacetylene cutting can grasp the gouging technique more readily if trained to use the straight blowpipe. Experienced cutting operators usually prefer the 75 or 90-degree blowpipe. They find they can operate these torches skillfully with only slight modification of hand-cutting technique. Many nozzles are protected from abrasion during the gouging operation by hard surfacing bottom of nozzle.

A production setup for oxyacetylene welding the shell and liner as well as various other parts of a refrigerating unit was described by R. G. Rodgers, works manager, and Walter R. Campbell, superintendent, Electrolux division, Servel Inc., Evansville, Ind. Materials, apparatus for welding and testing procedures were discussed in detail. An ingenious conveyor system keeps parts in continuous motion along the production line while welding is in progress to considerably increase production rate. This paper will be presented at some length in an early issue of STEEL.

Since the welder's torch is a convenient tool for fabricating welding jigs, many such jigs are (Please turn to Page 84)

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Managerial Ideas Pooled At S.A.M. Conference

■ IN THE spreading of efficiency throughout our industrial structure lies a major part of the solution of our social and economic ills. Coordination of departments is important. No amount of planning and system can overcome failure of departments to mesh, with consequent quiet flow.

This was the message that Stuart Symington, president, Emerson Electric Mfg. Co., St. Louis, delivered at the opening session of the Society for the Advancement of Management, which met April 11-12 at Hotel Statler, Cleveland. More than 120 members and guests attended, as mentioned in last week's issue.

In speaking on a concrete corporate approach, Mr. Symington explained that management is not just the top of a company or its departments. Management goes right down through to the worker himself. Execution is, itself, part of management, he contended. Scientific management means "arranging for order."

"Management should mean the extension of order and simplicity right down to the worker and his machine," the speaker continued. "Then we will get our production jobs done; and done at a price.

Arguments Retard Thinking

"Everybody will agree that no ultimate wage plan is with us as yet; and also that incessant argument on plans in general have probably retarded constructive thinking with respect to fair remuneration. With the knowledge and co-operation of employes plus extended study, there is no better method of cost reduction through refinement than time and motion study."

In alluding to the wage and hour law, the Wagner act and unemployment insurance, the speaker brought out that there is not anything we can do about them now; and regardless of any possible change in the political situation this year, he does not expect major modification of either.

"By many people the unemployment insurance per se is considered a handicap to getting the production job done. To us that is not correct, at least in Missouri. If the law results in more employment we are for it because the great challenge to our present system is the problem of unemployment. Nobody should deny the logic of the tax tending to prevent unemploy-

ment, provided it is not punitive.
"The law is a great incentive to scheduling. It cannot be emphasized more than we believe the

sized more than we believe the 5-day 40-hour week is close to, if not at, the end of what should be demanded in the way of a short work week."

In speaking of the Wagner act the speaker was of the opinion that in several ways it should be amended.

Matter of Education

"It is important that we educate all our people in the advantages of the capitalistic system; in increasing problems resulting from closing of frontiers and technological developments. The average employe is bewildered. He didn't understand the years leading up to 1929 to 1933. In many cases his life's savings went to educate children; now they cannot work. Then he is constantly laid off. Idle, he sits by the radio listening to people telling him what a sucker he is.

"If part of the Wagner act is designed to bring the employe closer to our problems to a point where he realizes the advantages of the American way, we are 100 per cent for that part of the act. If we are to have leadership in labor, as we have in industry, the speaker continued, we must place confidence in people. To trust leaders of labor is to educate them in industrial democracy and thereby give them a clearer view of political democracy; and thereby go a long way toward the preservation of our system.

"Today there are two theories among the many advanced as palliatives for our economic woes. One advocates lesser hours and higher pay, and the other greater efficiency, with consequent lower costs.

"The problem in this country is not to increase wages and lower the working day for a privileged few of any group, capital or labor. It is to get the unemployed back to work on a decent wage scale and to raise the rates of millions of people who are earning less than \$500 per year; to get purchasing power to the potential buyers. In all analysis of our industrial future lies this question of unemployment," the speaker warned.

"We recognize our social obligation to take care of the sick who cannot work. What difference is there between them and people who want work but cannot find it? Many people have their own ideas of a plan that might help. Our answer is profit sharing.

"The speaker has recommended in private for many years a federal law requiring enterprises to divide an agreed percentage of their net profits with industry. Such a plan has many advantages and the speaker cited the following: It gives the employe a vested interest in the plant, it makes the employe profitconscious, it acts as a break against unfair demands for higher wages, it increases the employe's interest in, and sympathy with, such developments of scientific management as time and motion study. Such a plan then would automatically insure a broad distribution of mass buying power. Finally, it fills a plant with that 'constructive attitude' so essential to getting the production job done.

"Profit-sharing plans have failed, but many have resulted in success. We do not know of one failure where the plan was given an extended fair trial. Industrial successes here and there, however, are as the oasis in the desert, accomplish little but precedent in effort to find a national solution.

Are Machines Our Masters?

"As we gather here in peace to discuss the problems of our industrial democracy, the world is on fire. Those countries which believe in a planned economy, and a planned life for their citizens, are on the march. Today the same question points to our industrial life—are we to become servants of our machines; or masters of them? We made them. Therefore, it is surely up to us to keep them running smoothly," Mr. Symington stated in conclusion.

W. C. Wright, manager of supervisional training, the Goodyear Tire & Rubber Co., Akron, O., mentioned that, in keeping production costs in line, the method used must depend upon the situations existing in the plant concerned. Usually the method used is decided upon by top management.

"Keeping production costs in line is primarily a function of the production department. Your production man has just three items of expense; namely, created, fixed and apportioned. Created expenses are those for which the production man is directly responsible. Apportioned are those costs which are created by some one else and sold to him as service when and if needed. Fixed expenses are taxes, insurance and depreciation. The proper care and caution in handling of these three constitutes his only task.

"Your production foreman today comes nearer to being the real manager of his department than any other man in the organization," Mr.

Wright said. "He must know the company's policies and their intended application as well as being somewhat familiar with competitors' methods and standards. He must also understand and respect the legal restraint and restriction. He must be up-to-date on all personnel practices and must be a student of psychology and philosophy. He must have something to say on promised dates. He must recognize the value of labor training as a real service. Finally, he must be familiar with pension and retirement plans and be conscious of the necessity for safety."

In the iron and steel industry, in 1929, Mr. Wright pointed out that 1869 establishments, with 712,000 employes, reported a weekly wage of \$21,417,297 or \$30.08 per week per individual, or an annual earnings of \$1504. In 1939 this annual wage was \$1519. Yet, in 1929, at the current rate of interest then prevailing to industry, iron and steel could have considered an expenditure of \$25,067 toward the mechanization for the elimination of one manual worker and, in 1939, with an interest rate of 3½ per cent or lower,

this same investment in mechanization could have been increased to \$43,400. Obviously, from a national welfare standpoint, the parade is headed in the wrong direction and industry deserves a great amount of credit for their consideration.

The speaker, in conclusion, brought out that we are in a new era, the prime factors of which are education, responsibility and authority. These must be recognized, he warned, if you plan to continue to keep your costs in line, once you have established the location of the line and method.

Other papers presented at the conference included "Making the Budget an Effective Management Tool" by P. T. Poulton, secretary and treasurer, Palon Inc., Meadville, Pa.; "Pricing Your Product to Reach Your Market" by J. S. Dewhurst, economist, Twentieth Century Fund, New York; "Multiple Management" by C. P. McCormick, president, McCormick & Co., Baltimore; and "Public Relations" by Whiting Williams, consultant on employe and public relations, Cleveland; and John Hill, partner, Hill & Knowlton, public relations, New York city.

resistance to abrasion in applying carbides in numerous other fields esides wire drawing, Mr. Longwell pointed out. Wire products manufacturers use tungsten carbide incerts in various tools, such as pitch tools, coiling points, etc., employed in the spring and wire forming industries. The sheet metal industry uses tungsten carbide tools for blanking, drawing, redrawing, and sizing. These dies are in operation with holes as large as 61/2 inches diameter. Carbides are used by the cold working industry to size, cold forge, swage and head nails and

Catalog Outlines Role Of Lathes in Industry

■ Under title "March of the Masters," R. K. LeBlond Machine Tool Co., 15 East Eighth street, Cincinnati, has issued an unusual type of machine tool catalog. This 47-page book, profusely illustrated—partly with color plates—deals in a comprehensive manner not only with design, construction and specifications of this company's lathes and accessories, but also drives home the important part played by lathes in general in development and manufacture of modern industrial products.

Hard-Wearing Enamel Offered in 21 Colors

■ Baertex, the new abrasion-resisting, high gloss enamel made by Baer Bros., 438 West Thirty-seventh street, New York, is now available in 21 colors. Used chiefly for concrete floors and on any interior surface, this synthetic covering has an average covering area of 600 to 700 square feet per gallon. It is claimed to give 40 per cent longer wear than ordinary paints.

Offers Dust Caps for Gasoline Tanks

■ Self-closing dust caps for motor vehicle gasoline tanks and for booster couplings on road trailers, permitting attachment of air hoses without tools, are announced by Gits Bros. Mfg. Co., 1846 South Kilbourn avenue, Chicago. Cap is cadmium plated and attached by several small screws. Self-closing hinge lid for gasoline tanks has cork gasket and is reinforced by lip attached to top of lid, adding extra pressure to gasket seat and avoiding leakage. Cap is available to fit over a 2 9/16 or 2¼-inch gasoline tank neck.

Cemented Carbide Reviewed at Worcester Regional Wire Meeting

■ A BROAD review of the cemented carbide field, notably in wire drawing dies, was presented by J. R. Longwell, chief engineer, Carboloy Co., Detroit, at the regional meeting of the Wire association, Worcester, Mass., April 11. This, with a plant inspection tour of the South works, American Steel & Wire Co., highlighted the one-day session, which was attended by some 150 mill operating executives, suppliers, sales managers and engineers.

While operations at the South works, from open-hearth furnaces to finishing, were inspected a feature included a description of the workings of an Austempering unit with a capacity of 500 pounds per hour involving small work.

Many also inspected a new type reactive wire drawing machine developed by George D. Hartley, Worcester, consultant and long connected with the development of wire mill equipment through former affiliation with Sleeper & Hartley Inc., Worcester.

Since early in the year wire has been drawn on experimental equipment with gratifying results on the physical properties of the finished material. The machine is equipped with a dynamometer die-holder which indicates the die pressure. Reactive load on the wire is a fixed proportion of the pull of the drawing block. By adjustments the pull ratio may be varied. The reactive die pressure is not apparently affected by the speed of drawing. No alteration in pressure was noted in one test during which speed was increased from 55 to 540 feet per minute. It is claimed drawing reactively reduces die pressures from 20 to 40 per cent, depending on the volume of reactive load applied to the wire.

Mr. Longwell in speaking on carbide dies cited a test run in the wire mill of a large steel company to check the qualities of the various carbides then available and the 39,-000 tons of steel wire drawn. The material drawn included the full range, from low carbon to improved plow wire. All makes of carbide dies were run and an observer on each of the three shifts made certain that the records obtained were accurate. When the test was completed it was found that the materials then in use, and still in use today, were the most satisfactory for wire drawing dies.

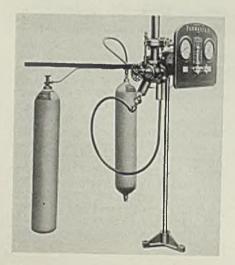
Advantage is taken of the high



Heavy Duty Oxygen Flow Controller

■ Air Reduction Sales Co., 60 East Forty-second street, New York, announces heavy duty oxygen flow controller for installations requiring large volumes of oxygen, and in which the oxygen is stored in large banks of cylinders or in special containers at pressures as high as 2500 pounds per square inch. It has discharge capacity up to 60,000 cubic feet of oxygen per hour, while delivery pressure may be adjusted from 0 to 200 pounds per square inch. Controller is fitted with a flow indicator which estimates drainage time for particular storage bank being used. Controller delivery pressure is governed by a pilot regulator which discharges gas directly into the control dome bolted over diaphragm of main regulator. In order that delivery pressure of regulator may remain unaffected by room temperature, a diffuser block, which is in communication with control dome of master regulator has been incorporated.

Hydraulic dashpot attached to lower portion of regulator body serves nonfrictionally to stabilize motion of operating mechanism.



Main regulator body is fitted with ½-inch relief valve. In addition, a 3-inch bursting disk prevents excessive pressure in regulator body, even if master regulating valve seat has been inadvertently omitted during assembly.

Liquid Pumps

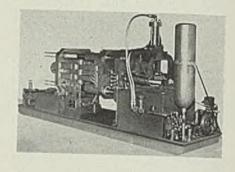
■ Fairbanks, Morse & Co., 600 South Michigan avenue, Chicago, have introduced line of 2-stage, splitcase pumps with capacities up to 550 gallons per minute. They are for general pumping service where liquid is of low viscosity and free from foreign matter.

One-piece impellers of the pumps are mounted back to back on the shaft to assure proper hydraulic balance. The shaft is journaled in ball bearings and centrifugally-cast bronze shaft sleeves are mounted on the shaft to protect it against abrasive or corrosive action. Horizontally divided bronze glands facilitate the removal and adjustment of packing.

Die Casting Machines

G & M Mfg. Co., 11610 Madison avenue, Cleveland, announces two new high-pressure hydraulic diecasting machines, one for zinc, tin and lead-base alloys, and the other for aluminum, brass and magnesium alloys. Similar in construction. machines accommodate larger dies. Their base, framework, die plates and toggle links are of solid steel plates, flame-cut and welded. Toggle arrangement permits moving and locking of die plates with a hydraulic pressure of less than 300 pounds against the actuating mechanism. Its construction provides a locking pressure of approximately 500,000 pounds. Feature of toggle linkage is that no strain is exerted on the link pins in stopping the forward motion of the moveable die plate. The machines are so equipped that the actuating movement of the linkage is stopped when the hydraulic piston which moves it comes in contact with the moveable die plate when the die is locked. Steel hard-ened bushings are used on all bearing surfaces in the toggle linkage, and the link pins themselves have an extra large diameter. Tie bars also are heavy, and the bearing surface for each bar totals 230 square inches, distributed over 22 linear inches. All hydraulic regulating valves are on the operator's side and all hydraulic piping is concealed in the base. Motor and pump are mounted on the base. Base itself is 48 inches wide and 182 inches long. Hydraulic valve arrangement for ejecting and core-pulling is standard equipment on both machines. The

zinc-tin-lead-alloy machine is designed so the gooseneck or the fur-



nace pot can be replaced without disturbing the hydraulic piping.

Fluorescent Luminaire

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a 48-inch, 2-lamp, 40-watt fluorescent luminaire with spread for general or supplementary lighting in low bay industrial areas. Units are furnished wired completely with hood, reflector, lamp holder, lamp starter and ballast equipment for 110-125, 199-216 or 220-250 volt circuits.

Hood of sheet-steel is hinged to reflector with knockouts at each end to provide for end-to-end mounting and straight-through wiring. Finish is of silver gray baked enamel, while reflector is white porcelain enameled steel.

Railroad Tie Puller

■ Duff-Norton Mfg. Co., 30 Church street, New York, offers tie puller claimed to permit completion of maintenance jobs in half ordinary time. Puller is horizontal ratchet jack with adjustable base that grips tie. Lever arrangement is said to

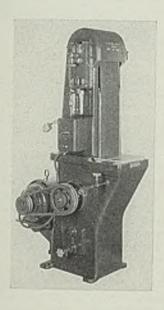


maintain firm grip on ties of various sizes without screws, clamps, etc., and without damaging tie. Device is sufficiently light for han-

dling with other track tools. It does not foul track when in use and has enough power for long switch ties. Roadbed is not disturbed as new tie fits tightly against base of rail.

Belt Grinder

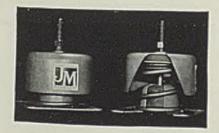
■ Porter-Cable Machine Co., Syracuse, N. Y., has introduced heavy duty G-8 belt grinder equipped for dry or wet grinding. It has provisions for speeds from 2400 to 6000 feet per minute for grinding metals, plastics, ceramics, glass, rub-



ber, etc. It can be used for squaring, cleaning, burring, facing and polishing operations, for removing gates and flashing. Belt 9 feet in circumference is utilized to reduce heat. Model has large pulleys and special heavy duty sealed bearings.

Vibration Isolator

■ Johns-Manville, 22 East Fortieth street, New York, announces an easily installed vibration isolator to control machine vibration. Device,



known as the J-M Controlled Spring Isolator, is for use on bases of motors, generators, pumps, ventilating fans and similar equipment. Working parts consist of a coil spring and a rubber load pad which support the equipment. An adjustable rubber snubber inside the base con-



NEW EXCLUSIVE PROCESS IN-CREASES RUST RESISTANCE— MINIMIZES FRICTIONAL WEAR ON ALL YALE CHAIN

The world's best chain is now better! A new secret plating process developed by Yale makes it so.

Corresponding in a general way to the cadmium plating common to the automobile industry, the secret of this process lies in the final dehydrogenation. Yale has perfected a means of performing this final step in a way which maintains the physical and chemical properties of the steel.

Chain treated with this process—and only such chain—has an impervious finish so satin smooth that frictional wear is reduced to a new minimum. This means less operating effort. As for rust—Yale's new coating makes it practically impossible!

Ask your distributor to show you secret processed Yale Chain. It's the latest hoist advance!

THE YALE & TOWNE MFG. CO.

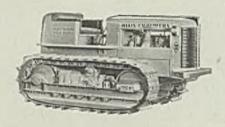
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U.S.A.
IN CANADA: ST. CATHARINES, ONT.



trols excessive motion. Isolator takes care of horizontal and torsional as well as vertical vibration. Tests indicate it to be efficient for low frequency vibrations resulting from slow speeds and from many operations involving reciprocal action. Heavy machines may be isolated by clusters of the units. Loaded overall dimensions of the isolator are 6 x 6 inches by approximately 3% inches high. It is enclosed in a metal jacket.

Crawler Tractor

Allis-Chalmers Mfg. Co., Milwaukee, has introduced HD10 diesel crawler tractor designed to lower operating costs. Machine includes extra-heavy crankcase, radiator and truck wheel guards, muffler, hour meter, adjustable radiator shutters,

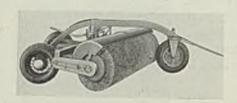


bumper, front pull hook and electric starting and lighting as standard equipment.

Four-cylinder engine provides 86 belt horsepower and 71.2 drawbar horsepower with drawbar pulls up to 17,600 pounds. Tractor is available in two tread widths, 62 and 74 inches. Constant-mesh gears permit shifting on the go like a truck, with six speeds forward and two reverse.

Road Sweeper

■ W. E. Grace Mfg. Co., Dallas, Tex., announces an axle driven road sweeper which will sweep either to the right or left, change being made by one operator. Overall width of brush is 8 feet with actual fiber width of 7 feet 2 inches, and diameter of 33 inches. Hickory, bamboo



or wire brushes may be furnished. When brush is at right angles, overall width of machine is less than 8 feet. Three sweeping speeds are provided. Bearings are of antifriction type with dust seals. Both rear wheels drive, providing adequate

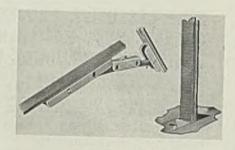
traction. The sweeper is mounted on three wheels which are equipped with tires.

Cemented Carbide Cutting Tools

Wesson Corp., 1050 Mount Elliott street, Detroit, announces line of standard cemented carbide cutting tools for every-day use on every job. Line of tools include reamers, shell reamers, core drills, end mills, counterbores and inserted blade milling cutters. Prices on some tools in this line are considerably lower than they have been for some time.

Files and File-Chains

■ Grob Bros., Grafton, Wis., have placed on the market new files and file-chains for continuous motion filing machines. Illustration at left shows the new provision made for alignment of files, and at right, the files guided and passing through the working zone. As files pass and follow each other in this manner, there is a smooth clean cutting action. The second cut of the file pre-



ferably is to be opposite in angle to the angle of the end of the file. Small slots are milled into ends of files on the rear side. These fit closely into projections of the chain links behind the files. Thus, as files enter into a straight line path after leaving the pulley they are independent from one another, locked into alignment. Chip clearance is provided by having the file chain guide slightly deeper than depth of chain.

Hand, Lathe Grinder

■ Stanley Electric Tool division, New Britain, Conn., announces compact grinder No. 153 for both hand and lathe grinding. With a motor holder, grinder can be mounted in a lathe, milling machine or shaper for external or internal grinding on dies, punches, machine parts, spiral cutters, etc. Motor is a %-horse-power direct-drive unit mounted on ball bearings and has ample power to drive grinding wheels up to 1\frac{14}{2}

inches. Extended shaft gives reach of 5 inches for deep internal grind-



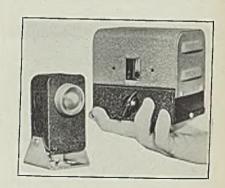
ing. Grinder accommodates emery wheels, mounted points and rotary files for many jobs.

Steel Measuring Tape

Lufkin Rule Co., Saginaw, Mich., offers Chrome Face line of steel measuring tapes which feature easy-to-read jet black markings. Chromium plated, tapes resist rust. Surface is hard, smooth and easy to clean. New cases and frames of improved design and appearance are used. Tapes are now offered in two brands: Anchor in % and %-inch width; and Leader, %-inch wide. Included also are Chrome Face % and %-inch wide tapes on metal frames with plumb bob for tank gaging.

Photoelectric Control

■ United Cinephone Corp., Long Island City, N. Y., has introduced a new model 150 photoelectric control which operates on 110-volt, 60-cycle alternating current only. Current supply to light source is supplied from transformer within control. It has a power relay designed for 3 amperes. Potentiometer ad-



justment permits compensation for various degrees of light intensity to photocell. Standard 6J5 tube is good for 3500 hours service—the photocell, 20,000 hours.

< < < HELPFUL LITERATURE > >

(1)—Bearings and Bronze

Johnson Bronze Co.—76 page illustrated general catalog No. 400, covering over 800 sizes of plain bearings and more than 350 listings of bronze bars. Many new numbers are added to the electric motor bearing section, and each is illustrated. Other items such as graphited bronze, Ledaloyl self-lubricating bearings and babbitt are included.

(2)-Foot Switch

Clark Controller Co.—4 page illustrated bulletin No. 3C, describing the recently developed type FS foot switch for heavy duty service. Wearing parts are interchangeable with 101 master switch, 102 type CL cam limit switch and 102 type HL hatchway limit switch, but pedal and latching arrangement are entirely new, eliminating operator fatigue.

(3)—Forging Machines

Ajax Manufacturing Co.—24 page illustrated bulletin No. 65-A. Describes air clutch operated forging machines in sizes of 2 inches to 7 inches. Design and structural features are covered, and dimensional information is given. Standard accessory equipment, and typical upset and pierced pieces made on these machines are shown.

(4)—Electric Clay Gun

William M. Bailey Co.—6 page illustrated folder No. 3340. The Bailey electric plunger clay gun for blast furnaces is described. This machine is said to have a positive action and is simply operated. It is a self-contained unit. Full information on its operation is given.

(5)—Adult Training

International Correspondence Schools
—128 page illustrated booklet "Looking
Ahead and Getting Ahead", describing
this organization's history, accomplishments and outlining scores of courses of
study. The I. C. S. method of instruction is fully covered.

(6)—Bearing Lubrication

New York & New Jersey Lubricant Co.

—8 page illustrated bulletin No. 506-A, in which lubrication and maintenance of ball and roller bearings is discussed. Proper selection of lubricant for these bearings under various conditions is considered and recommendations are made. sidered and recommendations are made.

(7)—Metalworking Machinery

Economy Engineering Co.—24 page illustrated loose-leaf booklet, describing this company's automatic machines including combined pointing and threading four-spindle bolt threader, pointing and shaving, shaving, double-end turning piston pin drilling, reaming and chamfering, and "U" bolt.

(8)—Lathes

R. K. LeBlond Machine Tool Co.—50 page illustrated spiral bound book "March of the Masters" telling in readable style the story behind the lathe and presenting the Regal and Super Regal lathes and accessories made by this company. Manufacturing processes in lathe making are covered and specifications are given.

(9)—Anti-Friction Bearings

New Departure Div., General Motors Sales Corp.—12 page Illustrated book No. A-266, discussing the fundamental reasons responsible for the increased use of antifriction bearings, and showing numerous applications. Performance data is given. Book is cross-indexed.

(10)—Acid Inhibitor

William M. Parkin Co.—8 page bulletin describing "NEP", a pure and concentrated acid inhibitor for improving metal pickling. Eight important claims are made for this material, including reduced pickling costs and improved quality. Available in several grades.

(11)—Hoisting Equipment

Yale & Towne Manufacturing Co.—44 page Illustrated catalog No. PD-25. Contains complete information on various models of chain hoists including the spur-geared, screw-geared and differential types. Also covers "Pul-Lifts" as well as trolleys and the Cable King wire rope electric hoist.

(12)—Abrasive Snagging

Abrasive Co.—8 page illustrated bulletin No. ESA-62. Describes abrasive snagging wheels for foundry and billet grinding. Contains data on recent developments in this company's line and standard recommendations of vitrified and resinoid-bonded wheels for floor stand, swing frame and portable grinders.

(13)—Speed Transmission

Link-Belt Co. — 40 page illustrated book No. 1574, describing the P.I.V. gear, speed transmission. Its design, construction and applications are covered. Available in several styles. Specifications, speed and horsepower ratings are given. Price list is included.

(14)—Synchronous Motor

Electric Machinery Mfg. Co.—Illustrated bulletin No. 160, describing high speed "packaged" synchronous motors, which are self-contained drive units with built-in controls, Advantages claimed include, lower first cost and installation, less wiring, compactness, improved voltage regulation and constant speed unaffected by line voltage.

(15)—Welding Rod

Allied Weld-Craft, Inc.—4 page illustrated bulletin No. 60, describing the new Weld-Craft "60" welding rod for fillet and downward position welding. This rod is heavily mineral coated, formign smooth concave beads free from undercut or overlap. Fusion metal conforms to A.S.M.E. specifications U-68 and U-69, and A.W.S. No. E10 and E20.

(16)—Steel Floor Plate

Alan Wood Steel Co.—16 page illustrated bulletin, describing five patterns of "A.W." rolled steel floor plate for use where floors are subject to unusual service, including traffic aisles, railroad running boards and platforms, truck body floors, engine rooms, refinery towers, etc. Complete engineering data is included.

(17)—V-Belts

Allis-Chalmers Mfg. Co.—Revised catalog section No. 151, introducing new horsepower ratings for multiple V-belt drives based on the new formula developed by Robert F. Vogt and recently adopted by the industry. Provides engineering information on selection of size of belt for horsepower rating, speed, center distances and sheave diameters. ter distances and sheave diameters.

(18)—Forcing Presses

Beatty Machine & Manufacturing Co.

—12 page illustrated bulletin No. 200.

Motor driven hydraulic forcing presses with capacities from 15 to 750 tons are described. Features include double acting hydraulic cylinder, eliminating counterweights, chains, etc.; variable speed control; rapid return speed; and greater production. production.

(19)—Alloy Steel

Jessop Steel Co.—8 page illustrated bulletin on "Trueform" oil hardening non-shrinkable alloy steel. Applications, characteristics, analysis, working data and tempering data are given. A list of warehouses and sales agents is included.

(20)—Industry Equipment

Jeffrey Mfg. Co.—32 page illustrated booklet No. 733, briefly describing equipment made by this and subsidiary companies for the industrial field. Products include materials handling equipment, chains, transmission and reduction machinery and mining machinery.

(21)—Power Presses

V & O Press Co.—24 page illustrated catalog No. 39. Inclinable open back power presses in 14 standard sizes and 9 special sizes, are described. Construction features, specifications and advantages are cited. Punching and shearing data is given.

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(22)—Gear Pumps

John S. Barnes Corp.—4 page illustrated bulletin No. PA-20. This series of gear pumps for hydraulics is said to offer several improvements, including, 1000 pounds of pressure at 50 RPM, minimum oil heating, minimum maintenance costs, smooth and positive feeding, variable delivery control and no aeration. Range of capacities is one to 25 gallons per minute.

(23)—Car Pullers

Stephens-Adamson Mfg. Co.—8 page illustrated catalog No. 1339, describing car pullers, holsts and winches. Characteristics, sizes, specifications and dimensional data, and information on selection of proper equipment are given. Accessories for these units are covered.

(24)—Welding Accessories

Hobart Brothers Co.—20 page illustrated handbook covering electrodes, electrode holders, hood and hand shields, protective clothing, welding, ground and power cables and lugs. Welding rod for numerous types of work are covered in detail.

(25)—Floor Plate

Inland Steel Co.—16 page illustrated bulletin on Inland 4-way floor plate, in which commonplace industrial hazards are discussed and methods of their elimination are covered. Advantages of using this type floor plate are described. Numerous plant pictures show installa-

(26)—Water Filters

William B. Scaife & Sons—12 page illustrated bulletin No. 275A. Describes various types of pressure water filters for industrial use. Tables list capacity and dimensions of single vertical pressure filters and single horizontal pressure filters. Valves, controls and supplementary equipment are also covered.

(27)—Building Maintenance

Flexrock Co .- 64 page illustrated handbook of technical information for factory engineers and maintenance men. Shows how to do hundreds of odd jobs and presents many ideas that save time and money. Written in semi-technical language.

(28)—Furnaces

Surface Combustion Corp.—4 page illustrated bulletin No. SC-89, describing standard rated gas-fired equipment for heating and heat treating. Numerous different types are covered. SC burners, built in 50 types and more than 500 sizes, are described briefly.

(29)—Autoclaves

Struthers-Wells — 8 page illustrated bulletin on "High Pressure Autoclaves." Describes laboratory autoclaves in detail. Others are available up to 2000 gal. capacity. The units described are for pressures up to 25,000 lbs. per sq. in.

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(30)—Pipe Line Filters

Staynew Filter Corp.—Illustrated bulletin No. 110-B, describing "Protectometers" for all kinds of pipe line filtering. "Glastex" is a new type filter medium and it is fully described. Specifications and applications of various sizes are covered. Suitable for comparated all light and was lined. pressed air, liquid and gas lines.

(31)—Woodworking Machines

DeWalt Products Corp .- 8 page illusrated bulletin, describing flexibility and advantages of the DeWalt woodworking machine, capable of performing fifteen woodworking operations. Available in 72 models, 11 frames and 5 types.

(32)—Evaporators

Struthers-Wells-76 page illustrated catalog supplying information on design, application and selection of evaporators for industrial use. Schematic illustra-tions and charts show operation and efficiency of these units. Evaporators for handling all types of materials are

(33)—Boiler Protection

McDonnell & Miller—4 page illustrated bulletin No. 10121. Boiler water level control for steam bollers of all sizes are described. Several types are available. Designed to operate under all conditions and types of feed, on bollers up to 150 lbs. pressure.

(34)—Grinding Wheels

Norton Co.—6 page illustrated bulletin on "Norton Service", describing how this company's engineering service has aided in solving numerous industrial grinding problems. A list of Norton offices is included.

(35)—Special Machines

W. F. & John Barnes Co.—16 page illustrated book, "Since 1872", describing the development of special machinery from 1872 to 1940. Several special units developed for specific operations are shown and briefly described.

(36)—Roll Grinders

Mesta Machine Co.—12 page illustrated booklet describing the two types of Mesta roll grinders. Advantages of their use and actual shop pictures showing them in operation are included.

(37)—Paint

B. F. Goodrich Co.—4 page illustrated catalog section No. 9770. "Acidseal" paints, with characteristics of strong adhesion, corrosion resistance and elasticity are described. Are said to be resistant to acids, alkalis, salt spray and moisture. Properties, directions for use, color charts and a list of applications are given.

(38)—Refractories

Mullite Refractories Co.—50 page illustrated catalog, describing "Shamva Mullite" refractories for high temperature applications. Typical uses shown include electric induction and arc furnaces, industrial boilers, open flame and crucible furnaces, iron and steel furnaces, etc. A complete line of air and heat setting cements is also described.

(39)—Link Leather Belt

Alexander Brothers—8 page illustrated bulletin No. A-13. A new type leather belt, in which leather links are formed and combined to make a belt that operates smoothly and has high tensile strength. Applications are described and plctured. Price list included.

(40)—Arc Welding Electrodes

Wilson Welder & Metals Co., Inc.—24 page Illustrated booklet No. ADW-18, covering general description, application, procedure for use and selection of electrodes for numerous and varied welding purposes. All types of arc welding are covered.

(41)—Industrial Cleaners

Pennsylvania Salt Manufacturing Co.

—8 page illustrated folder No. 2, describing Pennsalt concentrated cleaners for industry, available in numerous types for specific purposes. Reasons for Pennsalt cleaners' economy and efficiency are

(42)—Spraying Equipment

Devilbiss Co.—44 page illustrated catalog No. DG Spray-painting equipment for exterior and interior painting, automobile refinishing and equipment for automotive service are described. Specifications and price lists are included.

(43)—Welding and Cutting

Victor Equipment Co.—40 page illustrated catalog No. 1940. Covers this company's complete line of gas cutting and welding equipment. Cross-sectional and weiding equipment. Closs-sectional illustrations of regulators, assembly pic-tures and a price list are included. A table of welding torch nozzle pressure and consumption data is included.

(44)—Stock Gears

Brad Foote Gear Works-246 page illustrated wire bound catalog No. 110, covering this company's line of gears, reducers, cog belts, sprockets, bearings, pulleys and chain. Specifications and prices are included.

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FIRST CLASS PERMIT No. 36 (Sec. 510 P.L. & R.) Cleveland, Ohio

Automatic Soldering

(Concluded from Page 69)

one pass of the table. In operation, the tubes are laid in the fixture, the torches in the multiple head are started and the head is swung down over the table, automatically starting the feed mechanism to traverse the work from right to left under the head. At the same time, an automatic feeder roll synchronized with the table motion is operated to feed solder into the joint. The feeding is at the correct speed to give just the proper amount of solder to make the required joint. Solder is in the form of coils just above the pivot point of the swinging head in Fig. 3.

This special machine shown in Figs. 3 and 4 enables one operator to solder about 80 pairs of tubes per hour. This contrasts strikingly with former cutput of 25 per hour when the work was done by hand.

It will be seen that neither of these setups is particularly complicated. The equipment required in either instance is not costly, nor are the controls involved especially intricate. Perhaps a study of some soldering operations in your own plant might show how some simple automatic or semi-automatic machine would enable the operator to do the job better and at lower cost.

Operator Fatigue

(Concluded from Page 52)

to race around to the front of the table. After all, a skilled mechanic is hired to do head work and not foot work, and a setup of this kind is easy on both head and feet.

Finally, consider Fig. 4, which shows the operator of a production grinder actually sitting down on the job. As a matter of fact, the Landis Tool Co. intended that he should sit down when they designed this machine. The working height of this grinder is such that the operator can stand up to his work if he so desires—as he may on short run work. The kneehole, however, makes it equally possible for him to sit down comfortably when handling a long run of repetitive work. Good location of controls is another obvious feature here.

Manufacturers Accept Pipe-Nipple Standards

■ Signed acceptances of a recommended commercial standard for pipe nipples; brass, copper, steel and wrought iron have been received from a number of manufacturers, distributors and users, estimated to represent a satisfactory majority, according to department of com-

merce, national bureau of standards, Washington.

The Standard, identified as CS5-40, is effective from May 10, 1940. Copies of the standard will be forwarded to each acceptor of the record as soon as they are printed.

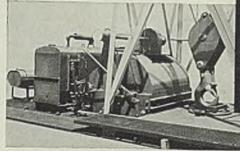
Westinghouse Develops Stronger Alloy for Dies

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new alloy, K-42-B, containing only 7 per cent iron, yet retaining its strength at temperatures higher than 2000 degrees Fahr. Almost half of the new alloy is nickel;

about a quarter is cobalt. Other components include chromium, titanium and iron.

Immediate applications are expected to be in dies, valves, steam fittings, possibly turbine blades and other uses requiring temperature-resistant metals. Its creep is low. Tests where rods of the metal were loaded in tension to produce a stress of 20,000 pounds per square inch, and heated in an electric creep-testing furnace for 6000 hours at a constant temperature of 1000 degrees Fahr., showed a yield of only 0.0001-inch for each inch of length. Most of this occurred during the first few hours.

Typical of housings and structural work fabricated with Genex is this portable drill rig built by Brauer Machine & Supply Co., Oklahama City.





Easy to use, Genex Electrodes are often employed in making small units to replace castings, such as this one built by The Darr Company, Denver.

KEEP YOUR WELDING COSTS DOWN WITH MUREX

GENEX



In marine work, Genex speeds work where lap welds are required on bulkheads and hull plating.

The SPEEDY, EASY-TO-USE ALL-POSITION ELECTRODE FOR STRAIGHT POLARITY OR A.C. WELDING.

Designed for welding in any position . . . flat, vertical, or overhead . . . and to readily bridge gaps where assembly fit-up is imperfect, Murex Genex Electrodes have several outstanding features which make them highly economical in operation. They are used at higher currents, which steps up welding speed. They burn with less spatter; less smoke, and so provide better visibility of the arc and the molten pool of weld metal. The slag is easy to remove and does not cling to the edges of the weld, even on heavy fillets. In multiple pass work, beads can be deposited on top of each other without cleaning away the slag between passes.

Send for complete information, or ask to have a representative call and show you what these electrodes can do.

METAL & THERMIT CORPORATION

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Investigate Thermit Welding, too — in use since 1902 for heavy repair work, crankshafts, etc.

Furnace Conveyors

(Concluded from Page 70) of the conveyors as the plates passed over the lubricator.

As the conveyor at this point has a temperature of around 375 to 400 degrees. Fahr., the carbon tetrachloride evaporates almost instantly, leaving a coating of dry graphite on the wear surfaces. A small amount of kerosene and oil is added to the carbon tetrachloride to slow up evaporation slightly. This allows the graphite to completely cover and lubricate the bearing surfaces.

Headaches Disappear

When first installed, the automatic lubricator was operated periodically during the day. Since then, it has been found that operating it for a short period once a day is adequate to maintain complete lubrication as the colloidal graphite adheres firmly to the surface to give satisfactory 24-hour lubrication.

Resulting smooth operation of the conveyor was accompanied by a sharp drop in headache complaints. Incidentally, power consumption was reduced materially.

Another example along the same line is found in connection with the handling of kiln cars in the Champion plant. Loaded with insulators, etc., to a total weight of better than 4000 pounds, these cars are pushed gradually through a long kiln having a 3-day firing cycle.

While passing through these kilns, the wheel bearings of the cars are at a temperature of around 450

degrees Fahr. continuously for three days. The lubricant formerly used had a tendency to carbonize, the carbon building up so the wheel would lock completely. This not only increased the load on the pusher excessively but also made it extremely difficult to handle the cars after they left the kiln. Powdered graphite, mixed with kerosene, was tried with considerable improvement. It was found difficult, however, to keep the graphite from settling out.

However, use of colloidal graphite suspended in kerosene proved satisfactory. Kiln car bearings now are given an injection of this lubricant twice a day while not in the kiln (1½ days). When they come out of the kiln at the end of three days, the bearings are free enough so one man can handle a 2 to 3-ton car without difficulty.

While no figures are as yet available, it is estimated that the change will result in a reduction of 24 per cent in wheel maintenance costs, based on experience to date.

Acetylene Industry

(Concluded from Page 74)

fashioned on the job by the welder without consulting alone. In some instances this may be an advantage and in others a disadvantage, pointed out John Haydock, managing editor, American Machinist, New York. While time is saved in getting the jig into operation and an intelligent operator often devises

an efficient jig, good engineering is an advantage in cases where production qualities are involved and a general purpose jig is to be used on a wide variety of work.

Welding of sheet steel to form tubs subsequently enameled for use in washing machines was described by Joseph C. Lewis, president, Associated Engineers Inc., Fort Wayne, Ind. Detailed description of this setup will appear in an early issue of STEEL.

Advantages and applications of automatic bronze welding as a regular step in production welding were presented by Roland Hawley, foreman, Oilgear Co., Milwaukee. He discussed type of setup employed, methods of fluxing and preheating the work, flame adjustment, tinning methods and physical characteristics of joint produced.

Mirrors of Motordom

(Concluded from Page 36)

cilities are necessary. Construction will be financed out of treasury funds and will be started in about 60 days, according to Amos Lint, president.

Convinced of the pulling power of its novel Futurama exhibit at the New York fair last summer (13,000,000 visitors), General Motors has been completely overhauling this 35,000-square foot miniature world of 1960, greatly increasing the animation and relandscaping the entire area. This summer 16,000 miniature motor cars will be operating instead of 300, a hundred new farm units will be on display, 500 small lamp posts with "grain of wheat" lamp bulbs will line streets in the industrial town.

CIO Wins

Largest labor board election ever held was last week's voting on union preferences by 137,000 eligible employes of General Motors Corp. Sixty plants in 11 states were involved, chief battle being between the CIO and AFL divisions of the United Automobile Workers which were competing for exclusive bargaining rights.

Results of the vote were preponderantly for CIO. Totals for 54 plants were: In favor of UAW-CIO, 84,024; in favor of UAW-AFL, 25,911; in favor of neither union, 13,919. CIO won in 49 of 54 plants.

The 28,000,000th Ford car to be produced rolled off the Edgewater, N. J. assembly line April 8 and after appropriate ceremonies left on an international good will tour of the United States, Canada and Mexico, which will take it to San Francisco for the opening of the exposition there May 25.



Lower Trend In Steel Quotations Is Checked

Sheet and strip buying gains only moderately. Restoration of former prices not in immediate prospect

MABKET IN TABLOID *

Demand

Recovering from slump caused by price cut.

Prices

Generally steady, following recent reductions.

Production

 $Up^{-1/2}$ -point to 61 ½ per cent.

■ PRICE weakness in sheets and strip appears to have been checked at the reduced levels instituted recently.

Reports last week that early withdrawal of the lower prices was being considered helped to stimulate demand for flat-rolled products, a number of buyers placing blanket orders covering needs through remainder of the quarter. However, volume was far below the heavy tonnage bought during the price war last May.

Absence of a buying rush is attributed partly to the fact consumers' inventories are relatively large and to buyers' expectations they will be given protection on this quarter's requirements at present prices even should former quotations be restored. A move to reinstate the old schedules is thought likely for third quarter but is not seen as an immediate development.

Business in other products has recovered from most of the lag experienced a week ago when sheet and strip prices were lowered. Buying still is conservative, but fear that price weakness might spread to other products gradually is disappearing. Warehouses in several districts have reduced sheet and strip quotations to reflect revisions by mills.

Meanwhile, steel ingot production continues fairly steady, last week's national average of 61½ per cent being a gain of ½-point over the previous week and 10 points higher than a year ago. The upturn was furnished principally by the three leading districts, Pittsburgh being up 2 points to 55 per cent, Chicago rising 2½ points to 61½ and Youngstown expanding 1 point to 43. New England had a 5-point rise to 60.

Lower schedules prevailed in four districts, reductions including 1 point to 56 in eastern Pennsylvania, 2 points to 42 at Buffalo, 6 points to 50 at Cincinnati and 5 points to 72 at Detroit. Unchanged were Wheeling at 73, Cleveland at 65, Birmingham at 81 and St. Louis at 45.

Major steel consuming outlets are maintaining operations. Automobile assemblies last week were practically unchanged at 103,725 units, marking nine consecutive weeks in which production has shown a maximum variation of only a few thousand units. Output a year ago was 90,280. Despite sustained assemblies, operations of some partsmakers are receding.

Tin plate specifications are increasing more slowly

than usual for this period, but production continues to gain. Last week operations were up 2 points to 62 per cent.

Activity in railroad equipment markets is only moderate. New inquiries include 500 box cars for the Denver & Rio Grande, 75 hopper cars for the Cincinnati, New Orleans & Texas Pacific, 50 hopper cars for the Santa Fe and 30 box cars and 20 flat cars for the Panama Canal commission.

Export business in iron and steel products continues active despite the loss of trade with Scandinavian countries. An order for 25,000 tons of pig iron for European shipment has been placed, with several other large inquiries pending.

Slowness with which heavy building construction is increasing is reflected in the lag in structural shape awards. Orders have been more numerous lately but generally involve small lots. Reinforcing bars are relatively more active than shapes, but bookings to date this year have trailed the 1939 volume. Concrete bar prices are a trifle steadier but still highly irregular.

To date this year structural awards are off 28 per cent and concrete bar orders are down 16 per cent, compared with the corresponding 1939 period.

Recent orders for fabricated steel include 2100 tons of plates for a Los Angeles aqueduct and 2000 tons of plates for a St. Louis gas holder. Heading concrete bar awards is 4500 tons for army housing at the Panama canal.

Reduction of 50 cents a ton in Lake Superior iron ore prices for the 1940 season restores the market to approximately the level prevailing for eight years prior to 1937. This cut brings ore in closer relationship with the price of pig iron. Leading vessel interests have reduced ore carrying charges on the Great Lakes by 10 cents a ton.

Lake Superior iron ore consumption declined slightly in March. Stocks as of April 1 were about 4,000,000 tons less than a year ago.

Scrap prices have a stronger tone in several districts. Steelmaking grades are unchanged at principal consuming centers, however, thereby continuing the price composite at \$15.96.

COMPOSITE MARKET AVERAGES

			One	Three	One	Five
			Month Ago	Months Ago	Year Ago	Years Ago
Apr. 20	Apr. 13	Apr. 6	Mar., 1940	Jan., 1940	Apr., 1939	Apr., 1935
Iron and Steel \$36.56	\$36.56	\$37.07	\$36.83	\$37.09	\$36.34	\$32.29
Finished Steel 55.50	55.50	56.30	56.10	56.10	56.50	54.00
Steelworks Scrap 15.96	15.96	16.09	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, pipe. rails alloy steel. hot strip. and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars sheets, 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. 20, M	ar. Jan.	Apr.	Pig Iron Apr. 20, Mar. Jan	. Apr.
I lilished Material	1940 19	940 1940	1939	1940 1940 1940	
Steel bars, Pittsburgh		15c 2.15c		Bessemer, del. Pittsburgh \$24.34 \$24.34 \$24.3	4 \$22.34
Steel bars, Chicago		15 2.15	2.25	Basic, Valley 22.50 22.50 22.5	0 20.50
Steel bars, Philadelphia		47 2.47	2.57	Basic, eastern, del. Philadelphia 24.34 24.34 24.3	4 22.34
Iron bars, Chicago		25 2.30	2.15	No. 2 foundry, Pittsburgh 24.21 24.21 24.2	
Shapes, Pittsburgh		10 2.10	2,10	No. 2 foundry, Chicago 23.00 23.00 23.0	
Shapes, Philadelphia		215 2.215 $10 2.10$	5 2.215 2.10	Southern No. 2, Birmingham 19.38 19.38 19.3	
Shapes, Chicago		10 2.10	2.10	Southern No. 2, del. Cincinnati. 22.89 22.89 22.8	
Plates, Plitsburgh		15 2.15	2.15	No. 2X, del. Phila. (differ. av.) 25.215 25.215 25.2 Malleable, Valley	
Plates, Chicago		10 2.10	2.10	Malleable, Valley	
Sheets, hot-rolled, Pittsburgh		10 2.10	2.15	Lake Sup., charcoal, del. Chicago 30.34 30.34 30.3	
Sheets, cold-rolled, Pittsburgh		05 3.05	3.20	Gray forge, del. Pittsburgh 23.17 23.17 23.1	0.0 -
Sheets, No. 24 galv., Pittsburgh.	3.50 3.	50 3.50	3.50	Ferromanganese, del. Pittsburgh 105.33 105.33 105.3	
Sheets, hot-rolled, Gary		10 2.10	2.15		00.00
Sheets, cold-rolled, Gary		05 3.05	3.20	Scrap	
Sheets, No. 24 galv., Gary		50 3.50	3.50	Heavy melt. steel, Pitts \$16.25 \$17.05 \$18.19	5 \$15.50
Bright bess., basic wire, Pitts		60 2.60	2.60	Heavy melt, steel No. 2, E. Pa 15.50 15.90 16.8	
Tin plate, per base box, Pitts			\$5.00 2.45	Heavy melting steel, Chicago 15.25 15.50 16.49	5 13.35
Wire nails, Pittsburgh	2.55 2.	55 2.55	2.40	Rails for rolling, Chicago 18.75 18.25 19.09	5 17.25
0 10 13 136 1 11				Railroad steel specialties, Chicago 18.00 18.35 18.5	15.35
Semifinished Material				Coke	
Sheet bars, Pittsburgh, Chicago.	\$34.00 \$34.0	0 \$34.00	\$34.00	Coke	
	34.00 34.0		34.00	Connellsville, furnace, ovens \$4.75 \$4.75 \$4.75	5 \$3.75
Rerolling billets, Pittsburgh			34.00	Connellsville, foundry, ovens 5.75 5.75 5.75	
Wire rods, No. 5 to 32-inch, Pitts.	2.00 2.0	0 2.00	1.92	Chicago, by-product fdry., del 11.25 11.25 11.25	5 10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

		Except when otherwise designa	ted. prices are base, 1.o.b. cars.	
Sheet Steel Hot Rolled Pittsburgh Chicago, Gary	1.90c 1.90c	Granite City, Ill. 3.60c Middletown, O. 3.50c Youngstown, O. 3.50c Pacific Coast points 4.00c Black Plate, No. 29 and Lighter	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	Buffalo 2.10c Gulf ports 2.45c Birmingham 2.10c St. Louis, del. 2.34c Pacific Coast points 2.70c
Chicago, Gary Cleveland Detroit, del. Buffalo Sparrows Point, Md. New York, del. Philadelphia, del. Granite City, Ill. Middletown, O. Birmingham Pacific Coast points Cold Rolled Pittsburgh Chicago, Gary Buffalo Cleveland Detroit, delivered Philadelphia, del. New York, del. Granite City, Ill. Middletown, O. Youngstown, O.	1.90c 1.90c 1.90c 1.90c 2.14c 2.07c 1.90c 1.90c 1.90c 2.40c 2.85c 2.85c 2.85c 2.85c 2.95c 2.95c 2.85c 2.85c	Pittsburgh 3.05c	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 Youngstown 2.10c Gulf ports 2.45c Pacific Coast points 2.60c Steel Floor Plates Pittsburgh 3.35c Chicago 3.35c Chicago 3.35c Gulf ports 3.70c Pacific Coast ports 3.95c	Tin and Terne Plate Tin Plate, Coke (base box) Pittsburgh, Gary, Chicago \$5.00 Granite City, Iii. 5.10 Mig. Terne Plate (base bex) Pittsburgh, Gary, Chicago \$4.30 Granite City, Iii. 4.40 Bars Soft Steel (Base, 20 tons or over) Pittsburgh 2.15c Chicago or Gary 2.15c Chicago or Gary 2.15c Duluth 2.25c Duluth 2.15c Cleveland 2.15c Cleveland 2.15c Cleveland 2.15c Detroit, delivered 2.25c Philadelphia, del. 2.47c
Pacific Coast points Gaivanized No. 24 Pittsburgh Chicago, Gary Buffalo Sparrows Point, Md. Philadelphia, del. New York, delivered Birmingham		No. 302 No. 304	Structural Shapes Pittsburgh 2.10c Philadelphia, del 2.21 ½ c New York, del, 2.27c Boston, delivered 2.41c Bethlehem 2.10c Chicago 2.10c Cleveland, del. 2.30c	Boston, delivered 2.52c

	-Ine Ma	rket Week-	
Buffalo 2.0 Birmingham 2.0 Gulf ports 2.4 Pacific Coast points 2.6	oc (Base, hot strip, 1 ton or over	7. Inch and under65-10 on Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt	2¼ "O.D. 13 14.54 16.76 2¼ "O.D. 12 16.01 18.45
Iron Chicago 2.25 Philadelphia 2.37	Hot Strip, 12-inch and less Pittsburgh, Chicago,	mfrs. l.c.l. \$5.40; c.l. \$5.75 off	3" O.D. 12 19.50 22.48
Pittsburgh, refined 3.50-8.00 Reinforcing	c Youngstown, Middle- town, Birmingham 1.90c		3½ "O.D. 11 24.62 28.37 4" O.D. 10 30.54 35.20
New Billet Bars, Base Chicago, Gary, Buffalo, Cleve., Birm., Young.,	Detroit, del. 2.00c Philadelphia, del. 2.22c New York, del. 2.26c	Base discounts on steel pipe. Pitts., Lorain, O., to consumers	5" O.D. 9 46.87 54.01 6" O.D. 7 71.96 82.93
Sparrows Pt., Pitts. 1.70-1.90 Gulf ports 2.05-2.25		less on lap weld, 1 point less	Cast Iron Pipe
Pacific Coast ports. 2.05-2.25 Rail Steel Bars, Base	c Cold strip, 0.25 carbon and under, Pittsburgh.	2½ and 1½ less, respectively. Wrought pipe, Plitsburgh base.	4-in., Birmingham 48.00-49.00
elitsburgh, Gary Chi- cago. Buffalo, Cleve- land, Birm 1.70-1.90	Cleveland, Youngstown Chicago 2.70c Detroit, del 2.70c	Steel Steel	4-in., Chicago 56.80-57.80 6-in. & over, Chicago 53.80-54.80 6-in. & over, east idy. 49.00
Gulf ports 2.05-2.25 Pacific Coast ports 2.05-2.25 The above represent average	Carbon Cleve., Pitts. 0.26—0.50 2.60c	½ 63 ½ 54 ½ 66 ½ 58	Do., 4-in. 52.00 Class A Pipe \$3 over Class B Stnd. fitgs., Birm., base \$100.00
going prices. Last quotation announced by producers were 2.15c, mill base, for billet bars	$0.51 - 0.75 \dots 4.30c$ $0.76 - 1.00 \dots 6.15c$	1—3 68 1/4 60 1/4 Iron 1/4	Semifinished Steel
and 2,00c for rail steel. Wire Products	Worcester, Mass, \$4 higher. Commodity Cold-Rolled Strip	1—1¼ 34 19 1¼ 38 21¼	Rerolling Billets, Slabs (Gross Tons) Pittsburgh, Chicago, Gary,
Pitts-CleveChicago-Birm. bass per 100 lb. keg in carloads	Detroit, del 2.85c	Lap Weld	Cleve., Buffalo, Young., Birm., Sparrows Point. \$34.00 Duluth (billets)
Standard and cement coated wire nails \$2.55 (Per pound)		2	Forging Quality Billets
Polished fence staples. 2.556 Annealed fence wire. 3.056	(Gross Tons)	7 and 8 65 55 % 9 and 10 64 % 55	Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm 40.00 Duluth
Woven wire fencing (base C. L. column) 67	Relay rails, Pittsburgh 20—100 lbs 32.50-35.50	11 and 12 63 ½ 54 Iron 2 30 ½ 15	Sheet Bars Pitts., Cleveland, Young
Single loop hale tier, (base C.L. column) 56 Galv. barbed wire,	Light rails, billet qual., Pitts., Chicago, B'ham. \$40.00 Do., rerolling quality. 39.00	2½-3½	Sparrows Point, Buf- falo, Canton, Chicago 34.00 Detroit, delivered 36.00
80-rod spools, base column	Cents per pound Angle bars, billet, mills. 2.70c Do., axle steel 2.35c	9—12 28½ 15 Line Pipe	Wire Rods Pitts., Cleveland, Chicago, Birmingham No. 5 to 32-
wire, column	Spikes, R. R. base 3.00c Track bolts, base 4.15c	Steel 1 to 3, butt weld 67% 2, lap weld 60	inch incl. (per 100 lbs.) \$2,00 Do., over ½ to ¼-in. incl. 2.15 Worcester up \$0.10; Galves-
Birmingham (except spring wire) Bright bess., basic wire 2.60c	Chicago, Birmingham. 3.15c Tie plates, base 2.15c	2% to 3, lap weld 63 3% to 6, lap weld 65 7 and 8, lap weld 64	ton up \$0.25; Pacific Coast up \$0.45.
Galvanized wire 2.60c Spring wire 3.20c Worcester, Mass., \$2 higher on	lbs. up \$8; 8 lbs. up \$10. Base	10-inch lap weld 63½ 12-inch, lap weld 62½ Iron	Skelp Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c
bright basic and spring wire.	railroad spikes 200 kegs or more; base plates 20 tons.	% butt weld 25 7	Coke Price Per Net Ton
Cut Nails Carload, Pittsburgh, keg\$3.85	Bolts and Nuts	1 and 1% butt weld 29 13 1% butt weld 33 15%	Beehlve Ovens
Cold-Finished Bars	F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Dis- counts for carloads additional 5%, full containers, add 10%.	2 lap weld 23 1/4 7	Connellsville, fur \$4.35-4.60 Connellsville, fdry 5.00-5.75 Connell. prem. fdry. 5.75-6.25
Carbon Alloy Pittsburgh 2.65c 3.35c Chicago 2.65c 3.35c	Carriage and Machine % x 6 and smaller68.5 off	4 lap weld 281/4 15	New River Idry 6.25- 6.50 Wise county Idry 5.50- 6.50 Wise county Idr 5.00- 5.25
Gary, Ind. 2.65c 3.35c Detroit 2.70c *3.45c Cleveland 2.65c 3.35c	Do. larger, to 1-in66 off Do. 1% and larger64 off Tire bolts	9 to 12 lap weld231/2 9	By-Product Foundry Newark, N. J., del 11.38-11.85
Buffalo 2.65c 3.35c Delivered.	Stove Bolts In packages with nuts separate 72.5 off; with nuts attached	Carloads minimum wall seam-	Chicago, delivered. 11.25 Ferre Haute, del. 10.75
Alloy Bars (Hot)	add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.	burgh, base price per 100 feet subject to usual extras.	Milwaukee, ovens 11.25 New England, del 12.50 St. Louis, del 11.75
(Base, 20 tons or over) Pittsburgh, Buffalo, Chi- cago, Massillon, Can-	Step bolts	Char-	Birmingham, ovens. 7.50 ndianapolis, del. 10.75 Cincinnati, del. 10.50
ton, Bethlehem 2.70c Detroit, delivered 2.80c Alloy Alloy	Semifinished hex. U.S.S. S.A.E. ½-inch and less. 67 70	Sizes Gage Steel Iron F 1½"O.D. 13 \$ 9.72 \$28.71 I	Cleveland, del 11.05 Buffalo, del 11.25 Detroit, del 11.00
S.A.E. Diff. S.A.E. Diff. 2000 0.35 3100 0.70	%-1-inch 64 65 1%-1½-inch 62 62 1% and larger 60	2" O.D. 13 12.38 19.35 24."O.D. 13 13.79 21.68	Philadelphia, del
2300 1.55 3300 3.80 2500 2.25 3400 3 20	Upset, 1-ln., smaller70.0 off Square Head Set Screws	2½"O.D. 12 16.58 26.57 22%"O.D. 12 17.54 29.00 F	Spot, gal., freight allowed east of Omaha Pure and 90% benzol 16.00c
4100 0.15 to 0.25 Mo 0.55 4600 0.20 to 0.30 Mo. 1.50- 2.00 Ni	Headless set screws64.0 off	3 ½ "O.D. 11 23.15 39.81 s	oluol, two degree 25.00c colvent naphtha 27.00c ndustrial xylol 27.00c
5100 Cr. spring flats 0.15 6100 bars	Pitts Chgo., Buffalo 2.40c	5" O.D. 9 44.25 73.93 6 O.D. 7 68.14	Per lb. f.o.b. Frankford and St. Louis Phenol (less than 1000
Cr. N., Van. 1.50 Carbon Van. 0.00	Culf ports 2.85c Pacific coast ports 2.90c Rivets, Washers	Hot Cold Sizes Gage Rolled Drawn	Do. (1000 lbs. or over) 13.75c Eastern Plants per lb
9200 spring flats 0.15 9200 spring rounds, squares 0.40 Electric furnace up 50 cents.	F.o.b. Pitts., Cleve., Chgo., Bham.	1 "O.D. 13 \$ 7.82 \$ 9.01 N 1¼"O.D. 13 9.26 10.67 1½"O.D. 13 10.23 11.79	taphthalene flakes, balls, bbls. to jobbers 6.75c Per ton, bulk, f.o.b. port
April 22 1040	Structural 3.40c		ulphate of ammonia\$28.00

Pig Iron	No. 2 Malle- Besse- Fdry. able Basic mer
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.	St. Louis, northern 23.50 23.50 23.00 St. Louis from Birmingham 723.12 22.62 St. Paul from Duluth 25.63 25.63 26.13
No. 2 Malle-Besse- Basing Points: Fdry. able Basic mer	tover 0.70 phos. Low Phos. Basing Points: Birdsboro and Steelton. Pa., and Buffalo, N. Y.,
Bethlehem, Pa. \$24.00 \$24.50 \$23.50 \$25.00 Birdsboro, Pa. 24.00 24.50 23.50 25.00	\$28.50, base; \$29.74 delivered Philadelphia.
Birmingham, Ala. 19.38 18.38 24.00 Buffalo 23.00 23.50 22.00 24.00	Gray Forge Charcoal Valley furnace\$22.50 Lake Superior fur\$27.00
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 3.00 23.00 22.50 23.50	Pitts. dist. fur
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	#Silvery Jackson county, O., base: 6-6.50 per cent \$28.50; 6.51-7—\$29.00;
Everett, Mass. 24.00 24.50 23.50 25.00 Granite City, III. 23.00 23.00 22.50 23.50	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.
Hamilton, O	Bessemer Ferrosilicon+ Jackson county, O., base; Prices are the same as for silveries,
Provo, Utah	plus \$1 a ton. †The lower all-rail delivered price from Jackson, O., or Buffalo
Sparrow's Point, Md. 24.00 23.50 Swedeland, Pa. 24.00 24.50 23.50 Toledo, O. 23.00 23.00 22.50 23.00 Youngstown, O. 23.00 23.00 22.50 23.50	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.
\$\frac{1}{2}\$\$\frac{1}{2}\$\$\$ \$1 \text{ 38 cents deduction for 0.70 per cent phosphorus}\$\$	Refractories Ladle Brick
or higher.	Per 1000 f.o.b. Works, Net Prices Dry press
Delivered from Basing Points:	Super Quality Magnesite
Akron, O., from Cleveland 24.39 24.39 23.89 24.89 Baltimore from Birmingham 24.78 23.66	Pa., Mo., Ky \$60.80 Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net
Boston from Birmingham 24.12 24.00 25.50 Boston from Everett, Mass 24.50 25.00 24.00 25.50	Pa., III., Md., Mo., Ky 47.50 ton, bulk
Boston from Buffalo	New Jersey 52.50 Busic Brick Second Quality Net ton, f.o.b. Baltimore, Ply-
Chicago from Birmingham †23.22 Cincinnati from Hamilton, O 23.24 24.11 23.61	Pa., Ill., Ky., Md., Mo 42.75 mouth Meeting, Chester, Pa. Georgia, Alabama 34.20 Chrome brick \$50.00
Cincinnati from Birmingham 23.06 22.06 Cleveland from Birmingham 23.32 22.82	New Jersey 49.00 Chem. bonded chrome 50.00 Magnesite brick 72.00 Chem. bonded chrome 61.00
Mansfield, O., from Toledo, O 24.94 24.94 24.44 24.44 Milwaukee from Chicago 24.10 24.10 23.60 24.60	First quality 39.90 Chem. bonded magnesite 61.00 Intermediate 36.10 Second quality 31.35 Fluorspar
Muskegon, Mich., from Chicago, Toledo or Detroit	Second quality 31.35 I IUOISPUI Malleable Bung Brick Washed gravel, duty
Newark, N. J., from Bethlehem 25.53 26.03 Philadelphia from Birmingham 24.46 23.96	All bases
Philadelphia from Swedeland, Pa. 24.84 25.34 24.34 Pittsburgh district from Neville (Neville base, plus 69c, 84c,	Pennsylvania \$47.50 carloads, all rall. 22.00 Jollet, E. Chleago 55.10 Do. barge 22.00
Island	Birmingham, Ala. 47.50 No. 2 lump 22.00
Ferroallo	
Ferromanganese, 78-82%, carlots	Do, contract, ton lots 145.00 Do., 2% 12.50c
tide., duty pd\$100.00 Do., less-ton lots 12.00c Ton lots 110.00 67-72% low carbon: Less ton lots 113.50 Car- Ton Less	15-18% tl., 3-5% carbon, Silicon Briquets, contract
Less 200 lb. lots 118.00 loads lots ton Do., carlots del. Pitts. 105.33 2% carb 17.50c 18.25c 18.75c	Do, spot
Spiegelelsen, 19-21% dom. 1% carb. 18.50c 19.25c 19.75c 19	Do, spot, ton lots 165.00 Less-ton lots, lb 3.75c Less 200 lb lots lb. 4.00c
Do., 26-28% 39.50 0.20% carb. 19.50c 20.25c 20.75c Spot %c higher	Do, ton lots 8.00c Manganese Briquets,
allowed, c.l	Spot %c lb. higher bulk freight allowed,
Do., 75 per cent 126.00 mill, 16 0.95 Do. ton lots 142.00 Calcium molybdate, 1b. Spot, \$5 a ton higher. malyb. cont., f.o.b. mill 0.80	tract, freight allowed, Ton lots 5.50c
Siliconnuganese, c.l., 24 Ferrotitanium, 40-45%, per cent carbon, 103.00 lb., con. tl., f.o.b. Niag-	Do., ton lots 7.50c Spot %c higher Do., less-ton lots 7.75c
2% carbon, 108.00; 1%, 118.00 ara Falls, ton lots \$1.23 Contract ton price Do., less-ton lots 1.23	Spot, %c nigher. contract, carloads,
\$12.50 higher; spot \$5 20-25% carbon, 0.10 over contract. max., ton lots, lb 1.35	according to grade, Do, spot shipment 200 lb 34.40% contract car-
Ferrotungsten, stand., lb. Do, less-ton lots 1.40 con, del. cars1.90-2.00 Spot 5c higher	drum lots. lb
Ferrovanudium. 35 to Ferrocolumbium. 50-60%. 40%. ib., cont. 2.70-2.80-2.90 contract, lb. con. col., Ferrophosphorus, gr. ton. f.o.b. Niagara Falls \$2.25	Vanadlum Pentoxide. Do, less-ton lots 16.00c contract. lb. contained \$1.10 Spot %c higher
Ferrophosphorus, gr. ton, f.0.5. Niagara Falls 2.30 c.l., 17-18% Rockdale. Do., less-ton lots 2.30 Tenn basis 18%, \$3 Spot is 10c higher	
unitage, 58.50; electric Technical molybdenum furn., per ton, c. l., 23- trioxide, 53 to 60% mo-	contract, lb. con. Do, 100-200 lb. lots. 2.75 chrome
26% f.o.b. Mt. Pleasant, lybdenum, lb. molyb. cont., f.o.b. mill 0.80	Do., spot
Ferrochrome, 66-70 chro- mlum, 4-6 carbon, cts. Ferro-carbon-titanium, 15- 18%, ti., 6-8% carb.	Do spot
lb., contained cr., del carlots, contr., net ton.\$142.50	contract, carlots, 2 x ducers' plant 80.00c

STEEL PRICES WAREHOUSE

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Struc- tural Shapes	Floor Plates	Hot Rolled	-Sheets- Cold Rolled	Galv. No. 24	Cold Rolled Strip	— Cold	Drawn E S A E 2300	SAE 3100
Boston New York (Met.) Philadelphia Baltimore Norfolk, Va.	3.98 3.84 3.85 3.95 4.15	4.16 3.78 3.85 4.05 4.25	5.16 3.78 4.35 4.45	3.85 3.76 3.55 3.70 3.90	3.85 3.75 3.55 3.70 3.90	5.66 5.56 5.25 5.25 5.45	3.81 3.38 3.55 3.55 3.75	4.78 4.40 4.55	4.86 4.50 4.75 5.05 5.40	3.46 3.31 3.51	4.13 4.09 4.06 4.05 4.15	8.63 8.59 8.56	7.23 7.19 7.16
Buffalo Pittsburgh Cleveland Detroit Omaha Cincinnati	3,35 3,35 3,25 3,43 3,90 3,60	3.62 3.60 3.50 3.43 4.00 3.67	3.62 3.60 3.50 3.68 4.00 3.67	3.62 3.40 3.40 3.60 3.95 3.65	3.40 3.58 3.65 3.95 3.68	5.25 5.00 5.18 5.27 5.55 5.28	3.05 3.35 3.35 3.43 3.75 3.42	4.30 4.05 4.50 4.37	4.45 4.75 4.72 4.84 5.00 4.67	3.22 3.35 3.20 3.40 3.45	3.75 3.65 3.75 3.80 4.42 4.00	8.15 8.15 8.15 8.45	6.75 6.75 6.75 7.05
Chicago Twin Cities Milwaukee St. Louis Kansas City Indianapolis	3.50 3.75 3.63 3.62 4.05 3.60	3.40 3.65 3.53 3.72 4.15 3.76	3.40 3.65 3.53 3.72 4.15 3.76	3.55 3.80 3.68 3.47 4.00 3.70	3.55 3.80 3.68 3.47 4.00 3.70	5.15 5.40 5.28 5.07 5.60 5.30	3.05 3.30 3.18 3.38 3.90 3.51	4.10 4.35 4.23 4.32	4.60 5.00 4.73 4.95 5.00 4.76	3.50 3.63 3.54 3.61	3.75 4.34 3.88 4.02 4.30 3.97	8.15 8.84 8.38 8.52	6.75 7.44 6.98 7.12
Memphis	3.90 3.80	4.10 4.00 4.54 3.70 4.10	4.10 4.00 4.54 3.70 4.10	3.95 3.85 4.33 3.55 3.80	3.95 3.85 4.33 3.55 3.80	5.71 5.68 5.93 5.88 5.75	3.85 3.75 4.24 3.45 3.85		5.25 4.40 5.71 4.75 4.80	5.00	4.31 4.39 4.69 4.43 4.60		
Houston, Tex Seattle Portland, Oreg Los Angeles San Francisco	4.25 4.15	6.20 3.85 4.50 4.65 4.00	6.20 5,20 6.10 6.45 6.00	4.05 3.40 4.00 4.00 3.35	4.05 3.50 4.00 4.00 3.35	5.75 5.75 5.75 6.40 5.60	4.20 3.70 3.95 4.30 3.40	6.50 6.50 6.50 6.40	5.25 4.75 4.75 5.25 5.15		5.75 5.75 6.60 6.80	10.65 10.65	9.80 9.80
	_S A I	E Hot-rol	led Bars	(Unanne	ealed)-				BASE Q	JANTITI	ES		

	-S A E 1035- 1050	Hot-rolle 2300 Series	3100 Series	(Unannes 4100 Series	6100 Series
Boston New York (Met.) Philadelphia	4.18 4.04 4.10	7.50 7.35 7.31	6.05 5.90 5.86	5.80 5.65 5.61	7.90 8.56
Baltimore Norfolk, Va	4.10	141.7			
Buffalo	3.40 3.30 3.48	7.10 7.20 7.30 7.42 7.44	5.65 5.75 5.85 5.97 5.99	5.40 5.50 5.85 5.72 5.74	7.50 7.60 7.70 7.19 7.84
Chicago Twin Cities Milwaukee St. Louis	3.70 3.95 3.83 3.82	7.10 7.45 7.33 7.47	5.65 6.00 5.88 6.02	5.40 6,09 5.63 5.77	7.50 8.19 7.73 7.87
Seattle		8.85 9.40 9.65	8.00 8.00 8.55 8.80	7.85 7.85 8.40 8.65	8.65 8.65 9.05 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; 150-1499 in Boston; 500-1499 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tuisa; 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

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 18

Export Prices f.o.b. Port of Dispatch-

By Cable or Radio

Continental Channel or

North Sea ports, gross tons **Quoted in British gold pounds sterling £ s d Quoted in dollars at gross tons U. K. ports £ a d current value 3 18 0 \$33.23 Foundry, 2.50-3.00 St., \$21.12 6 0 0 Hematite, Phos. .03-.05 22.00 6 5 0 3 15 0 6 17 6 \$31.95 58.58 Standard rails
Merchant bars
Structural shapes
Plates, 1½ in. or 5 mm.
Sheets, black, 24 gage
or 0.5 mm.
Sheets, gal, 24 ga, corr.
Bands and strips
Plain wire, base.
Wire nails, base.
Wire nails, base.
Tin plate, box 108 lbs. 2 67c 17 0 0 3 07c 19 10 0 7 18 0° 3.00c 10 6 0 7 0 0 8 6 3 9 17 6 9 7 6 3.91c 2.66c 3.15c 3 75c

Tin plate, box 108 lbs. \$ 5.63 1 12 0 British ferromanganese \$100.00 delivered Atlantic seaboard duty-paid. Domestic Prices at Works or Furnace-

				L	asl	Rep	orted				
		£	s d				French Francs	,	Belg!ai		Releh §§ Mar
Fdy, pig iron, 8l, 2.5. 2 Pasic bess, pig iron Furnace coke	18.39 5.57 33.00 1.75c 2.20c 1.95c 1.97c 2.75c 3.14c 3.07c 2.32c	5 5 1 9 11 14 12 12 17 20 19 14	111 4 1 111 3 0 8 10 10 10 15	0(a) 6(a) 8 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 . 23 1 1 1 1 1 3 2 1 1 1 1 1 1 1 1 1 1 1	.50 .26 .43c .31c .27c .86c .97c .23c .11c .47c	788 225 1,163 1,588 1,454 1,414 1,848 2,193 3,588 2,340 1,632 1,632	\$30, 98 30, 15 10, 06 42, 71 2, 06c 2, 06c 2, 42c 2, 85c 4, 80c 3, 00c 2, 18c 24 ga.	925 900 330 1,275 1,375 1,375 1,375 1,610 1,900‡ 3,200 2,000 1,450 ‡1 to 3	\$25.33 27.94 7.64 38.79 2.38e 1.98e 1.93e 2.29e 2.59e 6.66e 3.11c 2.29e 3 mm. bs	63 (b) 69 . 50 19 96 . 50 132 110 107 127 144‡ 370 173 127 asic price.
n-teleb quotations	are for bi	asie	ope	n-he	arth	steel	. Con	tinent usu	ally for b	asic-besse	mer steel.
(a) del. Middlesbro	ough. 58	g ret	bate	to a	ppr	oved	custome	rs. (b) b	ematite.	°Close	annealed.
††Rebate of 15s o	on certai	in c	ond	litiot	15.						
##Cold pound ster	dog not	au	otec	1 5	3 Tally	it pri	Ces, no c	dirent da	D B CHI O I CHI		

**Gold pound sterling not quote

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IRON AND STEEL SCRAP PRICES

Corrected to Friday night.	Gross tons delivered to consume	ers, except where otherwise stated	l; †indicates brokers prices
HEAVY MELTING STEEL	Buffalo 10.00-10.50	Buffalo 18.00-18.50	Eastern Pa 22,50-23.00
Birmingham, No. 1. 15.00	Chicago 8.50- 9.00 Cincinnati, dealers 4.75- 5.25	Chicago 15.50-16.00	St. Louis, 14-34"†16.50-17.00
Bos. dock No. 1 exp. 15.00 New Eng. del. No. 1 14.00	Cleveland, no alloy. 8.50- 9.00	Cleveland 18.50-19.00 Pittsburgh 17.50-18.00	CAR WHEELS
Buffalo, No. 1 16.00-16.50	Detroit †7.50- 8.00	St. Louis†14.75-15.25	Birmingham, iron. 13.00
Buffalo, No. 2 14.50-15.00	Eastern Pa 9.50-10.00 Los Angeles 4.00- 5.00	Seattle 18.00-18.50	Boston dist., iron †13.00-13.25 Buffalo, steel 21.00-21.50
Chicago, No. 1 15.00-15.50 Chicago, auto, no	New York †6.50- 7.00	PIPE AND FLUES	Chicago, iron 16.50-17.00
alloy 14.00-14.50	Pittsburgh 10.00-10.50	Chicago, net 10.50-11.00	Chicago, rolled steel 17.50-18.00
Chicago, No. 2 auto 12.00-12.50 Cincinnati dealers . 12.25-12.75	St. Louis †6.50- 7.00 San Francisco 5.00	Cincinnati, dealers 9.50-10.00	Cincin., iron, deal 16.25-16.75 Eastern Pa., iron 20.00-20.50
Cleveland, No. 1 15.50-16.00	Toronto, dealers 7.00- 7.25	RAILROAD GRATE BARS	Eastern Pa., steel 20.00-20.50
Cleveland, No. 2 14.50-15.00 Detroit, No. 1 †12.75-13.25	Valleys 10.00-10.50	Buffalo	Pittsburgh, iron 18.50-19.00 Pittsburgh, steel 21.00-21.50
Detroit, No. 2 †11.75-12.25	SHOVELING TURNINGS Buffalo 12.00-12.50	Cincinnati, dealers. 8.25-8.75	St. Louis, iron 14.50-15.00
Eastern Pa., No. 1. 16.50-17.00 Eastern Pa., No. 2. 15.50	Cleveland 9.50-10.00	Eastern Pa 15.00-15.50	St. Louis, steel†16.00-16.50
Eastern Pa., No. 2	Chicago 9.50-10.00	New York	NO. 1 CAST SCRAP
Granite City, R. R.	Chicago, spcl, anal. 12.50-13.00 Detroit †8.00- 8.50		Birmingham 15.50 Boston, No. 1 mach †15.00-15.50
No. 1	Pitts., alloy-free 12.00-12.50	RAILROAD WROUGHT Birmingham 14.00	N. Eng. del. No. 2. 14.00-14.50
Los Ang., No. 1, net 11.50-12.00	BORINGS AND TURNINGS	Boston district +9.50-10.00	N. Eng. del. textile 16.00-17.00 Buffalo, cupola 17.25-17.75
Los Ang., No. 2, net 10.50-11.00 N. Y. dock No. 1 exp. 13.75	For Blast Furnace Use Boston district †3.50- 4.00	Eastern Pa., No. 1. 18.00-18.50	Buffalo, mach 18.25-18.75
Pitts., No. 1 (R. R.) . 17.25-17.75	Buffalo 9.50-10.00	St. Louis, No. 1 10.00-10.50 St. Louis, No. 2 12.50-13.00	Chicago, agrl. net 12.50-13.00 Chicago, auto net 14.50-15.00
Pittsburgh, No. 1. 16.00-16.50	Cincinnati, dealers 3.50- 4.00 Cleveland 9.50-10.00	FORGE FLASHINGS	Chicago, railroad net 14.00-14.50
Pittsburgh, No. 2. 15.00-15.50 St. Louis, No. 1 †13.75-14.25	Eastern Pa 9.00- 9.50	Boston district †10.00-10.25	Chicago, mach. net. 14,75-15.25
St. Louis, No. 2 12.50-13.00	Detroit †7.75- 8.25	Buffalo 14.00-14.50	Cincin., mach. deal. 15.75-16.25 Cleveland, mach 20.00-21.00
San Fran., No. 1, net 11.50-12.00 San Fran., No. 2, net 10.50-11.00	New York †5.25- 5.75 Pittsburgh 8.75- 9.25	Cleveland 14.50-15.00 Detroit †12.50-13.00	Detroit, cupola, net. †15.50-16.00
Seattle, No. 1 14.50-15.50	Toronto, dealers 6.75	Pittsburgh 15.00-15.50	Eastern Pa., cupola. 19.00-20.00 E. Pa., No. 2 yard. 16.50
Toronto, dirs., No. 1 11.00 Valleys, No. 1 16.00-16.50	AXLE TURNINGS	FORGE SCRAP	E. Pa., yard fdry 16.50-17.00
COMPRESSED SHEETS	Buffalo 15.50-16.00 Boston district †8.00- 8.50	Boston district 17.00	Los Angeles 16.50-17.00 Pittsburgh, cupola 17.50-18.00
Buffalo, new 15.00-15.50	Chicago, elec. fur 15.50-16.00	Chicago, heavy 18.50-19.00	San Francisco 14.50-15.00
Chicago, factory 14.25-14.75	East. Pa. elec. fur 16.00-16.50 St. Louis †9.25- 9.75	LOW PHOSPHORUS	Seattle
Chicago, dealers. 13.00-13.50 Cincinnati, dealers. 11.75-12.25	Toronto 6.00- 6.50		St. Louis, agri. mach. 15.75-16.25
Cleveland 15.00-15.50	CAST IRON BORINGS	Eastern Pa. crops 20.00-20.50	St. L., No. 1 mach †16.25-16.75
Detroit	Birmingham 7.50 Boston dist, chem †8.25- 8.50	Pitts., billet, bloom, slab crops 21.50-22.00	Toronto, No. 1 mach., net dealers 17.00
E. Pa., new mat 16.50-17.00 E. Pa., old mat 14.00-14.50	Buffalo 9.50-10.00	LOW PHOS. PUNCHINGS	
Los Angeles, net 9.00- 9.50	Chicago 9.00- 9.50 Cincinnati, dealers 3.50- 4.00	Buffalo 19.50-20.00	HEAVY CAST Boston dist, break †12.75-13.25
Pittsburgh 16.00-16.50 St. Louis †10.00-10.50	Cleveland 9.50-10.00	Chicago 17.50-18.00	New England, del 14.50-15.00
San Francisco, net. 9.00-9.50	Detroit	Cleveland 17.00-17.50 Eastern Pa 21.00-21.50	Buffalo, break 15.00-15.50 Cleveland, break, net 15.25-15.75
Valleys 15.50-16.00	E. Pa., chemical 14.50-15.00 New York †7.00	Pittsburgh 20.00-20.50	Detroit, auto net †16.00-16.50
BUNDLED SHEETS	St. Louis †5.00- 5.50	Detroit	Detroit, break †12.50-13.00 Eastern Pa 18.50
Buffalo, No. 1 14.00-14.50 Buffalo, No. 2 13.00-13.50	Toronto, dealers 6.75		Los Ang., auto, net. 13.00-14.00
Cleveland 11.00-11.50	RAILROAD SPECIALTIES Chicago 17.75-18.25	RAILS FOR ROLLING	New York break †14.00 Pittsburgh, break 15.00-15.50
Pittsburgh 15.00-15.50 St. Louis †9.00- 9.50	ANGLE BARS—STEEL	5 feet and over Birmingham, 16.50	
Toronto, dealers 9.75	Chicago 18.00-18.50	Boston	STOVE PLATE Birmingham 10.00
SHEET CLIPPINGS, LOOSE	St. Louis†14.75-15.25 SPRINGS	Chicago 18.50-19.00 New York 15.50-16.00	Boston district †10.50-11.00
Chicago 10.00-10.50	Buffalo 19.50-20.00	Eastern Pa 20.00-20.50	Buffalo 14.00-14.50
Cincinnati, dealers 7.75-8.25 Detroit	Chicago, coll 19.00-19.50 Chicago, leaf 17.50-18.00	St. Louis†17.00-17.50	Chicago, net 9.00- 9.50 Cincinnati, dealers. 8.00- 8.50
St. Louis	Eastern Pa 20.00-20.50	STEEL CAR AXLES	Detroit, net †9.50-10.00
Toronto, dealers 9.00	Plttsburgh 21.00-21.50	Birmingham 18.00	Eastern Pa 15.00-15.50 New York fdry 10.75-11.25
BUSHELING	St. Louis†16.25-16.75 STEEL RAILS, SHORT	Boston district †16.00-16.50 Chicago net 20.00-20.50	St. Louis 10.50-11.00
Birmingham, No. 1. 13.00 Buffalo, No. 1 14.00-14.50	Birmingham 16.50	Chicago, net 20.00-20.50 Eastern Pa 22.00	Toronto dealers, net 12.00
Chicago, No. 1 14.00-14.50	Buffalo	St. Louis†18.50-19.00	MALLEABLE
Cincin., No. 1, deal. 8.75- 9.25 Cincin., No. 2 deal 2.75- 3.25	Chicago (2 ft.) 18.50-19.00	LOCOMOTIVE TIRES	New England, del 21.00 Buffalo 19.00-19.50
Cieveland, No. 2 9.50-10.00	Cincinnati, dealers. 17.75-18.25 Detroit 119,50-20,00	Chicago (cut) 18.50-19.00	Chicago, R. R 19.00-19.50
Detroit, No. 1, new.†12.75-13.25 Valleys, new, No. 1 14.75-15.25	Pitts., 3 ft. and less 21.00-21.50	St. Louis, No. 1 14.75-15.25	Cincin., agri., deal 13.00-13.50 Cleveland, rail 20.50-21.00
Toronto, dealers 5.50- 6.00	St. Louis, 2 ft.& less †18.00-18.50	CHAPTING	Eastern Pa., R.R 21.00-21.50
MACHINE TURNINGS (Long)	Birmingham 16.00	Boston district †17.00-17.50	Los Angeles
Birmingham 5.00		New York†18.00-18.50	Pittsburgh, rail 21.50-22.00 St. Louis, R. R 15.50-16.00
Ores	Eastern Local Ore	Swedish low phos 14.00	Manganese Ore
Lake Superlor Iron Ore	Cents, unit, del. E. Pa.	North African low	Including war risk but not duty, cents per unit cargo lots.
Dake Superior Hon Ole	56-63%, contract. 9.00-10.00	phos	Caucasian, 50-52% 48.00-50.00
Gross ton, 511/3 %	Foreign Ore	basic, 50 to 60% 14.00	So. African, 50-52% 48.00-50.00 Indian, 49-50% nom.
Lower Lake Ports	(Prices neminal)	Chinese wolframite.	Indian, 49-50% nom.

Old range bessemer	\$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

(Prices nominal)

Cents per unit, c.i.f. Atlantic ports

Manganii	erous ore,	
45-55%	Fe., 6-10%	
Mn		14.00-15.00

North African low	
phos	14.00
Spanish, No. African	
basic, 50 to 60%	14.00
Chinese wolframite,	
short ton unit,	
duty paid\$23.5	0-24.00
Scheelite, Imp	\$25.00
Chrome ore, Indian,	
48% gross ton, cif.\$26.0	0-28.00

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 — Sheet and strip buyers have been urged to cover requirements as protection against withdrawal of recent price concessions, but the general belief is that reversion to previous quotations will not come until later this quarter. Buying improved moderately as indications appeared that prices had reached bottom on the \$4 cut. In addition to automotive placements, which provided the incentive for the price change, heavier buying is appearing from numerous other directions.

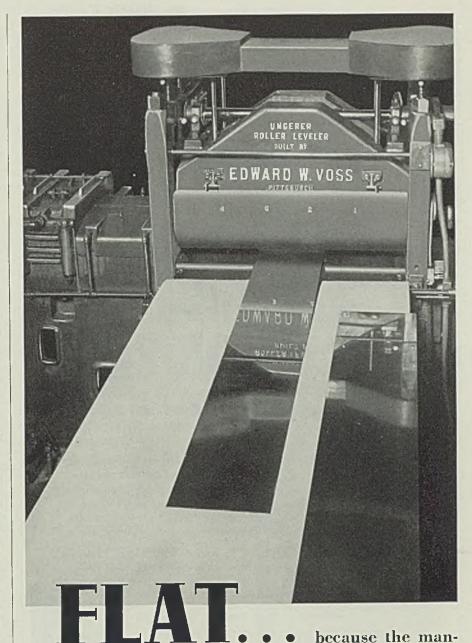
Cleveland — Orders have been stimulated by price developments, although tonnage is small compared with the volume placed during the price war of last May. Despite recent rumors, an immediate withdrawal of concessions is thought unlikely. Buyers expect to be protected for this quarter at current levels and are not particularly concerned over possibility of restoration of former quotations.

Boston — Lower prices on hot and cold-rolled strip have driven in little additional tonnage but buying, which started to improve several weeks ago, is mildly stimulated. Coverage has been less than might be expected following the reduction. This is attributed to the fact that consumer inventories are still large, although fillin buying recently has been heavier.

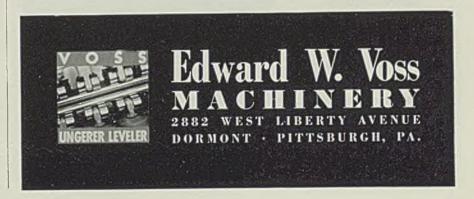
New York — Sheet and strip buying is more active, following a lull on the recent price cut. With sellers offering protection against any further reductions at this time, consumers are disposed to cover the quarter's needs. So far there has been no heavy surge of buying, and producers are unwilling to accept orders for shipment beyond June.

Philadelphia — Rumors that the \$4 reduction on hot rolled, cold-rolled, and enameling sheets will be withdrawn shortly have been accompanied by considerable volume of new orders, part of which specified dates for shipment. Stovemakers are estimated to have placed more than 1000 tons of enameling sheets, providing coverage for some interests through July.

Toronto, Ont. — Extensive imports of sheets are being made from the United States to fill pressing spot demands, and further large orders are pending. In addition Canadian mills are making heavy shipments and also are booking substantial new business. Much of



agement wanted to roll a better product . . . because they wanted to do it without increasing operating expense or slowing down production . . . because they bought an Ungerer Leveler.



the new demand for sheets is for the automotive industry and for war materials, although buying for ordinary business continues above the average of the past three or four years.

Cincinnati—Backlogs were thinned prior to the recent price cut, but consumers are more active in making forward commitments. Orders are being taken at the new prices for delivery only to June 30. Recent demand has been slightly under 60 per cent of capacity.

Buffalo-While hope is held for

increased buying, production remains at the slower pace of a week ago. The principal mill here has returned to a three-day week. Consumers are reported low in inventories, but are reluctant to cover far ahead.

Birmingham, Ala. — Production has a slightly upward tendency, although there has been no notable increase in production. Orders are still in small lots, but the outlook is for more substantial demand. Production continues around 85 per cent.

Plates

Plate Prices, Page 86

Chicago — Moderate improvement is noted in bookings. Demand from plate fabricators is more active because of new requirements of petroleum refineries and public projects, such as large dam constructions. Makers of heavy equipment furnish steady demand.

Boston — Plate buying is slack, less-than-car orders from miscellaneous user; making up the bulk of volume. Shops fabricating plates have light backlogs generally and are buying as needed. Warehouses occasionally place scattered fill-in orders. Shipyard releases are steady. Some scattered price shading is reported.

Prospective standpipe requirements include two units at Lynnfield and Shirley Village, Mass. Old Colony Gas Co., East Braintree, Mass., plans to rebuild its plant recently destroyed by fire, including a gas-holder.

New York—Despite recent \$4 decline in sheets and strip, plate prices are unchanged, although there has been little to test the market. Until recently the war has resulted in substantial improvement in export tonnage and in requirements for machinery to ship abroad. Recent lull has been due mainly to dislocation of ocean traffic and is expected to be temporary and to be followed by still heavier demand.

Philadelphia - Pusey & Jones has placed contracts for a large part of the hull plates required for two C-1 cargo vessels on which bids were opened July 11, 1939. Each vessel requires 2200 tons of plates. Some midwestern, as well as eastern plate mills, participated, delivery being specified over a period of three months. It is understood the full 2.10c, base, applied. Miscellaneous plate buying has slowed up as a result of reduced prices on sheets, but platemakers generally maintain a firm front. It is pointed out that plates held well during the period of extreme price weakness in sheets last year.

Birmingham, Ala. — No important railroad business has developed but the plate market is sustained on small railroad orders, tanks and shipbuilding.

San Francisco — Plate lettings were the second largest for any week this year, 3050 tons. This brought the year's aggregate to 21,230 tons, compared with 15,532 tons for the same period a year ago. Consolidated Steel Corp. was awarded 2100 tons of large diameter welded steel pipe for replacement work on the Los Angeles aqueduct and

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On floors, steps, platforms and runways—Inland 4-Way Floor Plate reduces costly injuries due to slips and falls. It provides safer traction because the specially designed projections center one another at right angles. No matter at what angle a foot, or wheel, contacts the plate, it meets a projection edge which firmly grips forward, backward, right, left—4-Way Safety.

In addition to being non-skid, Inland 4-Way Floor Plate is easy to clean and quick to drain. It is fireproof, heat-proof, crack-proof, and impervious to oil, or water, and it is structurally strong and long wearing.



850 tons for welded conduit for the Leevining creek project.

Seattle—Demand for plates is confined to lots of less than 100 tons, shops reporting a fair volume of seasonal boiler, tank and stack work. Cle Elum, Wash., which took bids for 500 tons has contracted for concrete pipe.

Toronto, Ont. — Plate demand continues heavy, with Canadian mills running at capacity to meet needs for ordinary business and war contracts. In addition imports from the United States continue in large volume for shipbuilding purposes.

Plate Contracts Placed

2200 tons, 5,000,000 cubic-foot holder, St. Louis County Gas Co., St. Louis, to Stacey Bros. Gas Construction Co., Cincinnati.

2100 tons, 8-feet 6-inches to 10-feet 3-inches welded steel pipe, specification 3315, replacement work on Los Angeles aqueduct, to Consolidated Steel Corp., Los Angeles.

850 tons, Leevining creek conduit, specification 3374, Los Angeles, to Consolidated Steel Corp., Los Angeles.

Plate Contracts Pending

1000 tons, caisson gates, drydock, navy yard, Bremerton, Wash.; bids Apr. 24. Unstated tonnage, four steel sand barges, 750-cubic yard capacity each, general purchasing officer, Panama Canal, Washington, schedule 4008; bids also to be taken on an alternate for three barges, April 24.

Bars

Bar Prices, Page 86

Pittsburgh — An important producer of hot-rolled steel bars now is selling specified dead lengths in the 10-to-20 foot range without cutting charge, as against 5 to 10 feet formerly.

Price irregularity has developed on small lots in the near South, through reappearance of the preference quantity extras that were dropped last July in favor of a single North and South schedule.

Chicago — Recent slight gains in carbon and alloy bar bookings have been noted by several mills, while orders have remained steady in other quarters. Automotive and agricultural equipment interests continue among most active sources of demand, although a wide range of industries is represented in present market. Machinery makers are fairly steady takers.

Boston—Orders for alloy bars from aircraft manufacturers, small arms builders, shipbuilders, machine tool builders and government shops continue steady, although volume is widely distributed. Demand for carbon steel bars is slackening, but prompt delivery is requested. Sub-

stantial portion of all current business is passing through secondary distributors and prices at pr.mary sources are holding.

C. H. Cowdrey Machine Works, Fitchburg, Mass., has been awarded a contract at \$174,203.50 for small howitzers by the war department.

Youngstown Sheet & Thbe Co. has been awarded 250 tons carbon steel bar stock for induction furnace melting at the Watertown, Mass., arsenal.

New York-Prices are firm despite recent weakness in sheets and

strip, and feeling is growing among consumers that bars will not be adversely affected by revisions in flat-rolled products. Principal demand is from machine tool builders, aircraft equipment and government shops, although automobile accessory makers are buying more freely than anticipated. Plain carbon bar deliveries range from three to four weeks; cold drawn bars about four weeks, alloy bars five to six weeks, and special heat-treated bars two to three months or longer.

Philadelphia - Published quota-

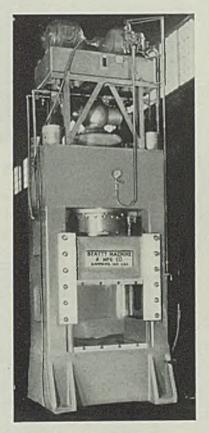
ONLY ONE

control lever for forward and reverse pressure and speed control on Beatty hydraulic presses, increases their efficiency, reduces lost time and practically eliminates accident hazards.

Illustrated is the motor driven, 4-column, heavy duty hydraulic press designed for all types of heavy forming including freight and passenger car parts and similar form.

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Air or hydro-pneumatic cushions for drawing and forming work can be furnished on all sizes.



NOTE THE OPERATING SPEEDS AS SHOWN IN TABLE BELOW:

Nos.	Cap. in tons	Size platen (inches)	Max. opening (inches)	Stroke (inches)	Operatin Advance	g speeds p in inches Pressing	er minute Return	H.P. Motor
300 300-A	{200} 300}	36x36	30	18	510	11	475	10 to 15
400-A 400-B	400 500 750	42x42	48	26	510	11	475	20 to 30
500-A 500-B	{400 500 750	60×60	48	26	510	11	475	20 to 30

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tions on bars are well maintained and so far the market has not been influenced by the reduction in sheets. Buying continues fairly active from machine tool builders, chain makers, equipment builders, screw machine product plants and government shops. A maker of replacement sparkplugs has expanded operations. Republic Steel Corp., Cleveland, is low on 175,000 pounds of rivets for the Philadelphia navy yard, bids April 9, at 3.12c, for 115,000 pounds, mostly 7/16-inch, and 4.47c on 60,

000 pounds, 1/2-inch and over.

Buffalo—Production holds close to recent levels, which are considered only fair. Although of moderate volume, tonnage to motormakers continues the principal individual support of operations. Rumors that price reductions in strip and sheets may spread to bar items, appear without foundation.

Toronto, Ont. — Bar sales have shown improvement in recent weeks and mills report heavy booking to the end of this quarter. While mills

are six to eight weeks back in deliveries, there is no special pressure on production and consumer demands are being met without special difficulty.

Birmingham, Ala. — Bar production holds at approximately 80 per cent, but the tendency has been slightly upward.

Pipe

Pipe Prices, Page 87

Pittsburgh—Standard pipe buying is up slightly, with heavier demand from distributors in most sections of the country in prospect. Shipments to consigned stocks are up slightly and a little ahead of March tonnage. Mechanical tubing orders are up somewhat, although there is little change in oil country goods.

Chicago—A. O. Smith Corp., Milwaukee, has been awarded a pipe contract for an Oklahoma line for Cities Service Co. Line will be approximately 61 miles long.

Boston — Miscellaneous demand for steel, wrought iron and corrugated metal pipe for several engineering projects is up slightly, but the lag in general construction continues to retard merchant steel pipe buying. Demand for tubing, notably alloy, is up moderately. Cast pipe contracts are being placed more frequently, but average tonnage is generally well below last year, with small diameters leading.

New York—Cast pipe inquiry and buying is below last year. Although New York city is expected to ask bids on a large tonnage for yard stocks within the next two weeks, current awards are scattered and light. Export demand is well maintained, notably to South America.

Birmingham, Ala. — Inquiries for pipe continue to give promise of at least a slight increase and production has been consistent.

San Francisco — A fair tonnage at least a slight increase, and proing the week, aggregating 1679 tons, bringing the total for the year to 11,085 tons, compared with 6670 tons for the corresponding period in 1939. Inquiries were for lots of less than 100 tons.

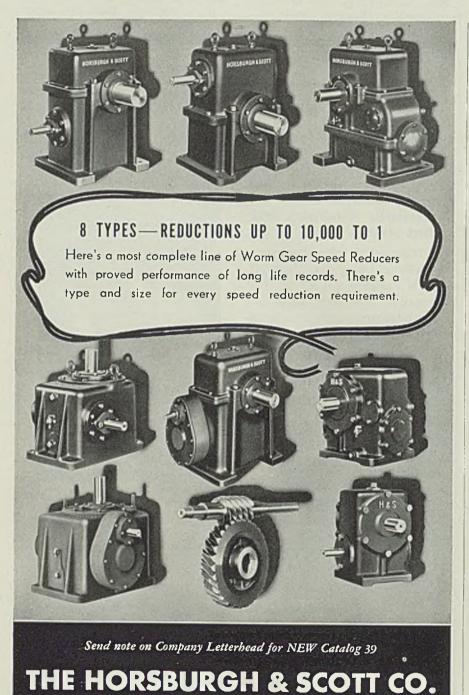
Cast Pipe Placed

900 tons, 8-inch, Los Angeles, specification 3387; allocated as follows; 675 tons to National Cast Iron Pipe Co., Birmingham, Ala. and 225 tons to American Cast Iron Pipe Co., Birmingham, Ala.

350 tons, 4 to 12-inch, for Cle Elum, Wash., to Pacific Water Works Supply Co., Seattle, for French pipe.

160 tons, 6 and 12-inch, Andover, Mass., to R. D. Wood & Co., Philadelphia.

110 tons, 6-inch, for Wrentham, Mass., to Central Foundry Co., New York.



GEARS AND SPEED REDUCERS

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Rails, Cars

Track Material Prices, Page 87

Scattered buying by railroads does not indicate a trend and little new business is being done. Placing of 500 tons of rails by the Baltimore & Ohio with Bethlehem Steel Co. is the first rail order for some time. Denver & Rio Grande Western is in the market for 500 box cars.

Canadian National Railways has placed 150 ballast cars, 25 baggage and five mail and express cars with Canadian builders. Argentine State Railways is inquiring for ten locomotives.

Bail Orders Placed

Baltimore & Ohio, 500 tons, 100-pound rail, to Bethlehem Steel Co., Bethlehem, Pa.

Car Orders Placed

Canadian National Railways, 150 convertible ballast cars and five mail and express cars, to Canadian Car & Foundry Co. Ltd., Montreal; 25 baggage to National Steel Car Corp. Ltd., Hamilton, Ont.

Car Orders Pending

Atchison, Topeka & Santa Fe, fifty 70-ton covered cement hoppers; blds asked.

Cincinnati, New Orleans & Texas Pacific, seventy-five 70-ton hoppers; bids asked. Denver & Rio Grande Western, 500 box

Denver & Rio Grande Western, 500 box cars; bids asked; in addition to 100 stock cars and 10 caboose cars recently placed with its own shops.

Panama Canal commission, 20 flat cars and thirty 50-ton steel box cars; blds May 8.

Locomotives Pending

Argentine State Rallways, Buenos Aires, ten 4-6-2 type locomotives, pending.

Buses Booked

Twin Coach Co., Kent, O.: Thirty-six 41-passenger for Seattle Transit System, Seattle; twenty 23-passenger for Toronto Transportation Commission, Toronto, Ont.; six 37-passenger for Pacific Electric Railway Co., Los Angeles; four 27-passenger for Georgia Power Co., Atlanta, Ga., three for Rome, Ga., and three for Macon, Ga., same buyer; two 23-passenger for Sloux City Service Co., Sloux City, Iowa.

The a.c.f. Motors Co., New York: 86 coaches, powered with Hall-Scott horizontal engines, for Philadelphia Transportation Co., Philadelphia.

Wire

Wire Prices, Page 87

Pittsburgh — Wire product sales have improved slightly, mostly in the merchant division, although there has been some increase in manufacturers' specifications, considered as merely a temporary development.

Chicago-Sales of wire and wire

products so far this month are 5 to 10 per cent better than in March. Improvement has been irregular, but the outlook is favorable for heavier bookings of merchant products. An increase has appeared lately in fill-in orders to balance spring stocks. Wire mesh demand is expected to be more active soon.

New York—Wire specifications are slightly heavier, some gains being made in manufacturers' wire and larger sizes for boltmakers. Improvement in spring wire is spotty with some tapering expected from the automotive trade. Rope vol-

ume continues to top that of last year. While some eastern producers have accumulated substantial stocks of rods, a brisk export demand is taking up considerable of the slack and rod mills are still operating in excess of finished wire units in numerous instances.

Birmingham, Ala. — Demand for wire has shown some signs of improvement, and production schedules are being maintained at or above 85 per cent.

Boston—Demand for manufacturers' wire has improved in spots, although still mostly of fill-in char-

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310 SOUTH MICHIGAN AVE., CHICAGO, ILL. 60 EAST 42ND STREET, NEW YORK CITY KOPPERS BUILDING, PITTSBURGH, PENNA. GRANITE HOUSE, CANNON ST., E. C. 4, LONDON acter, volume thus far this month is slightly ahead of March. Buying is well diversified and some general replacement orders are appearing in moderate volume.

Shapes

Structural Shape Prices, Page 86

Pittsburgh — Prices are holding fairly well in most sections, with new inquiries numerous. Private construction is active and

there is a large tonnage of new public works projects. Placements include several industrial and commercial jobs. A large tonnage is pending. Export prices are good, with inquiries rising.

Chicago—Private construction is expanding, although principal projects continues to be federal, state and city work. Substructure for State street bridge, Chicago, involves 150 tons. Factory addition, National Biscuit Co., Denver, Colo., takes 650 tons.

Boston — Demand for heavier steel is centered in sheet piling,

close to 1300 tons being required for a dike at West Springfield, Mass., and a pumping station at Northampton, Mass. These and two dam projects, Swett's Mills, N. H., and South Royalston, Mass., take several hundred tons of miscellaneous structural steel. Awards are light but include 460 tons for five New York, New Haven & Hartford railroad bridges in Connecticut.

New York—Inquiry for structural steel is featured by school requirements, public and parochial, accounting for close to 7000 tons, bids being asked. With three grade crossing and bridge crossings closing before the end of the month, tonnage is gradually mounting, although current awards are light. Industrial plant expansions are more numerous, but few large contracts are involved

Philadelphia — A. B. Rote Co., Lancaster, Pa., has taken 840 tons of shapes through Herman Wahlson Sons, Lancaster, for a new plant building for Armstrong Cork Co., Lancaster. So far, total volume of work has not shown much seasonal improvement. Prices are soft.

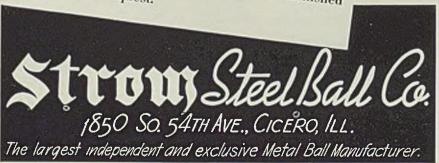
Buffalo — Structural activity has moderated in the absence of large inquiries. Awards include 300 tons for the Hewitt Rubber Corp. plant addition. An addition to Allegheny Ludlum Steel Corp.' plant at Dunkirk, N. Y., involves 150 tons.

Scattle—Little new business of importance has developed and some shops are closed for lack of orders. Coast bidders find land grant rates a handicap in competing with eastern plants for delivery in the interior. It is reported that Bethlehem Steel Co. has taken additional 800 tons for the Vancouver, Wash., plant of Aluminum Co. of America, making a total of 2000 tons. Largest tonages pending include 900 for caisson gates Puget Sound navy yard and unstated amount in coaster gates for Coulee dam, bids April 22.

San Francisco—While structural shape awards were by no means heavy, over 22,000 tons is pending.

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Shape Awards Compared

	Tons
Week ended April 20	10,014
Week ended April 13	7,960
Week ended April 6	14,226
This week, 1939	26,316
Weekly average, year, 1940.	17,194
Weekly average, 1939	22,411
Weekly average, March	19,759
Total to date, 1939	383,629
Total to date, 1940	275,112

Includes awards of 100 tons or more.

Awards aggregated 1453 tons and brought the total for the year to 57,373 tons, compared with 45,626 tons for the corresponding period in 1939. Bethlehem Steel Co. took 700 tons for permanent work in connection with a graving dock for the Mare Island, Calif., navy yard. An additional 400 tons for contractors' work is pending and Columbia Steel Co. is reported low on 1500 tons of sheet steel piling for the same project. New bids are expected to be called for soon for 5300 tons for the appraisers' store and immigration station at San Francisco, bids the first time exceeding the estimate of funds available.

Providence, R. I.—Philips & Davies Inc., Kenton, O., is low on structural steel service and emergency gates, Birch Hill dam, South Royalston, Mass., bidding \$43,563; includes four sets of conduit linings.

Toronto, Ont. — Building activities continue to expand with consequent active demand for structural shapes. Awards for the past week exceeded 2000 tons, and orders pending, including construction work on the Canadian National Railways terminal at Montreal to cost \$3,000,000 this year, total around 5000 tons.

Shape Contracts Placed

- 1208 tons, steel sheet piling with related items, cap plates, shelf angles, bolts, washers, the rods and H-beams, repairs, Lily Pond Harbor of Refuge, Kewcenaw Waterway, Michigan, to Carnegie-Illinois Steel Corp., Pittsburgh through U. S. engineer, Duluth, Minn., bids March 28, award by lot, page 370 spec. 379.
- 941 tons, state highway bridges, various locations, Texas; 422 tons to Virginia Bridge Co., Roanoke, Va., and Mosher Steel Co., Houston, Tex.; 519 tons to Alamo Iron Works, San Antonio, Tex.
- 840 tons, coating building No. 95, Armstrong Cork Co., Lancaster, Pa., to A. B. Rote Co., Lancaster, through Herman Wahlson Sons, Lancaster.
- 800 tons, plant buildings, Vancouver. Wash., for Aluminum Co. of America, to Bethlehem Steel Co., Bethlehem,
- 700 tons, graving dock, specification 9452, Mare Island, Calif., navy yard, to Bethlehem Steel Co., San Francisco.
- 700 tons, addition to post office, St. Paul, for United States government, to Lakeside Bridge & Steel Co., Milwaukee.
- 650 tons, furnace building No. 15, for Armstrong Cork Co., Millville, N. J., to Bethlehem Steel Co., Bethlehem, Pa.
- 565 tons, bridge 34, Gibbon, Wash., for Northern Pacific railway, to American Bridge Co., Pittsburgh.
- 500 tons, lift bridge at Montreal Que., for Canadian National railways, to Dominion Bridge Co. Ltd., Lachine, Que.
- 500 tons, store for C. Woodward at Edmonton, Alta., to Standard Iron Works, Edmonton, Alta.
- 470 tons, five bridges, Connecticut, New York, New Haven & Hartford railroad, to American Bridge Co., Pittsburgh.
- 450 tons, factory building, for Kentucky Macaroni Co., Louisville, Ky., to Beth-

lehem Steel Co., Bethlehem, Pa.

- 300 tons, factory building for Metal Stampings Ltd., Scarborough, Ont., to Frankel Bros., Toronto, Ont.
- 300 tons, building Hewitt Rubber Corp., Buffalo, to R. S. McMannus Steel Construction Co. Inc., Buffalo; John W. Cowper Co. Inc., Buffalo, general contractor.
- 270 tons, pumping stations, Toledo, O., to Ingalis Iron Works Co., Birmingham, Ala.
- 240 tons, additional stories, building, 23-27 Park Row, New York, to Dreier Structural Steel Co., New York,
- 230 tons, theater building, for Royal Theatre Co., Detroit, to Whitehead &

Kales Co., Detroit.

- 230 tons, two-span plate girder bridge, 285.66 feet in length, Springfleld, Vt., to American Bridge Co., Pittsburgh; W. W. Wyman, Inc., Shelburne Falls, Mass., and B. A. Simeone, Inc., Medford, Mass., joint contractors at \$113,-204, bids April 12 to state highway commissioner, Montpelier.
- 210 tons, building, Hygeia Tube & Container Co., Newark, N. J., to Albert Smith & Sons Co., Irvington, N. J., through W. J. Barney Corp., New York.
- 200 tons, state bridge 152, section 104-SF, Pinckneyville, Ill., to American Bridge
- 200 tons, store building, for Sears, Roebuck & Co., Wyandotte, Mich., to



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Whitehead & Kales Co., Detroit.

200 tons, plant addition for Canadian Marconi Co. at Mount Royal, Que., to Dominion Bridge Co. Ltd., Lachine, Que.

200 tons, club building at South Hull Que., for Avalon Club Ltd., to Dominion Bridge Co., Ltd., Ottawa Ont.

200 tons, theater and stores for Famous Players Canadian Corp. Ltd., Toronto, Ont., at Niagara Falls, Ont., to Standard Steel Construction Co., Port Robinson, Ont.

175 tons, two heavy duty mine hoists, to Couer d'Alene Hardware & Foundry Co., Wallace, Idaho.

150 tons, state bridges, Frazier, O., to Fort Pltt Bridge Works, Pittsburgh. 150 tons, science building, University of Louisville, Louisville, Ky., to Louisville Bridge & Iron Co., Louisville, Ky.

150 tons, four cranes for aircraft tendand other equipment for to Western Gear Works, Seattle.

150 tons, escalator supports, John Wanamaker store, Philadelphia, to Bethle-hem Steel Co., Bethlehem, Pa., through Lauter Construction Co., Philadelphia.

125 tons, grade elimination at Lehigh Valley railroad crossing, West Seneca-Ridge Road, Erie county, New York, contract PSC-5386, to Bethlehem Steel Co., Bethlehem, Pa.; Bero Engineering & Construction Corp., North Tonawanda, N. Y., general contractor.

120 tons, alterations to store building, for Montgomery Ward & Co., Charles-

ton, W. Va., to Ingalls Iron Works Co., Birmingham, Ala.

120 tons, bridge No. 100.87, Kans., for Union Pacific railroad, to American Bridge Co., Pittsburgh.

120 tons, subway contract S-9-A- Chicago, to American Bridge Co., Pittsburgh.

Shape Contracts Pending

5300 tons, appraisers' store and immigration station, San Francisco; new bids asked.

4350 tons, sheet piling, dam and spillway, Denison dam, Denison, Tex.; bids opened.

3500 tons. Benjamin Franklin high school. East River drive-116th street, New York.

2000 tons, public school 99, Bronx, N. Y .; blds May 1.

1900 tons, stage 16, viaduct, Eleventh avenue and Thirty-third street, New York, for New York Central railroad.

1700 tons, bakery building, for Loose-Wiles Biscuit Co., Oakland, Callf.

950 tons, steel sheet piling, dike, West-field river, West Springfield, Mass., White Oak Excavators, Inc., Plainville, Conn., low, \$96,367.50, bids to U. S. engincer, Providence.

650 tons, building, Denver, for National Biscuit Co., New York.

627 tons, including 362 tons bearing piles and 165 tons sheet piling, Brea dam, Orange county, California, for United States engineer office; bids April 20.

625 tons, three bridges, relocation Atchi-son, Topeka & Santa Fe railroad, Cad-doa reservoir project on Conchas dam, N. Mex.; blds soon.

500 tons, hangar, Mills Field, Calif.; bids soon.

500 tons, sheet piling, Grand avenue viaduct, Kansas City, Mo.; bids April 30. 500 tons, building for war supply board

on Wellington street, Ottawa, Ont. 500 tons, state highway projects, New

York; bids May 1, Albany. 450 tons, tunnel supports, station 618.39 to 698.39, Continental divide tunnel near Estes, Colo.; S. S. Magoffin, Englewood, Colo., low on general contract at \$471,123.

400 tons, extension to power house, for Atlantic City Electric Co., Atlantic City, N. J.

400 tons, extension to melting building, Massena, N. Y., for Aluminum Co., of America.

400 tons, apartment building at Mon-treal, Que.; Paul H. Craig Ltd., 1405 Bishop street, Montreal, general contractor.

400 tons, apartment house for Kahn & Nathanson, 4685 Grosvenor avenue, Westmount, Montreal, Que.

400 tons, overpass, Delaware, Lackawanna & Western, Route 6, Section 13, New Jersey State highways; bids April 26.

380 tons, two bridges over Caddoa and Mud creeks, Caddoa, Colo., for army engineers.

0 tons, machine shop, Vancouver, Wash., for Aluminum Co. of America. 315 tons, hangar No. 7, Oakland, Calif., port commission; Golden Gate Iron

Works, San Francisco, only bidder. 300 tons, bridge over Rule creek, Caddoa,

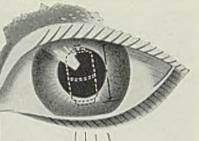
Colo., for army engineers.

300 tons, factory at Leaside, Ont., for Lincoln Electric Co. of Canada Ltd., 65 Bellwoods avenue, Toronto, Ont.

270 tons, underpass near Davis, Solano county, Calif., for state; bids May 1.

270 tons, Winton Terrace apartments, Cincinnati, for Cincinnati metropoli-tan housing authority. 260 tons, Missouri state highway, under-

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engineering, and manufacturing resulted in important savings in cost and time. From idea to finished product, Hackney's facilities were utilized to assure the most practical, economical and satisfactory results.

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DEEP DRAWN SHAPES AND SHELLS

pass; bids April 26.

240 tons, alterations to Douglas elementary school, Chicago, for city.

225 tons, building, National Fire Insurance Co., Hartford, Conn.

180 tons, state bridge, Wellman, Iowa.
170 tons, store building, for F. W. Woolworth Co., Malden, Mass.

170 tons, steel sheet piling, pumping station, Connecticut river, Northampton, Mass.; J. G. Roy & Sons Co., Springfield, Mass., low, \$134,175.78, bids to U. S. Engineer, Providence; work also takes 150 tons, reinforcing steel.

165 tons, including conduit linings, Birch Hill dam, Connecticut river, South Royalston, Mass., B. Perini & Sons Inc., Framingham, Mass., low \$535,829, bids to U. S. engineer, Providence; work also takes 65 tons reinforcing steel.

160 tons, Illinois highway projects; bids April 16.

150 tons, substructure, State street bridge, Chicago; bids April 24.

150 tons, building addition, Allegheny Ludlum Steel Corp., Dunkirk, N. Y.

130 tons, trestle over San Sebastian river, St. Augustine, Fla., for Florida East Coast railway.

130 tons, Georgian creek bridge for Sacramento county, California; blds opened.

130 tons, state bridge, Harrison county, Ohio.

130 tons, steel tunnel ribs for Clearwater dam, Piedmont, Mo.; bids April 23.

120 tons, building, for Camillus Cutlery Co., Camillus, N. Y.

105 tons, schedule 3971, Panama, Bethlehem Steel Export Corp., New York, low; bids April 5.

100 tons or more, shapes, gates, etc., Walla Walla flood control project; bids to United States engineer, Bonneville, Oreg., May 9.

100 tons, radio towers, naval air statlon, Jacksonville, Fla., Aetna Steel Construction Co., Jacksonville, low; bids April 10.

100 tons, library, Haverford college, Haverford, Pa.; blds April 29.

Reinforcing

Reinforcing Bar Prices, Page 87

Pittsburgh — Prices on concrete bars are still weak, with rail steel cut more than new billet material in most cases. A slight resistance has been noted on some jobs but for the most part little improvement has been reported.

Chicago—Quiet in the market is regarded as only temporary, since a large tonnage of bars is pending. Numerous small jobs are in the market, including considerable private work. Foundation and first floor requirements of Northwestern university's \$6,500,000 technical school here are expected out for bids this week.

New York—Reinforcing steel awards are not impressive, but new tonnage being estimated, including grade crossings and a housing project, account for close to 6000 tons, bids on which close before the end of the month. Highway require-

ments are subnormal for this period and bar prices continue subject to shading.

Boston—Concrete reinforcing bar buying is mostly in small lots, few exceeding 100 tons. An exception is 150 tons for a pumping station, Northampton, Mass. A New York contractor is low on a housing project, New Bedford, Mass., 350 tons, which will be placed soon. Bridge and highway requirements are light with inquiry lagging. Prices have made only slight recovery from the weakness of recent weeks.

Philadelphia — While a fair tonnage remains to be closed, the number of new projects is disappointing. Backlogs of some local fabricating shops are shrinking. Prices show no improvement.

San Francisco—Movement of reinforcing material is active and awards last week totaled 3817 tons, bringing the year's average to 43,230 tons, compared with 60,618 tons for the same period last year. Pending business totals more than 10,000 tons.

Seattle-Sizable tonnages are lack-

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FRESH AIR FRESH AIR

TO YOUR WORKERS?

TRUFLO FANS

are built to meet every ventilating requirement. Portable or stationary, they whip fresh air in and foul air out smoothly and evenly. The TRUFLO portable is very useful in bar and tube mills, crane cabs, and around skelp and heat treating furnaces. This fan cools the workers, but doesn't expose them to draughts. In pickling plants, oil or paint shops, the TRUFLO pent house fan removes fumes which affect men and motors. TRUFLO fans assure safe, positive ventilation because they are well designed and sturdily built. The wheel is cast in one piece of high tensile strength aluminum alloy. This gives more power at less cost. Perfect balance reduces excessive weight on the motor shaft. There is a TRUFLO fan suitable for every requirement; do you have a ventilating problem that can stump us?

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Behind the Scenes with STEEL

What Price Glory?

■ This Expense Account is one that only Supersalesman Sam could get away with but it tells a rather interesting story and most emphatically points a ticklish moral:

most	emphatically points a tick-
lish	moral:
4/1	Advertisement for
	girl stenographer\$.50
4/2	Violets for new sten-
	ographer
4/8	ographer
	stenographer 15.00
4/9	Roses for stenogra-
	pher 5.00
4/11	pher 5.00 Candy—for wife75
4/13	Lunch with stenog-
	rapher 6.25 Week's salary for
4/15	Week's salary for
	stenographer 20.00
	Picture show tickets
	for self and wife80
4/19	Theater tickets-self
	and stenographer. 8.80
	Candy—for wife75
	Lillian's salary 25.00
4/23	Theater and dinner
	with Lillian 21.75
4/24	Fur coat for wife-
,	down payment412.00
4/24	Advertisement. for
	new stenographer-

One Among Many

Up in Kalamazoo, Mich., G. H. Allen, president, Allen Elec. & Equip. Co., at one time must have been quite intrigued by one of those guys "working his way through college". He reports what we believe to be a record. At home he receives and pays for 22 magazine subscriptions, just a few of which he has time to look at. Of course, you've probably guessed the moral of this one. That's right—at the office, whether or no, he finds he takes time to read Steel each week, which is quite the natural thing to do.

Dry Land Cruise

■ And down in Dallas, Texas this week the Triple Mill Supply convention swings into action.

These boys always do it up right, and you probably remember that last year they convened enroute to, at, and returning from Bermuda on a chartered boat. Well, this year there'll be no salt air but the 10-car Land Cruise special will probably have its own peculiar aroma. H. H. Allen (Cook's Tours) went whole-hog on the "cruise" program but unfortunately had to cancel the turtle races. Try as they would, not a turtle could be found in proper condition to run, what with the late spring and all. But turtles or no turtles it's Bon Voyage—and don't get seasick.

Puzzle Dept.

■ A few of the more literary members of the class crashed through with the three missing letters to last week's word puzzler, and supplied the correct answer of UNDERGROUND. To get back to something a little tougher: Can you draw three straight lines, each of which will touch four different circles?

Melancholy Baby

■ The sniffles and a dull head, a gloomy day, and the opening ball game across the street at Cleveland's Stadium all combine into something like this:

The problem of working out jokes

Has surely got us a bit daunted. Those which you want, we daren't print;

No doubt, those we print, aren't wanted!

But We'll Live

Maybe next week when Carl de Ganahl, V. P. Fleetwings, Inc. tells you about new developments in stainless steel aircraft, our sulphur and molasses will have taken holt and we'll be happy again.

SHRDLU

ing, pending programs of highway departments in Pacific Northwest states involving only small jobs and no immediate major construction. There is a fair volume of small lots of less than 50 tons each. Mills are practically up to orders and are operating only as delivery demands.

Toronto, Ont. — Small lot buying continues steady. According to plans announced, a number of fair sized orders are pending, which should stimulate sales later this month or early in May. Some 500 tons of reinforcing steel will be required for the Bell Telephone exchange building at Sudbury, Ont., for which A. F. Buyers & Co. Ltd., 1226 University avenue, Montreal, have general contract, and 300 tons are in prospect for agricultural school at St. Damien, Que.

Reinforcing Steel Awards

2600 tons, officers' quarters, Panama Canal Zone, Pacific side, to Bethlehem Steel Co., Bethlehem, Pa.; Tucker & McClure, contractors.

1900 tons, Panama Canal barracks, Canal Zone, Atlantic side, to Bethlehem Steel Co., Bethlehem, Pa.; J. A. Jones Construction Co., contractor.

1100 tons, high and low pressure pumping stations, Toledo, O., to Truscon Steel Co., Youngstown, O.; through A. Bentley & Sons, general contractors.

380 tons, public health service hospital, Lexington, Ky., to West Virginia Rail Co., Huntington, W. Va.; Fleisher Engineering & Construction Co., contractor.

343 tons, steam plant, Oleum, Calif., for Pacific Gas & Electric Co., to Gilmore Fabricators Inc., San Francisco.

302 tons, bachelor quarters, naval air base, Alameda, Calif., to Herrick Iron Works, Oakland, Calif.

300 tons, chemical building, waterworks, Toledo, O., to Bethlehem Steel Co., Bethlehem, Pa.; through J. A. Utley Co., contractor.

260 tons, housing project, Bristol, Tenn.-Va., to Knoxville Iron Works, Knoxville, Tenn.; C. L. Nickolson Co., contractor.

257 tons, public opening, Euclid, O., blds April 5, to Republic Steel Corp., Cleveland, through Paterson-Leitch Co., Cleveland.

250 tons, army air base, Fairbanks, Alaska, to Columbia Steel Co., San Francisco.

250 tons, bureau of reclamation, invitation 38,227-A, Odair, Wash., to Bethlehem Steel Co., Seattle.

Concrete Bars Compared

Ton	S
Week ended April 20 10,57	6
Week ended April 13 15,86	6
Week ended April 6 10,97	2
This week, 1939 4,49	1
Weekly average, year, 1940. 8,47	9
Weekly average, 1939 9,19	7
Weekly average, March 7,46	9
Total to date, 1939 162,18	
Total to date, 1940 135,67	8
Includes awards of 100 tons or more.	

- 230 tons, plant, Belleville, N. J., for Andrew Jergens Co., to Bethlehem Steel Co., Bethlehem, Pa.; through James Stewart Co., contractor.
- Logan-Fontanelle 0 tons, Logan-Fontanelle housing, Omaha, Nebr., to Sheffield Steel Corp., Kansas City, Mo.
- 200 tons, George A. Hoverter housing, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; Berwick Lumber & Supply Co., contractor.
- 150 tons, pumping station, Connecticut river, Northampton, Mass., to Truscon Steel Co., Youngstown, O.; J. G. Roy & Sons Co., Springileld, Mass., general contractor, bid to U.S. engineer, Providence.
- 150 tons, store, Sattler's Inc., Buffalo, to Truscon Steel Co., Youngstown, O.; Siegfried Construction Co., contractor.
- 140 tons, factory addition, Chrysler Corp., Highland Park, Mich., to Truscon Steel Co., Youngstown, O.; through O. W. Burke Co., contractor.
- 135 tons, grade elimination, Dunkirk, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; C. B. Moon Co., Cleveland, contractor.
- 5 tons, dormitory, Stephens college, Columbia, Mo., to Laclede Steel Co., St. Louis.
- 125 tons, seaplane hangar, Floyd Bennett field, New York, to Bethlehem Steel Co., Bethlehem, Pa.
- 24 tons, treasury department project, Minneapolis, to Youngstown Sheet & Tube Co., Youngstown.
- 120 tons, building, Phillips Chemical Co., Glenbrook, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Samworth-Hughes Co., Paterson, N. J., contractor.
- 115 tons, plant addition, B. F. Goodrich Co., Oaks, Pa., to Bethlehem Steel Co., Bethlehem, Pa.
- lo tons, city work, Detroit, to Great Lakes Steel Corp., and Republic Steel 110 tons, Corp.
- 110 tons, factory building, Kentucky Macaroni Co., Louisville, Ky., to Poliak Steel Co., Cincinnati; through Dalhem Construction Co., general contractor.
- 100 tons, bureau of reclamation, invita-tion 27,672-A, Deer Creek, Utah, to Republic Steel Corp., Youngstown, O.
- 100 tons, for Standard Oil Co., Whiting, Ind., to Inland Steel Co., Chicago.
- 100 tons, navy yard building No. 16, Boston, to Bethlehem Steel Co., Beth-lehem, Pa.; through Hughes-Foulkrod Co., Philadelphia, general contractor.
- 100 tons, Gwinn Milling Co., Columbus, O., to Pollak Steel Co., Cincinnati; through Arthur S. Clemens, general contractor.
- 100 tons, Pennsylvania turnpike commission, section 13P3, Bedford, Pa., to Bethlehem Steel Co., Bethlehem, Pa.
- 100 tons, Pennsylvania state highway project, route 1, Dauphin, Pa., to Beth-lehem Steel Co., Bethlehem, Pa.

Reinforcing Steel Pending

- 3000 tons, appraisers' store and immigration station, San Francisco; new bids asked.
- 1200 tons, Sinepuxent bridge, Ocean City,
- 750 tons, Clearwater dam, Piedmont, Mo.; bids April 23.
- 700 tons, graving dock, specification 9450, Mare Island, Calif., navy yard; Bethle-hem Steel Co., San Francisco, low.
- 550 tons, building, Willowbrook state school for mental defectives, Staten Is-

land, N. Y.; bids in.

- 493 tons, flood control project, Walla Walla, Wash.; bids to United States engineer, Bonneville, Oreg., May 9.
- 425 tons (also 12 tons gates) wasteway Yakima Ridge Roza project, Washington state; H. J. Adler Construction Co, Yakima, Wash., general contractor; materials by reclamation bureau.
- 00 tons, substructure State street bridge, Chicago.
- 400 tons, Parkside housing, Unit B, Detroit.
- 375 tons, Missouri Pacific overpass, St. Louis.
- 350 tons, housing project, New Bedford, Mass.; Stolnick Construction Co., New York, low
- 300 tons, Grand avenue viaduct, Kansas

City, Mo.; blds April 30.

- 290 tons, flood control dam, Youghiogheny river, Somerfield, Pa.
- 268 tons, highway work, Riverside county, California, for state; bids May 2.
- 245 tons, store building, Sears, Roebuck & Co., Rochester, N. Y.
- 200 tons, sewer section, Queens, N. Y.; Tomasetti Construction Co., New York,
- 200 tons, viaduct, Eleventh avenue, New York, for New York Central railroad; bids in.
- 200 tons, Lincoln memorial bridge, Macon county, Illinois.
- 164 tons, navy air base, Tongue Point. Oreg.; Western Construction Co., Seattle, general contractor.
- 155 tons, Leevining Creek conduit, Los

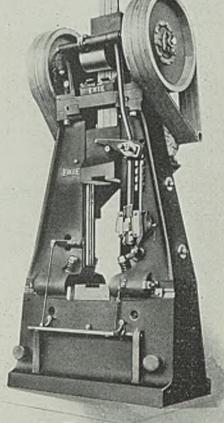


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Type FV self-contained Board Drop Hammer lowers installation costs Permits full utilization of floor space

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TURNINGS ARE MORE EXPENSIVE THAN THE STEEL FROM WHICH THEY COME!

... not in scrap falue, of course, but in their cost of manufacture ... But, you say, we don't intend to manufacture turnings! Yet, you do if you attempt to economize by making ring dies, bushings, forming rolls, etc., from solid steel

With a complete stock of BISCO alloy and tool steel tubing on hand-and with both local and distant deliveries so modernly dependable, it becomes more economical to select your exact requirements from the BISSETT line of tubing and also secure the exact size needed in both inside and outside diameters negrest your individual requirements. In addition to BISCO Non-shrink, oil-hardening tool steel tubing, we furnish from stock stainless steels, alloy steels, etc. A copy of our stock list will be mailed promptly upon request.

THE BISSETT STEEL CO.

900 EAST 67th STREET, CLEVELAND OHIO

-The Market Week-

Angeles; general contract to A. Telchert & Son, 1846 Thirty-seventh street, Sacramento, Callf., at \$806,355.90.

150 tons, Allison division, General Motors Corp., Speedway, Ind.

150 tons, auditorium for school, Bakersfield, Calif.; bids April 25.

130 tons, state highway projects, Middiesex and Monmouth counties, New Jersey; blds May 3, E. Donald Sterner, state highway commissioner, Trenton.

130 tons, Sears, Roebuck & Co., Detroit.

120 tons, train shed, Fisher Body division, General Motors, Flint, Mich.

100 tons, bars and mesh for 32,000 feet of 16-inch concrete water pipe, Cle Elum, Wash.; Pacific Water Works Supply Co., Seattle, general contractor. 100 tons, bridge over Herring run, Baltimore.

Pig Iron

Pig Iron Prices, Page 88

Pittsburgh—Deliveries are steady, with almost no new buying except for a few odd cars. A large part of current shipments is being applied on orders placed before the current price was announced. Blast furnace activity is unchanged, 32 furnaces blowing.

Chicago — Shipments are unchanged from a month ago. By-product foundry coke shipments have eased slightly but still remain ahead of last month. Sales of iron are better, though still spotty and not reflecting a general buying movement.

Boston — Pig iron buying is slightly heavier, and while generally limited to lots for early needs and to maintain stocks, one textile mill equipment builder is in the market for 1000 to 1500 tons. Most larger consumers continue to operate mainly from inventories.

New York — Domestic buying has improved moderately to the best volume so far this year, aided by better demand from soil pipe makers and machine tool builders. Export buying also is more active, including one order for more than 25,000 tons for European shipment. Another foreign inquiry for 30,000 tons is pending.

Cincinnati — Buying has reverted to carload orders for fill-in needs, many melters having covered requirements for this quarter. Shipments reflect a steady melt. Seasonal extension in demand for castings from stove and farm implement makers is still somewhat under previous expectations.

St. Louis — Sales are still confined principally to single carloads, with shipments about the same basis as a month ago. Stove foundries in the St. Louis district are operating three days a week. Because of increased use of stampings, demand on foundries catering to the













ROOMS from \$3



stove trade has been steadily declining.

Philadelphia - Pig iron buying has subsided after a slight spurt early in the month when several lots ranging up to 500 tons were placed. Most consumers are well covered for the remainder of the quarter and see little reason for making additional commitments.

Buffalo - Producers report the slight improvement in pig iron shipments earlier this month is not being sustained, although the letdown is small. Foundry operations vary markedly. Heating equipment manufacturers are calling for little tonnage. Textile equipment and pipe plants are busy.

Scrap

Scrap Prices, Page 90

Pittsburgh-Open-hearth grades, including turnings and heavy melting materials, are weak with little interest shown. Low phos grades also are relatively slow. Railroad specialties are strong and are tending upward, with sales at better levels. Accordingly, quotations have been raised 50 cents.

Chicago - Scrap market at the week end is quiet but with an undertone of strength. No material change has been made in value of No. 1 steel, although dealer-broker trading, such as it is, is almost entirely at \$15.50.

Boston - With inquiry and buying slightly improved, changes in iron and steel scrap prices are limited, with the trend upward on a few grades, including chemical borings and forge flashings.

New York - Buying of steelworks and foundry scrap grades is light, although the New Jersey side is moving slightly more heavy melting steel to eastern Pennsylvania for which shippers are paying \$14, f.o.b. cars for No. 1, 50 cents higher than for barge delivery for export.

Philadelphia - Shipments to consumers have slowed up in some instances but material generally is comparatively scarce and the market is by no means weaker. While No. 1 heavy melting steel is still quoted \$16.50 to \$17.00, it is not believed that much tonnage could be had at the minimum figure. No. 2 steel has been substantiated at \$15.50 by additional small coverage.

Detroit - Strength in foundry grades continues, largely due to acceleration of work on 1941 model die programs. Heavy breakable cast is up \$1; No. 1 cupola up 50

Cincinnati - Quotations are un-

changed in a quiet market, with mills showing no interest in covering future needs.

St. Louis—Price advances of 25 to 50 cents on some specialties are due more to higher market in eastern centers than demand from mills

San Francisco - Apparent bottom prices for scrap have been reached and present movement consists entirely of material stock piles. Some export material is still being shipped but on orders placed last

Steel in Europe

Foreign Steel Prices, Page 89

London (By Cable) - Steel and iron production and consumption in Great Britain have expanded further and producers are unable to fill

the substantial export demand. Swedish ore arrivals have been suspended but other sources continue shipments.

Belgium and Luxemburg report all business with Scandinavia has stopped but makers of bars, structurals and plates are already out of the market, due to heavy bookings. Luxemburg is making some effort to obtain South American business.

Warehouse

Warehouse Prices, Page 89

Pittsburgh — Business has been steady for several weeks. Prices have held well, except in bars and sheets, the latter reflecting cuts in mill prices.

Effective on orders Chicago booked from April 16 mill reductions on flat-rolled steel have been



AMERICAN CHAIN & CABLE COMPANY, Inc.



AMERICAN CHAIN DIVISION AMERICAN CABLE DIVISION ANDREW C. CAMPSELL DIVISION FORD CHAIN BLOCK DIVISION

HAZARD WIRE BOPE DIVISION HIGHLAND IRON AND STEEL DIVISION MANLEY MANUFACTURING DIVISION OWEN SILENT SPRING COMPANY, INC.

PAGE STEEL AND WIRE DIVISION READING-FRATT & CADY DIVISION READING-FRAIT & CADY DIVISION

READING STEEL CASTING DIVISION

WEIGHT MANUFACTURING DIVISION

THE FARSONS CHAIN COMPANY, LTD.

In Canada DOMINION CHAIN COMPANY, LTD.

followed by leading warehouses. Buying is practically even with that of March.

New York—Warehouses have reduced prices on hot-rolled sheets and strip \$4 a ton, effective April 19. Hot sheets now are included in the quantity differential plan. Terne

plate has been cut \$6 and flat wire, round edge, has been lowered to 4.56c

Philadelphia — Minor improvement is noted in some seasonal lines, jobbers report, but on the average sales are about on a par with March.

Nonferrous Metal Prices

	-	——Copper		-						Anti-	
	Electro,	Lake,		Stral	ts Tin,		Lead		Alumi-	mony	Nickel
	del.	del.	Casting,	New	York	Lead	East	Zinc	num	Amer.	Cath-
Aprll	Conn.	Midwest	refinery	Spot	Futures	N, Y.	St. L.	St. L.	99%	Spot, N.Y.	odes
13	11.50	11.50	11.12 %	47.25	46.87 1/2	5.10	4.95	5.75	19.00	14.00	35.00
15	11.50	11.50			46.25	5.10	4.95	5:75	19.00	14.00	35.00
16	11.50	11.50	11.12 1/2		46.75	5.10	4.95	5.75	19.00	14.00	35.00
17	11.50	11.50	11.12 ½	47.50	47.00	5.10	4.95	5.75	19.00	14.00	35.00
18	11.50	11.50	11.12 1/2	47.50	46.87 1/2	5.10	4.95	5.75	19.00	14.00	35.00
19	11.37 1/2	11.50	11.12 1/2	47.37 1/2	46.87 1/2	5.10	4.95	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 rolled20.12
Lead, cut to jobbers8.25
Zinc, 100 lb. base11.00
Tubes
High yellow brass21.06
Seamless copper20.62
Rods
High yellow brass14.26
Copper, hot rolled16.62
Anodes
Copper, untrimmed17.37
Wire
Yellow brass (high)18.56

OLD METALS
Nom. Dealers' Buying Prices

	No.	1		C	0	n	nj	9	0:	i	t	ic	1	ı]	R	e	d	Ī	B	r	a	88			
New																										
Cleve																										
Chica	ago .	,							. ,										7	.3	7	1/2	-7	.6	2	1/2
St. L	ouis		٠	,								٠		٠	٠	٠		٠				7	.75	j-8	8.2	25

Chicago, No. 1	8.75-9.00
St. Louis	
Composition Brass	
New York	
Light Copper	
New York	6.87 1/2 -7.12 1/2
Cleveland	7.00-7.25
Chicago	6.75-7.00
St. Louis	6.75-7.00
Light Brass	
Cleveland	4.00-4.25
Chicago	
St. Louis	
Lead	
	450 455
New York	
Cleveland	
Chicago	
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	
Borings, Cleveland	
Clips, soft, Cleveland	

Brass ingot, 85-5-5, less carloads. .11.75

Standard No. 12 aluminum...14,00-14,25

SECONDARY METALS



Tin Plate

Tin Plate Prices, Page 86

Pittsburgh — Tin plate operations have moved up two points to 63 per cent of capacity, with nearly all the increase coming from cold mills. Releases from can companies are somewhat better, and the export market is still moving upward as shipments from English mills are being curtailed. Shipments to Pacific coast points are larger as consumers take advantage of present freight rates.

Nonferrous Metals

New York—Fresh demand for nonferrous metals dropped to a low level last week but prices held fairly steady.

Copper—Due to renewed competition for business and increased intake of red metal scrap, custom smelters lowered prices for electrolytic ½-cent a pound on Friday to 11.37½c, delivered Connecticut. Mine producers continued to ask 11.50c. Offerings for prompt shipment were tight, however, reflecting in part recent heavy sales for export.

Lead—Buying interest waned but prices held firm at 4.95c, East St. Louis.

Zinc—The domestic market remained in the doldrums with prime western holding steady at 5.75c, East St. Louis. Consumers drew on their reserve stocks as shipments held up fairly well.

Tin—Straits spot fluctuated between 46.50c and 47.50c, in a dull market. The week's close was around 47.37½c. A feature of the market was the drop from £6 to £3 in the spread between spot and futures in London, indicating that the recent technical squeeze shortly will be dissipated.

Iron Ore

Iron Ore Prices, Page 90

Cleveland—Iron ore prices were reduced 50 cents a gross ton last week, when Pickands, Mather & Co. announced several sales for delivery this season on the basis of \$4.45 a ton, delivered at lower Lake Erie ports, for Mesabi nonbessemer iron ore, guaranteed 51.50 per cent natural iron content.

The company also stated it was offering its ores for sale for this year's delivery at this price with the customary differentials. Base price of \$4.45 represents a reduction of 50 cents a ton from prices announced Jan. 3. The complete list of prices, as revised, all per gross ton, for this year's delivery at Lake Erie ports, on a guarantee of 51.50

-The Market Week-

per cent natural iron, follows: Old Range bessemer \$4.75 Mesabi bessemer Old Range nonbessemer 4.60 Mesabi nonbessemer 4.45

When ore prices were advanced 50 cents a ton on March 8, 1937, pig iron was quoted \$1 a ton higher than current levels. The cut in ore, consequently, restores the former relationship between prices of pig iron and its raw material.

Charges for shipping iron ore also have been reduced. Vessel arrangements for the transportation of a round tonnage of ore have been concluded by one of the lake ore shippers at a reduction from last season. Rates in cents per gross ton from various northern points to lower lake ports and changes from a year ago follow:

Net to

	Vessel	Reduction
Head of lakes to	. 70	10
Marquette, Mich., to lower ports	. 63	9
Escanaba, Mich., to lower ports Escanaba, Mich., to	. 52 1/2	7 ½
South Chicago	. 42	6

The unloading rate from hold to rail of vessel currently is 14 cents per ton, the same as last season.

A large shipper also has announced closing of contracts for moving a substantial tonnage of coal at a reduction of 5 cents a ton from last year's rate. Coal shippers simultaneously announced a cut of 50 cents a ton for vessel fuel delivered over coal dumpers. New rates are 40 cents a ton from Lake Erie to head of Lake Superior ports; 50 cents from Lake Erie to South Chicago and Milwaukee; and \$4 for car dumped fuel.

Rate schedules on ore and coal now are almost the same as those prevailing before the advance made

in early 1937.

March consumption of Lake Superior iron ore was 4,087,767 gross tons, against 4,241,839 tons in February and 3,316,691 tons a year ago, according to the Lake Superior Iron Ore association. First quarter consumption of 13,618,914 tons compares with 9,095,937 in the 1939 pe-

Ore stocks as of April 1 were about 4,000,000 gross tons less than a year ago. Comparisons follow:

Iron Ore on Hand

On Lake At Furnaces Erie Docks Total

April 1,

1940 ... 18,411,970 3,450,332 21,862,302 Month ago 22,086,676 3,880,198 25,966,874 Year ago. 21,054,249 4,817,875 25,872,124

Duluth-Oliver Iron Mining Co., United States Steel Corp. subsidiary, has stated it will accept business for 1940 delivery on the basis of \$4.45 per gross ton for Mesabi nonbessemer ore, delivered lower lake ports.

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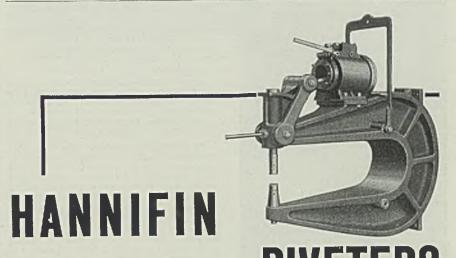
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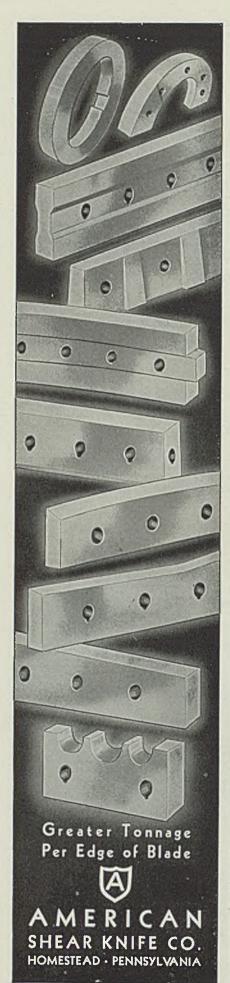
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Construction and Enterprise

Michigan

DETROIT—Hudson Mfg. Co. Inc., has been formed with \$25,000 capital to deal in refrigerating plants, by James L. Hudson, 4107 Cass avenue, Detroit.

DETROIT—McLouth Steel Corp. has given contract to Walbridge-Aldinger Co., Detroit, for an addition to cost about \$30,000.

DETROIT—Detroit Bevel Gear Co., 813 Joseph Campau avenue, is having plans made by Shreve, Anderson & Walker, 914 Marquette building, for a 1-story addition to cost about \$55,000.

DETROIT—Sunday Air Conditioning Co., 1553 Penobscot building, has been formed with \$150,000 capital to manufacture air conditioners, by James J. Sunday, 5250 Bishop road, Detroit.

FLINT, MICH.—A. C. Spark Plug division of General Motors Corp. is building a two and four-story plant, 250 x 500 feet, including a central heating plant and electric power installation. Entire cost is estimated at about \$1,500,000. L. Clifford Goad is president and general manager.

LANSING, MICH.—McLouth Air Conditioning Corp., has been formed with \$15,000 capital to manufacture air conditioning equipment, by Bruce F. McLouth, 750 East Main street, Lansing, Mich.

YPSILANTI, MICH.—United Stove Co. has given contract to the Austin Co., Cleveland, for a plant addition to cost about \$75,000.

Ohio

CLEVELAND—Warner & Swasey Co., 5701 Carnegle avenue, has given contract to Sam W. Emerson Co., 1836 Euclid avenue, for \$120,000 factory addition, (Noted April 1.)

CLEVELAND—Arthur G. McKee & Co., 2422 Euclid avenue, has been given contract by Carnegle-Illinois Steel Corp., Pittsburgh, to design and construct a blast furnace at Rankin, Pa., replacing No. 3 stack of Carrie furnace.

CLEVELAND—Grabler Mfg. Co., 6565 Broadway, will build open crane runway 36 x 120 feet. Edward H. Blywise is president and treasurer. Contract will be let soon by Christian, Schwarzenberg & Gaede, architects, 1836 Euclid avenue.

CLEVELAND—Danco Co., recently organized, 1385 Mathews avenue, is nearly ready for production of sheet metal fabrication, including cabinets, in plant now being equipped. George Danielson is president and Edmund D. Evans, 3191 West 117th street, is secretary-treasurer.

CLEVELAND — Kaye-Zee Mig. Co., Karl J. Ertle, Guardian building, secretary treasurer, is preparing to manufacture restaurant, hotel and other equipment in plant containing about 6500 feet of space. Production formerly was let to other manufacturers.

CLEVELAND—H. K. Ferguson Co., Hanna building, has been awarded contract for soap plant at Dallas, Tex., for Procter & Gamble Co., seven stories, 120 x 300 feet, heavy flat slab concrete. Includes facilities building for operating and maintenance departments and several equipment and controlling structures are included. Present power plant will be completely revised, including installation of high-pressure boliers and turbines. Henry Manley, 655

Fifth avenue, New York, is engineer. Field work will start May 1.

NEWCOMERSTOWN, O.—Sterling Faucet Co., whose plant was burned in March, 1939, will re-establish itself at Morgantown, W. Va. Stock-selling campalgn to hold industry here failed.

NORTH BALTIMORE, O.—City council has plans for a municipal electric power plant, including two 450-horse-power and one 375-horsepower diesel engine-generator units and accessories, to cost about \$195,000. C. J. Simon, Evans Central building, Van Wert, O., is consulting engineer.

WARREN, O.—Packard electric division of General Motors Corp. will build two additions with 75,000 square feet floor space enlarging plant to 350,000 square feet. One building will be used for manufacturing, the other for offices and service. Plans being made by C. M. Gross of Delco Remy division, Anderson, Ind. B. N. McGregor is general manager at Warren and E. E. DeBolt is purchasing agent.

WILLOUGHBY, O.—Village has purchased two acres adjoining Nickel Plate railroad as site for future municipal electric light plant. C. B. Todd is mayor.

WOOSTER, O.—Wooster Brass Co. has been incorporated with \$75,000 capital to operate a brass manufacturing plant here, specializing in fire department equipment. John G. Schellin, formerly with Akron Brass Mfg, Co. is behind new company. Idle plant 55 x 225 feet, 1 and 2-story, on East Bowman street has been leased, will be remodeled and equipped for production in six to eight weeks.

Connecticut

PORTLAND, CONN.—Robert Gair Co., 155 East Forty-fourth street, plans boll-crhouse in connection with its new plant, which will be erected on an eight-acre tract. Electric power equipment will be about \$125,000. (Noted March 25.)

Vermont

SPRINGFIELD, VT. — Fellows Gear Shaper Co. is building a 1-story assembly building, 20×250 feet, to cost about \$40,000, with equipment.

SPRINGFIELD, VT.—Vermont Foundries Inc. is building a 1-story foundry addition, 100 x 102 feet, costing \$40,000 with equipment. General contract to Harty Blaney Construction Co., 25 Huntington avenue, Boston.

New York

LONG ISLAND CITY, N. Y.—Flush Metal Partition Corp. has bought two-story plant 100 x 100 feet at 46-10 Lieventh street, Long Island City and adjoining lot with about 5000 square feet space for future expansion.

NIAGARA FALLS, N. Y.—E. I. du Pont de Nemours & Co., Wilmington. Del., is expanding its plant here at cost of about \$400,000.

SILVER CREEK, N. Y.—Ielfield Machinery Co., Central avenue, will build a 1-story factory at cost of \$40,000, including equipment.

New Jersey

JERSEY CITY, N. J.-American Can

-Construction and Enterprise-

Co., 230 Park avenue, New York, will build a 1-story addition 140 x 280 feet, costing about \$500,000. C. G. Preis, 230 Park avenue, New York, is engineer.

NEWARK, N. J.—Public Service Electric & Gas Co., Public Service Terminal, has plans under way for a new electric testing laboratory in the Irvington district to cost more than \$300,000, F. P. Faurchild is company engineer.

NEWARK, N. J.—Hygienic Tube & Container Co., 34 Avenue L, will build a 2 and 3-story addition and a 1-story 32 x 50-foot boller house and compressor room. General contract has been awarded W. J. Barney Corp., 101 Park avenue, New York. Cost is about \$150,000.

PERTH AMBOY, N. J.—Barber Asphalt Corp., State street, plans additions and alterations, including new equipment, piping, tanks and other steelwork, to cost about \$250,000. General contract has been awarded M. W. Kellogg Co., 225 Broadway New York,

Pennsylvania

OIL CITY, PA.—Pennzoil Co. Inc., Drake building, will add a cracking plant to its refinery at cost of about \$40,000. P. M. Robinson, care owner, is engineer.

OIL CITY, PA.—Keystone Public Service Co., 325 Seneca street will build a 1-story power plant addition, 60 x 100 feet, including a 3000-horsepower boiler and 500-kW. pressure turbine. General contract has been awarded to L. O. Bouquin Co., Oil City. Cost will be about \$300,000.

SHARON, PA.—Sharon Tube Co., North Water avenue, Meyer Yanowitz, superintendent, is planning a plant addition.

YORK, PA.—York Ice Machinery Corp. has been awarded a contract for cooling system for Marshall Ford dam at Rutledge, Tex. Its purpose is to dissipate heat generated in concrete mass by chemical action in setting.

Illinois

CHICAGO—Goodrich Electric Co., 2935 North Oakley avenue will take bids soon on a factory addition to cost about \$40,000. A. S. Alschuler, 28 East Jackson boulevard, is architect.

CHICAGO — Peabody Coal Co., 231 South LaSalle street, will build complete coal-washing plant at its Peabody mine No. 7, near Kincaid, Ill., to cost \$1,-350,000.

MARSEILLES, ILL.—City council plans municipal electric light and power plant to cost about \$200,000. Samuel R. Hunter, 608 South Dearborn street, Chicago, is consulting engineer.

Indiana

COLUMBUS, IND.—Noblitt-Sparks Industries Inc., Seventeenth street, will install electric power equipment in an addition to its metal stampings division. Entire project will cost about \$60,000.

INDIANAPOLIS—Allison Motor Engineering division of General Motors Corp. has awarded contract to National Concrete Fireproofing Co., Citizens building, Cleveland, for a four-unit plant addition. (Noted April 15.)

KOKOMO, IND.—Continental Steel Co., West Markland avenue, will install electric power equipment in a 1-story addition, 67 x 140 feet, estimated to cost \$65,000, with equipment, L. H. Mand-ville is company engineer.

MARION, IND.—Indiana General Service Co., O. M. Drischel, general manager, Marion, will build transmission and distribution lines in 14 counties, at cost of \$2,600,000, under state public service commission permission.

Alabama

MOBILE, ALA.—Alabama Power Co., Birmingham, Ala., has started work on \$4,000,000 steam generating plant at Chickasaw, Ala., to increase capacity from 8000 to 40,000 KW. A. D. Quackenbush is company's divisional manager.

Georgia

MACON, GA.—Georgia Power Co. has started construction of \$4,000,000 steam generating plant. Cornell-Young Co., First National Bank building, has been awarded contract for concrete substructure.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids as follows: April 30, schedule 1287, motor-driven light-duty engine lathe; schedule 1295, motor-driven omniversal horizontal milling machine for



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Mare Island, Calif.; schedule 1293, two motor-driven turret lathes for Mare Island, Calif.; schedule 1304, motor-driven air compressor for Seattle, Wash.; schedule 1315, single spot electric welding machine for Alameda, Calif.; schedule 1321, single compartment monorail type externally heated paint drying oven for Alameda, Calif.; schedule 1343, portable electric saw for Alameda, Calif.

Missouri

ST. LOUIS—Mines Equipment Co., 1909 South Kingshighway, will build a 1story plant adultion, 100 x 140 feet, N. I. Balley, 26 Fern Ridge, Valley Park, Mo., is architect.

Wisconsin

KAUKAUNA, WIS.—Kaukauna utilities commission, H. F. Weckwerth, superintendent, will open bids April 26 for structural steel for a new power plant structure. Mead, Ward & Hunt, Madison, Wis., are engineers.

KENOSHA, WIS. — Kelvinator Corp. will build an addition, 240 x 240 feet, on Thirtieth avenue, to cost about \$175,000, including electric power equipment.

MILWAUKEE — Ampco Metals Inc., 3831 West Burnham street, Carl J. Zalser, president, will erect a 3-story office building, 45 x 100 feet, present plant space occupied by these dapartments to be used in expanding machine shop. Cost is about \$100,000.

Texas

DALLAS, TEX.—Paddock Engineering Co. of Texas, has been formed with \$1000 capital to deal in steel and Iron, by Pascal P. Paddock, A. L. Elsenman and Harry Stanfield.

PAMPA, TEX.—Dwyer-Boynton Machine Co. has been incorporated with \$20,000 capital to manufacture and deal in machinery, by J. Emmet Dyer, H. H. Boynton and C. M. Jeffries.

Kansas

STERLING, KANS.—Bond Issue of

\$80,000 has been authorized to finance improvements to power plant and equipment, including diesel generating set, switchboard and feeder lines. Robert F. Peart is city manager. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is consulting engineer.

South Dakota

SIOUX FALLS, S. DAK.—C. M. Whitfield, city auditor, taking bids to May 6 for furnishing complete, three KVA transformers for sewage treatment pumping plant; also equalizing tank and accessories; gas holder foundations; erect pressure gas holder and starting equipment for sewage pumps. R. E. Bragstad is city engineer. Greeley & Hansen, 6 North Michigan avenue, Chicago, are consulting engineers.

Iowa.

WATERLOO, IOWA—Rath Packing Co. will build a 1-story heating plant addition, 33 x 80 feet, costing about \$100,000. General contract to S. S. Sollitt, 109 North Dearborn street, Chicago.

Idaho

BOISE, IDAHO—City has applied to WPA for aid in constructing sewage disposal plant costing about \$300,000. Proposed bond issue for this purpose was defeated about two years ago.

California

LOS ANGELES—Atlas Spring Mfg. Co. Inc. has been formed with \$40,000 capital. Benjamin Elconnin, 612 Hillstreet building, Los Angeles, is representative.

LOS ANGELES — Norris Stamping & Mfg. Co. has been formed with \$500,000 capital. C. B. Runkle, Bank of America building, is representative.

LOS ANGELES — Steel Derrick Construction Co. has been formed with \$25,000 capital. Carleton B. Wood, Financial Center building, Los Angeles, is representative.

LOS ANGELES-Anderson Die Casting

& Engineering Corp. will build a 1 and 2story plant on East Sixtieth street, with 20,000 square feet floor space, to cost about \$25,000.

Oregon

BONNEVILLE, OREG.—Capt. R. H. Elliott, United States engineer, has called bids May 9 for a flood control project near Walla Walla, Wash., including dam 3200 feet long, 145 feet high. Will require 493 tons merchant bars, 76 tons fabricated steel pipe, 69 tons cast iron pipe and other steel and iron material. Specification 694-40-180.

Washington

CHEHALIS, WASH.—Washington Asphalt Co., Seattle, has been given a contract by Lewis county public utility district No. 1 for constructing 204 miles of power lines, subject to REA approval.

SEATTLE—Western Gear Works has been awarded a contract for airplane carrier cranes and equipment for the navy, totaling \$282,000.

Canada

HAMILTON, ONT. — Canadian Industries Ltd., Burlington and Ottawa streets, will erect a plant addition costing \$20,000.

HAMILTON, ONT.—Canadian Westinghouse Co. Ltd., 286 Sanford avenue North, D. P. Brown, engineer, is receiving bids for additions and alterations to plant on Aberdeen avenue.

HAMILTON, ONT. — Dominion Foundries & Steel Ltd., Depew street, has let general contract to Frid Construction Co., 128 King street, East, for a hot mill and foundry addition. Prack & Prack, St. James street South, are architects.

LEASIDE, ONT.—Mathers & Haldenby, architects, 96 Bloor street, are taking new bids on plant on Copeland avenue for Lincoln Electric Co. of Canada Ltd., 65 Bellwoods avenue, Toronto, Ont.

MALTON, ONT.—Canadian Associated Aircrafts Ltd., 1050 Beaver Hall Hill, Montreal has given contract to Redfern Construction Co. Ltd., 36 Toronto street, Toronto, for a 2-story plant addition to cost \$100,000. T. Pringle & Son, 36 Toronto street, Toronto, are engineers.

OTTAWA, ONT.—Modern Machine Co. Ltd., 344 Queen street, Leslie I. Finnie, president, plans construction of \$60,000 plant.

OTTAWA, ONT.—Ottawa Aircraft Ltd., 301 Slater street, has let contract to Doran Construction Co., 78 Bank street, for an airplane plant costing \$60,000 on Bowesville road.

TORONTO, ONT.—Toronto Iron Works Ltd. has given general contract to Evan S. Martin, 16 Saulter street for a machine shop building on Eastern avenue, H. G. Duer, 910 Lumsden building, is architect.

WESTON, ONT.—Canada Cycle & Motor Co. Ltd. has given general contract to Ramsay Contracting Co. Ltd., 39 Indian Road Crescent, for \$30,000 addition to its plant on Dufferin street East. T. Pringle & Son, 36 Toronto street, Toronto, are engineers.

DRUMMONDVILLE, QUE. — Canadian Celanese Ltd. has let general contract to Stewart Construction Co. Ltd., 7 Dufferin street, Sherbrooke, Que., for a plant addition to cost about \$150,000.

MOUNT ROYAL, QUE. — Canadian Marconi Co., 211 St. Sacrement street, Montreal, has let several contracts for a \$35,000 addition to its plant at 2440 Trenton avenue, Mount Royal.



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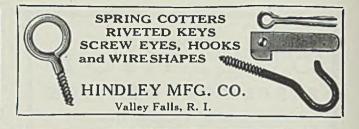
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Bids Wanted

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 for the standard property of the standard p 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. 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 falled to submit proposals. One set upon request and when considered in the interests of the Government, will be furnished, in the discretion of the Commissiener, 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., April 4, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1. P. M., Standard Time, May 3, 1940, for construction of the U. S. P. O. at Waverly, 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 Comfurnished, 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 Works Agency.

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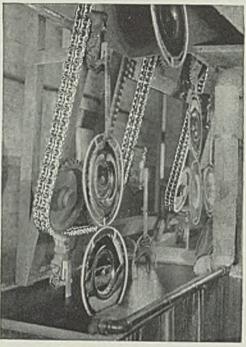
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HERE'S HOW SILVERLINK ROLLER CHAIN CUTS PRODUCTION COSTS!





ELECTRO PLATING

Because it is available in either bronze or stainless steel, installations even in the presence of the acid fumes from a plating bath are safely made with Silverlink Roller Chain.

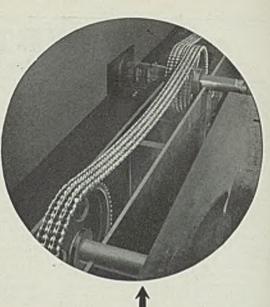
HIGH strength, great flexibility, accuracy, smoothness, stability and long life are features of Silverlink Roller Chain which help speed work and cut costs.

A complete range of sizes, sprockets and attachments simplify any conveyor or drive problem. And Link-Belt's abundant experience and effective engineering help are at your command.

Send for Roller Chain Engineering Data Book No. 1757.

LINK-BELT COMPANY

Indianapolis, Chicago, Philadelphia, Atlanta, Dallas, San Francisco, Toronto. Branch offices and distributors located in principal cities.



BETTER FINISH ON STEEL PLATES

Empire Sheet & Tin Plate Co. in the modernization of their Mansfield, Ohio, plant used Silverlink Roller Chain drives to improve their cold-rolling mill operation. As compared to gear drives, their smoother operation resulted in a better finish of steel plates; maintenance expense was greatly reduced and the initial cost was only one-ninth as much as gears.

LOWERS SELLING PRICE





Because they developed their honing and reaming machine with Silverlink Roller Chain as the internal transmission instead of a series of gears, the Automotive Maintenance Machinery Co., North Chicago, Illinois, were able to cut costs and keep their selling price advantageously low.

LINK-BELT Silverlink ROLLER CHAIN

