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# STEEL

ESTABLISHED 1882

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February 19, 1940

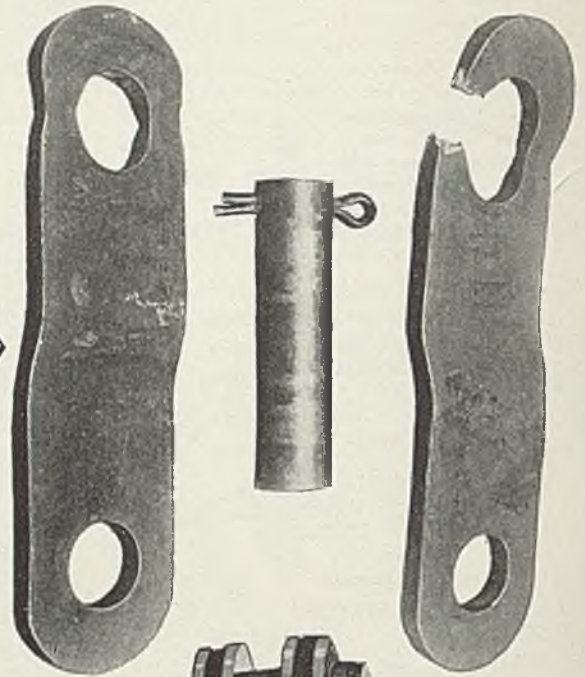
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PRODUCTION • PROCESSING • DISTRIBUTION • USE

February 19, 1940



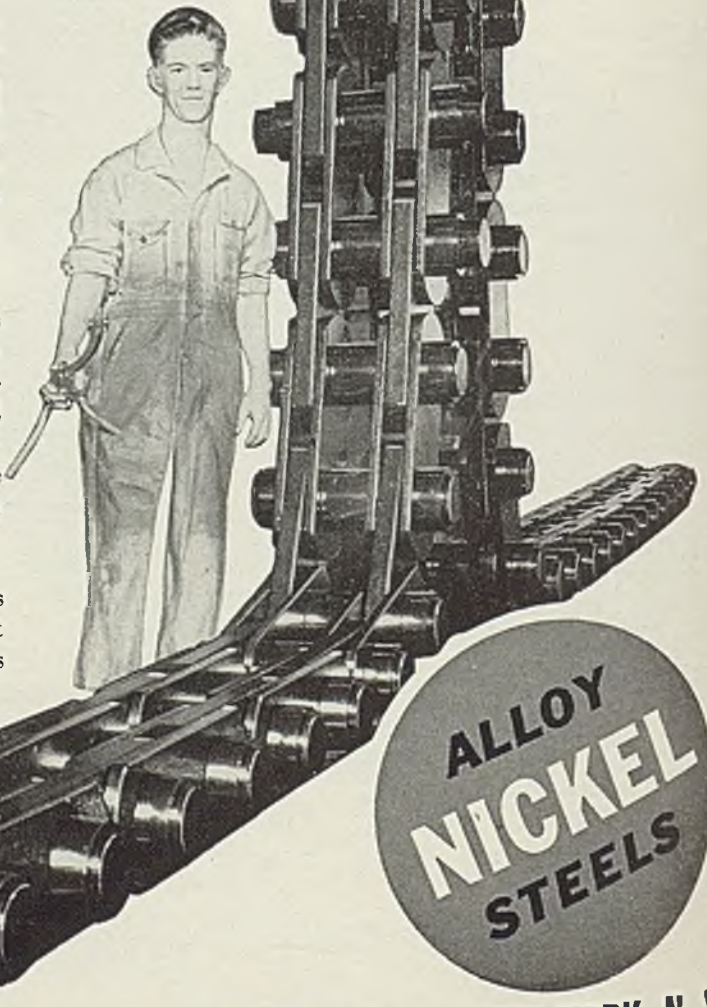
*This test*  
**CHANGED**  
*chain*  
*design*



This destruction test, pictured above, made during 1934, opened new fields for applications of long pitch chains, where maintained accuracy is vital in transmitting power. The properties of Nickel alloy steels, with their high strength/weight ratio, permitted modern redesigning which cut weight—and costs—over heavier chains formerly forged from plain carbon steel. This 10" link showed an ultimate strength of 455,000 lbs., a yield point of 388,000 lbs. — 30% higher than U. S. Engineer specifications.

Roller chains, with 12 $\frac{1}{4}$ " pitch, control roller gates on Mississippi River Dam 14, LeClaire, Iowa. Link-Belt Company used Nickel alloy steels to specifications of U. S. Engineer Office. Side bars are SAE 3140, Brinell 300-341, rollers SAE-3140, 300-341 Brinell, and pins SAE 3245, 340-380 Brinell. Triple width assemblies have an estimated ultimate strength of 2,250,000 lbs.

Dams on the upper Mississippi control water levels to provide navigable channels and guard against sudden floods. Dam gates are moved by roller chains of Nickel alloy steels. On hard jobs you can safeguard performance, keep costs down, by specifying Nickel alloy steels for all highly stressed units.



**THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.**

STEEL



## As the Editor Views

### *The News*

■ **DECLINE** in steel output is less precipitous. Last week (p. 25) production dropped two points to 69 per cent of capacity. Ingot output remains in excess of new business so that further declines are in order. Under prevailing conditions (p. 85) current buying is for early needs only and consumers tend to deplete the inventories they accumulated in the last quarter of 1939. Although some industries, as aviation (p. 35) and machine tools (p. 29), reflect great activity, the general business trend cannot be discerned far ahead and there are uncertainties. Scrap prices are weak. Export business appears likely to continue brisk, at least as long as war continues to dominate Europe.

The most critical business problems looking for solution today have to do "with the well-planned and widespread propaganda against the country's economic system," members of the American Institute of Mining and Metallurgical Engineers were told (p. 21) at their convention last week, the question being: Will business seize the opportunity to justify itself at the court of public opinion or will it continue to permit politicians to harrass it and ultimately subdue and conquer it?" . . . Criticism of trends in government also were voiced (p. 40) at the annual conference at Del Monte . . . More "Modern Pioneers" dinners last week (p. 26) laid emphasis on the need for perpetuating our patent system.

Last week the house committee investigating the national labor relations board revealed evidence (p. 32) the board has been violating the law prohibiting federal agencies from using public funds to lobby for their own interests. The testimony has been placed before the attorney general . . . Industrial spokesmen (p. 23) favor extension of the reciprocal trade agree-

ments program, believing it represents a marked improvement over previous approaches to foreign trade problems . . . Shortage of semiskilled and skilled labor (p. 28) again is becoming a problem . . . Steel industry expects to spend \$146,000,000 for equipment during 1940 as compared (p. 28) with \$121,000,000 in 1939.

An authority discusses (p. 54) the factors that must be considered in selecting sling chains. . . . Laboratory tests indicate (p. 60) that flame treatment has important possibilities for strengthening highly stressed parts locally in regions of excessive stress concentrations. . . . Through utilization of a new gas-powered truck cost of handling axle housings (p. 64) has been reduced 40 per cent. . . . Unusually rapid construction of a new office building (p. 49) was made possible by using cellular steel floor, partition and roof sections, bonded metal paneling for walls and other features. . . . New hydraulic punching unit employing balanced-spring principle (p. 74) reduced time in punching holes.

Important questions in connection with ash in blast furnace coke are (p. 70): How much money can be spent economically in coal preparation and to what extent is it economical to prepare this coal. . . . A new vertical combination method (p. 71) is proving successful in flame hardening rolls. . . . Thin-plate structural members, with sheet-steel roofs and wall sections (p. 49), feature a novel type of building construction developed in England. Costs are lowered and maximum structural strength is obtained with a minimum of materials. . . . Ventilated buffs (p. 80) permit faster and more economical work. . . . A study of the toxicity of welding fumes (p. 80) is in progress.

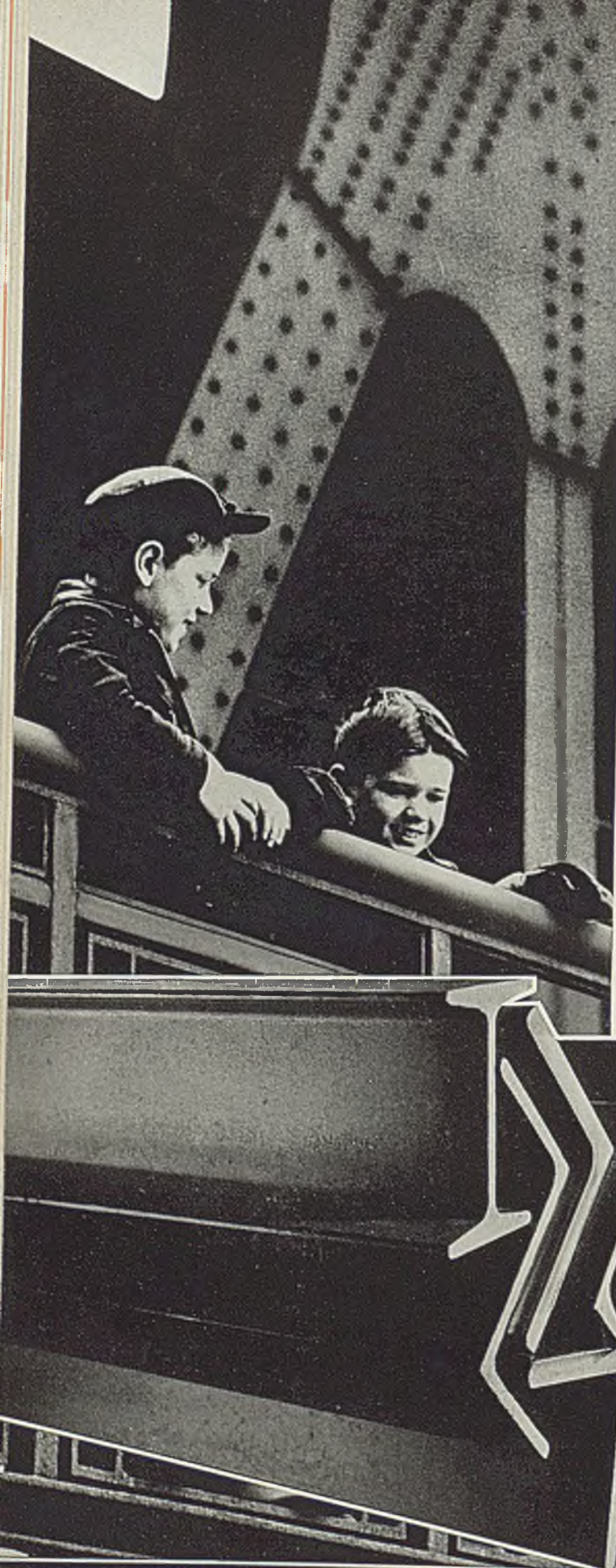
### **Business and Government**

### **Study Coal Preparation**

### **Expansion Budgets Up**

*EC Kreutzberg*





# “My Dad Built this Bridge

Sure, he's proud of his Dad! And, his Dad and numerous other structural shop executives are proud of the bridges and buildings they fabricate with structural sections and plates made by Inland.

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# Must Combat Propaganda Against Country's Economic System

*Mining and Metallurgical Engineers told well-conceived public relations program by industry would effectively refute fallacious schemes and preserve free enterprise*

■ ASSERTING that American business has shown remarkable vitality in the face of many handicaps and discouragements over the past few years, Merlin H. Aylesworth, former president, National Broadcasting Co., New York, declared in that city last week that the most critical business problems looking for solution today have to do "with the well-planned and widespread propaganda against the country's economic system."

Speaking at the 152nd meeting of the American Institute of Mining and Metallurgical Engineers at the Engineering Societies building, Feb. 12-15, he said that these problems converge in a big public relations job for the combating of a program of propaganda which involves many fallacies and crackpot schemes.

"The question is," Mr. Aylesworth declared, "will business seize the opportunity to justify itself at the court of public opinion or will it continue to permit politicians to harass it and ultimately subdue and conquer it? I am confident that business now sees the violent necessity of public enlightenment as to its processes and will not only preserve free enterprise but the American system."

## Optimistic About the Future

Mr. Aylesworth said that "for ten long years American business had been criticized, denounced and derided. It has been abused by muddle-headed economists, terrorized by political charlatans and attacked on all sides with all sorts of weapons by socialists, communists, and that wide assortment of fuzzy thinkers Theodore Roosevelt delighted in calling 'the lunatic fringe.'"

"During this period a tidal wave has threatened to submerge industry; a Chinese wall of laws, rules and regulations limiting its development and circumscribing its activities has been erected around it, and a deep cellar is now being dug under it to accelerate its expected collapse."

However, notwithstanding, he was

optimistic about the future of American industry. Instead of capitulating to the forces now assailing it, it is still holding out and is now showing unmistakable signs of a vigorous comeback. A well-conceived public relations program would assure its success, he declared.

United States is far better prepared to maintain peace than ever before in its history, according to Lieut. Col. L. A. Codd, executive secretary, Army Ordnance association, and editor, *Army Ordnance*, Washington. This is true, he said, because opinion of the public regarding national defense has changed in recent years and because government and industry are co-operating in a comprehensive campaign of preparedness.

Calling attention to the work of

Congress this past year in furthering this objective, Colonel Codd declared "the first of two most commendable steps of Congress was the approval of educational orders to American industry for production of military armament in time of peace, while the second was the procurement of a stock pile of strategic materials essential for our armed forces."

The meeting attracted an attendance of over 2400, a figure comparable with the records of the past two years, and provided a program of broad interest to iron and steel and metalworking industries. The Iron and Steel division devoted sessions to chemistry of steelmaking, control of surface qualities of steel, carbon and low alloy steels, and diffusion and decomposition in austenite and austenitic stainless steels,



■ Meeting of American Institute of Mining and Metallurgical Engineers in New York last week was addressed by this group. Left to right: Merlin H. Aylesworth, former president, National Broadcasting Co.; Donald B. Gillies, vice president, Republic Steel Corp., and retiring president, A.I.M.E.; Herbert G. Moulton, consulting engineer, and president-elect, A.I.M.E.; and Lieut. Col. L. A. Codd, executive secretary, Army Ordnance association. Wide World photo





Louis D. Ricketts

Recipient of A.I.M.E. James Douglas medal

in addition to a series of committee luncheons.

The Institute of Metals division conducted sessions on copper and silver alloy systems, alloys of cobalt and general physical metallurgy, and participated in a joint meeting with the Iron and Steel division on recrystallization, as well as holding a session of its own on this subject.

Herbert G. Moulton, consulting engineer, New York, was inducted into the office of president at the annual banquet at the Waldorf Astoria, Feb. 14, succeeding Donald B. Gillies, vice president, Republic Steel Corp., Cleveland. Various medals and honors were conferred upon this occasion.

Erle V. Daveler, vice president, Utah Copper Co., and W. M. Peirce, chief of research, New Jersey Zinc Co., are new vice presidents. New directors include: Holcombe J. Brown, consulting engineer, Boston; Frank A. Wardlaw Jr., assistant general manager, Inspiration Copper Co., Inspiration, Ariz.; and Felix E. Wormser, secretary-treasurer, Lead



Frank T. Sisco

Elected chairman, Iron and Steel division, A.I.M.E.

Industries association, New York.

The James Douglas medal for 1940 was awarded to Louis D. Ricketts, consulting engineer, Pasadena, Calif., for "inspirational leadership and distinguished achievements in the metallurgy of copper."

The Anthony F. Lucas medal for 1940 was presented to Everett L. DeGolyer, DeGolyer, McNaughton & McGee, New York, consulting engineers, "for initiating applied geophysics, directing early practical seismic exploration, and fostering applied science in finding, developing and producing oil."

The Robert Woolston Hunt medal for 1940 was awarded to Axel Hultgren, professor of metallography, Tekniska Hogskolan, and Gosta Phragmen, professor, Metallografiska Institutet, both of Stockholm, Sweden, for their paper "Solidification of Rimming-Steel Ingots," presented at the Institute of Metals di-



Alden B. Greninger

Recipient of A.I.M.E. Institute of Metals division award

vision meeting in Detroit, October, 1938.

The J. E. Johnson Jr., award was given to Peter V. Martin, assistant division superintendent, coke plant and blast furnaces, Carnegie-Illinois Steel Corp., Gary, Ind., in recognition of his paper, "Effect of the Solution-Loss Reactions on Blast Furnace Efficiency," presented at the Cleveland meeting of the Blast Furnace and Raw Materials committee, April, 1939.

Honorary membership was conferred upon Henry Krumb, consulting engineer, New York, and vice president of the institute for the past 12 years, "in recognition of his notable attainments as an engineer; of his constant and effective efforts in behalf of the profession; and of his never-failing and wise counsel in the administration of the institute's affairs during critical years."

The Institute of Metals award for 1940 was presented at the Institute

of Metals division dinner at the Biltmore hotel, Feb. 15, to Alden B. Greninger, assistant professor of metallurgy, graduate school of engineering, Harvard university, Cambridge, Mass., for his paper, "The Martensite Transformation in Beta Copper-Aluminum Alloys."

#### Division Chairmen Introduced

Frank T. Sisco, editor, *Alloys of Iron Research*, Engineering Foundation, New York, was introduced as the newly elected chairman of the Iron and Steel division; and Edmund M. Wise, staff advisor, research laboratories, International Nickel Co. Inc., Bayonne, N. J., as newly named chairman of the Institute of Metals division. (STEEL, Feb. 5, p. 41.) Charles E. Lawall, president, University of West Virginia, Morgantown, W. Va., was announced as the new chairman of the Coal division.

Charles H. Herty, Jr., research and development department, Bethlehem Steel Co., Bethlehem, Pa., presented the seventeenth Howe memorial lecture before the Iron and Steel division, his subject being "Slag Control." Mr. Herty said that slag control in the modern sense means far more than the chemical analyses of the slag, the taking of tests by the furnace man to judge quality and the making of additions to a furnace to correct slag conditions. Fundamentals of slag control, he indicated, go far back into the prenatal history of the steel melt and affect the nature of the product in many ways.

Edgar H. Dix Jr., chief metallurgist, Aluminum Research Laboratories, Aluminum Co. of America, New Kensington, Pa., delivered the nineteenth annual Institute of Metals lecture on the subject "Acceleration of Rate of Corrosion by High Constant Stresses." He declared that metal structures in service are almost in-

(Please turn to Page 66)



Edmund M. Wise

Elected chairman, Institute of Metals division, A.I.M.E.



# Steel Leaders Favor Reciprocal Trade Treaty Act in Principle

NEW YORK

■ EXTENSION of the reciprocal trade agreements act generally is favored by steel industry leaders, especially those in close touch with foreign trade. While the industry submitted no formal testimony before the house ways and means committee at hearings recently concluded in Washington, spokesmen privately express the opinion the trade agreements program represents marked improvement over previous approaches to foreign trade problems.

While few regard the act as perfect, consensus is that there has been a conscientious nonpartisan effort by Secretary of State Hull and associates in developing the program and that already it is stimulating foreign trade and improving our world economic relations.

The act is due to expire June 12 unless congress again authorizes extension. House ways and means committee last week recommended a 3-year extension.

Foreign trade in iron, steel and allied products has gained steadily since the act was passed in 1934. Extent to which these gains have been caused by the trade agreements cannot be determined precisely, but comparison of trade between agreement and nonagreement countries indicates the program's influence.

## War Presents Obstacles

War in Europe at present offers serious obstacles to the program's further rapid expansion (although much remains to be done in South America and some other countries). Europe's chaos has heightened the controversy as to advisability of renewing the act.

Typical of the steel industry's sentiment is the position of the National Foreign Trade council, which includes in its membership steel as well as other manufacturers, merchants, steamship and railroad men, bankers and insurance underwriters, who have heavy investments in divers enterprises in many parts of the world.

Council's position recently was presented in Washington by Eugene P. Thomas, president, who until a few years ago had been prominently identified with the steel industry, particularly in export trade. He expressed hearty support for the program, termed it essential in maintaining and expanding United States' foreign markets and emphasized the importance of the advances

indicated by comparisons of trade with agreement and nonagreement countries.

"It is too great a strain on human credulity," he said, "to be told that the favorable results shown by the operations of the act—as in the case of practically all existing agreements—are a mere coincidence, especially when the lower rates of trade increases in relation to our trade with nonagreement countries are reported with a similar coincidental regularity."

In 1933, our foreign trade, he said, had fallen to slightly more than three billion dollars, compared with more than nine and one-half billions in 1929. In 1937, with the act in operation for three years, foreign trade had improved to nearly six and one-half billions. Exports to trade agreement countries increased 61 per cent over 1934-35; exports to nonagreement countries gained 38 per cent.

## Emergency Prompted Change

Mr. Thomas pointed out that while public opinion had been gradually changing in respect to tariff-making procedure since the time of President McKinley, it required an emergency of exceptional proportions to bring about the present change in 1934. The emergency, he said, came with the 65 per cent drop in exports, following the economic and financial crisis of 1929.

A study was made by the tariff commission in 1933 in response to a senate resolution. The report, he said, contained a wide range of dutiable items more or less noncompetitive or unsuited for domestic production, and of those imports which represented less than 5 per cent of total domestic production. Lists of more than 1000 items falling in these categories were published, and were accepted as evidence that without detriment to any domestic product numerous noninjurious import concessions could be made in the interest of expanded exports, which was the primary pur-

pose of the investigation and which now is the primary aim of the act.

He added, however, that renewal of the act is no longer a question only of domestic recovery. Mr. Thomas said it is also one of maintaining intact the principles and practices of sound international trade, and that "self-interest alone makes it incumbent on the United States to participate actively in the leadership that will be required when peace comes, in formulating plans for the reconstruction of the shattered world economy, by which all countries may liquidate the losses incurred by another war and find their way back to a well ordered system of peace-time exchange of goods and services."

The act's critics have alleged the usurpation of tariff-making powers of congress, and on this question Mr. Thomas pointed out that the present act had the sanction of congress and that the legislative body had retained the power of review by the time limit applied by it to the act. Moreover, he declared the act provides for the ample hearing of testimony of all interested parties.

Reflecting the general trend in foreign trade over recent years, especially as it applies to trade agreement and nonagreement countries, the foreign commerce department of the United States chamber of commerce has compiled statistics covering two 5-year averages, 1926-30 and 1931-35, together with annual totals for 1936, 1937 and 1938, and 11-month figures for January-November, 1939.

## Many Factors Involved

The department, however, makes clear that discretion is necessary in appraising the figures, that changes in rates and regulations affecting imports and exports are but one factor, and that market conditions, crop conditions, military requirements in preparation for war or during war and other considerations must be kept in mind.

Figures show this country's export trade in 1938 with nations with which the United States had trade agreements at that time increased 68 per cent over the 1931-35 average; that exports with nonagreement countries increased 45 per cent. Imports from agreement countries, in

TABLE I—EXPORTS, IN THOUSANDS OF DOLLARS

	1926-30 (average)	1931-35 (average)	1936	1937	1938	1939 Jan.-Nov.
Agreement countries...	\$2,747,901	\$1,142,358	\$1,426,305	\$1,957,316	\$1,850,651	\$1,760,911
Nonagreement countries	\$2,029,413	\$882,837	\$1,029,673	\$1,391,851	\$1,243,444	\$1,048,663
World total .....	\$4,777,314	\$2,025,195	\$2,455,978	\$3,349,167	\$3,094,095	\$2,809,574

## IMPORTS

Agreement countries...	\$2,340,216	\$1,017,757	\$1,526,458	\$1,841,949	\$1,220,209	\$1,283,803
Nonagreement countries	\$1,693,253	\$695,345	\$896,134	\$1,241,719	\$740,319	\$787,390
World total .....	\$4,033,469	\$1,713,102	\$2,422,592	\$3,083,668	\$1,960,528	\$2,071,193



the same comparison, increased 21 per cent; from nonagreement countries, 10 per cent. Table I summarizes these figures.

Since Table I was compiled, final figures for 1939 have become available, which show total exports amounted to \$3,177,000,000, as against \$2,809,574,000 indicated above for the first 11 months, and total imports, \$2,318,000,000, compared with the 11-month figure of \$2,071,193. This provided an export balance of \$859,000,000, compared with \$1,134,000,000 in 1938.

Incidentally, December exports reached the highest monthly total since March, 1930, with the gain attributed primarily to shipments of aircraft, metals, machinery and automobiles.

Trend of exports of certain leading steel products to trade-agreement countries is brought out in comparisons by the foreign trade department in Table II. Products selected are leading steel exports, in terms of value, upon which concessions have been granted by foreign countries. Countries from which the concessions have been obtained are indicated and a date given for the trade agreement in which the first concession was granted, such date thus indicating the point at which concessions began to influence volume of trade.

A sharp gain in power-driven met-

alworking machinery exports to trade agreement countries also was revealed, with Cuba making the first concession Sept. 3, 1934. During the first 11 months last year, \$99,750,000 of equipment was shipped to these countries, compared with the annual figures of \$97,271,000, \$59,880,000 and \$41,897,000 in 1938, 1937 and 1936, respectively, and with an annual average of \$20,548,000 for the 5-year period 1931-35 and \$26,211,000 for the 5-year period 1926-30.

Tractor shipments to these countries did not fare so well, although 35,000 in the first 11 months last year were substantially higher than

**More news of the steel and metal-working industries may be found on pages 83, 103 and 104.**

an annual average of 11,000 for the 5-year period 1931-35 and 20,000 in 1936. It was down, however, from the annual average of 56,000 for the 5-year period, 1926-30, and from the annual figures of 40,000 and 39,000 in 1937 and 1938, respectively.

One manufacturing group with a high ratio of exports are business machine manufacturers. Since the depression lows, both production and exports have increased sharply. Biennial census figures show production in 1933 was valued at \$62,451,682; in 1937, last year available,

at \$168,925,055. Meanwhile, exports jumped from \$15,768,000 (the actual low for the depression was in 1932 with \$14,869,000) to \$37,523,000.

Strong endorsement of the reciprocal trade agreements act was presented at the recent hearings by the automobile industry. B. C. Budd, chairman, export committee, Automobile Manufacturers association, declared export trade is an element essential to domestic prosperity.

Pointing to heavy increases in motor exports in recent years, he said the industry did not attribute all its gains to the act, but did "believe it was a most important contributing factor."

He took particular care to point out that the industry, with 85 to 90 per cent of its cars and trucks sold in this country would not support the act if it thought it jeopardized or adversely affected the home market.

One reason, he said, why automobile manufacturers desire renewal of the trade agreements act is that the question of the alternative is a serious one. "Certainly," he said, "a policy of excessive protectionism again would end in retaliation, reprisals and a closing of the markets."

According to figures supplied by the Automotive-Aeronautics trade division, department of commerce, the value of exports of complete motor vehicles to trade agreement countries in 1934 was \$37,040,009; in 1937, \$96,324,372 and in 1938, \$70,991,127; to nonagreement countries in those years, exports were valued at \$79,493,957, \$130,571,076 and \$94,874,430.

Among leading groups opposed to the extension of the trade agreements program, without at least broad revisions, are the American Mining congress, certain factions of the petroleum industry, certain labor organizations, and the National Association of Manufacturers.

The Mining congress charges there has been a gratuitous extension of concessions to nearly all countries which does not result in benefits to this country equivalent to its sacrifices; that the trade agreements committee has not given each commodity the careful and expert consideration it deserves; and that the act's administrators have not applied the provisions permitting modification where exchange rates are seriously altered.

The Mining congress also claims the administrators have not utilized clauses providing for withdrawal of specific commodities when countries outside a given pact reap the principal benefits at the expense of domestic industries; that the practical application of the act has not demonstrated a feasible method for providing tariff increases when necessitated by changed domestic conditions; and that the agreements are

**TABLE II—EXPORTS, ALL FIGURES IN THOUSANDS**

		1926-30 (average)		1931-35 (average)	1936	1937	1938	1939 Jan.-Nov.
*Date on which concession first was granted.								
Ingot, semi-finished	{ tons } value	21 \$ 846	14 \$ 398	21	339 \$13,392	168	\$ 5,905	156 \$ 5,558
*Jan. 1, 1936 by Canada.								
Iron, steel bars, rods	{ lbs. } value	402,543 \$11,019	136,929 \$ 3,175	205,042	491,156 \$14,616	390,424	\$11,722	429,855 \$13,370
*Sept. 3, 1934 by Cuba; concessions later by Canada and France.								
Plates, sheets skelp, strip	{ lbs. } value	1,430,985 \$45,032	523,512 \$13,997	981,779	2,134,378 \$65,411	1,373,316	\$42,183	1,614,555 \$45,633
*Sept. 3, 1934 by Cuba; concessions later by Canada, Colombia, France and Turkey.								
Tin plate,terne plate & tagger's tin	{ lbs. } value	550,948 \$27,388	241,215 \$ 9,732	535,092	807,929 \$39,940	361,934	\$19,078	566,483 \$26,674
*Jan. 1, 1936 by Canada; concessions later by Colombia and France.								
Structural shapes	{ tons } value	232 \$12,545	53 \$ 2,772	83	175 \$10,896	122	\$ 8,171	133 \$ 7,645
*Sept. 3, 1934 by Cuba; concessions later by Canada, Colombia and France.								
Tubular products, fittings	{ lbs. } value	650,224 \$18,445	139,780 \$ 5,711	120,715	216,057 \$10,124	327,955	\$16,667	415,594 \$19,659
*Sept. 3, 1934 by Cuba; concessions later by Haiti, Canada, Colombia and France.								
Ferroalloys—value		\$ 942	\$ 2,016	\$ 3,205	\$12,473	\$14,156		\$15,785
Jan. 1, 1936 by Canada.								
Nickel, alloys	{ lbs. } value	2,253 \$ 847	2,675 \$ 908	6,877	7,633 \$ 2,685	11,843	\$ 2,892	16,353 \$ 4,266
*Sept. 3, 1934 by Cuba.								



in fact treaties and should be ratified by the senate.

With respect to zinc the claim is made by officials of the Mining congress that following the 20 per cent cut in zinc duties which became effective a year ago last January under the treaty with Canada, imports in 1939 reached a post-war peak of 51,000 tons, ore more than twice as much as in 1938, and that of this amount only 5000 tons came in from Canada. These importations represented 10 per cent of the domestic production, and proved harmful, it is said.

While declaring approval of what it regards to be the basic theory of reciprocal trade agreements between nations, the National Association of Manufacturers asserts that any sound program for such agreements should provide that they be made on a bilateral basis.

It is the association's contention, among other points, that further reductions in duties would "violate all principles of prudence in view of the present chaotic conditions and the wholly unknown post-war situation"; and that the trade agreements program "in its present formal administration has abrogated one of the most important principles ever written into United States tariff law—the principle of flexible tariffs providing for changes up or down as changing conditions may warrant."

### Post-War Competition Feared

The association expresses grave concern as to the application of the present program after the European war is over, at which time, it is pointed out, millions of men in foreign countries will be released from military service and from other activities contingent upon war, to again take up pursuits of normal production, with vigorous competition probable.

As indicated in Table III, there has been a strong upward trend in steel exports since the depth of the depression in 1932, although the actual peak of the movement came in 1937, and reflected in part war preparation abroad.

Steel imports, on the other hand, relatively light at best, have tapered.

TABLE III  
IRON AND STEEL, EXCLUDING SCRAP  
(Gross Tons)

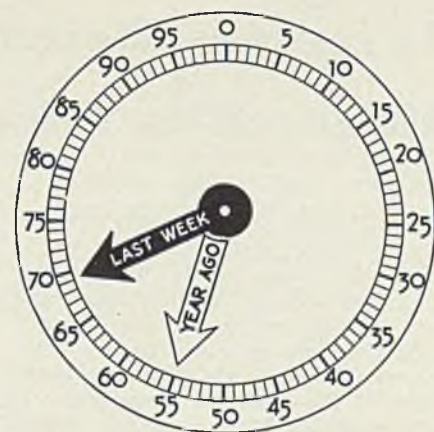
	Exports	Imports
1939	2,499,002	285,669
1938	2,149,184	240,100
1937	3,471,990	451,520
1936	1,221,663	524,593
1935	959,522	469,954
1934	997,210	316,761
1933	569,383	414,790
1932	367,196	378,282
1931	832,867	421,108
1930	1,639,198	538,089
1929	2,480,160	739,004

# Production

## Steelmaking Drops Two Points to 69 Per Cent

■ STEELWORKS operations last week declined 2 points to 69 per cent. Six districts reduced operations, one made a gain and five were unchanged. A year ago the rate was 55; two years ago 31.

**Youngstown, O.**—Reduction of 1 point to 43 per cent, with three bessemers and 41 open hearths active.



66 per cent may be followed by a slight increase this week.

**Wheeling** — Remains at 86 per cent, the same schedule probable this week.

**Cincinnati** — Sustained at 61 per cent. One mill plans to withdraw an open hearth this week.

**Cleveland**—Decline of 3.5 points to 66.5 per cent. Some plants will curtail further this week.

**St. Louis**—Off 2 points to 68 per cent. Lighting of two furnaces was more than offset by shutting down of two larger units.

**Buffalo**—Up 9½ points to 70 per cent as Republic Steel Corp. lighted four open hearths.

## Steel Corp. Shipments Decline in January

■ Finished steel shipments by United States Steel Corp. in January totaled 1,145,592 net tons, a decrease of 298,377 tons from 1,443,969 in December, but an increase of 274,726 tons over January, 1939.

Previous to this the United States Steel Corp. has reported its shipments as "tons", including both net and gross. From now on the report will be in net tons and revision of statistics has been made of previous reports back to January, 1929, for purposes of comparison. The accompanying table contains the revision for three years past.

U. S. Steel Corp. Shipments  
(Inter-company shipments not included)

	Net Tons			
	1940	1939	1938	1937
Jan.	1,145,592	870,866	570,264	1,268,403
Feb.		747,427	522,395	1,252,845
March		845,108	627,047	1,563,113
April		771,752	550,551	1,485,231
May		795,689	509,811	1,443,477
June		807,562	524,994	1,405,078
July		745,364	484,611	1,315,353
Aug.		885,636	615,521	1,225,907
Sept.		1,086,683	635,645	1,161,113
Oct.		1,345,855	730,312	875,972
Nov.		1,406,205	749,328	648,727
Dec.		1,443,969	765,868	539,553

Total, by Months	11,752,116	7,286,347	14,184,772
Adjustment	*44,865	†29,159	*87,106

Total . . . . . 11,707,251 7,315,506 14,097,666

†Increase. \*Decrease.

## District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Feb. 17		Same week 1939	
	ended	Change	1939	1938
Pittsburgh	66	- 3	47	29
Chicago	68.5	- 6	52.5	24.5
Eastern Pa.	68	None	37	30
Youngstown	43	- 1	45	29
Wheeling	86	None	66	44
Cleveland	66.5	- 3.5	56.5	33
Buffalo	70	+ 9.5	35	21
Birmingham	90	None	83	61
New England	63	None	70	27
Cincinnati	61	None	55	22
St. Louis	68	- 2	55	28
Detroit	92	- 1	89	48
Average	69	- 2	55	31

One bessemer was taken off for repairs and three open hearths were added. Outlook for this week is for 40 to 42 per cent.

**Chicago**—Down 6 points to 68½ per cent, fourth consecutive decline. One producer is above theoretical capacity on agricultural implement demand. One other advanced slightly, the remainder curtailing output. Rate now lowest since September.

**Detroit** — Operations are fairly steady, with a drop of 1 point to 92 per cent, with 24 of 26 open hearths active.

**Birmingham, Ala.**—Unchanged at 90 per cent with 21 open hearths active. Highest number in past 12 months was 22.

**Central eastern seaboard**—Steady at 68 per cent with wide disparity between producers. One has expanded production slightly.

**New England** — Holds at 63 per cent, which probably will continue.

**Pittsburgh**—Drop of 3 points to



# Inventors, Research Workers

## Honored as "Modern Pioneers"

■ "MODERN PIONEERS," inventors and industrial research workers who have made outstanding contributions to employment and better living conditions, were awarded certificates of merit in five communities last week. Awards were part of the National Association of Manufacturers' program to recognize such achievements in commemorating the 150th anniversary of the United States patent system.

"Modern Pioneers" previously had been honored in two other cities, Cleveland and Minneapolis (STEEL, Feb. 12, p.21). Climax to the program will be on Feb. 27 when 19 national "Modern Pioneers" will be announced at a dinner in New York. Awards last week:

### Detroit (Feb. 15)

Charles S. Ash, Differential Wheel Corp., Detroit; Benjamin F. Bailey, University of Michigan, Ann Arbor, Mich.; R. L. Beers, Detroit Stoker Co., Monroe, Mich.; Carl Breer, Chrysler Corp., Detroit; Samuel Higby Camp, S. H. Camp & Co., Jackson, Mich.

Donald J. Campbell, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; Therom P. Chase, research division, General Motors Corp., Detroit; Kirke White Conner, Micromatic Hone Corp., Detroit; Louis A. Cornelius, Wolverine Brass Works, Grand Rapids, Mich.

Harry A. Douglas, retired president, H. A. Douglas Mfg. Co., Bronson, Mich.; Stephen Ivan Fekete, Hudson Motor Car Co., Detroit; A. J. Fisher, General Motors Corp., Detroit; Henry Ford, Ford Motor Co., Detroit; Louis Charles Huck, Grosse Pointe, Mich.; Charles E. Johnson, Sealed Power Corp., Muskegon, Mich.; Charles F. Kettering, General Motors Research Corp., Detroit; Harry C. Mangey, research division, General Motors Corp., Detroit.

Thomas Midgley Jr., General Motors Corp., Detroit; John F. Olin, Sharples Solvents Corp., Wyandotte, Mich.; Maurice Olley, Rolls Royce Ltd., Detroit; Francis J. Pym, Kawneer Co., Niles, Mich.; F. Malcolm Reid, Fruehauf Trailer Co., Detroit; Willard F. Rockwell, Timken-Detroit Axle Co., Detroit; William Shakespeare Jr., Shakespeare Co., Kalamazoo, Mich.; Charles R. Short, General Motors Corp., Detroit; John W. Votypka, Fruehauf Trailer Co., Detroit.

Joint Awards—William T. Dunn, Otto E. Fishburn, Edwin R. Maurer, George L. McCain, Carl A. Neracher, Walter F. Ploetz, David A. Wal-

lace, Chrysler Corp., Highland Park, Mich.

Ronald A. McGlone and Stephen J. Roskosky, fabric and finishes department, E. I. du Pont de Nemours & Co., Flint, Mich.

Lester R. Beltz, Robert N. Brown, John M. Christman, James R. Ferguson, Walter R. Griswold, Clyde R. Paton, Milton Tibbetts, Jesse G. Vincent, Marsden Ware, Packard Motor Car Co., Detroit.

Caleb E. Summers, Manville Mfg. Co., Pontiac, Mich., and Thomas C. Van DeGreff, research division, General Motors Corp., Detroit.

J. O. Almen, Oliver K. Kelley and Earl A. Thompson, General Motors Corp., Detroit.

Alfred L. Boegehold, research division, General Motors Corp., Detroit, and Harry M. Williams and Norman H. Gilman, of Cincinnati.

Honorable mention—Taine D. McDougal, Hector Robezanna, Karl Schwarzwald and Albra Henry Tessler, AC Spark Plug division, General Motors Corp., Detroit.

### Hartford, Conn. (Feb. 16)

Fernley H. Banbury, Farrel-Birmingham Co. Inc., Ansonia, Conn.; Henry Jones Blakeslee, States Co., Hartford, Conn.; Albert Frank Breitenstein, Geometric Tool Co., New Haven, Conn.; Edward Payson Bullard Jr., Bullard Co., Bridgeport, Conn.; Frank Walker Caldwell, Hamilton Standard Propellers division, United Aircraft Corp., East Hartford, Conn.; Thomas Edwin Dunn, Bullard Co., Bridgeport, Conn.

George G. Going, Remington Rand Inc., research laboratory, Stamford, Conn.; Walter Frederick Herold, Stewart-Warner Corp., Bridgeport, Conn.; Frederick G. Hughes, New Departure division, General Motors Corp., Bristol, Conn.; Erle Martin Jr., Hamilton Standard Propellers division, United Aircraft Corp., East Hartford, Conn.; Karl Ernest Peiler, Hartford-Empire Co., Hartford, Conn.; John Cargill Shaw, Pratt & Whitney, division Niles - Bement-Pond Co., Hartford, Conn.

Honorable mention—Wallace E. Brown, E. I. du Pont de Nemours & Co., Fairfield, Conn.

### Los Angeles (Feb. 16)

William Mariam Burton, Pasadena, Calif.; Dr. Lee DeForest, Hollywood, Calif.; Erle Palmer Halliburton, Los Angeles; Lloyd F. Hunt, Southern California Edison Co. Ltd., Los Angeles; Edgar Buck Symons, Symons Development Co., Hollywood, Calif.

Joint awards—Evald Anderson, Walter August Schmidt, Harry Valentine Welch, Western Precipitation Corp., Los Angeles.

### San Francisco (Feb. 14)

Harold C. Tolman, Avery, Marchant Calculating Co., San Francisco; Nathaniel Baldwin, Mill Creek, Utah; William John Besler, Besler Systems, Emeryville, Calif.; Robert Thomas Bowling, Wood Briquette Inc., Lewiston, Idaho; Fred Christwell, Pacific Car & Foundry Co., Seattle; Carl Mauritz Frederick Friden, Friden Calculating Machine Co. Inc., San Leandro, Calif.

Dr. Harry E. Kennedy, Moore Dry Dock Co., Oakland, Calif.; Dr. E. B. Lawrence, University of California, Berkeley, Calif.; Charles Washington Merrill, Merrill Co., San Francisco; Edwin Letts Oliver, Oliver United Filters Inc., Oakland, Calif.; Walter R. Schlage, Schlage Lock Co., San Francisco; Ernest J. Sweetland, Oliver United Filters Inc., Oakland, Calif.; Albert Riley Thompson, Food Machinery Corp., San Jose, Calif.

Joint awards—William Wesley Hicks, Wesix Electric Heater Co., San Francisco, and Arthur J. Kercher, Kercher Research Laboratories, Berkeley, Calif.

### Philadelphia (Feb. 16)

Dr. Lytle S. Adams, All American Aviation Inc., Wilmington, Del.; Newcomb Kinney Chaney, United Gas Improvements Co., Philadelphia; Philip Hartley Chase, Philadelphia Electric Co., Philadelphia; Henry Jermain Creighton, Swarthmore college, Swarthmore, Pa.; Edmond C. Crowther, Philadelphia; Glenn Leslie Dimmick, RCA Mfg. Co. Inc., Camden, N. J.

Harry S. Drum, Smith Drum & Co., Philadelphia; Charles B. Gray, Gray Machine Co., Philadelphia; Thomas Randolph Harrison, Brown Instrument Co., Philadelphia; Francis Hodgkinson, Westinghouse Electric & Mfg. Co., Philadelphia; Dr. Russell Pearce Heuer, General Refractories Co., Philadelphia; Eugene Houdry, Houdry Process Corp., Wilmington, Del.; William Carl Huebner, Lanston Monotype Machine Co., Philadelphia.

Mauritz Christian Indahl, Lanston Monotype Machine Co., Philadelphia; Albert Kingsbury, Kingsbury Machine Works Inc., Philadelphia; Samuel M. Langston, Samuel M. Langston Co., Camden, N. J.; Walter Larkin, Fidelity Machine Co., Philadelphia; Morris E. Leeds, Leeds & Northrup Co., Philadelphia; Dr. Edwin Fitch Northrup, Ajax Electrothermic Corp., Trenton, N. J.

David Chandler Prince, General Electric Co., Philadelphia; William K. Rankin, General Electric Co., Philadelphia; Henry Frederick (Please turn to Page 83)



# Stainless Steel Tanks To Haul Bulk Milk on Rail-Truck System

■ SIX specially equipped steel underframe railroad flat cars built at the National Car Co.'s Alexandria, Va., shops recently picked up 12 stainless steel demountable tanks at Glascote Products Inc. plant, Cleveland, for service in long-haul co-ordinated railroad-truck basis for the Farm Products division, Borden Co., New York.

Tanks, 3150-gallon capacity and weighing 6800 pounds, are electrically welded and leased Borden by Motor Terminals Inc., New York, to haul bulk milk from country receiving points to Brooklyn pasteurizing plants. Loaded tanks weigh 27,900 pounds, and two placed longitudinally are carried by a single car.

Inside shells are fabricated of 12-gage stainless steel furnished by Allegheny Ludlum Steel Corp., Pittsburgh. A three-inch insulation of cork supplied by the Armstrong Cork Co. separates inside and outside shells. Latter are welded of 14-gage high tensile steel rolled by Republic Steel Corp., Cleveland. The interior, welded and polished, is fabricated first. Each tank is carried in a specially built car cradle. All removable tank parts, including agitator, peep hole, inlet and outlet connections, manhole, thermometer and valves are of stainless steel, most material being formed and stamped at the Glascote shops in Cleveland.

Ten skid rails are placed on the deck with ten positioner-anchorage which hold the tank rigid during rail shipment. Highway unit consists of a heavy-duty trailer and tractor

of standard type with power take-off attachment. Welded to the chassis frame of the trailer is a special transfer conveyor, including two endless drive chains operating transversely across the trailer. To the chains are attached seven lugs on 27-inch centers, engaging companion lugs on the demountable units. The conveyor is driven by a 3-horsepower electric motor fed by a flexible, detachable cable from a generator on the tractor and connected with a universal shaft to the truck engine power take-off.

To close the gap between the car and trailer, two retractable bridges are located at each side of the conveyor. Detachable push-pull bars of bent tubing with steel castings at each end are used to move the tanks. One end of the bar, fitted with an engagement casting engages links of the drive chain and the other has a ball-and-socket for engagement in a pocket on the demountable bodies. After spotting the truck parallel to the car, the transfer of either two tanks can be made in 90 seconds, the operation being done solely by the truck driver.

## Handling Costs Reduced

Each tank is fitted with an end vestibule containing fill and discharge pipes, valves, agitator, motor, thermometer peep hole and cleaning manhole.

Anticipated savings of 16 per cent on handling costs are estimated by the Borden Co. and initial hauls are from Newark Valley, Owego and Dryden, upstate New York, dis-

tances of 291, 281 and 313 miles, respectively, from Jersey City over the Lehigh Valley railroad. At that point tanks are transferred to trucks for hauling to the Brooklyn pasteurizing plant. There the tank is moved to a platform and the milk pumped into fixed storage tanks, the trailer loading empty tanks for return to Jersey City, thus allowing continual shuttle operations between plant and yards.

With the freight rate paid to the railroad remaining the same with both fixed and demountable tanks, the anticipated Borden savings result from economies in the operations from the time the milk reaches the rail yard until it is delivered to the plant. Under the present fixed-tank car operations, more men are employed at the Jersey City and three other railroad platforms for handling tank car and canned milk shipments.

## Steel Founders Society Hears W. J. Cameron

■ Annual convention of Steel Founders Society of America, held at Edgewater Beach hotel, Chicago, Feb. 14-15, presented as a leading speaker to 140 members in attendance, W. J. Cameron, Ford Motor Co., Detroit. Mr. Cameron emphasized necessity for business to forget difficulties caused by the New Deal and turn full attention to building economy. Industry and business, he pointed out, should forge ahead regardless of the outcome of the coming presidential elections.

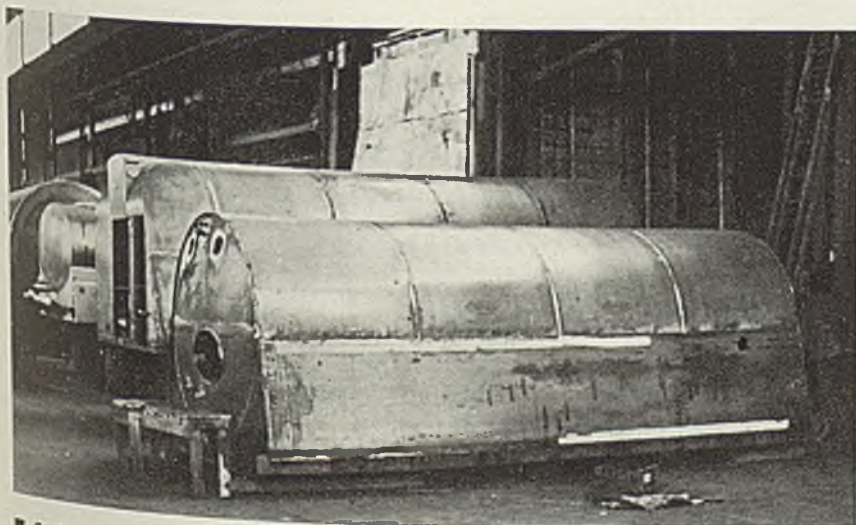
Other speakers included A. L. Kress, National Metal Trades association, Chicago, who discussed job evaluation; C. S. Ching, U. S. Rubber Products Co., who discussed values of properly developing and maintaining satisfactory employee relations.

Other sessions dealt with technical subjects in steel founding.

## Brochure on Details of Lincoln Welding Contest

■ The James F. Lincoln Arc Welding foundation, Cleveland, has issued a brochure giving all details necessary for competing in the foundation's second \$200,000 industrial progress arc welding program (STEEL, Jan. 1, p. 327)

It is the official document of the progress program, the result of more than a year of planning and development by trustees of the foundation and others to produce a program productive of greatest benefit to industry and society. Requests for the brochure should be addressed to The James F. Lincoln Arc Welding foundation, Cleveland.



■ Stainless steel tanks to be used in co-ordinated rail-truck bulk milk shipments under construction in Glascote Products Inc. plant, Cleveland. In foreground is tank ready to receive cab; next to it is a tank ready for painting



# What's New at Pittsburgh . . .

By R. L. HARTFORD, Pittsburgh Editor, STEEL

■ **BLANKETED** by the heaviest snow of record, Pittsburgh's mills kept their pace up well last week. Although some crews were reported short many hands because of drifts, operations were not curtailed for that reason.

Weather conditions, aside from snow, are better. Temperatures have been more favorable and ice jams in the rivers have largely broken up, with traffic moving as usual. Coal markets are returning to normal. Coke oven activity in Connellsville district probably will expand slightly since coal will not have to be diverted to plants nearer Pittsburgh. Steel tows are reported moving down river by all companies here. River commerce for January, however, was much lighter than in December.

Despite heavy snow and following thaw, there is no danger of a flood in the district, according to United States engineers. Because of the deficiency in precipitation this year, river levels are barely high enough to support transportation, and the snow blanket will be carried off without danger.

## Installing New Rolling Mills

Capacity for cold-reduced tin plate here has been increasing. A year ago Carnegie-Illinois put its Irvin works in full operation, and is now in the process of installing an additional 5-stand tandem cold mill to double cold mill capacity. Weirton Steel Co. and Wheeling Steel Corp.

have been installing new cold mills to increase capacity for cold-reduced plate. Latest in this procession is the newborn Follansbee Steel Corp., (reorganized Follansbee Bros. Co.) which will install two reversing cold mills, a temper pass mill and a tin plate flying shear. Units have been ordered from United Engineering & Foundry Co. for July delivery.

## Five Blast Furnaces Off

District operations are still sagging, the decline partially foreshadowed by blast furnaces shut down. Carnegie-Illinois has taken off two more, one at Duquesne and one at Clairton, while Jones & Laughlin has taken off one at Pittsburgh. This leaves 36 of 50 stacks active in the immediate district.

## 1940 Steel Modernization To Cost \$146,000,000

■ Steel companies expect to spend nearly \$146,000,000 for new equipment during 1940, according to a survey by American Iron and Steel institute of 150 companies representing over 95 per cent of the steel-making capacity of the industry.

Total amount budgeted by steel companies for plant modernization this year is more than was spent in either of the preceding two years, and brings the total spent or to be spent for new equipment since 1934 above a billion dollars.

Early in 1939 steel companies es-

timated their new equipment expenditures for that year at \$126,000,000, of which \$121,000,000 is now reported as actually spent. A total of \$140,000,000 was spent for new equipment in 1938.

Most of the major plant expansion programs undertaken recently have now been completed, and the modernization activity planned for the current year covers chiefly the purchase of new and up-to-date equipment to supplant or supplement older installations.

## Personnel Executives To Joint Action Essential

■ Necessity for management and labor to work jointly to solve the human problems in industry was the theme of the eighteenth annual conference of the personnel division of the American Management association in Chicago Feb. 14-16. More than 1400 personnel and industrial relations executives attended.

J. W. Dietz, personnel relations manager, Western Electric Co., New York, declared the time has come to take the "versus" out of the relationship between management and labor.

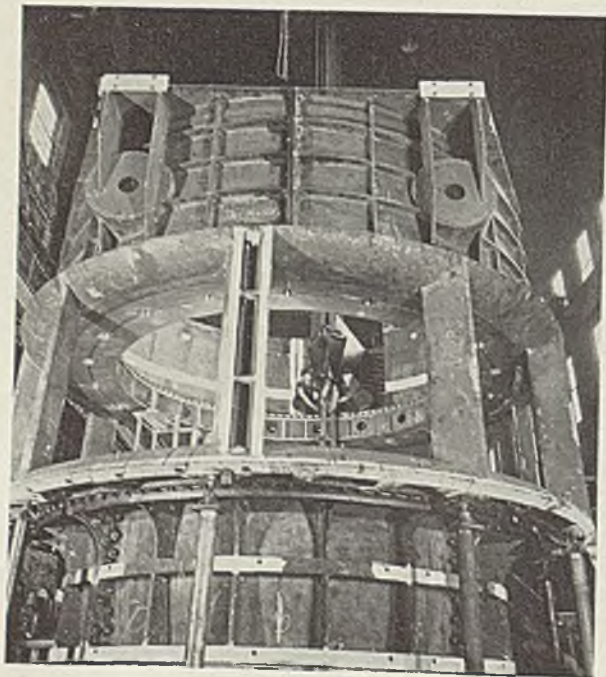
"With constructive leadership in labor and management, with combined efforts of men plus management, let's go ahead in the way that uses man power and management skill to the greatest advantage of employe, employer, stockholder and customer," the speaker urged. "The big job is still the same—make better products, cheaper, for more people. . . ."

"The problems for the new decade are right back in the everyday lap of industry. The big problems are internal to our organizations. They have to do with human relationships, interaction and collaboration and with the release of human energy in the solution of problems of production, and in sharing the benefits in equitable ways among all who contribute."

In discussing the adoption of training courses to meet present special needs, L. D. McDonald, vice president, Warner & Swasey Co., Cleveland, stated: "There apparently is no longer a pool of semiskilled labor upon which to draw, and our skilled laborers of the 1920s have become much older; many have been lost since 1929, not only through death, but through transfer to other occupations. Therefore it seems business as a whole must definitely adopt courses of training in order to provide a supply of semiskilled and skilled labor from which it can draw in the future for supervisory and technical employes."

## Huge Turbine Assembly

■ Giant hydraulic turbine under construction at Allis-Chalmers Mfg. Co.'s Milwaukee plant for South Carolina's Santee-Cooper hydroelectric project near Charleston. Stationary parts, assembled as shown, weigh 350,000 pounds. Overall height is 22 feet; speed ring has outside diameter of 26½ feet





# FINANCIAL

## COLORADO FUEL & IRON NETS \$554,554 IN FOURTH QUARTER

■ COLORADO Fuel & Iron Corp., Denver, reports fourth 1939 quarter net profit of \$554,554, compared to a deficit of \$661,908 in corresponding 1938 period. Third quarter net profit was \$231,282. In final six months last year, the corporation, whose fiscal year ends June 30, netted earnings of \$785,836, against a loss of \$805,660 in same period of preceding year.

Net income for calendar year 1939, based on quarterly reports, and subject to adjustments, was \$1,649,060, compared to a loss of \$1,586,085 in 1938.

### Earnings comparisons:

Quarters	1939	1938	1937
First .....	\$163,630	\$389,561*	\$532,283
Second .....	699,594	390,863*	228,645
Fiscal year, ended June 30	57,563	489,363*	1,207,849
Third .....	231,282	143,752*	442,080
Fourth .....	554,554	661,908*	491,019*

\*Loss.

## JONES & LAUGHLIN REPORTS \$3,188,944 PROFIT IN 1939

Jones & Laughlin Steel Corp., Pittsburgh, in a preliminary earnings statement reports fourth 1939 quarter net profit of \$2,907,755, equal after dividend requirements on \$7 cumulative preferred stock to \$3.26 a share on common. This compares with deficit of \$1,129,856 incurred in corresponding 1938 period and net income of \$1,129,001 or 17 cents a share on common stock

in quarter ended Sept. 30, 1939.

Net earnings for 1939, subject to audit and year-end adjustments totaled \$3,188,944, equal to \$5.43 a share on the \$7 preferred stock, compared to a loss of \$5,879,958 in 1938. Net profit in 1937 was \$4,788,799.

Dividend accumulations on the \$7 cumulative preferred total \$42 a share. Total earnings last year did not equal preferred stock requirements.

## CONTINENTAL EARNS 9.09 PER CENT ON INVESTMENT IN 1939

Continental Steel Corp., Kokomo, Ind., reports net 1939 profit of \$1,208,199, equal to \$5.28 a share on common, and highest net profit for any year since 1929. Net income in 1938 was \$632,865 or \$2.32 a share. Per cent of total income on capitalization was 9.09 per cent, against 5.15 per cent in 1938.

Fourth 1939 quarter net earnings totaled \$477,754, compared to \$229,205 in corresponding 1938 period and \$198,138 in quarter ended Sept. 30.

Quarters	1939	1938	1937
First .....	\$279,178	\$ 55,200	\$279,447
Second .....	253,129	156,091	255,175
Third .....	198,138	192,360	258,890
Fourth .....	477,754	229,205	21,041
Year .....	\$1,208,199	\$632,865	\$814,553

M. A. Hanna Co., Cleveland, iron ore, coal, dock and vessel operator, reports net 1939 profit of \$1,904,316, equal to \$1.23 a share on common, compared to net earnings of \$799,507 or 15 cents a share in 1938. Dividends of \$5 on preferred and 75 cents on common left a balance of

\$518,325 which was added to the surplus.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., reports consolidated net profit of \$2,093,518 for 1939.

Fourth quarter net earnings were \$1,411,423, compared to net income of \$327,772 in second quarter and \$147,740 in period ended June 30.

Granite City Steel Co., Granite City, Ill., in a preliminary statement reports net 1939 profit of \$347,940, equal to 91 cents a share, compared to net loss of \$330,230 for 1938. Fourth quarter net profit was \$258,941, compared to a \$77,057 deficit in same 1938 period; third quarter net income, \$53,953.

Midvale Co., Philadelphia, reports net 1939 income of \$1,703,770, equal to \$8.52 a common share, compared to \$1,244,210 net profit, equal to \$6.22 a share in 1938. In 1937 company earned net profit of \$1,341,816 or \$6.71.

Alan Wood Steel Co., Conshohocken, Pa., reports net 1939 income of \$678,921. Fourth quarter indicated net profit, based on nine months and the year's reports, was \$290,081. Net earnings in period ended Sept. 30 were \$124,585, compared to \$233,979 in second quarter and \$30,276 in first.

## Machine Tool Industry's January Rate Unchanged

■ Machine tool industry operated at 93.3 per cent of capacity during January, equalling its December record, according to National Machine Tool Builders' association index. This is an increase of 77 per cent over the 52.5 per cent of capacity operations during the same 1939 period.

J. E. Lovely, association president, stated the industry has made marked progress toward solving problems created by unprecedented demand for machine tools that has arisen this winter from both domestic and foreign customers.

"The industry," Lovely said, "has consistently endeavored to give domestic orders preference over foreign orders, with respect to delivery dates . . . Strenuous measures are being taken by the industry to increase output. New equipment has added substantially to plant facilities.

"In most cases it has seemed more practicable to secure the desired immediate set-up in production by increasing the productivity of existing plants rather than attempting the building and equipping of new plants."

## Iron, Steel Consumers' 1939 Profits Increase

■ TWENTY-SIX iron and steel consumers reporting fourth quarter and year's earnings for 1939 had an aggregate net income of \$39,778,654, compared to \$6,976,608 for identical companies in 1938. In fourth quarter their earnings totaled \$14,948,292, compared to \$4,979,484 in corresponding 1938 period.

	Fourth 1939		Fourth 1938	
	Quarter	Quarter	1939	1938
American Brake Shoe & Foundry Co., New York .....	\$794,285	\$322,584	\$2,121,173	\$1,080,719
American Steel Foundries, Chicago .....	1,178,981	340,507*	1,368,514	1,750,235*
Black & Decker Mfg. Co., Towson, Md.† .....	180,677	54,892	721,636	261,109
Bilas & Laughlin Inc., Harvey, Ill. ....	281,046	74,476	672,422	52,062
Byers, A. M. Co., Pittsburgh .....	241,757	46,599*	824,605	387,659*
Caterpillar Tractor Co., Peoria, Ill. ....	2,103,735	1,163,608	6,004,890	3,235,709
Chicago Railway Equipment Co., Chicago .....	201,461	1,999	243,680	61,758*
Greenfield Tap & Die Corp., Greenfield, Mass. ....	98,934	27,462	202,990	2,461*
General Railway Signal Co., Rochester, N. Y. ....	153,059	14,210*	247,593	133,352*
Cutler-Hammer Inc., Milwaukee .....	404,220	62,904*	814,700	307,438*
Dresser Mfg. Co., Bradford, Pa. ....	338,481	24,756	765,611	53,212
Eureka Vacuum Cleaner Co., Detroit .....	171,312*	55,093*	317,908*	290,462*
Federal-Mogul Corp., Detroit .....	281,829	146,102	648,325	323,247
Food Machinery Corp., San Jose, Calif.† .....	214,412	159,791	1,223,030	787,310
Minneapolis-Honeywell Regulator Co., Minneapolis .....	1,023,960	283,648	2,158,582	1,003,289
Mullins Mfg. Corp., Salem, O. ....	27,593	155,359*	143,185	614,825*
Nash-Kelvinator Corp., Kenosha, Wis.† .....	22,998	1,579,702*	29,177	8,451,795*
National Acme Co., Cleveland .....	390,873	112,043	578,994	182,914
Nobilt-Sparks Industries Inc., Columbus, Ind. ....	491,736	347,407	1,003,744	393,890
Reynolds Spring Co., Jackson, Mich. ....	281,111	74,326*	265,905	435,272*
Tatcher Mfg. Co., Elmira, N. Y. ....	130,937	188,643	787,867	727,584
Transee & Williams Steel Forging Corp., Alliance, O. ....	32,567	15,964*	32,940	194,636*
U. S. Hoffman Machinery Corp., New York .....	43,069*	110,420*	47,331	295,371*
U. S. Pipe & Foundry Co., East Burlington, N. J. ....	228,030	184,554	2,570,279	1,654,238
Westinghouse Electric & Mfg. Co., East Pittsburgh .....	4,784,552	2,839,951	13,854,360	9,052,773
Westinghouse Air Brake Co., Wilmerding, Pa. ....	1,275,439	1,502,652	2,765,629	993,816

\*Loss; †based on quarterly reports.



# MEN of INDUSTRY

■ OSCAR M. HAVEKOTTE, of Pittsburgh, has been elected president and general manager, International-Stacey Corp., Columbus, O. He succeeds the late Lewis J. Brown. Mr. Havekotte formerly was assistant treasurer, Carnegie-Illinois Steel Corp., Pittsburgh. He also has been a director and a member of the executive committee of International-Stacey Corp. the past eight years.

Neil C. Hurley Jr., vice president, Independent Pneumatic Tool Co., Chicago, has been elected a director.

Henry M. Blume, secretary, Safeway Steel Scaffolds Co., Milwaukee, has also been made executive vice president.

Mark A. Gardner, associated with W. Bingham Co., Cleveland, the past 11 years as steel buyer, has resigned to become sales manager, Wasmer Bolt & Nut Co., Cleveland.

G. Miller Hyde, secretary-general, Anglo-French Purchasing board, 15 Broad street, New York, has resigned owing to ill health. Charles T. Ballantyne succeeds Mr. Hyde.

P. F. Benedict, of the Faitoute Iron & Steel Co., Newark, N. J., has resigned to organize the Benedict-Miller Co., iron and steel jobber, Newark, N. J.

H. P. Binder has been appointed assistant manager, centrifugal pump division, Allis-Chalmers Mfg. Co., Milwaukee. He formerly was engaged in sales-engineering work in that division.

Thomas H. Corpe has been appointed general sales manager, Vega Airplane Co., Burbank, Calif., a subsidiary of Lockheed Aircraft Corp. He formerly had been in charge of promotional departments at the Lockheed plant.

E. D. Bransome, president, Vanadium Corp. of America, New York, has been elected a director, General Refractories Co., Philadelphia. Dr. Russell P. Heuer, vice president and director of General Refractories, has been elected a member of the executive committee.

J. C. Merwin, vice president in charge of the conveyor division, Chain Belt Co., Milwaukee, has been elected treasurer. He has been with Chain Belt since 1907 in various capacities and will retain the office of vice president. L. B. McKnight,

sales manager, conveyor division, has been named assistant to the vice president.

William H. Manning, assistant chief engineer in charge of experimental work, Pontiac Motor division, Pontiac, Mich., has been appointed assistant chief engineer in charge of design.

George A. Delaney, former electrical engineer, now heads the experimental laboratories. L. Raymond Sampson, head of the technical data section, has been made electrical engineer. William J. de Beaubien, of the drafting department, has become engineer in charge of accessories, and George W. Lampman, designer, has been placed on special assignment in



W. H. Manning

charge of all rubber developments.

Forrest H. Kane, assistant to chief engineer, has been made executive engineer and will continue to specialize in cost analysis, budget and sales contact.

H. H. Yeager has been appointed assistant sales manager, Shafer Bearing Corp., Chicago. Mr. Yeager was for a number of years district sales manager, Dodge Mfg. Corp., and prior to that was manager, mill supply department, SKF Industries Inc.

George S. Whyte, chairman of the board, Macwhyte Co., Kenosha, Wis., and Mrs. Whyte celebrated their golden wedding anniversary last week. On that occasion they were presented with a grandfather's clock by employees of the company.

E. L. McIlhenny, associated with the metal cleaning industry the past 13 years, has been appointed

manager, alkali division, Detroit Rex Products Co., Detroit. He formerly was with the company's Cleveland office.

Robert F. Herrick, of Boston, has been elected president, Scott & Williams Inc., Laconia, N. H., maker of knitting machinery. He succeeds the late Walter L. Toy. Harry J. Kelley, treasurer, will be resident head of the plant.

B. M. Menden, formerly with Airtemp Construction Corp., Detroit, has been appointed vice president and general manager, Airtemp New York Co. Inc., New York. He succeeds J. R. MacDonald, who has resigned to join General Cable Corp., New York.

S. H. Worrell, for 20 years associated with the steel industry and for a number of years active in the Detroit territory, has been named sales manager, Detroit branch, Edgar T. Ward's Sons Co. Nate A. Wade is district manager.

Alex Dow has resigned as president, Detroit Edison Co., Detroit, continuing, however, as chairman of the executive committee of the board of directors. Albert C. Marshall, vice president and general manager, succeeds to the presidency.

A. F. Colling, New York; E. A. King, manager, Chester, Pa., plant; L. F. McKay, manager, North Kansas City, Mo., plant, and C. L. Flori, manager, New Orleans plant, have been appointed to executive committee, Wackman Welded Ware Co., St. Louis, with titles of executive vice presidents.

H. R. MacMillan, Canadian industrialist, has been elected a director, International Nickel Co. of Canada Ltd., Copper Cliff, Ont. He succeeds the late James A. Richardson. Robert L. Beatty has been elected to the newly created office of assistant vice president.

Charles E. Wilson, vice president since 1934, in charge of Pacific coast operations of Worthington Pump & Machinery Corp., is moving his headquarters to the home office at Harrison, N. J., where he will direct sales of all products handled by the corporation's carbondale division, which specializes in air conditioning and refrigeration equipment. He succeeds H. A. Feldbush, who will devote his time to the manu-



facturing department. Mr. Wilson is also assuming charge of sales of all products made at the Holyoke, Mass., factory.

Edward J. Leiser has retired as superintendent. Milwaukee works, International Harvester Co., after 35 years continuous service with the company. He served successively as chief clerk in the order department, production manager, foundry manager, assistant superintendent and superintendent. John E. Harris, the past five years assistant superintendent of the company's Chicago tractor works, succeeds Mr. Leiser as superintendent of the Milwaukee works.

John H. Rasp has been named superintendent of the tool and die department, sintered carbide division, Firth-Sterling Steel Co., McKeesport, Pa. J. H. Chivers has been appointed superintendent of melting, succeeding the late L. B. Knox. Prior to joining Firth-Sterling Mr. Chivers acted as consultant on melting practice to a number of steel companies.

Horace S. Bumby, director, treasurer and vice president. Barlow & Seelig Mfg. Co., Ripon, Wis., has been elected president, and W. A. Royce, New York, treasurer, to succeed the late R. C. Hammer. R. C. Labinsky, with Barlow & Seelig 17 years, has been named assistant to Mr. Bumby. Plans of R. I. Petrie, former president and general manager, are indefinite.

Sidney P. Davies, formerly Texas manager, Bethlehem Steel Co., has joined Edgar T. Ward's Sons Co. in the Philadelphia district as special sales representative. Charles Dickerson, heretofore president, Miami-Dickerson Steel Co., Dayton, O., has resigned to also become associated with Edgar T. Ward's at Pittsburgh where he will have general staff duties.

David C. Spooner Jr., associated with General Electric Co., Schenectady, N. Y., over 20 years, has been placed in charge of the newly formed pioneer products section of the appliance division. Preceding the recent consolidation of all G-E appliance and merchandise activities at Bridgeport, Conn., he had been manager of the household appliance sales division. H. A. Cook, assistant commercial engineer for G-E wiring materials, has been named manager of the new miscellaneous construction material sales section. He has been with General Electric since 1920.

M. H. Kuhl has been appointed assistant manager, industrial divi-



F. M. Huffman

Whose appointment as assistant general traffic manager, Bethlehem Steel Co., Bethlehem, Pa., was reported in STEEL, Feb. 5, page 40

sion, Timken Roller Bearing Co., Canton, O. He succeeds S. D. Partidge, who recently was made manager of that division. Mr. Kuhl joined Timken in 1926 and has been active in the sales department of the industrial division since that time as sales engineer and district manager. P. J. Reeves, associated with Timken 11 years, has been transferred to the home office to engage in special sales work. Mr. Reeves' former position as manager, Los Angeles office, is being filled by S. T. Salvage, promoted from the sales-engineering ranks.

## Died:

■ D. B. JACOBS, 61, vice president, general manager and co-founder of Clifford-Jacobs Forging Co., Champaign, Ill., in that city, Jan. 26. As a young man he entered the drop forging business and advanced from hammerman to general manager, serving a number of shops in the East and Middle West. He helped organize Clifford-Jacobs Forging Co. in 1919.

Albert G. Turck, 53, president, American Signal Corp., Milwaukee, Jan. 19 in Milwaukee.

Fred W. Rogers, 91, for many years president, Stowell Co., Milwaukee, in Milwaukee, recently.

Ozro E. Underwood, 52, vice president, Robbins Engineering Co., Detroit, Feb. 3 in Detroit.

Edward Kieft, 58, chief fuel and power engineer, Gary works, Carnegie-Illinois Steel Corp., more than 20 years, recently. He became as-

sociated with the former Illinois Steel Co. at Gary in 1913.

M. S. Milburn, 88, treasurer, Alliance Machine Co., Alliance, O., in that city, Feb. 10.

B. F. Hazelton Jr., a director and former vice president, Owens-Illinois Glass Co., Toledo, O., Feb. 4 in that city.

Herbert Jay Rich, 61, retired president, National Cable & Metal Co., Duluth, Minn., Jan. 14 at his home in Glendale, Calif.

Robert P. Rasmussen, 50, president, Economy Equipment Co., Chicago, maker of air conditioning equipment, Feb. 2 in that city.

William Lubenow, 79, founder, Lubenow Mfg. Co., Milwaukee, maker of screw machine products, in that city, Feb. 4.

David B. Knowlton, manager of Birmingham, Ala., branch, Virginia Steel Co. Inc., Richmond, Va., in Birmingham, Feb. 2.

Timothy Meadows, 48, president, Star Tool & Die Works, Detroit, for 21 years, and secretary-treasurer of Meado Products Co., Feb. 2 in Detroit.

C. Leo Wenzel, 42, general sales manager, Budd Wheel Co., Feb. 12, in Rochester, Minn. He joined the company 20 years ago, going to Detroit in 1926 when the company moved its main plant there from Philadelphia.

Allen R. Hoffer, 63, Feb. 11, at his home in Lansdowne, Pa. At one time he was manager, Philadelphia office of Charles Dreifus Co. In recent years he had been associated with A. M. Wood & Co. Inc., Philadelphia, scrap iron and steel broker.

Robert J. Heisserman, sales engineer, Link-Belt Co., Chicago, at his home in Philadelphia, Feb. 9. He joined the company 30 years ago and for a number of years had been head engineer and engineering salesman for Link-Belt foundry conveyors and molding sand preparation equipment throughout the eastern territory.

John J. Fasmer, 56, until recently general sales manager, Stephens-Adamson Mfg. Co., Aurora, Ill., in that city, Feb. 3. He had been with the firm since its organization in 1901, as superintendent at Aurora until 1919, as manager of the St. Louis office to 1931, and as general sales manager until recently when illness limited his activity. At that time he took charge of special promotional projects. This corrects the item used in STEEL, Feb. 12, page 29.



# Windows of WASHINGTON



By L. M. LAMM  
Washington Editor, STEEL

**WASHINGTON**  
■ EVIDENCE given last week before the special house committee investigating national labor relations board revealed the board and its staff have been violating the law prohibiting federal agencies from using public funds to lobby for their own interests. Chairman Smith thought the testimony so convincing it should be presented to the attorney general. This has been done.

Meanwhile, he withheld from the record "implied" charge of committee counsel, Edmund M. Toland, that board members and field officers had violated the statute. While Mr. Toland, reading the law, said he was not so charging anybody, committee members said they could draw no other inference from his comments.

Discussion followed a mass of documentary evidence showing board's regional directors, often with knowledge of board members and other Washington officials, had organized pressure on congress, especially through labor leaders, to prevent cuts in appropriations and amendments to the Wagner act.

Mr. Toland climaxed his "implied" charge by accusing board chairman J. Warren Madden, who was on the stand, of "blackjacking" employers. This was done, he said, by asking treasury department procurement division not to award these employers contracts when unfair labor charges had been filed against them, though not even heard.

## REQUESTED NAVAL BUDGET DECREASED TO \$966,000,000

House appropriations committee has recommended \$966,000,000 navy appropriation, \$111,000,000 less than was asked by the President for coming fiscal year.

Decrease from President's request for \$1,078,472,577 was the largest cut made by appropriations commit-

tee in any single budget recommendation to date. Committee said the fleet's needs could be "adequately met" with the smaller sum.

Included was \$1,000,000 to start work on a \$3,000,000 development project designed to make the tiny Pacific Island of Guam a naval "lookout" post.

In sending navy bill to the house floor, appropriations committee also cut \$16,316,250 from "contract authorizations" recommended. Thus total decrease in amount the navy could spend or obligate itself for in fiscal year beginning July 1 amounted to \$128,015,949.

While allowing money for 19 new combat ships and 5 auxiliaries, the committee cut \$7,750,000 from sums recommended for two new battle-ships and two new cruisers.

## HOUSE COMMITTEE STUDIES SMITH SCRAP EXPORT BILL

Arguments for and against advisability of prohibiting exports of iron and steel scrap, except by license, as proposed in the Smith bill, was presented before the house military affairs committee last week.

Bradley Stoughton, professor of metallurgy and former dean, Lehigh university's college of engineering, representing Independent Steel and Iron Producers' Committee on Scrap contended a serious scrap shortage faced United States' steel industry. Because of exports, he testified, scrap is used more rapidly than accumulated; definite and pressing need exists for scrap conservation. Steel scrap, he asserted, is a strategic material, though it has not been officially so designated.

Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., and chairman, Independent Committee on Scrap, testified United States needs large scrap piles available at present, and referred to scrap as a national resource. Only

six or seven weeks' supply of scrap is available in United States, he said.

Testimony charging severe scrap shortage in New England was given by E. H. Pape, purchasing agent, Stanley Works, Bridgeport, Conn. L. L. Middleton, vice president, Sheffield Steel Corp., Kansas City, Mo., declared small steel mills cannot exist with scrap at its present price level. Emergency or 100 per cent steelmaking operating rate would find United States facing a serious scrap shortage, said F. E. Vigor, transportation manager, American Rolling Mill Co., Middletown, O.

In opposition it was argued there was no logic in such a law at present. Scrap stocks, according to Edwin C. Barringer, executive secretary, Institute of Scrap Iron and Steel, are ample for all purposes. He declared the bureau of mines' survey showed more than 7,000,000 tons of scrap available. Furthermore, he pointed out, approximately 30,000,000 tons of scrap become annually available through obsolescence of iron and steel products.

Scrap exported, said Mr. Barringer, is about 10 per cent of domestic consumption, represents only inferior grades that would not be used by American steel mills.

War department and bureau of mines experts testified a ban on scrap exports is unnecessary (see page 34, this issue).

## 1939 MANGANESE ORE IMPORTS TOTAL 1,404,769,953 POUNDS

"Imports for consumption" of ores containing 35 per cent or more manganese into United States during 1939 totaled 1,404,769,953 pounds. Containing 702,934,243 pounds of manganese, their invoice value was \$3,498,050, according to metals and minerals division, bureau of foreign and domestic commerce.

Manganese content of ore imported in 1939 increased 34 per cent over



*Speed Nut System*



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CUT AVERAGE NET ASSEMBLY COSTS 50%

SPEED NUTS are manufactured from high carbon spring steel and heat treated to provide positive holding power for the life of the product. Made in over 500 shapes and sizes for most standard sizes of machine screws, stove bolts, metal screws, metal rivets, die cast and plastic studs. Many special shapes and sizes also developed for mass production products. Write for samples today, stating sizes desired and nature of application.

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2039 FULTON ROAD  
CLEVELAND, OHIO

MANUFACTURERS OF PATENTED SPEED NUTS

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario

IN ENGLAND: Simmonds Aeroaccessories, Ltd., London

**900 MILLION SPEED NUTS ALREADY USED**



534,536,026 pounds in 1938, but decreased 40 per cent of the 1937 total, 1,000,011,895 pounds. Of the 1939 totals, 403,433,528 pounds of ore with a manganese content of 199,610,840 pounds, valued at \$3,030,086, constituted entries for immediate consumption; 996,336,425 pounds of ore, 503,323,403 pounds manganese content, worth \$5,467,964, was withdrawn from bonded warehouse for consumption.

Gold Coast, Russia, Cuba and British India were chief sources of 1939 imports of ore containing more than 35 per cent manganese. Manganese content of their respective shipments totaled 275,001,971, 154,294,192, 115,848,809, and 102,045,930 pounds. Other countries entering into 1939 trade were Brazil, 43,678,130; Philippine Islands, 7,801,646; Union of South Africa, 3,802,308; Canada, 179,039; France, 141,017; Mexico, 53,950; Chile, 51,221; and Morocco, 36,030 pounds.

Approximately 1,156,183,181 pounds of ore, manganese content 566,056,467 pounds, valued at \$5,738,719, was imported into United States in bond during 1939. In addition to withdrawals from bonded warehouse for consumption previously mentioned, 22,056,850 pounds of ore, 11,022,400 pounds manganese content, valued at \$93,903, was withdrawn from bonded warehouse for re-export.

Last year 68,732,160 pounds of ore, manganese content 29 per cent or 19,932,326 pounds, valued at \$130,009, entered the country for immediate consumption. All came from Union of South Africa.

Slight increase is noted in the accumulation of stocks at close of 1939, compared with preceding year. Manganese content of ore remaining in bonded warehouse Dec. 31 was estimated at 989,643,458 pounds (441,805 gross tons), compared with 937,932,794 pounds (418,721 gross tons), at end of 1938.

#### **SAYS STEEL SCRAP EXPORT BAN UNNECESSARY NOW**

Legislation prohibiting exports of iron and steel scrap except under special licenses issued by the President is unnecessary at present, according to Col. Harry Rutherford, United States army. Representing the war department at hearings of the house military affairs committee, Colonel Rutherford said such action would be advised by the army only in event of major emergency.

Bill to that effect was introduced in the house by Representative Smith, Connecticut, and has support of independent iron and steel producers' committee on scrap.

H. R. Ridgeway, bureau of mines, testified: "From the standpoint of national defense, industrial welfare and long range conservation, there

does not appear to be any necessity for enacting legislation that would restrict operations of this particular industry."

#### **50,000 EMPLOYEES ENGAGED IN INDUSTRIAL RESEARCH**

Approximately 50,000 persons are employed in industrial research today, nearly four times as many as in 1921. Annual expenditures average between \$150,000,000 and \$200,000,000, according to Col. F. C. Harrington, commissioner of works projects.

From these industrial laboratories have come the bulk of new inventions and improved processes in recent years, the commissioner said. Greatest amount of research, he stated, is in relatively new, mass-production industries such as electrical goods, rubber, petroleum, industrial chemicals and automobiles.

Significant aspect of research growth has been the increase in large laboratories, he said. "The number of companies maintaining research staffs of more than 50 persons increased from 15 in 1921 to 120 in 1938, representing an eight-fold growth, compared with a three-fold rise for companies with fewer than 11 on their research staffs."

#### **CHARGE FURNITURE MAKER MISREPRESENTS PRODUCT**

Misrepresentation of a carbon steel tubing product as chromium is alleged in a federal trade commission complaint against Howell Company, St. Charles, Ill., manufacturer of household and office furniture.

It is alleged that through use of the term "chromsteel" respondent corporation represents certain of its furniture as made of steel alloy containing chromium when, in fact, it is made of carbon steel tubing. Chromium or chrome steel, complaint points out, is more expensive than carbon steel. It combines intense hardness with high elastic limit.

#### **MANUFACTURERS' TOTAL 1939 INVENTORIES UP 7.5 PER CENT**

Value of manufacturers' inventories increased about 9 per cent during latter half of 1939, according to department of commerce.

Tabulations of a new monthly reporting service, launched last December by the department in co-operation with manufacturing corporations in all major lines of business, has just been announced. Companies included in the sample on which this estimate is based held, Dec. 31, 1939, inventories of somewhat less than three billion dollars, or more than one-fourth the total of all manufacturing corporations.

Much of the increase occurred dur-

ing November and December, each of which recorded a rise of nearly 3 per cent. Inventories Dec. 31, 1939, were 7½ per cent larger than those in manufacturers' hands at end of 1938.

Estimates based upon data of reporting concerns indicate almost a billion dollars was added to inventories of all manufacturing corporations during the latter half of 1939. Companies in textile, iron and steel products, transportation equipment (including automobiles), and machinery groups accounted for a major part of the advance.

Other data indicate that sales (shipments) of manufacturers during December showed practically no change from the previous month, and were about one-fifth larger than in December, 1938. Unadjusted sales totals for companies reporting inventory figures given were \$1,115,200,000 in December, compared with \$909,800,000 in December, 1938.

#### **WALSH-HEALEY IRON, STEEL AWARDS TOTAL \$903,179**

During the week ended Feb. 3, the government purchased \$903,179.18 worth of iron and steel products under the Walsh-Healey act as follows: Camillus Cutlery Co., New York, \$14,814; Sheet Metal Mfg. Division, Reliance Steel Corp., Youngstown, O., \$39,025.40; Wheeling Steel Corp., Wheeling, W. Va., \$24,098.63.

Enterprise Tool & Gear Corp., Detroit, \$30,112; Dana Tool-D Nast Machinery Co., Philadelphia, \$30,731.19; Noland Co. Inc., Washington, \$10,629.01; Puget Sound Machinery Depot, Seattle, \$43,559.52; American Rolling Mill Co., Middletown, O., \$16,324.26.

Geo. J. Fritz Foundry & Machine Co., St. Louis, \$73,591; American Steel & Wire Co., New Haven, Conn., \$30,801.60; R. L. Rettew & Co., Lebanon, Pa., \$14,147; Western Automatic Machine Screw Co., Elyria, O., \$10,474.80; Crucible Steel Co. of America, New York, \$58,528.53 (estimated).

American Cast Iron Pipe Co., New York, \$16,830; United States Pipe & Foundry Co., New York, \$103,090.10; Tyne Co., Chicago, \$12,608.70; Colorado Fuel & Iron Corp., Denver, \$89,900; Wausau Iron Works, Wausau, Wis., \$27,068; Kline Mfg. Co., Columbus, O., \$22,750; George Worthington Co., Cleveland, \$11,196.38.

Bethlehem Steel Co., Bethlehem, Pa., \$144,574.21; Louis Hansen's Sons, Davenport, Iowa, \$11,832.98; Hart Mfg. Co., Louisville, Ky., \$27,129.50; F. A. Klaine Co., Cincinnati, \$24,337.50; Lynchburg Foundry Co., Lynchburg, Va., \$14,118.07; Ferro Pipe & Foundry Co., Bridgeton, N. J., \$10,628.31; and Ross-Willoughby Co., Columbus, O., \$10,278.49.



# AVIATION

## AIRPLANES LAST LONGER; REVISE DEPRECIATION BASIS

■ **NORMAL** life of a plane and its engines depends a great deal on wear, fatigue and corrosion resistance of the metals used. In the modern transport plane, all-metal with few exceptions, wear and fatigue resistance is almost directly proportional to progress in metalurgy and fabrication methods.

Early fears that light metals used in planes couldn't stand the metal fatiguing stress in flying are being dispelled. Extent to which improved metals are increasing the life of aircraft is seen in United Air Lines' request to Civil Aeronautics Authority to approve revision of its basis for depreciation charges. Douglas DC-3 transports will be depreciated over a five-year period instead of four; engines are to be written off after 6000 hours instead of 4000.

Retroactive to November, 1936, the change would increase company's earned surplus as of Jan. 1, 1940, by \$573,000. American Airlines Inc., changed over on the same basis Jan. 1, 1939. Transcontinental & Western Air Inc., now is reported giving serious consideration to going on the same basis.

Harry H. Woodring, secretary of war, revealed location of two new army bases to be built in Alaska.

"Ladd Field" at Fairbanks will be an experimental station devoted to subzero air operations. Cost will be \$4,000,000 and construction will start immediately. The other will be 1400-acre "Elmendorf Field" at Anchorage; \$12,734,060 has been requested in the 1941 budget to cover construction costs.

Mass deliveries of planes to United States and foreign governments are expected within 30 days. American capacity now is estimated at 1250 planes per month. Of the 7000 military planes on American builders backlogs, 3800 are on foreign orders. Foreign governments spent \$204,555,000 here in 1939 of which \$199,015,846, or 97 per cent, has been for aircraft.

### Canada Gets Order

Swedish government placed before parliament a bill for 95,000,000 kroner on two new groups of fighter planes and reconnaissance units for army and navy. Canadian Associated Aircraft, comprising six companies, received a \$30,000,000 order from the British government, said to be the largest aviation order to be placed in Canada.

Consolidated Aircraft Corp., San Diego, Calif., is planning an 82 per cent expansion of its plant to take care of a \$43,000,000 record backlog. Seven steel buildings will be added costing \$1,200,000. Swedish government's purchase of 144 Vultee fighting units give about \$3,000,000 to United Aircraft Corp., East Hart-

ford, Conn., for its twin-row Wasp engines.

Because United States army is too busy to participate, 1940 national air races scheduled for Cleveland have been postponed to 1941.

Machine tool builders are reported to have set definite schedules to meet priority demands of aircraft engine builders. About 2500 machine tools will be required.

## MEETINGS

### SPECIAL LIBRARIANS PLAN MEETING IN INDIANAPOLIS

■ "UTILIZATION of Resources" will be theme of thirty-second annual convention of the Special Librarians association at the Claypool hotel, Indianapolis, June 3-6. Membership totaling about 2200 is drawn from institutions or companies maintaining special libraries or research departments.

### DISTRICT HEATING GROUP WILL CONVENE IN MAY

National District Heating association will hold its annual meeting at French Lick Springs hotel, French Lick, Ind., May 14-17. John F. Collins Jr., 1231 Grant building, Pittsburgh, is secretary of the association.

## Convention Calendar

Feb. 22-24—American Foundrymen's association. Eighth annual regional conference of Birmingham District chapter at Tutwiler hotel, Birmingham, Ala.

Feb. 29-March 1—American Hot Dip Galvanizers' association. Annual meeting at William Penn hotel, Pittsburgh. Stuart J. Swensson, 903 American Bank building, Pittsburgh, is secretary.

March 6—American Society for Testing Materials. Regional meeting at Hotel Statler, Detroit, in conjunction with spring group meetings of committees, March 4-8. C. L. Warwick, 260 South Broad street, Philadelphia, is secretary.

March 6-9—Industrial Tools and Equipment exhibition. State Armory, Bridgeport, Conn. R. T. Phipps, 271 Grovers avenue, Bridgeport, Conn., is exhibition manager.

March 7-9—American Society of Tool Engineers. Third annual meeting at Hotel New Yorker, New York. Ford R. Lamb, 2567 West Grand boulevard, Detroit, is executive secretary.

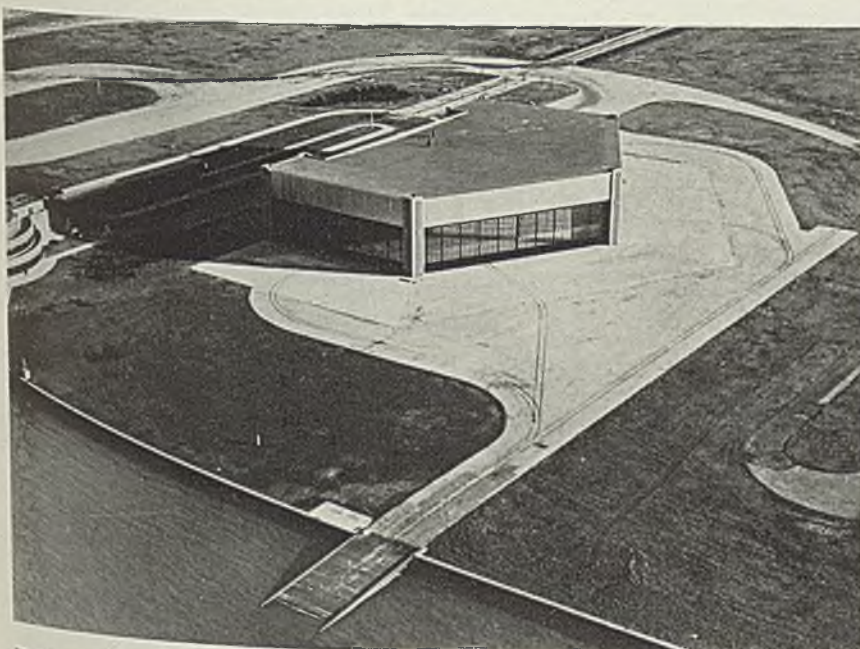
March 14-15—Society of Automotive Engineers. National aeronautic meeting, Washington hotel, Washington. John A. C. Warner, 29 West Thirty-ninth street, New York, is general manager.

March 18-20—National Association of Waste Material Dealers. Annual meeting at Hotel Astor, New York. Charles M. Haskins, 1109 Times building, New York, is secretary.

March 28-29—Society of Automotive Engineers. National transportation and maintenance meeting at Mellon Institute auditorium, Pittsburgh. John A. C. Warner, 29 West Thirty-ninth street, New York, is general manager.

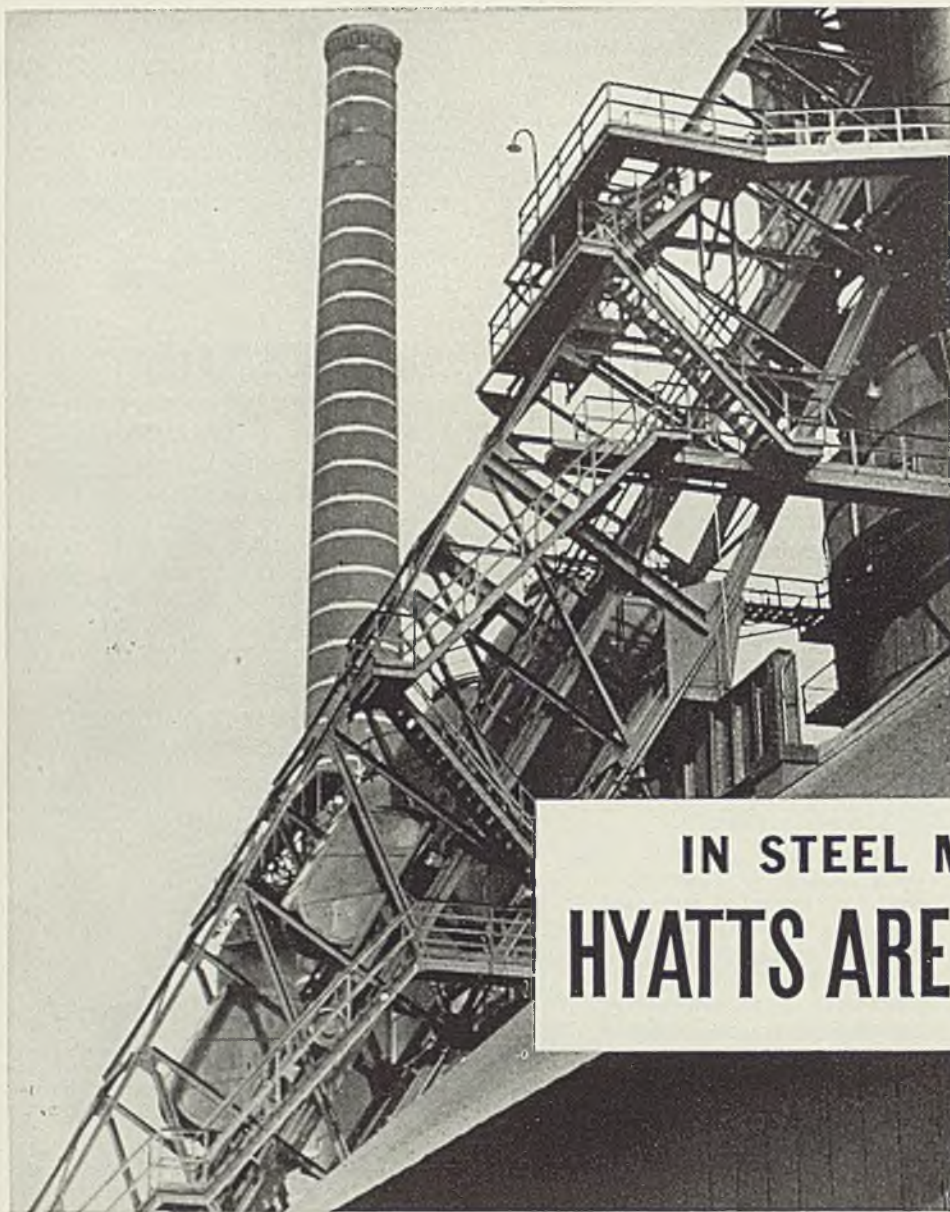
March 29-30—New England Foundrymen's association. Fourth annual conference at Massachusetts Institute of Technology, Cambridge, Mass.

## Moves Heavy Seaplanes on Steel Tracks



■ Handling large seaplanes is expedited at LaGuardia Field, New York, by marine railway and a pivoting cradle truck, a departure from the pneumatic-tired trackless cradle usually used. Track, on steel ties and concrete, is capable of 250,000-pound load. Approach to hangar is from four sides to allow movement of any plane within hangar without disturbing others. Photo courtesy Bethlehem Steel Co., Bethlehem, Pa.





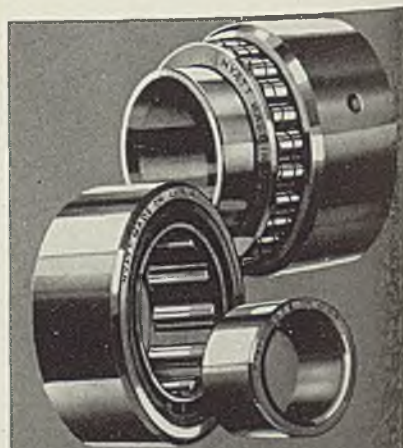
Close-up of the skip at "World's Largest Blast Furnace" showing Hyatt equipped skip cars. Another recent Hyatt "Long Life" application.

## IN STEEL MILL SERVICE HYATTS ARE EVERYWHERE

Because Hyatt Roller Bearings serve so well and so long they are given first consideration when it comes time for bearing selection on any new installation or changeover.

Therefore, as you would expect, in "The World's Largest Blast Furnace" Hyatts are on the job. Here they carry the loads of the skip cars and bull wheels.

In every other modern blast furnace, and throughout every modern mill, Hyatt-equipped skip hoists, cars of every description, tables, cranes, and motors are giving the same long-lived, carefree operation that, for years, has made Hyatts the preferred steel mill bearing. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Detroit, Pittsburgh and San Francisco.



# HYATT ROLLER BEARINGS



# Mirrors of MOTORDOM

By A. H. ALLEN  
Detroit Editor, STEEL



## DETROIT

■ FLASH percussive welding, the new process first mentioned in this department last fall, is being investigated by automotive engineers with a view to determining more fully its possible application. The method now is being used for welding Chrysler engine mounts at the rate of 1200 per hour. The latter comprise a 4-inch length of S.A.E. 1010 steel tubing  $\frac{5}{8}$ -inch in diameter and 0.084-inch wall thickness, welded to a steel washer about 3 inches in diameter and  $\frac{1}{8}$ -inch thick, with a hole in the center of the same diameter as the inside diameter of the tube. A rubber biscuit is fitted over the tube and a hold-down bolt through the tube. Three of these mounts are used in each car.

Developed by Alfred Vang, Danish inventor, and currently being promoted by the Vanco Products Co. here, the process, as explained to a group of 35 engineers and metallurgists of a leading automobile company, permits the welding of any of the metals used in industry, either to themselves or to dissimilar metals. Combinations of which welded samples are being shown include carbon steel welded to stainless steel, to silechrome steel, to aluminum, to Dowmetal, to stellite, to copper, to brass, to malleable iron; Dowmetal welded to steel, copper and brass; aluminum welded to steel, copper and brass; and copper welded to steel, aluminum, brass, stellite, pure nickel and cast iron.

The process is claimed to permit the welding of metals regardless of a difference in cross-sectional area or mass of the parts being welded. For example, stainless steel and copper valve needles  $\frac{1}{4}$ -inch

in diameter are being welded to copper and phosphor bronze bellows only 0.005-inch thick without affecting the physical properties of the bellows material—a ticklish job.

Hardened steel parts can be welded to softer parts without changing the hardness of either, because the heated zone of the weld is not over 0.002-inch deep. Welds are clean, with complete absence of flash which might have to be removed after welding.

## Process Reduces Costs

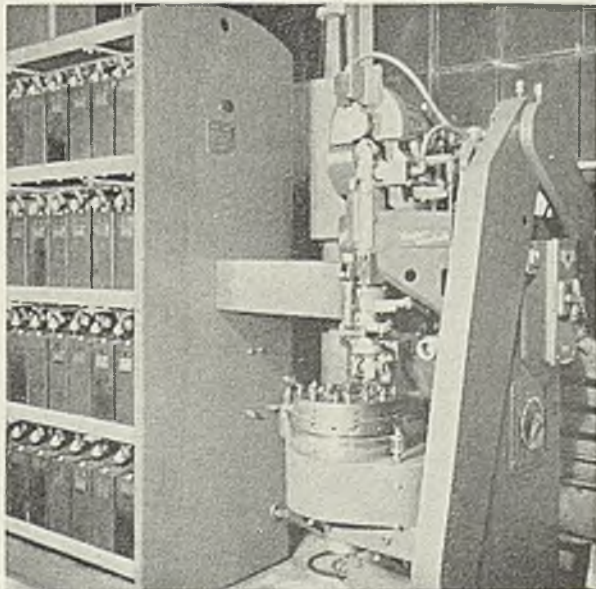
A part being produced experimentally is the shackle bolt for a leading make of car. Formerly made by upsetting the heated end of a solid cylindrical rod and turning it to final shape, the part can be produced at considerably less cost by blanking out the flange on a coining press and welding it to the rod which has been cut to length from a bar.

There are recognized limitations to the process. In the first place, it

has been developed only for quantity production on butt welds and cannot be used for seam or flash welding, even though the term "flash percussive" is used to describe the process. Areas up to  $\frac{1}{4}$ -inch square can be welded, but they must be concentrated, and while this area in a round or square section is welded readily, the equivalent area in thin, wide sheets cannot be welded. Further, the two pieces comprising the weld must be separate; that is, a ring or band cannot be formed by welding two ends together.

Process, in brief, is as follows: Condensers of suitable capacity are charged with current from a standard 110 or 220-volt power line. Current is stepped up to approximately 4000 to 4500 volts with an iron core transformer contained in the charging unit of the welding equipment. A vacuum tube is used to rectify the current, acting as a choke to change alternating to direct current. A simple timer such as used on spot

■ Cover removed from condenser bank operated in conjunction with flash percussive welding machine producing 1200 engine mounts per hour. Note dial table in which tubular pieces are chucked, and welding head which grips flange or washer to be welded to the tube



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welding equipment serves to control the charge in the condensers.

Parts to be welded are clamped in suitable fixtures, one being grounded to the machine and the other connected to the condenser being held in a movable slide retracted against spring or air pressure until the condensers are charged. Upon releasing a trigger, one piece moves toward the other rapidly. When it reaches a distance of about 1/16-inch, depending upon the voltage, an arc breaks across the gap, producing a molten condition on both surfaces. The two surfaces are brought together while still molten and a true surface weld results. Since only the surfaces of the metal are brought to a molten state, the penetration of heat is shallow, thus permitting the welding of thin or heat treated metals without disturbing the physical properties of the metal beneath the weld.

Difference of mass, thermal conductivity, electrical resistance or melting point of the two metals being welded plays little, if any, part in making the weld. This is why it is possible to weld materials of such diverse characteristics as those mentioned.

**Oscillatory Current Wave Used**

Study of the welding operation by Westinghouse engineers indicated that with a voltage of 4000 the arc is established when the pieces are about 1/16-inch apart. The current wave set up is oscillatory in nature, of a frequency around 5000 cycles per second, and with a peak on the first half cycle of about 70,000 amperes rapidly decreasing to zero in a few cycles. Mass of the moving system and the pressure are adjusted so that at the end of about 0.0005-second after the breakdown the parts are brought into mechanical contact (the percussive phase). Several cycles of the arc will have been completed by this time however; the metallic surfaces will have been heated to a molten state and the impact produces a weld before any cooling takes place.

Equipment for producing the previously mentioned engine mount has a maximum capacity of 1800 welds per hour, and has been operated for many months at a speed of 1200 pieces per hour, including stoppages. Shown in an accompanying illustration, this equipment was built by Taylor-Winfield Corp., Warren, O. In operation, the tubes are placed in holes in the dial table of the machine which indexes around under the welding head. Washers are placed on top of the tubes and are picked up by jaws in the head before coming into welding position. The weld is completed so quickly

that the pieces may be handled as fast as they are welded, and even the weld zone is not uncomfortably warm to touch.

Herbert B. Trix, vice president of Vanco Products, emphasizes the process is not intended to replace existing methods of resistance or other types of welding which are operating satisfactorily. Rather, it is being offered as a means of making possible improvements in design or reductions in cost not possible by conventional methods.

RENEWED activity by Crosley Corp. in the redesign of its small car is reported, and 1940 models are being expected on the production line shortly. Bodies have been changed extensively, and a universal joint has been added to the drive-

signed car and the new tractor units.

Though it still sounds incongruous to many, development work on the 6-cylinder Ford engine is proceeding at a rapid pace. Several score of these units have been built and some installed in test cars. Known as the OMA engine, it develops a little better than 70 horsepower and features overhead valves driven through an overhead camshaft, the latter chain driven from the crankshaft. According to those who have seen it, the engine is an exceptionally well engineered plant, with trim appearance.

When, if ever, this engine will appear in the Ford line must remain largely guesswork. Editors hereabouts recall that years ago when Ford was about to introduce the V-8 engine, company officials even the day before the introduction stoutly maintained that no change was being contemplated.

Production of the Ford tractor, on which Mr. Ford currently is concentrating nearly all of his attention, has been boosted to practically 300 per day and inquiries have been issued to some suppliers concerning the possibility of stepping up to 600 per day within a short time.

**All-Steel Tonneau**

Buick has announced introduction of town car models on the series 50 and 70 chassis. Innovations in custom body practice include the use of an all-steel tonneau section, hand finished in black grained top material. Canopy for the driver's compartment, when not in use, folds into a special cabinet built into the tonneau top over the center body pillars. Fittings and trim are elaborate throughout, including speaking tube in the right rear quarter panel, communicating with the driver's compartment. In-laid chrome door, window and ventilator controls harmonize with the interior trim. The 70 series job is on 126-inch wheelbase with 141-horsepower motor. The 50 series is on 121-inch wheelbase with 107-horsepower motor. As a final touch, a thick sheepskin rug is available for the carpeted floor.

For smoother travel over deep-rutted, muddy and snow-drifted roads, of which there appears to be too many throughout the country at this time, Plymouth has announced its 1940 "highboy" models, with 20-inch wheels to provide greater axle clearance, special rear axle gear ratio and 25 per cent heavier springs.

Chevrolet sales of cars and trucks in January mounted to 73,328, a figure which broke all January records with the exception of 1936, and was only 2280 units short of the January total for that year.

**Automobile Production**

Passenger Cars and Trucks—United States and Canada  
By Department of Commerce

	1937	1938	1939
Jan.....	399,186	226,952	356,950
Feb.....	383,900	202,597	317,517
March....	519,022	238,447	389,489
April.....	553,231	237,929	354,263
May.....	540,377	210,174	313,214
June.....	521,153	189,402	324,235
July.....	456,909	150,450	218,478
Aug.....	405,072	96,946	103,343
Sept.....	175,630	89,623	192,672
Oct.....	337,979	215,286	324,673
Nov.....	376,629	390,405	368,538
Dec.....	347,349	406,960	469,002
Year.....	5,016,437	2,655,171	3,732,374

Estimated by *Ward's Reports*

Week ended:	1940	1939†
Jan. 20 .....	108,545	90,205
Jan. 27 .....	106,400	89,200
Feb. 3 .....	101,240	79,410
Feb. 10 .....	95,985	84,500
Feb. 17 .....	95,050	79,860

†Comparable week.

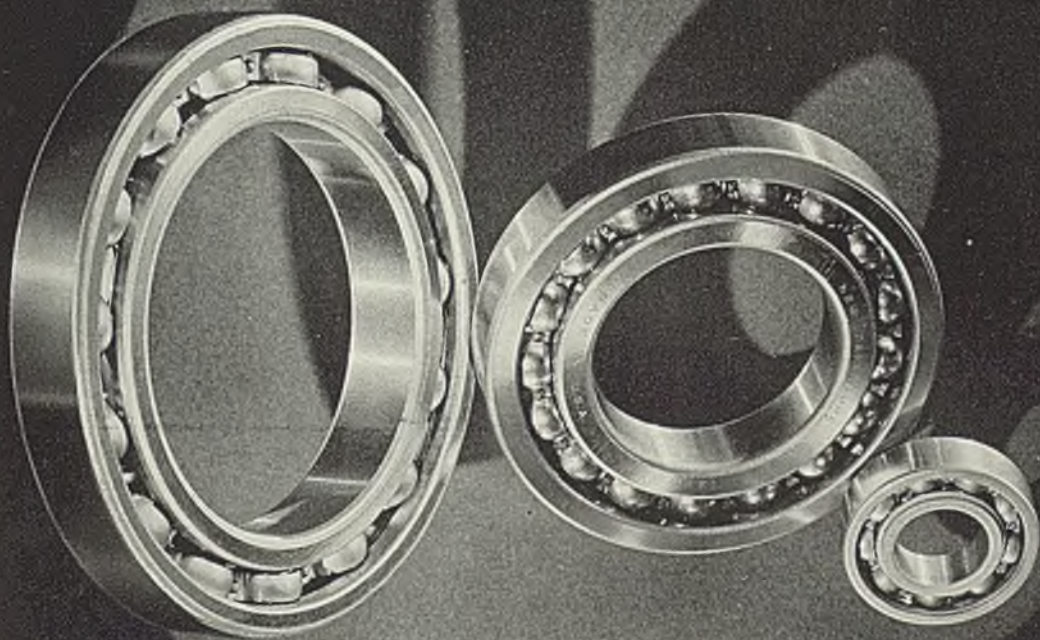
	Week Ended	
	Feb. 17	Feb. 10
General Motors .....	37,355	38,295
Chrysler .....	25,790	25,905
Ford .....	20,600	20,600
All others .....	11,305	11,185

shaft. Meanwhile, some further new developments are awaited from Crosley, in which the 2-cylinder air-cooled engine used in the car will figure prominently.

One of these new ideas is a tractor which has been put through tests on a Kentucky farm. Reports indicate that the unit will pull a 12-inch plow at a depth of 4 inches. Designs on the equipment have been worked out and it should be made public before many months. The other device is a small automotive-type tractor for hauling trailers. Despite the fact only about 2500 of the original Crosley cars were built, high hopes are held for the rede-



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# Dissolve "Fourth Branch", Simplify Government—Advice at Del Monte

DEL MONTE, CALIF.

■ ADMINISTRATIVE policies, cited as responsible for failure of United States to emerge more than temporarily from the past decade's depression were critically attacked at the sixteenth annual conference of Iron, Steel and Allied Industries of California, held here, Feb. 8-10.

Men prominent in the steel industry addressed the general sessions. Included were James F. Lincoln, president, Lincoln Electric Co., Cleveland, and H. S. Washburn, president, Plainville Casting Co., Plainville, Conn., and president, American Foundrymen's association.

Topics in general sessions and in the various group meetings composed of reinforcing steel jobbers, merchant steel distributors, structural shops, plate fabricators, foundries, tubular products and manufacturers and purchasing agents included relation of steel production to business, current problems in manufacture and merchandising of steel, government and national economic recovery.

Discussing United States' slow and interrupted progress toward a basic and lasting prosperity, W. C. Mullendore, executive vice president, Southern California Edison Co. Ltd., Los Angeles, asserted governmentally created obstacles have hampered recovery. If anyone in 1930 had attempted to prophesy the forthcoming decade's "most pronounced revolution by far that has taken place in the history of United States," said Mr. Mullendore, he would have been "forcibly ejected" before his revelation was complete.

Offering a formula for recovery, he advocated release of the spirit of enterprise from oppressive restrictions, free and fair competition, and reward for merit. Businessmen, however, he said, must strive for the formula's objectives, which are easier to state than achieve.

Further emphasis upon necessity

for businessmen to participate actively in politics was voiced by James Musatti, general manager, California state chamber of commerce. United States, he declared, is bending beneath the weight of innumerable independent administrative agencies. Agencies which have, in effect, "become the fourth branch of our government."

That they exist within the law is due, said Mr. Musatti, to loose and careless methods employed in drafting legislation which fails to make investiture of their power crystal clear.

## Advises Simplifying Government

Extent to which government shall dominate the individual is the fundamental political problem facing us today, declared Mr. Lincoln. Asserting that if responsibility placed upon government by New Deal legislation is to remain we must become a totalitarian state, he contended we can only remain a democracy if we simplify government to the point at which a democracy can function successfully. The decision, he warned, must be made shortly.

Pointing out that modern warfare is not simply a struggle between armed forces, but rather a contest of strength between the peoples of nations, Lieut. Col. Welton J. Crook, ordnance reserve, Stanford university, discussed co-operation of industry with the United States army for national defense. In order to prepare industry in time of peace for possible war *materiel* production, he said, the government

## Del Monte Delegates

■ Sixteenth annual meeting of the Iron, Steel and Allied Industries, held Feb. 8-10 at Del Monte, Calif., under auspices of the California state chamber of commerce. More than 300 delegates attended.

is placing "educational orders" for some non-commercial ordnance.

Mr. Washburn discussed merchandising of jobbing castings. Position of the foundry industry in the future is assured, he said, by increasing progress being made in application and manufacture of casting

Resolution favoring the merit rating principle in unemployment insurance legislation, under which employers who cut down labor turnover are rewarded with reduced tax rates, was rejected by the convention, contrary to report in last week's issue of STEEL.

Mediation of labor disputes on voluntary basis was favored in principle. Opposition to senate bill 1970 known as the LaFollette-Thomson oppressive labor bill, prohibiting use of industrial munitions and strike breakers was voiced. The delegate went on record opposing legislation patterned after the Wagner national labor relations act, national fair labor standards act, Norris-LaGuardia anti-injunction act, and the Walsh-Healey act.

Establishment of a stable and permanent tax structure was advocated. Reduction of high surtax rates on individual incomes and consideration of taxation of exempt securities; segregation of capital gains and losses with optional flat rate, or normal and surtax rate; filing of consolidated income tax returns; elimination of intercorporate dividends and new declaration of capital stock values each year were also favored.

Officers for next year were unanimously re-elected: B. J. Osborne, Moore Drydock Co., Oakland, Calif., chairman; C. B. Tibbetts, Los Angeles Steel Casting Co., Los Angeles, vice chairman; and C. S. Knight, California state chamber of commerce, secretary.

Named to executive committee:

### Foundries

Northern California—Charles P. Hoehn, Enterprise Foundry Co., San Francisco and E. M. Welch, American Manganese Steel Co., Oakland, Calif. Southern California—C. B. Tibbetts, Los Angeles Steel Casting Co., Los Angeles and Martin Madsen, Madsen Iron Works, Los Angeles.

Manufacturers, Purchasing Agents Northern California—James MacPherson





son, Standard Oil Co., San Francisco.  
Southern California—E. F. Watkins,  
Southern California Edison Co., Los  
Angeles.

#### Reinforcing Steel

Northern California—C. M. Gunn,  
Gunn, Carle & Co., San Francisco.  
Southern California—H. G. Haake, Ceco  
Steel Products Corp., Los Angeles.

#### Steel Mills

Northern California—William A. Ross,  
Columbia Steel Co., San Francisco. South-  
ern California—P. W. Cotton, Bethlehem  
Steel Co., San Francisco.

#### Merchant Steel

Northern California—H. E. Oliphant,  
Tay-Holbrook Co., San Francisco. South-  
ern California—W. M. Anderson, Cal-  
ifornia Hardware Co., Los Angeles.

#### Structural Shops

Northern California—S. G. Herrick,  
Herrick Iron Works, Oakland, Calif.  
Southern California—A. Neuffer, Bethle-  
hem Steel Co., Los Angeles.

#### Traffic

Northern California—T. E. Banning,  
Columbia Steel Co., San Francisco.  
Southern California—T. A. L. Loretz,  
Pacific Coast Steel Fabricators associa-  
tion, Los Angeles.

#### Steel Plate Fabricators

Northern California—George H. Ralftt,  
Steel Tank & Pipe Co., Berkeley, Calif.,  
and J. A. Shaw, Industrial Steel Tank &  
Body Works, Emeryville, Calif. Southern  
California—A. G. Roach, Consolidated  
Steel Corp. Ltd., Los Angeles, and C. W.  
Timmons, American Pipe & Steel Co.,  
Alhambra, Calif.

#### Members of the Pacific Coast Steel Fabricators' association elected:

P. F. Gillespie, Judson-Pacific Co., San  
Francisco, president; B. J. Osborne, Moore  
Drydock Co., Oakland, Calif., secretary-  
treasurer.

Directors: P. F. Gillespie; B. J. Osborne;  
T. L. Hanning, Steel Tank & Pipe Co.  
of Oregon, Portland, Ore.; D. G. Hender-  
son, Consolidated Steel Corp. Ltd., Los  
Angeles; Charles McGonigle, Poole & Mc-  
Gonigle Co., Portland, Ore.; Paul Pigott,  
Pacific Car & Foundry Co., Seattle;  
George H. Ralftt, Steel Tank & Pipe Co.,  
Berkeley, Calif.

A. B. Shafer, Garrett & Shafer En-  
gineering Works, Seattle; R. A. Stumm,  
Southern Pipe & Casing Co., Azusa,  
Calif.; Charles W. Broyles, Herrick Iron  
Works, Oakland, Calif.; C. W. Timmons,  
American Pipe & Steel Co., Alhambra,  
Calif., and T. A. L. Loretz, Los Angeles,  
manager.

■ Unemployed in December rose to  
8,428,000 from 8,353,000 in Novem-  
ber, according to National Industrial  
Conference board.

# Current Events In Chicago . . .

By J. F. POWELL, Chicago Editor, STEEL

■ PLANS for Chicago's first cold storage locker plant were announced tentatively last week. Ordinarily cold-storage locker movement has centered around farming areas (STEEL, Aug. 22, 1938, p. 32), and advocates of the system are not too enthusiastic over prospects for a successful plant being operated in so urban an area as Chicago's north side.

The community cold-storage locker movement has developed into a considerable market for steel, not only involving the sheets, mesh and angles used in the lockers themselves, but also structurals, reinforcing steel, piping, machinery, and meat racks.

Latest estimate is that there are nearly 4000 locker plants in this country, chiefly in the Mid-west. Installations are at a rate of 50 a month and last year over 600 plants were built.

A Chicago engineering firm specializing in such constructions reports an increase in the building of smaller units, ranging from 100 to 200 lockers each. Most plants run between 500 and 600 lockers.

Function of the plants, of course, is providing cold-storage facilities to individuals and families, resulting in substantial savings on fresh fruits, vegetables and meats. That the idea is feasible is indicated by the steadily-growing number of new installations. So far this country has the greatest number, but installations also are increasing in Canada. Although the system is not known to be used abroad, a large future market is seen in Central and South America, particularly the Argentine. Chicago engineers already have built one plant in Venezuela.

A national association of locker plants has been formed, convening in Des Moines in December, while at the recent air-conditioning show here approximately half the displays involved locker plant installations.

There has been no trend as yet

toward use of stainless steel for the lockers. Though rather an ideal material for them, engineers feel it necessary to keep costs down. Use of porcelain-enameled sheets also is not so widespread, hot-rolled galvanized material gaining in popularity.

#### Steel for War Materials

Deepest secrecy usually surrounds production of steel and steel products for use in the European war, but persistent are rumors, some true, many wild, of substantial orders booked by local interests for foreign war material. Requirements of belligerents for trucks and tractors for army service are rather well established, but even before the outbreak of hostilities last September reports here dealt with production of steel for British shell cases, the material being shipped to Canada in billet form and thence consigned to Great Britain. At present, steelworks here are reliably reported producing an order for 8000 gross tons of 41-40 steel bars in 25-foot lengths. Annealed and pickled, the material purportedly will be shipped to France to be made into tracer bullets, a use which arouses considerable speculation because ordinarily much softer metals are used for bullets, especially in the smaller calibers.

#### Operations Above Capacity

With district steel mills curtailing production weekly, in amounts ranging from two to 24 points at a time, one producing mill recently has moved counter to the downtrend and at present, after two consecutive increases in production, is operating in excess of 120 per cent of theoretical capacity, based on actual output. Chief reason is not, naturally, an increase in general demand for steel, but rather for the substantial needs of one consuming industry. Aided by this, the mill in point has been enabled to operate in excess of its rated capacity.





## *The Democratic Process Is Reviving*

■ HIGHLY beneficial results have materialized as a result of the investigation of the national labor relations board by a special house committee. The veil of secrecy which enshrouded many of the board's activities was removed sufficiently to prove unmistakably that important figures who directed or influenced the board's activities were less interested in labor relations as such than in driving workers en masse into labor union membership, with a strong bias in favor of CIO and an equally strong bias against employers.

Every manufacturer knows that the testimony at the hearings has exerted a powerful influence on public opinion throughout the country. How soon something will be done about the matter at Washington—and whether it will take the form of revision of the national labor relations act or a reorganization of the board—is not yet apparent. The whole matter is a hot potato. Sponsors of the act and the board are only human and do not like to admit their mistakes. In the present state of public opinion, however, it seems that it must be only a matter of time before we will have a national law and policy which will regulate industrial relations in the proper spirit.

### **Too Much Power to Administrative Bodies Brings Strong Reaction**

Perhaps the most important lesson that has been learned as a result of the investigation is that congress has been thoughtless in investing administrative bodies with undue authority. Charges frequently have been made that when congress invested such agencies with the powers of the prosecuting attorney, judge and jury, it was paving the way for divesting citi-

zens of their constitutional rights. Evidence developed in the national labor relations board investigation clearly demonstrated that such is the case. As a result, feeling is growing that congress must retrace its steps, that it must reinvest the courts with the jurisdiction they once had in protecting the individual citizen in his fundamental rights.

The "liberalized" Supreme Court also is contributing to this feeling. Some of its recent decisions have appeared to reflect a disposition to construe certain acts of congress as permitting administrative agencies to exercise authority which, it is believed in many quarters, extends far beyond what originally was intended. Hence there is growing congressional concern over the wording of some recent laws which have a far-reaching effect over the rights of citizens.

### **Trend Toward Dictatorial Methods Reversed; Congress Resuming Authority**

Congress already has given some signs of an awakening to the fact that it has absolute power over federal agencies. It required only a warning from some leading members of the house, to the effect that demands for an investigation of the securities and exchange commission were increasing, to cause SEC to reverse its position and decide that it would not undertake to run the 50 to 60 operating utilities formerly controlled by the bankrupt Associated Gas & Electric Securities Corp.

These and other recent manifestations indicate that the march toward dictatorship in this country has been reversed—that it has become a retreat. They justify belief that we are returning at last to democratic processes for solution of national problems.



# The BUSINESS TREND



## Activity Index Drifts To Lower Levels

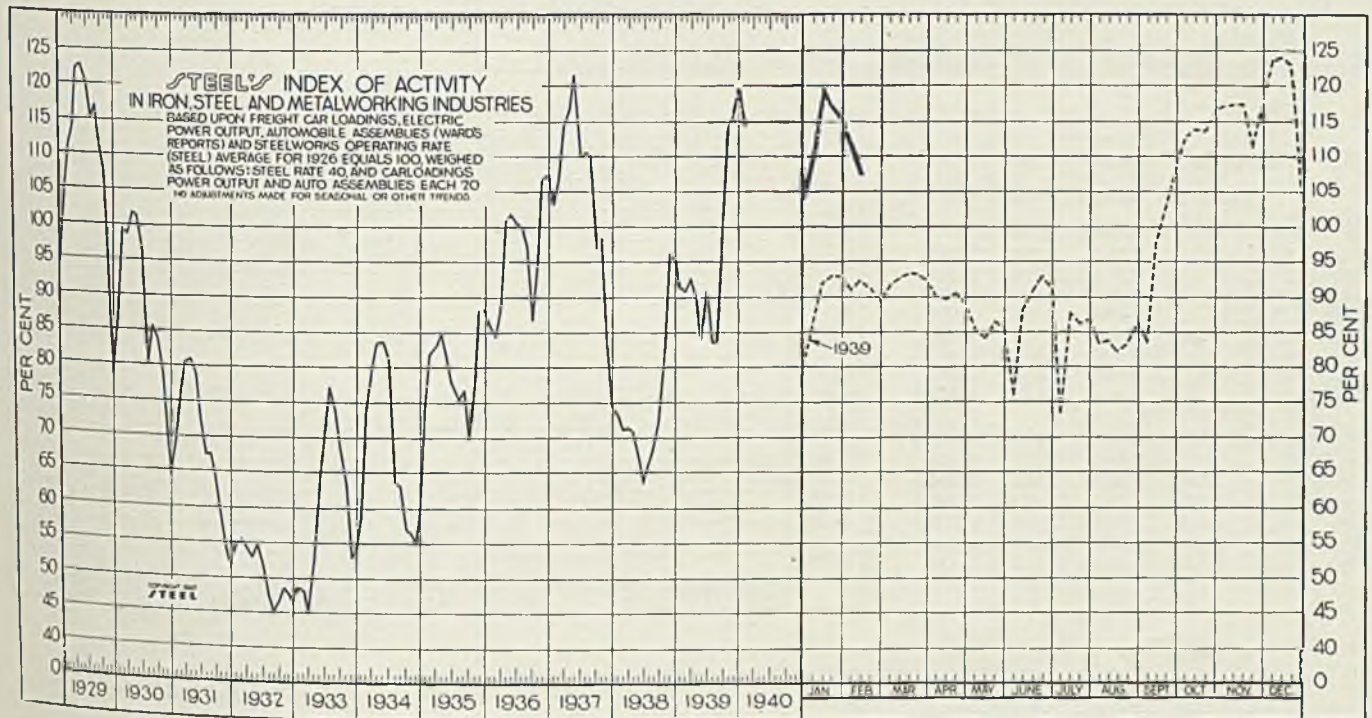
INDUSTRIAL activity continues to reflect the lethargy of new demand. The large order backlogs accumulated during the final months of last year have been reduced substantially and operating schedules, particularly among the durable goods group, are being adjusted to a closer relationship with incoming orders.

Steel index recorded the fourth consecutive weekly decline to 107.2

during the week ended Feb. 10 and current indications point to a continuation of this downward tendency throughout February. In the corresponding week last year the index stood at 92.1. Since the high point last year of 124.2 recorded in the week ended Dec. 16, the index has receded 17 points or 13.7 per cent.

Each of the business indicators composing the index moved to mod-

erately lower levels in the week ended Feb. 10. The national steel rate was off 5.5 points to 71 per cent and declined further last week. Electric power consumption receded for the fourth consecutive week, while revenue freight carloadings declined contra-seasonally to about 626,000 cars. Automobile assemblies totaled 95,985 units, compared with 101,240 in the week ended Feb. 3 and 84,500 in the corresponding 1939 period.



STEEL'S index of activity declined 4.4 points to 107.2 in the week ended Feb. 10:

Week Ended	1939	1938	Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Dec. 9	123.9	100.7	Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Dec. 16	124.2	99.8	Feb.	.....	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
Dec. 23	123.4	94.8	March	.....	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
Dec. 30	104.0	79.9	April	.....	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
Week Ended	1940	1939	May	.....	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
Jan. 6	110.3	86.5	June	.....	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
Jan. 13	119.2	91.9	July	.....	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Jan. 20	117.3	93.0	Aug.	.....	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Jan. 27	115.4	92.9	Sept.	.....	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Feb. 3	111.6	90.7	Oct.	.....	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Feb. 10	107.2†	92.1	Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
†Preliminary.			Dec.	.....	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3



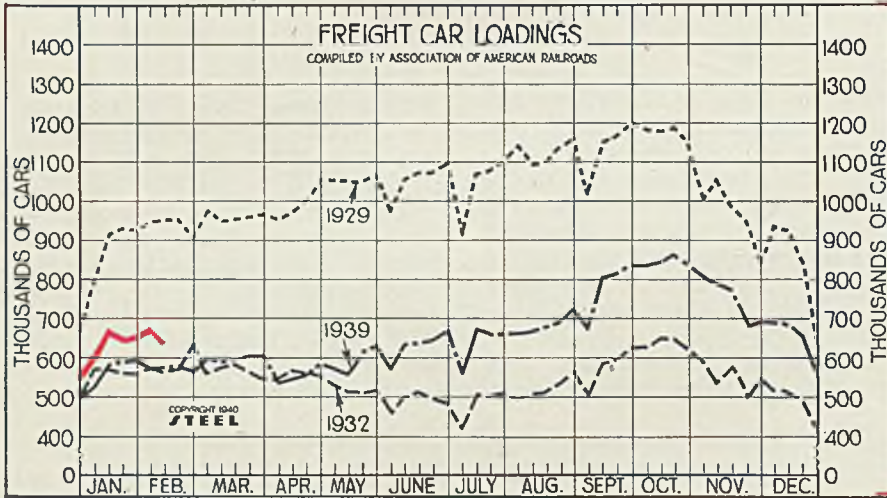
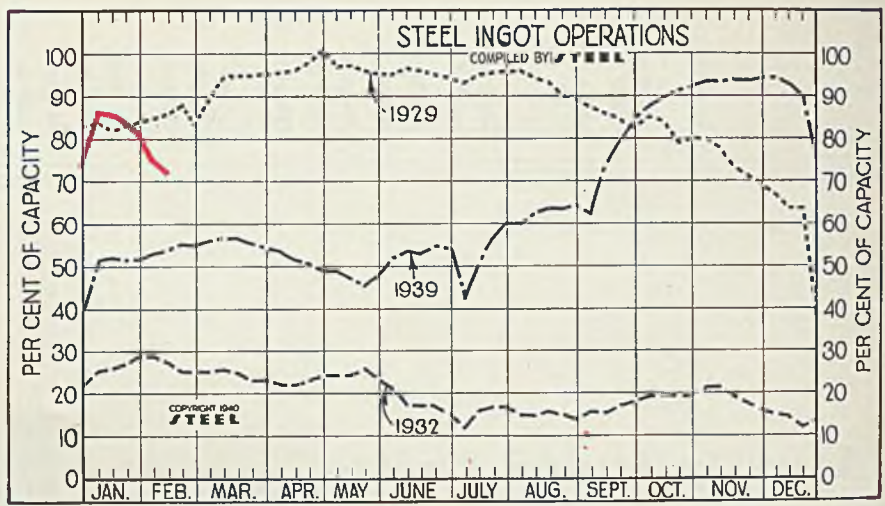
### Steel Ingot Operations

(Per Cent)

Week ended	1939	1938	1937
Nov. 11.....	93.0	61.5	39.0
Nov. 18.....	93.5	63.0	35.0
Nov. 25.....	93.5	62.0	31.5
Dec. 2.....	94.0	61.0	30.5
Dec. 9.....	94.0	61.0	27.0
Dec. 16.....	92.5	58.0	27.0
Dec. 23.....	90.5	52.0	23.0
Dec. 30.....	75.5	40.0	21.0

Week ended	1940	1939	1938	1937
Jan. 6.....	86.5	51.5	26.0	79.5
Jan. 13.....	86.0	52.0	29.0	79.0
Jan. 20.....	84.5	51.5	30.5	80.0
Jan. 27.....	81.5	51.5	33.0	76.0
Feb. 3.....	76.5	53.0	31.0	79.5
Feb. 10.....	71.0	54.0	30.0	81.0



### Freight Car Loadings

(1000 Cars)

Week ended	1939	1938	1937
Nov. 25.....	677	562	559
Dec. 2.....	689	649	623
Dec. 9.....	687	619	622
Dec. 16.....	681	606	603
Dec. 23.....	655	574	460
Dec. 30.....	550	500	437

Week ended	1940	1939	1938	1937
Jan. 6.....	592	531	552	699
Jan. 13.....	668	587	581	700
Jan. 20.....	646	590	570	670
Jan. 27.....	650	594	553	660
Feb. 3.....	553	577	565	675
Feb. 10.....	626†	580	543	692

†Preliminary.

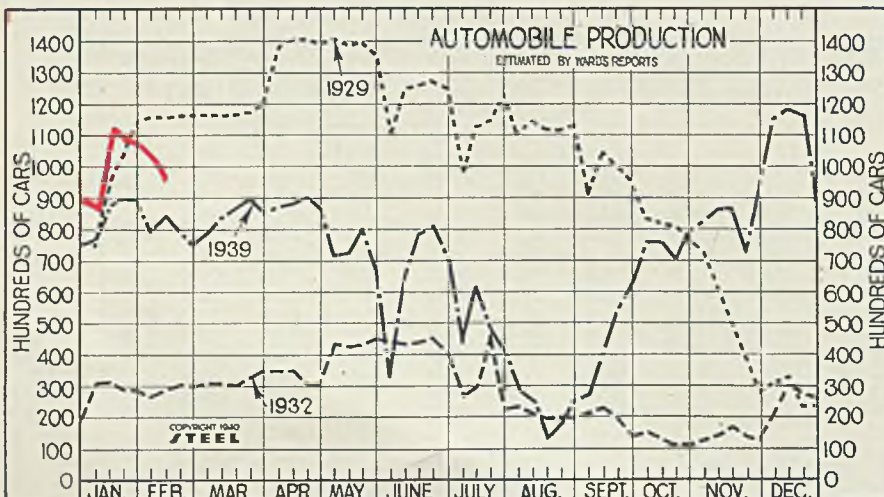
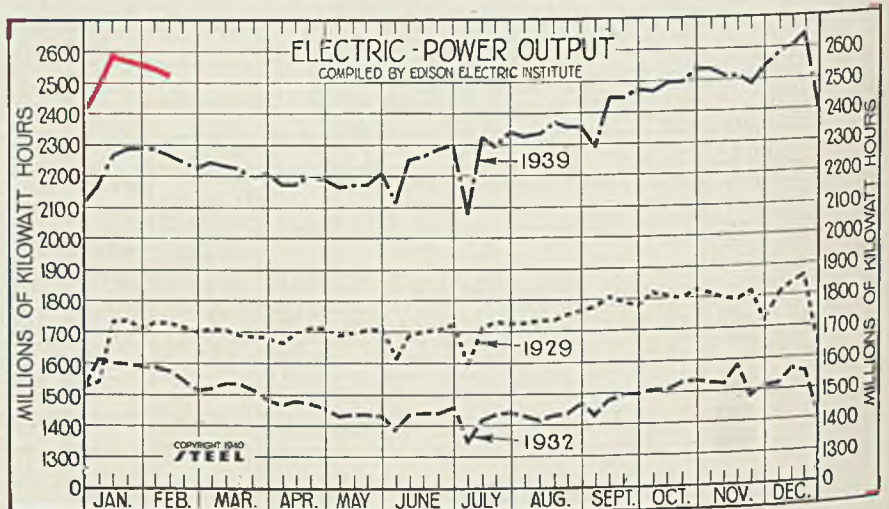
### Electric Power Output

(Million KWH)

Week ended	1939	1938	1937
Nov. 11.....	2,514	2,209	2,176
Nov. 18.....	2,514	2,270	2,224
Nov. 25.....	2,482	2,184	2,065
Dec. 2.....	2,539	2,286	2,153
Dec. 9.....	2,586	2,319	2,196
Dec. 16.....	2,605	2,333	2,202
Dec. 23.....	2,641	2,363	2,085
Dec. 30.....	2,404	2,121	1,998

Week ended	1940	1939	1938	1937
Jan. 6.....	2,473	2,169	2,140	2,244
Jan. 13.....	2,593	2,270	2,115	2,264
Jan. 20.....	2,572	2,290	2,109	2,257
Jan. 27.....	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



### Auto Production

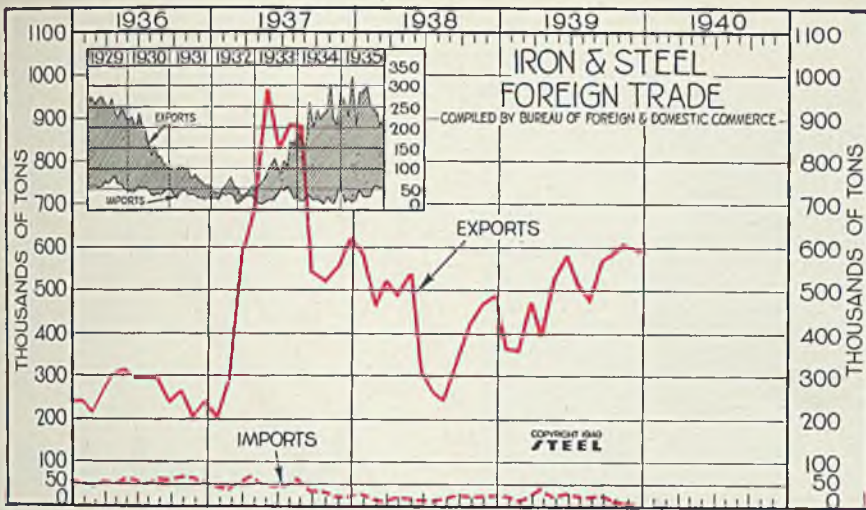
(1000 Units)

Week ended	1939	1938	1937
Nov. 11.....	86.2	86.3	85.3
Nov. 18.....	86.7	96.7	85.8
Nov. 25.....	72.5	84.9	59.0
Dec. 2.....	93.6	97.8	86.2
Dec. 9.....	115.5	100.7	85.8
Dec. 16.....	118.4	102.9	82.0
Dec. 23.....	117.7	92.9	67.2
Dec. 30.....	89.4	75.2	49.6

Week ended	1940	1939	1938	1937
Jan. 6.....	87.5	76.7	54.1	96.8
Jan. 13.....	111.3	86.9	65.7	91.7
Jan. 20.....	108.5	90.2	65.4	81.4
Jan. 27.....	106.4	89.2	59.4	74.1
Feb. 3.....	101.2	79.4	51.4	72.3
Feb. 10.....	96.0	84.5	57.8	72.8





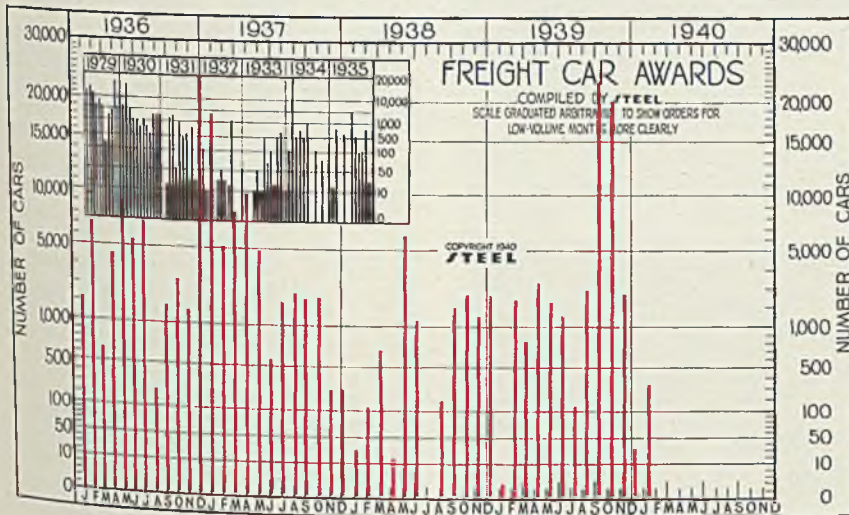
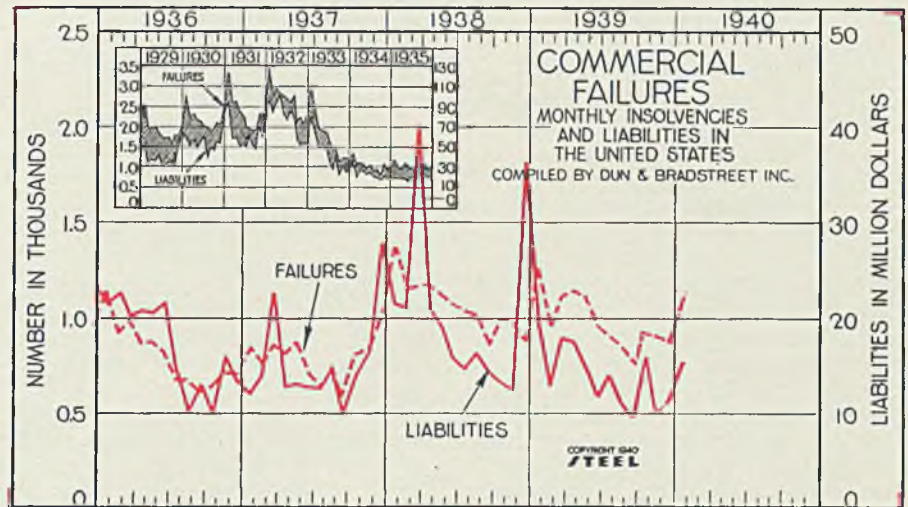
### Iron and Steel Foreign Trade

(Thousands of Tons)

	Exports		Imports	
	1939	1938	1939	1937
Jan.	362.7	586.3	201.5	27.7
Feb.	359.7	460.6	291.0	19.1
Mar.	474.4	526.9	570.6	25.4
April	394.0	489.2	683.7	44.1
May	532.6	540.6	969.2	28.1
June	588.9	312.0	826.6	32.6
July	513.7	263.7	889.4	30.8
Aug.	477.1	242.1	836.3	28.3
Sept.	575.6	346.1	542.7	29.9
Oct.	591.9	425.4	522.6	19.2
Nov.	605.6	646.2	556.6	15.2
Dec.	600.4	490.1	625.4	14.7
<b>Total</b>	<b>6076.4</b>	<b>5152.7</b>	<b>7567.9</b>	<b>315.2</b>

### Commercial Failures

	Failures Number		Liabilities (Unit: \$1,000,000)	
	1940	1939	1940	1939
Jan.	1,237	1,263	\$15.28	\$19.12
Feb.	963	963	12.79	12.79
Mar.	1,123	1,123	17.92	17.92
April	1,140	1,140	17.49	17.49
May	1,122	1,122	14.76	14.76
June	952	952	11.61	11.61
July	917	917	14.15	14.15
Aug.	859	859	11.26	11.26
Sept.	758	758	9.40	9.40
Oct.	916	916	16.14	16.14
Nov.	886	886	11.88	11.88
Dec.	882	882	12.08	12.08
<b>Total</b>	<b>11,408</b>	<b>11,408</b>	<b>\$168.20</b>	<b>\$168.20</b>



### Freight Car Awards

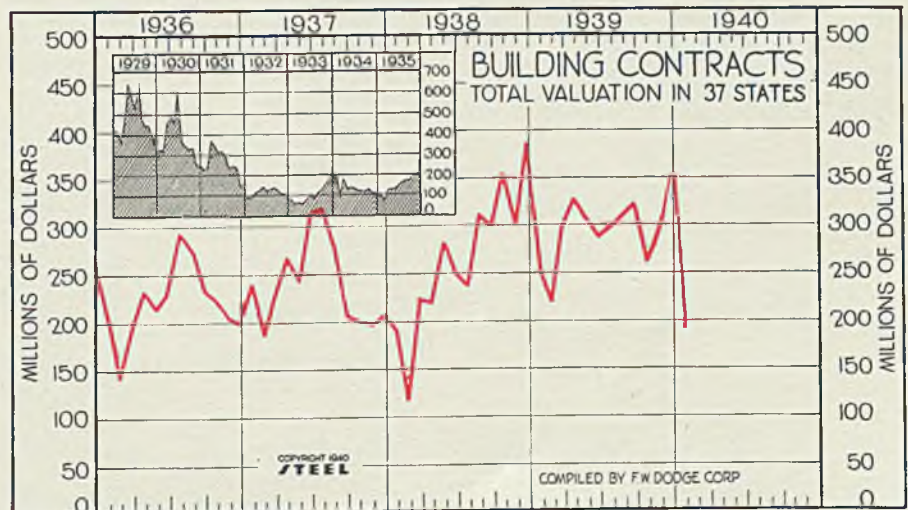
(Hundreds of Cars)

	1940	1939	1938	1937
Jan.	360	.03	.25	178.06
Feb.	22.59	1.09	49.72	49.72
Mar.	8.00	6.80	81.55	81.55
April	30.95	.15	97.72	97.72
May	20.51	60.14	47.32	47.32
June	13.24	11.78	5.48	5.48
July	1.10	.00	10.30	10.30
Aug.	28.14	1.82	14.75	14.75
Sept.	230.00	17.50	12.16	12.16
Oct.	196.34	25.37	13.55	13.55
Nov.	26.50	12.32	2.75	2.75
Dec.	.35	25.81	2.75	2.75
<b>Total</b>	<b>577.75</b>	<b>163.03</b>	<b>516.11</b>	<b>516.11</b>

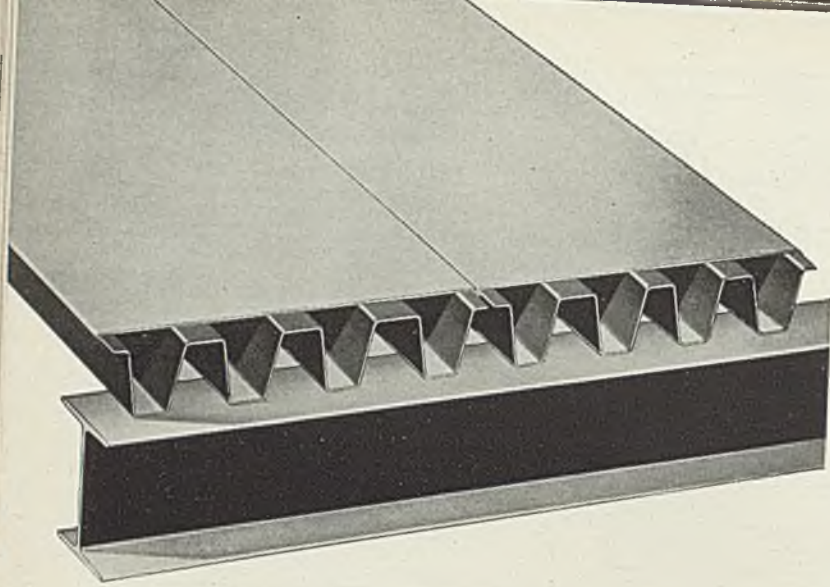
### Construction Total Valuation In 37 States

(Unit: \$1,000,000)

	1940	1939	1938	1937	1936
Jan.	\$196.2	\$251.7	\$192.2	\$242.7	\$204.8
Feb.	220.2	118.9	188.3	142.1	142.1
Mar.	300.7	226.6	231.2	199.0	199.0
April	330.0	222.0	269.5	234.8	234.8
May	308.5	283.2	243.7	216.1	216.1
June	288.3	251.0	317.7	232.7	232.7
July	299.9	239.8	321.6	294.7	294.7
Aug.	312.3	313.1	281.2	275.3	275.3
Sept.	323.2	300.9	207.1	234.3	234.3
Oct.	261.8	357.7	202.1	225.8	225.8
Nov.	299.8	301.7	198.4	208.2	208.2
Dec.	354.1	389.4	209.5	199.7	199.7
<b>Ave.</b>	<b>\$295.9</b>	<b>\$266.4</b>	<b>\$242.8</b>	<b>\$222.3</b>	<b>\$222.3</b>







# 79 Working

*Office building completed in 79 working days. Speed greatly facilitated by use of cellular steel floor and roof sections. These with cross headers permit floor, ceiling outlets on 6-inch centers*

■ **RECENTLY** a modern 2-story and finished basement office building with some 13,000 square feet of floor space was erected at Ambridge, Pa., in 79 working days. This fast erection was made possible largely through use of special cellular steel floor, roof and partition sections, bonded metal paneling for walls and other advanced structural items, manufactured by H. H. Robertson Co., owner of the building.

Details of construction and methods employed show considerable variation from conventional practice. Possibly most interesting is the use of steel sheets formed as shown in

Fig. 1, to give a cellular unit utilized for floors and ceilings. As seen in Fig. 1, these cellular units are flat plates formed to multiple Z-sections, the units being available in a number of different sizes, depth of cells and similar variations to suit particular construction at hand. Units were used in inverted position, flat side down, in this building. In Fig. 2, a roof section of 29 square feet in area is laid in place in 30 seconds. Fig. 3 shows how two men easily carry an 18-foot unit which is capable of bearing a concentrated load at center of 1600 pounds.

Here 13,856 square feet of cellu-

lar steel units for first floor, second floor and roof were unloaded, hoisted, placed in position, aligned and welded in exactly 4½ working days.

This shows the speed obtainable in erecting such units. All field operations in connection with erection of these units were accomplished at a cost of 3¼ cents per square foot.

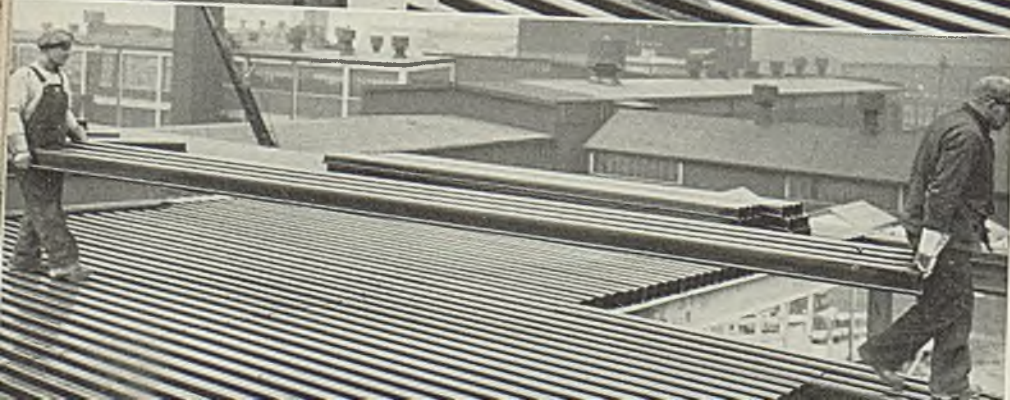
As soon as laid, the cellular steel floor provides a working platform for other trades as shown in Fig. 4. The contractors' construction superintendent estimates that use of this steel floor saved a full day in laying up the walls. Seven masons and five helpers were employed. Fig. 4 shows laying up of the walls from the floor. As soon as maximum working height had been reached, upper half of walls is laid up from scaffolds which bear directly on the floor units. Scaffolding is set up on each floor as needed. When not needed, it can be knocked down and stored at any point on the floor since all portions of the cellular steel units can be used as a platform for storing materials immediately upon being laid in position and even before they have been fastened to the structural frame.

Hangers for suspending pipes are hung from underside of the first

Fig. 1. (Top)—Cellular steel floor and roof section. Used inverted with flat side down to form ceiling

Fig. 2—Here 29 square feet of cellular steel roof is laid in place in 30 seconds

Fig. 3—This 18-foot unit, easily carried by two men, will support 1600-pound concentrated load at center





By H. B. WINSLOW  
H. H. Robertson Co.  
Pittsburgh

## Days

floor. Whereas pre-inserts in a concrete slab cannot be changed without weakening the floor structure, the hangers employed in this construction can easily be changed at will, merely by drilling a hole where desired.

Wiring for 110-volt light circuits, telephone service, signal systems, etc., is easily accommodated in the cellular units. Underside headers or boxes (one for each desired system) extend crosswise the cellular flooring to make every cell available for wiring. These permit outlets on 6-inch centers throughout the entire floor area wherever desired, even after completion of a building. Similarly, ceiling outlets may be had every 6 inches throughout the entire building.

### Headers Are Inconspicuous

Diagram Fig. 7 illustrates how the underside header is used in conjunction with floor cells to provide complete electrical availability throughout the entire floor area. The underside header is painted to match the ceiling and is not conspicuous.

Where a ceiling is to be suspended from the floor's underside, a top-side header system may be used to provide cross distribution through floor cells. This type of header is placed in a prefabricated slot normally occurring over a supporting beam in the top member of the floor unit. These slots are provided primarily to allow securing of the unit to the structural framework

Fig. 4—Lower half of wall laid from floor up working directly on floor sections before they are finished

Fig. 5—Concrete fill being placed on cellular steel floor sections to finish the floor

Fig. 6—Placing composite steel and wood veneer panels to form interior wall surfaces





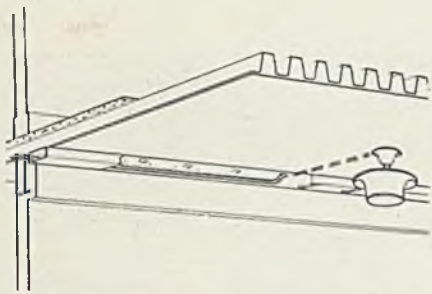
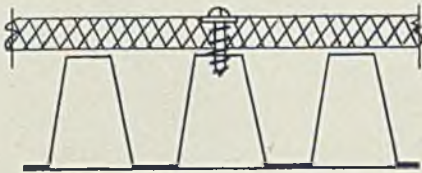


Fig. 7—Showing how wiring is placed in headers and cellular units

and when not occupied by headers are closed by permanent cover plates. It is quite economical to place the headers in these normal slots.

For special conditions, however, the slots can be fabricated in the floor unit at locations away from the beam. Proper consideration, of

Fig. 8—Method of fastening insulation to top of roof units



course, must be given to load carrying conditions.

Floor and ceiling units shown in Figs. 2 and 3 are butted end to end. Butt joints between courses are sealed carefully. In sealing, first an asphaltic adhesive is applied at the ends. Next, a tape is placed over the joint and carefully worked into the adhesive. Finally, application of a compound applied thickly over the tape produces a permanently sealed joint.

Cellular steel roof is finished by applying insulating board as shown in Fig. 8, using sheet metal screws on about 24-inch centers in each direction to anchor the insulating board mechanically as specified by many insurance companies to resist negative wind pressures. After insulating board has been applied, several layers of asphalt-impregnated paper, sealed with asphalt, are applied to form the conventional built-up roof surface.

Fig. 5 shows how floors are finished off. Wire reinforcing mesh is laid directly over the cellular flooring, anchored and a concrete fill placed. Here 1 3/4 inches of fill was poured on the first and second floors in only 3 working days, indicating speed floors can be finished.

Next, partitions were erected

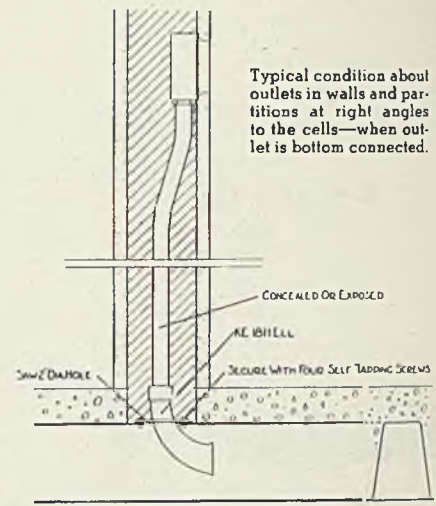


Fig. 9—Method of connecting wall outlets to floor cells

where required and risers to panel boxes provided for feeding wiring through floor cells as in Fig. 9. That illustration shows a typical condition for mounting outlets in walls and partitions at right angles to the cells when outlet is bottom connected. The risers may be either concealed in the wall or exposed outside the wall.

Some partitions were built of rectangular hollow tiles, Fig. 6. Many other partitions employed cellular steel units for offices on first and second floors. Shown at rear of Fig. 10, these prefabricated sections are quickly and easily erected and painted to match the walls. A unique adaptation of the cellular steel construction detailed in Fig. 1 is used for the partition units.

#### Strength and Beauty Combined

Those offices where a special finish was desired received an application of Robertson bonded metal, a wood veneer bonded to steel to combine effectively the beauty of wood and the strength of steel. Shown in Fig. 6, this material can be cut, stamped or otherwise formed without injuring the bond between the two materials. The fitted, composite sheets are backed up with celotex for heat insulation and sound deadening. Such panels were used in lobby, offices, conference room and other locations.

With the concrete applied, all floors were given a 3/4-inch Hubbellite monolithic wearing surface laid  
(Please turn to Page 83)



Fig. 10—View of completed interior with steel partitions at rear, cellular steel ceiling, concrete floor with light and phone outlets on 6-inch centers wherever desired

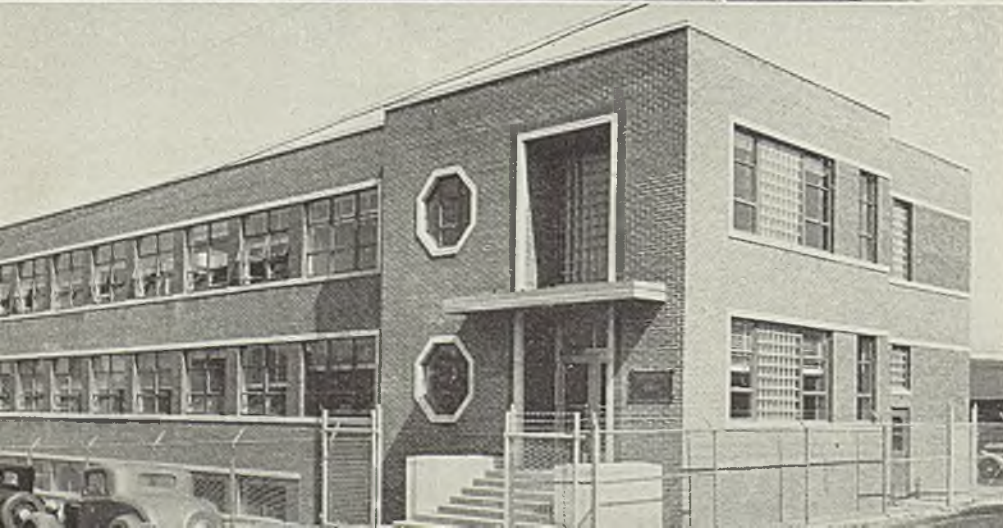


Fig. 11—Finished building as seen from the outside. Not shown are special fan ventilators mounted on weatherproof skylights, both Robertson products



# Folded Sheet-Steel Roofs



Unique welded structure features prefabricated roof and wall sections rapidly manufactured on site with ordinary equipment. Thin-plate supporting members permit fast low-cost erection

By R. SHERMAN\*  
London, England

AS LARGE roofs figure prominently in design and construction of single-story factory buildings, railroad terminals, theaters, garages, swimming pools, grandstands, airplane hangars, etc., the saving of 20 per cent over an equivalent roof by the novel construction detailed here is a significant advance.

Mild steel plate not over  $\frac{1}{8}$ -inch in thickness was used throughout for structural members. Such material is easy to obtain and to shape to the design required. The design is easily varied to suit the particular structural requirements of the unit under consideration. Although the structure detailed here employed three arches and thus required tie bars, these would be eliminated if 2-arch construction were utilized with heels of the arches rigidly fixed to supporting columns designed to take bending stresses. While the factory built has large floor areas, use of the 2-arch construction would permit uninterrupted head room over the entire area of the building, an essential factor in airplane hangars and similar buildings.

Practically all standard methods of spanning roofs can be adapted to thin-plate construction including N-trusses, Warren girders, French and other pitched trusses. For extremely large spans, thicker plate up to, say,  $\frac{1}{4}$ -inch could be used as a basis for the heavier members. Diagonal

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

members of present building employ 16-gage sheet.

Advantages of the construction include a definite saving in initial cost due first to saving in material and, second, to ability to fabricate easily at the site, thus saving transportation expense on large heavy mem-

\* Assistant to C. Helsby, M. I. Struct. E., consulting engineers to the builders and owners of the factory described, Steel Ceilings Ltd., Hayes, Middlesex, England.

bers. Thin-plate construction permits sections to be utilized which approximate closely the theoretical minimum. Thus maximum structural strength is obtained with minimum material. On tension flanges there are no reductions for rivet or bolt holes. On compression chords and flanges, greater width can be given without increasing weight, thus permitting stresses nearer maximum allowable.

Metal in compression members

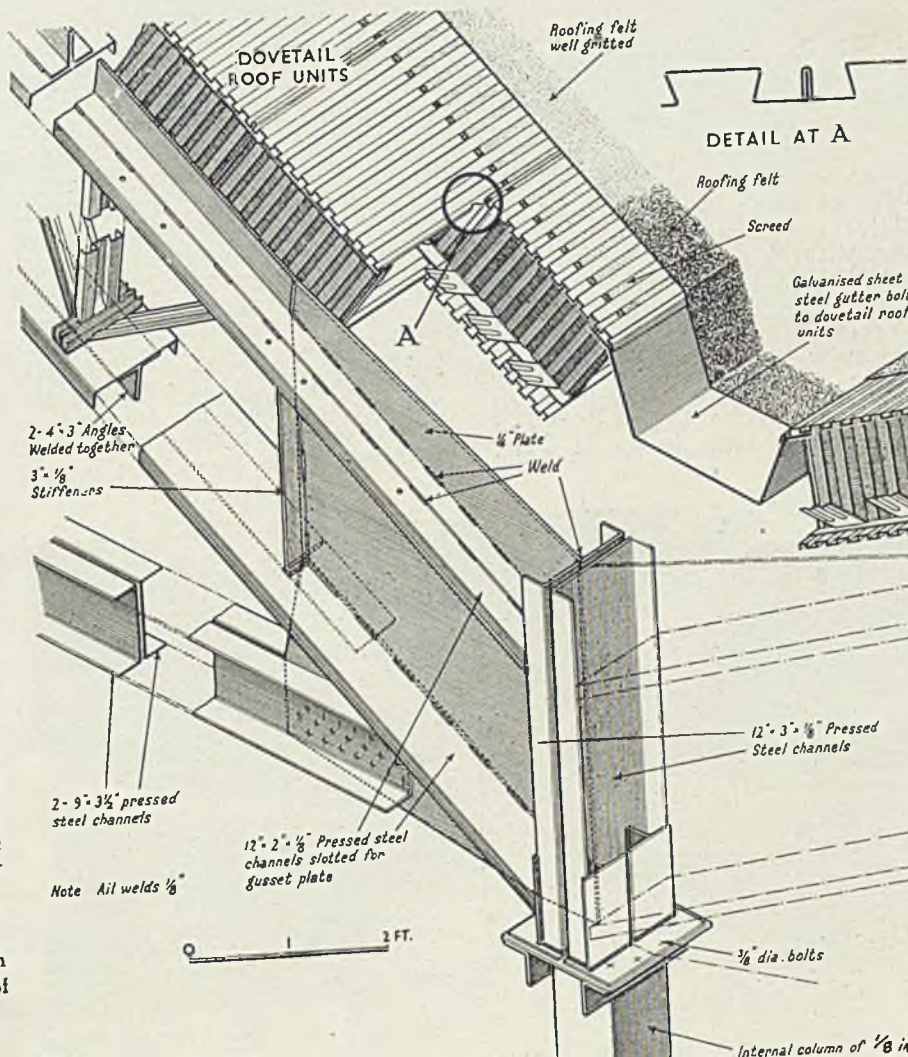


Fig. 1—Isometric view of heel of arch truss showing construction details of roof and column also



can be arranged so ratio of effective length to least radius of gyration is relatively low. Also, amount of scrap material is much less than with rolled sections. Saving in weight in upper structure is carried down through columns, tending to reduce these as well as foundations. Time and labor costs during fabrication and erection are cut owing to the comparative lightness of the separate parts.

As to upkeep, a welded frame of the type employed here has an inherent elasticity which allows it to take up strains resulting from unequal loading, wind and temperature.

The system is very easily adaptable to many building materials. Design employed for roof and walls was unusual but with a little ingenuity could be adapted to more common materials such as brickwork, timber, pressed sheet, etc. In addition, the building has high heat resistance and walls and roof do not transmit sound readily.

#### Use Mild Steel Plate

The folded sheet construction employed here utilizes no rolled steel sections whatever. Instead, all sections are made of  $\frac{1}{8}$ -inch mild steel plate folded to simple shapes as required.

In some instances, however, as for prefabrical roof and wall units, thinner sheet is used. All units are fabricated with the electric arc to make the sections required and then these are connected to form the composite structure.

As shown in Fig. 1, roof units are formed of flat steel sheets of 24-gage material formed in parallel dovetail design  $\frac{3}{8}$ -inch deep over the flutes and assembled into a roof unit with an air space of 15 inches between the top and bottom sheets. Standard units are 2 feet in width, 30 feet in length. These roof units are finished off after erection by applying 2 inches of concrete screed on top, one layer of bitumen felt, and one layer of bitumen covering the

top with a good dressing of pebble.

Walls consist of similar units formed of dovetailed sheets separated by a 6-inch air gap, finished with 1 inch of plaster inside and two inches outside. Such construction has high heat and sound insulating properties.

Roof includes continuous panels of glazing approximately 10 feet wide, giving a natural light area of about 30 per cent of total roof area.

#### Weight About 20 Per Cent Less

Total dead weight of roof is 35 pounds per square foot, excluding arches, purlins and other steelwork. Although high compared with usual roofing materials such as corrugated asbestos or iron, weight of the supporting steelwork is 20 to 40 per cent less than required for an asbestos or sheet-iron roof with rolled-steel supporting members.

Total area covered by the building is 72,000 square feet, consisting of five bays each 60 feet wide and 240 feet long. Arches, spaced 30 feet apart, span 60-foot bays, giving one internal column for each 1800 square feet of floor space.

Static design is conventional and employs 3-hinged arches of truss construction carried on columns designed to take the vertical reactions only. Horizontal thrust in arch members is taken in tie bars. Wind load is taken by horizontal beams in the walls carried at intervals on stiff columns.

With sections of main members calculated, shop details were drawn. Main arch members are designed to carry loads which stress them in the region of maximum allowable figure, thus reducing unnecessary material to the theoretical minimum. This may be contrasted with roofs of rolled steel where sections much

Fig. 2—General view of finished factory bay, one of five 60 x 240-foot bays forming complete building. Note large uninterrupted floor area and abundance of natural light



heavier than required often are owing to limitations of section available.

Fig. 1 is an isometric view of typical arch heel, showing also general construction of roofing internal columns.

Combining steel and concrete keeps down the size of internal columns without using a heavy section. The  $\frac{3}{8}$ -inch walls are considered as hoop reinforcement of the concrete, increasing allowable concrete stress. The reinforcement bars shown inserted at the four corners of the column in Fig. 1 are tack welded to the 8 x 8-inch angle formed of  $\frac{1}{8}$ -inch plate and tack welded together continuously along their edges. Structural wall columns are made in a similar manner.

Intermediate wall columns are fabricated from 16-gage sheet and carry no design load. Stiff wall columns are built up of flat angle and channels of  $\frac{1}{8}$ -inch plate. The simple sections are easily folded to a high degree of accuracy so fitting for welding is good and only simplest type of jig is required.

#### Arches Made in Three Pieces

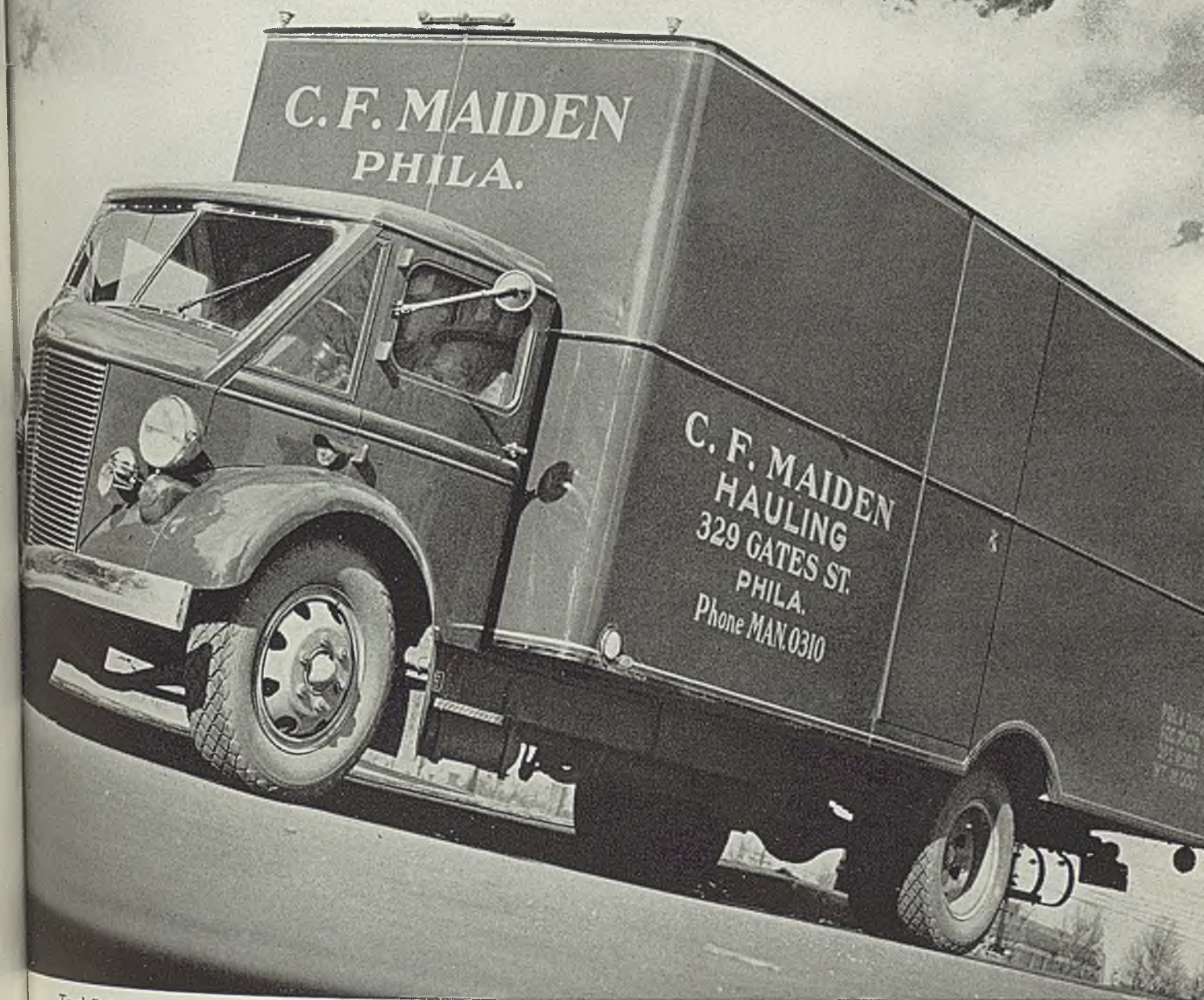
Parts for arch ribs also are of simple shapes. First segment was made as an experiment, length of each part and its position being carefully noted before welding and checked after welding. Production jigs then were made and subsequent parts turned out with no difficulty. Each half arch is made in three pieces, about 12 feet in length, welded together before erection so only erection bolts are required at heels and apexes. Further advantage of this method of construction is the light weight of the parts, as each half arch ready for erection weighed just 0.9-ton. Only lifting tackle required was a 30-foot pole, a set of pulley blocks and an ordinary hand winch.

To carry the glass, light glazing bars were put in on 2-foot centers. These bars are carried on purlins using an economical section of large depth, permitting use of flanges only  $\frac{1}{8}$ -inch thick. Purlins are made in 30-foot lengths, permitting erection across arches with erection bolts only.

Ties are formed from sheets to a sort of Z-section and sheets butt welded to make the 50-foot runs required. Hangers at centers of arches pick up the ties, eliminating sag over the comparatively long span.

Beams in walls to take the wind load consists of built-up H-sections with cross pieces placed horizontally for most effective action in that plane. Pieces were made in the shop in 30-foot lengths and welded





Truck Body built of "A.W." Dyn-el for C. P. Maiden by Barry & Baily Co., Phila. Over-all length, 260". Over-all width, 96". Over-all height, 98".

**Increases Payload 1500 Pounds . . .** A conventional truck body of this type and size weighs 5000 pounds. Built of "A.W." Dyn-el high strength steel, it weighs only 3500 pounds. The Dyn-el body is stronger, longer lasting, more resistant to shock, fatigue and corrosion. And the truck, itself, is less expensive to operate because of the decreased weight . . . *Fewer pounds of steel to buy means fewer pounds of steel to move.* Build light and strong with "A.W." Dyn-el high strength steel.

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to form a continuous beam on erection along all four walls.

Erection of steelwork started after site and foundations were prepared. Internal columns were lifted, set in position with hold-down bolts. These columns were so light that two men easily lifted them without tackle. After aligning and plumbing, columns were filled with concrete and vibrated. Cap plates then were welded on top.

#### Erection Begins from Gable

Structural wall columns were erected in a similar manner, and intermediate and nonstructural wall columns fixed in position at the same time.

Erection of arched roof members began in first bay from a gable end. First arch was temporarily strutted in place until next arch in line was up.

Arches then were braced together by the top purlin. Ties were put in as soon as heels of the arches were bolted to the column caps. Structure was self-supporting from then on. No further strutting was required.

Meanwhile, roof units were being prepared and erected by a separate gang as soon as the arches were in position. Units were drilled to correspond with holes in arch chord

flanges, automatically positioning them. Holes were  $\frac{3}{8}$ -inch in diameter at 2-foot centers, detracting little from strength of arch ribs. With a number of the roof units in place, fabrication of these was transferred from the adjoining factory to the new building.

Rate of manufacture of structural members was the limiting factor in the speed of erection. By increasing the number of platers and welders, a remarkably fast erection program was maintained. At end of three weeks, much of the roof was in place as well as walls and other portions of the structure.

A hinge effect at the apex of the two half arches over each bay was obtained by bolting the arches together, employing bolts of sufficient strength to take the difference in vertical shear due to unequal loading on the roof.

#### Paint Aids Lighting

Fig. 2 was taken in the last bay to be erected. It shows the expanse of uninterrupted floor in each bay and the large amount of roof lighting.

Subsequently, all the under sides of the roof units were painted with a light-reflecting paint, increasing the lighting. See Fig. 3.

Despite the lightness of the steel-

work, perfectly straight lines were kept. By forming the web stiffeners of angle section, the purlins have the robust appearance of a much heavier section.

Fig. 3 is a typical internal column with bolted joints at the ends of the tie members designed to avoid site welding as far as possible. However, experience showed site welding was no disadvantage so later joints were made by means of a continuous weld around the ends of the tie channels with only three bolts being retained for erection purposes.

As nearly all the welding was downhand shop work, the best setting for the welding machines was soon discovered and first-class welds were turned out rapidly. All work was done with shielded-arc electrodes, and most of it consisted of single runs using  $\frac{5}{32}$ -inch rods to place a  $\frac{1}{8}$ -inch fillet weld. Standard tests were applied to specimen pieces chosen at random. Since  $\frac{1}{8}$ -inch fillet welds may be taken for design purposes as carrying 0.4-ton per inch, continuous runs were employed only where necessary, intermittent welding being used on long runs of plate. Much intermittent welding is shown in Fig. 1 on various members.

#### Arches Required More Welding

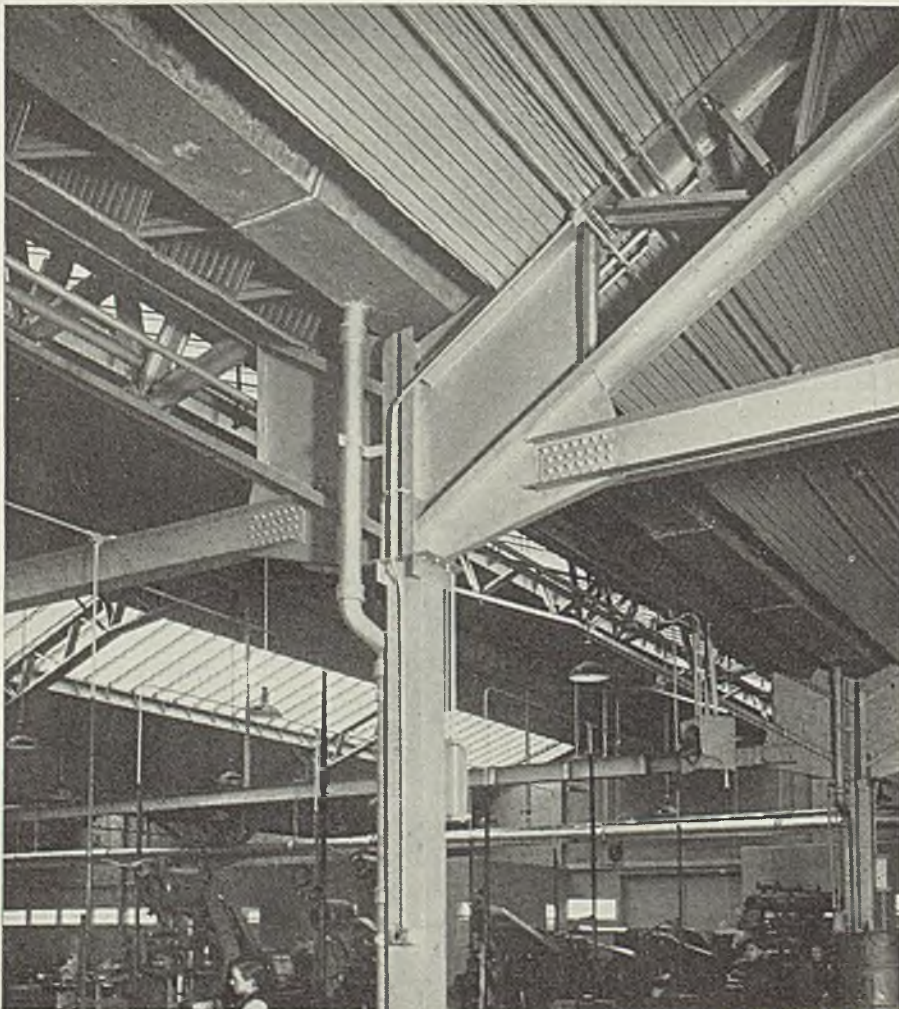
Total length of welding was 46,620 feet. Experience has shown this to be about 8 per cent more than actually was required as it was found possible toward the latter part of fabrication to cut down amount of welding on long lengths of plate connections, especially on stiffeners. Here spaced welds, 1 to 2 inches in length, were found ample. Of the total amount of welding employed, 18,600 feet was for arches with 15,000 feet for purlins.

Amount of steel employed totaled 77 tons for arches, 52 tons for purlins, 14 for structural columns, 7 for wind beams, 4 for ties and hangers, 6 for intermediate columns. These total 160 tons.

Study of material costs shows a saving of about 20 per cent over a roof of equivalent strength, light area, etc.

This comparison, however, does not take into account economies in erection. These would mean a much greater saving with roofs of larger span and at greater height above ground level as the small weight of the new sections would mean correspondingly lighter tackle and ease of handling.

Fig. 3—Inside closeup showing a typical internal column. Also some of the prefabricated roof units can be seen edgewise, revealing their construction

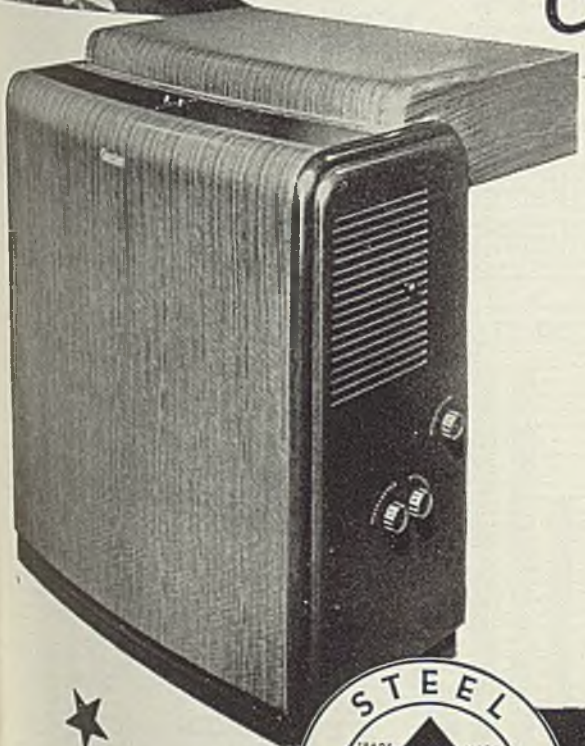






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# Sling Chains

*To select a sling chain, consider impact, loading, weight and shape of load, frequency of operation, atmospheric conditions. Tensile strength, hardness, elongation must be balanced correctly to suit load*

■ IN THE manufacture of chain to be used as slings in the handling of heavy loads, there are two important factors. The material used possibly is the most important. As in other industries, the trend is to employ modern alloy steels carefully processed by advanced heat-treating methods to lighten the products and provide higher tensile strength without sacrificing factors of safety.

Second important element is design. Welding chain links so the weld comes at the link end tends to eliminate failures caused by bending links where slings are used around sharp projecting objects and corners. Also, the weld section is free to move in any direction.

With the above two factors in mind, a new line of chains has recently been developed by American Chain & Cable Co. Inc., York, Pa., especially for sling use. These are manufactured from three types of

By H. A. DELANO

Chief Engineer  
American Chain Division  
American Chain & Cable Co. Inc.  
York, Pa.

steel: Hot-rolled steel, normalized, with a tensile strength of 55,000 pounds per square inch; controlled analysis carbon steel, normalized, with a tensile strength of 85,000 pounds per square inch when heat treated; and 3½ per cent nickel steel with a tensile strength of 125,000 pounds per square inch when normalized, heat treated and drawn. These are known respectively as

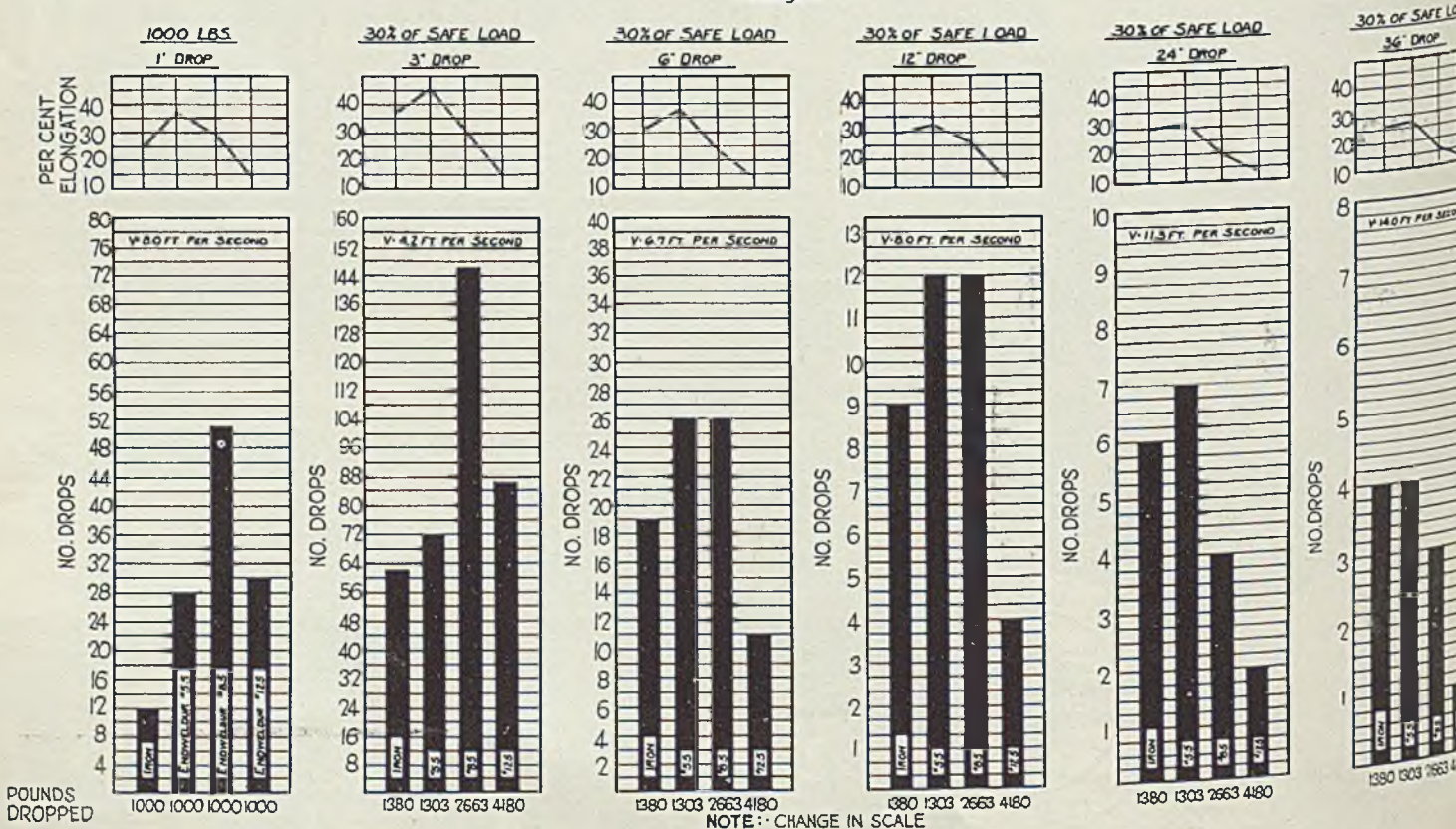
Endweldur 55, 85 and 125. All links in these chains are welded at the end.

Where extreme ductility and great impact resistance are required but high tensile strength is not specified, the first type, hot-rolled steel normalized, is recommended. Such chain will elongate 35 per cent minimum under strain and has a hardness of approximately 100 brinell.

Where greater strength is required with high resistance to impact loading and moderate hardness to resist abrasion, the second type of steel makes an economical chain. This class will show approximately 25 per cent minimum elongation under load and has a hardness between 170 and 180 brinell.

Where maximum tensile strength and resistance to abrasion are required, the third type of steel should be used. This 3½ per cent nickel steel, normalized, heat treated and

Fig. 1—Impact tests made on sling chain of size known as ½-inch, actually 17/32-inch. Note change in velocity obtained by increasing drop of weight falling on chain. Also vertical scale changes





drawn, develops a tensile strength of 125,000 pounds per square inch with a hardness from 235 to 255 brinell. Tests on this chain show 15 per cent elongation minimum.

To manufacture and test these three types of chain, special equipment had to be provided.

Fig. 2 shows results of a series of straight tensile tests on 17/32-inch chain made from iron and the three types of steel described. Iron is shown simply as a comparison. As the hardness increases with the steel chain, elongation decreases; also the tensile strength is proportional to the hardness of the material.

Since all chains used for sling purposes and for handling heavy loads are subjected to impact loading, much work was done in testing materials to determine the most satisfactory analysis of material to use. Blocks of laminated steel of various sizes are elevated by a hydraulic cylinder to a predetermined point and allowed to drop on the chain being tested, with the chain held in tension. Capacity of the machine is approximately 16,000 foot-pounds. It is arranged so a maximum load of about 2 tons can be dropped through a range of 4 feet.

Impact figures developed by such tests on 17/32-inch chain and shown in Fig. 1 are most interesting. First chart section shows effect of 1000 pounds dropping 1 foot on the various materials. From the number of drops required to cause failure, it is evident the controlled analysis car-

bon steel offered the best resistance.

The five other sections shown on this chart, Fig. 1, represent a more fair test of the various chains. In each case, 30 per cent of the safe recommended load for the chain is dropped a distance of 3, 6, 12, 24 and 36 inches respectively. As in the first chart section, the number of

drops required for failure is plotted showing that under moderate impact the second type of chain stands out.

Under more severe abuse, the harder materials do not show the marked superiority to the lower brinell material as in the 3-inch drop. The fifth section has drop increased to 24 inches, so severe that the softer materials show superior results over the harder. This is particularly noticeable on the nickel alloy material with the high hardness of 235 to 255 brinell. This indicates rather clearly that softer materials seem to have a decidedly improved factor of safety on straight impact loadings.

To make a full comparison of the various chains, Fig. 3 shows tensiles and safe loads together with other characteristics. These charts are unusual in that they recognize the safe load of a chain is dependent on type of service encountered.

Thus a chain on a production line and subjected to continuous use is given a higher factor of safety. For chains used under ordinary conditions and not subjected to severe abuse, 62½ per cent of the proof test probably is the most efficient load. For chains used spasmodically under certain conditions, safe working load may be as high as 75 per cent of the proof test.

Fig. 3 also shows corrosion resist-

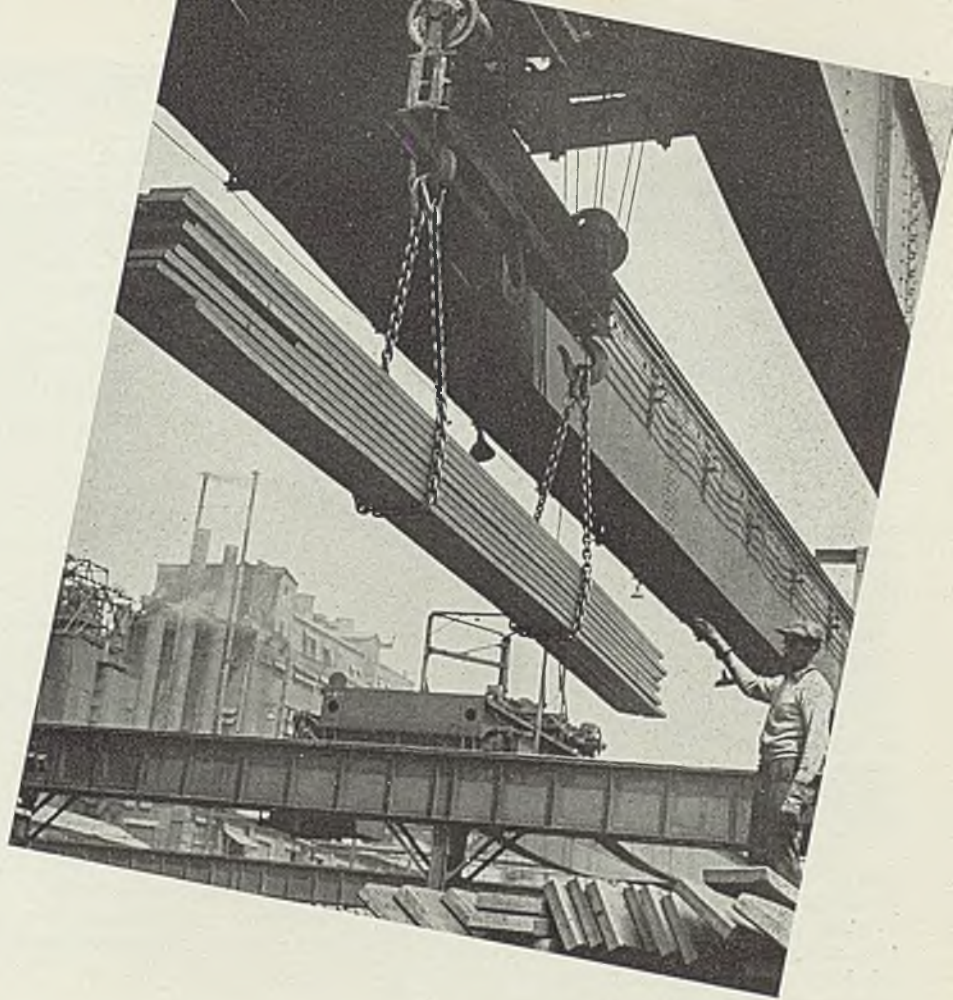
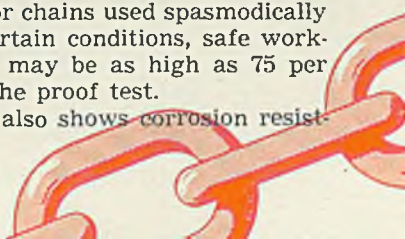
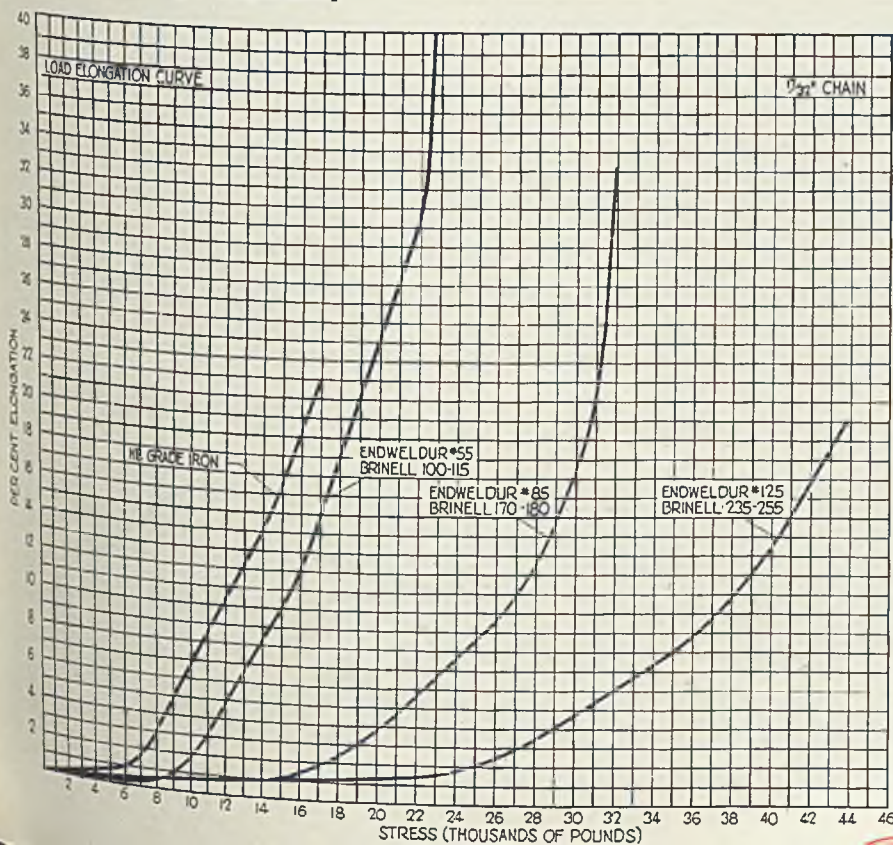


Fig. 2—Load-elongation curves made from tensile tests of the four classes of chain: iron, hot-rolled steel, heat-treated carbon steel, and nickel alloy steel from left to right respectively





ant alloy chains including monel, silicon bronze and stainless steel. Such chains meet severe operating conditions in pickling, electroplating, and similar work.

Since safety of life and property is entrusted to sling chains, chains should be selected intelligently for the class of work which they are to perform. Four basic points in selecting sling chain are: Possibility of loading under impact, weight and shape of load to be handled, frequency of operation and atmospheric condition under which chain is to be used.

As was brought out in the curves above, tensile strength generally must be sacrificed to get high impact resistance. Impact conditions caused by faulty hitches, bumpy crane track, slipping hookup, etc., must be given serious consideration.

From shape of part to be lifted, it is possible to determine the relative advantage of short extra flexible slings versus longer and somewhat lighter design.

Consider frequency of operation. Chain used continuously all day experiences wear and abrasion prevented only by either lubricating the chain or by employing material of high hardness to resist wear. However, hardness must be considered in connection with tensile and impact conditions.

Resistance to corrosion also must

be considered, especially when chains are used in or around acids or corrosive atmospheres. To meet conditions found in pickling rooms, plating department, etc., chains are now available made from various bronzes, monel and stainless steel.

In selecting a certain material, note that while the safe-load tables show sizes can be reduced if hardness of chain is increased, the correction of abrasion will not be inversely proportional to the hardness. This is because wear varies with unit pressure between links, increasing rapidly on smaller sizes.

### Other Factors To Be Considered

For example, assume a load of 10,000 pounds. Manufacturer recommends 3/4-inch iron chain of 110 brinell or 7/16-inch Endweldur 125 with 240 brinell. With chain well seated, approximately 1/3 of the circumference is in contact. This means the 3/4-inch iron chain would have 0.61 square inch bearing surface and the 7/16-inch chain would have 0.21 square inch of bearing surface. Therefore the unit pressure per square inch would be 16,500 and 46,000 pounds respectively.

Thus selection of the harder material alone does not improve the

Fig. 3—Approved load ratings and maximum tensile strengths of iron, three steel, monel, stainless steel and Everdur chain in sizes from 1/4 to 1 inch.

Note specifications for each class

wear resistance. If increase in tensile strength is not considered and harder chain is substituted size for size, a satisfactory increase in wear resistance can be obtained. For maximum overall efficiency and low operating costs, sizes of sling chains should not be reduced greatly when using higher tensile and harder alloys. Justification of their increased cost can be made easily in their longer life and greater factor of safety.

In addition to the four basic points mentioned, other conditions play an important part in selection of the proper sling chain. Angle of pull, possibility of unbalanced load, freedom of load to move, types of hitches required, temperature at which chain will operate and other conditions distinctively appreciable in some plants require simultaneous consideration.

Four essential points in use and care of sling chains are: Selection of proper sling for load to be handled, hookup on load and crane, storage and care when not in use, inspection and repair.

In choosing proper sling for a load, do not forget the angle of pull is most important. For instance, with a 10,000-pound load handled on a 2-legged sling with both legs parallel and vertical, a 9/16-inch iron chain is required; if the legs spread 60 degrees a 3/4-inch chain is neces-

(Please turn to Page 80)

IRON				STEEL & STEEL ALLOY												CORROSION RESISTING MATERIAL						SIZE				
SIZE	HB GRADE		AJAX GRADE		ENDWELDUR "55				ENDWELDUR "85				ENDWELDUR "125				MONEL		EVERDUR		STAINLESS		SIZE			
	TENSILE	SAFE LOAD	TENSILE	SAFE LOAD	TENSILE	SAFE LOAD (% OF PROOF)			TENSILE	SAFE LOAD (% OF PROOF)			TENSILE	SAFE LOAD (% OF PROOF)			TENSILE	SAFE LOAD	TENSILE	SAFE LOAD	TENSILE	SAFE LOAD				
						50	62.5	75		50	62.5	75		50	62.5	75	GENERAL PICKLING	GENERAL PICKLING	GENERAL PICKLING	GENERAL PICKLING						
1/4					5,700	1,000	1,250	1,500	8,550	2,150	2,675	3,200	10,500	2,750	3,425	4,125	7,500	1,875	1,600	5,700	950	800	7,500	1,875	1,600	1/4
5/16					8,800	1,550	1,940	2,300	12,100	3,025	3,775	4,550	16,000	4,400	5,500	6,600	10,000	2,500	2,125	8,750	1,460	1,240	10,000	2,500	2,125	5/16
3/8	9,000	2,700	9,000	2,970	12,550	2,200	2,750	3,300	17,100	4,275	5,350	6,400	22,500	6,600	8,250	9,900	15,000	3,750	3,200	12,500	2,085	1,775	15,000	3,750	3,200	3/8
7/16	11,500	3,450	11,500	3,800	16,650	2,900	3,625	4,350	22,200	5,550	7,000	8,300	30,000	8,800	11,000	13,200	19,000	4,750	4,000	16,600	2,775	2,360	19,000	4,750	4,000	7/16
1/2	15,000	4,500	15,000	4,950	20,100	3,500	4,350	5,250	28,000	7,000	8,750	10,500	40,500	11,250	14,000	16,800	24,500	6,125	5,200	20,000	3,340	2,840	24,500	6,125	5,200	1/2
5/8	18,600	5,580	18,600	6,140	25,000	4,375	5,450	6,550	35,000	8,750	11,000	13,100	50,500	13,750	17,150	20,600	30,000	7,500	6,400	24,100	4,025	3,420	30,000	7,500	6,400	5/8
3/4	23,100	6,930	23,100	7,620	32,000	5,625	7,050	8,450	40,500	10,125	12,750	15,200	59,500	16,500	20,600	24,750	35,000	8,750	7,500	32,100	5,350	4,550	35,000	8,750	7,500	3/4
7/8	33,800	10,140	33,800	11,160	38,500	6,750	8,400	10,000	56,000	14,000	17,500	21,000	77,500	23,000	28,750	34,500	47,250	11,550	9,850	38,500	6,425	5,450	47,250	11,550	9,850	7/8
1	46,700	14,000	46,700	15,400	51,750	9,075	11,350	13,600	76,500	19,125	23,250	28,650	104,000	28,750	36,000	43,000	62,500	15,625	13,300	51,750	8,625	7,325	62,500	15,625	13,300	1
	62,000	18,600	62,000	20,460	68,000	11,875	14,850	17,750	97,000	24,250	30,300	36,400	135,000	38,750	48,400	58,000	81,000	20,250	17,250	67,000	11,150	9,500	81,000	20,250	17,250	

**MATERIAL**  
SINGLE REFINED ALL PUDDLED IRON FREE FROM IRON OR STEEL SCRAP.

**WELD**  
FORGE WELDED ON END IN CORE FIRE.

**BRINELL**  
95-110

**ELONGATION**  
20% UP

**APPLICATION**  
TO PLACES SUBJECTED TO REASONABLE IMPACT LOADS, MUCH ABUSE, CRUSHING AND CORROSIVE ATMOSPHERES.

**MATERIAL**  
DOUBLE REFINED ALL PUDDLED IRON FREE FROM IRON OR STEEL SCRAP.

**WELD**  
FORGE WELDED ON END IN CORE FIRE.

**BRINELL**  
95-110

**ELONGATION**  
20% UP

**APPLICATION**  
TO PLACES SUBJECTED TO REASONABLE IMPACT LOADS AND TO EXCESSIVE ABUSE ALSO CORROSIVE ATMOSPHERES. THIS CHAIN HAS VERY SHORT LINKS AND IS EXTREMELY FLEXIBLE.

**MATERIAL**  
HOT ROLLED STEEL, NORMALIZED.

**WELD**  
ELECTRICALLY WELDED ON END OF LINK ON AUTOMATICALLY CONTROLLED WELDER.

**BRINELL**  
100-115

**ELONGATION**  
3.5% UP

**APPLICATION**  
TO PLACES WHERE SUBJECTED TO IMPACT LOADINGS AND HIGH TENSILE IS NOT REQUIRED.

**MATERIAL**  
CONTROLLED ANALYSIS CARBON STEEL, NORMALIZED, HEAT TREATED.

**WELD**  
ELECTRICALLY WELDED ON END OF LINK ON AUTOMATICALLY CONTROLLED WELDER.

**BRINELL**  
170-180

**ELONGATION**  
1.5% UP

**APPLICATION**  
TO PLACES WHERE SUBJECTED TO MODERATE IMPACT LOADINGS, HIGH TENSILE AND RESISTANCE TO ABRASION IS REQUIRED.

**MATERIAL**  
CONTROLLED ANALYSIS 3% NICKEL ALLOY STEEL, NORMALIZED, HEAT TREATED AND BURNED.

**WELD**  
ELECTRICALLY WELDED ON END OF LINK ON AUTOMATICALLY CONTROLLED WELDER.

**BRINELL**  
235-255

**ELONGATION**  
1.5% UP

**APPLICATION**  
TO PLACES WHERE NOT SUBJECTED TO IMPACT LOADINGS, WHERE MAXIMUM TENSILE AND RESISTANCE TO ABRASION IS REQUIRED.

**MATERIAL**  
THE RECOMMENDATION OF MANUFACTURERS OF THESE ALLOYS ON ANTI-CORROSION PROPERTIES UNDER VARIOUS CONDITIONS CAN BE FOLLOWED SAFELY WHEN WELDED BY THIS PROCESS.

**WELD**  
ALL WELDING IS DONE ON IMPROVED ELECTRIC END WELDERS EQUIPPED WITH FULL ACCOMPANIMENT OF AUTOMATIC CONTROL DEVICES TO INSURE UNIFORM AND RELIABLE WELDS WITHOUT THE INTRODUCTION OF ANY MATERIALS OTHER THAN THE PARENT METAL. THIS INSURES, IN ADDITION TO UNIFORMITY OF WELD, UNIFORMITY OF MATERIAL.

**APPLICATION**  
RECOMMENDED FOR USE IN AND AROUND SULPHURIC & HYDROCHLORIC ACID SOLUTIONS, NORMALLY USED FOR PICKLING OF STEEL PRODUCTS AND TO APPLICATIONS WHERE EXPOSED TO SEA WATER AND MARINE ATMOSPHERES ALSO HYDROFLUORIC ACID AND ALKALIES.

**APPLICATION**  
RECOMMENDED AS AN EXCEPTIONAL ACID RESISTING BRONZE PRODUCT FOR USE IN AND AROUND SULPHURIC & HYDROCHLORIC ACID PICKLING SOLUTIONS, MARINE ATMOSPHERES, AND SEA WATER.

**APPLICATION**  
RECOMMENDED FOR USE IN NITRIC ACID SOLUTIONS AND AT SUCH LOCATIONS WHERE ATMOSPHERIC OXIDATION WOULD PROVE TROUBLESOME. OBTAINABLE ONLY IN SATIN PICKLE FINISH.

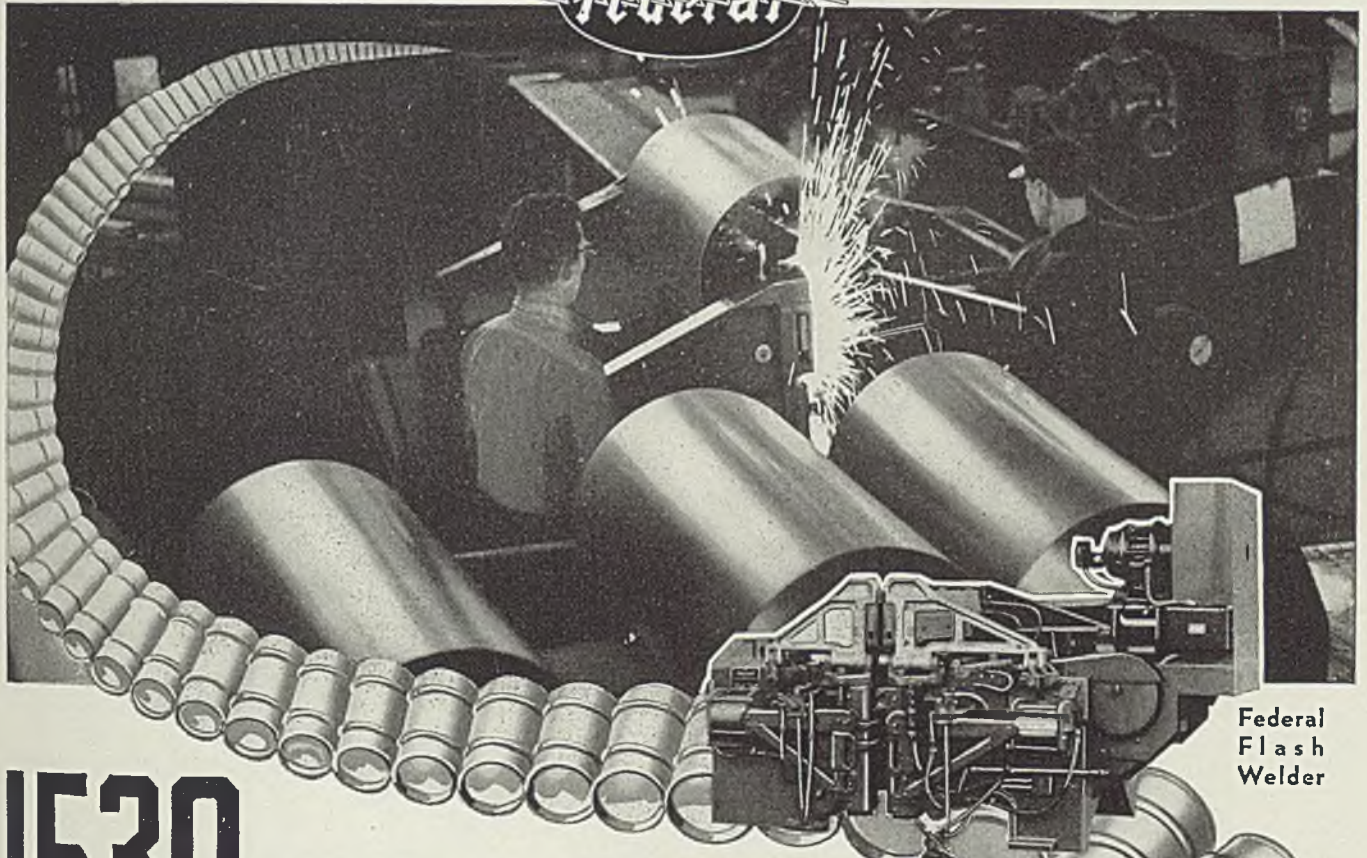
TENSILE FIGURES ARE AVERAGE- SAFE LOADS GENERAL UTILITY USAGE 62 1/2% RECOMMENDED, HARD AND CONTINUOUS USAGE 50% PREFERRED, EXCEPTIONALLY INFREQUENT USAGE 15% ALLOWED



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What Federal Resistance Welding Machines have done for this company is a production possibility that may be enjoyed by other manufacturers of steel drums, tanks and similar products. No tool placed in the hands of the metal fabrication industry has so increased the strength and beauty of metal products while speeding up production and lowering costs, as has resistance welding. Put this modern equipment to work for you. The consultant division of our engineering department offers its services in connection with your production problems.

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# Flame Strengthening

*Laboratory tests indicate new flame treatment has important possibilities. It is shown to eliminate effect of stress raisers in decreasing fatigue strength and doubles endurance limits on tests*

■ OF THE three flame-treating processes—flame hardening, flame softening and flame strengthening—perhaps the latter is the newest and least known. However, its name defines it. In application it is quite similar to flame hardening. The purpose of flame strengthening, however, differs appreciably from that of the other processes in that the intent is to strengthen highly stressed parts locally in regions of excessive concentration of

From paper presented at annual meeting of American Welding society, Chicago, Oct. 25, 1939.

By J. H. ZIMMERMAN  
Development Manager  
The Linde Air Products Co.  
New York

stress. An example of such stress concentration photoelastically is shown in Fig. 1.

The process is particularly suitable for parts which are to be subjected to repeated stresses and which thus are subject to failure by fatigue. In protecting against fatigue failures, it is a case of "save the surface and you save all." In other words, while flame

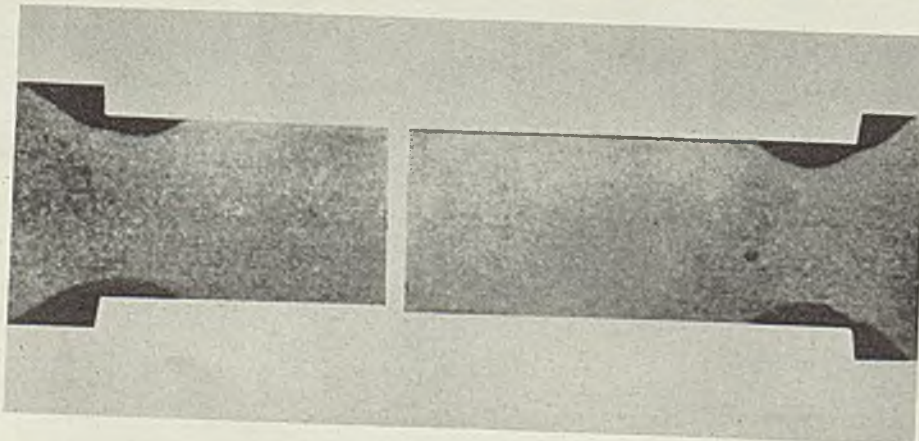
strengthening may appear identical with flame hardening, its purpose is not to protect parts against wear, but to increase mechanical strength against formation and propagation of fatigue cracks. Because of the extreme flexibility of the process, flame strengthening permits important savings in comparison with complete heat treatment where in most instances 100 per cent of the part would be hardened fully and drawn to increase the strength of the 1 or 2 per cent subjected to maximum stress.

To produce the desired contours of strengthened metal and to control the fadeout of this strengthened section into the base metal in regions of lower stress and thus prevent sharp discontinuities, it has been found desirable to employ special heating heads where the complexity of the part does not lend itself readily to use of simple or standard equipment.

## Resistance to Stress Desirable

In flame strengthening, cooling should be somewhat less drastic than in flame hardening. Whereas high hardness generally indicates great strength, such strength on the other hand does not indicate maximum fatigue or endurance properties. Thus somewhat lower than maximum hardness is advantageous for maximum resistance to repeated stress. Cause for this is probably the need for a certain amount of ductility to provide for minute plastic deformations in regions of high stress concentration. The need for tempering, even

Fig. 1. (Upper)—Photoelastic study showing stress concentration at shallow grooves in pure bending. Fig. 2. (Lower)—Macroetch of failed fatigue test specimens showing flame strengthening at regions of stress concentration

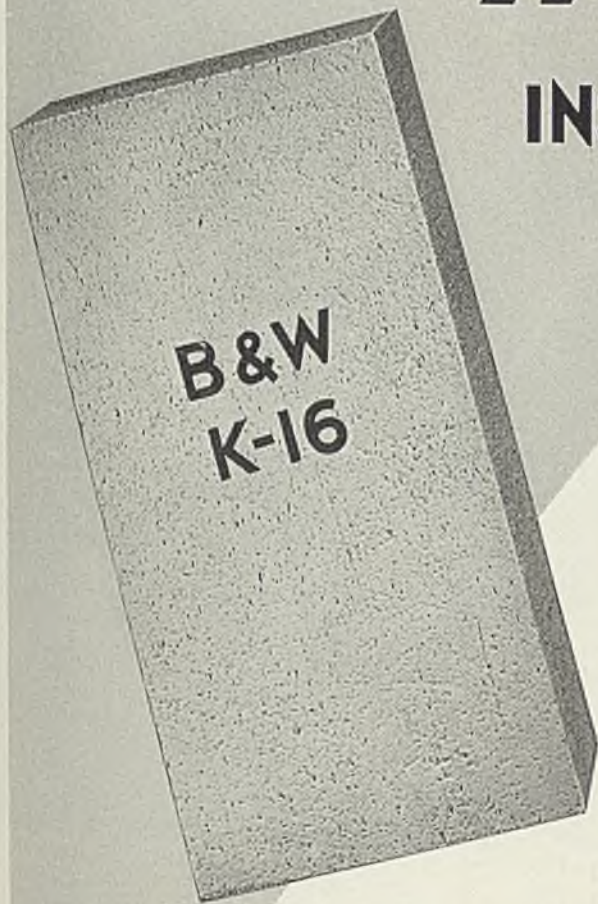




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though at a low temperature, is still more obvious in flame strengthening than in flame hardening.

While flame strengthening is as yet so new that little information is available concerning the performance of flame-strengthened parts, the results of laboratory tests are of interest. In Fig. 2 is shown a part of sectioned and etched fatigue specimen of the type employed in a series of tests to determine the advantages of this process. A sharp shoulder was introduced intentionally in the mid-section of the test specimen although shown near the end in Fig. 2. Uniform bending during rotation was the type of test employed.

### Fatigue Failures Transferred

As is well known and as has been previously indicated by the photoelastic illustration Fig. 1, this abrupt change in section is a stress raiser of appreciable magnitude. It was thought that if flame strengthening could divert the fatigue failure from the sharp cornered fillet to the shank of uniform diameter, the treatment would eliminate the weakening effect of the stress raiser. This has been found true as demonstrated in Fig. 2, which shows longitudinal sections of two fractured specimens with break away from the shoulder.

To investigate further the effect of flame strengthening, the entire reduced section surface as well as the fillet was strengthened in a

second series of specimens. In these tests it was found possible to throw the fatigue failures to the untreated metal in the section of larger diameter. Actual dimensions of the specimens under test were  $\frac{1}{8}$ -inch and  $\frac{1}{2}$ -inch for small and large diameters respectively. This variation in diameter corresponds to a much greater difference in the induced stress under load, the ratio of stresses for uniform bending moment being almost 1.5 to 1.

The results of one series of comparative fatigue tests are shown in Fig. 3. Endurance limits of four sets of specimens of the same type but treated differently are shown. The material employed was SAE-1045 steel. No attempt was made to determine the actual endurance limit of the material, which is probably in the neighborhood of 45,000 pounds per square inch. Instead the calculated stresses for the test specimens were based on the small diameter without regard to the stress-raising factor corresponding to the sharp cornered shoulder.

### Endurance Raised

In the curve, Fig. 3, it will be seen that the nominal endurance limit of the test specimen untreated was in the neighborhood of 18,000 pounds per square inch. If it is assumed that the test material itself has an endurance limit of 45,000 pounds per square inch, the actual stress-raising factor indicated is 2.5, a value which is not inconsistent with published data.

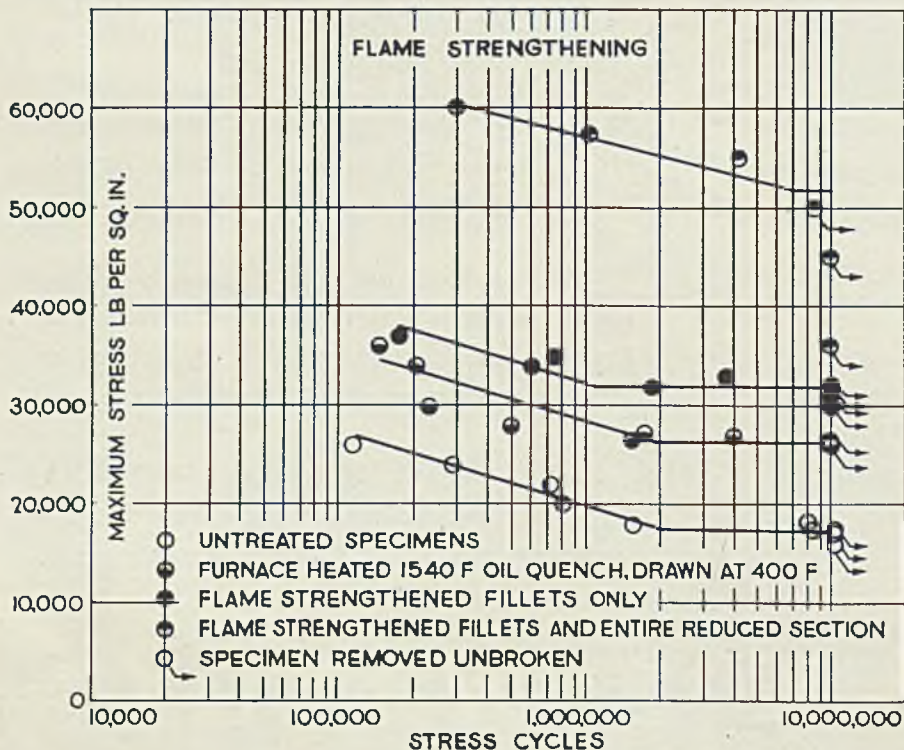
In the curve second from the bottom in Fig. 3, the nominal endurance limit is indicated to be approximately 26,000 pounds per square inch. This series of specimens was

oil quenched from 1540 degrees Fahr. and drawn at 400 degrees Fahr.

The next curve, showing a nominal endurance limit of 32,000 pounds per square inch, corresponds to the series of specimens treated as indicated in Fig. 2, namely, untreated base metal with the flame-strengthened fillet. It is interesting to note that this relatively sparse heat treatment has developed improved fatigue resistance as compared with a fully quenched and drawn specimen, although it must be admitted that the fully hardened specimens would probably have shown improved results had they been water quenched.

The upper curve, Fig. 3, indicating a nominal fatigue limit around 52,000 pounds per square inch, was obtained in testing a series of specimens which had been flame strengthened not only at the fillet but across the entire reduced section. The improvement is obvious. Thus, although less well known, the flame strengthening process gives every indication of still another important field of use for the oxyacetylene flame as an industrial tool.

Fig. 3—Graphical representation of fatigue test results showing determination of endurance limits. Illustrations courtesy The Linde Air Products Co., 30 East Forty-second street, New York



### Liquid Carburizer Speeds Carbon Penetration

For production shops heat treating small parts which require maximum penetration in a minimum of time, E. F. Houghton & Co., 240 Somerset street, Philadelphia, have produced Perliton No. 45, which is a unit product having carbon premixed with salt. Product contains a catalytic agent which speeds up penetration of carbon without altering the chemical reaction. Agent also assists in removing certain impurities in bath which tend to inhibit absorption of carbon by the steel. Perliton 45 is said to be at least 20 per cent faster in carbon penetration for short heats up to 90 minutes.

### Refractory Material for Furnace Repairs

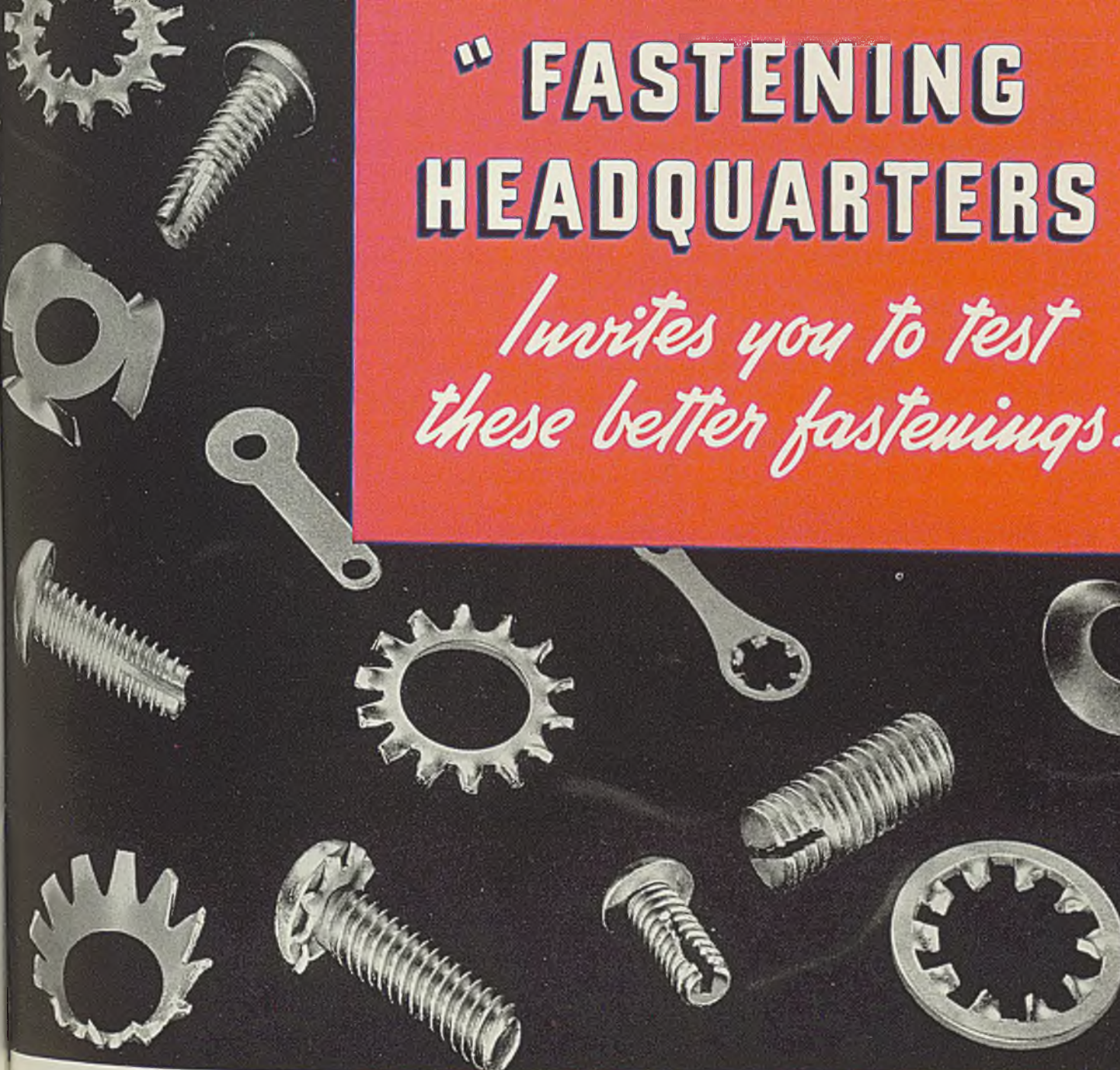
Refractory material, Greencote, has been developed by A. P. Green Fire Brick Co., Mexico, Mo., for repairing worn or spalled sections of furnace walls. It is said to be as refractory as first-quality firebrick and not to shrink or crack during drying or firing.

Material is stated to adhere equally well to hot or cold, new or old, refractory surfaces in furnaces operated at more than 2000 degrees Fahr., and is claimed to be highly resistant to slag, corrosion and spalling. Greencote is applied by spraying or troweling after first mixing with water.



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# SHAKEPROOF

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SENS Fastening Nuts . . . Lock Washers  
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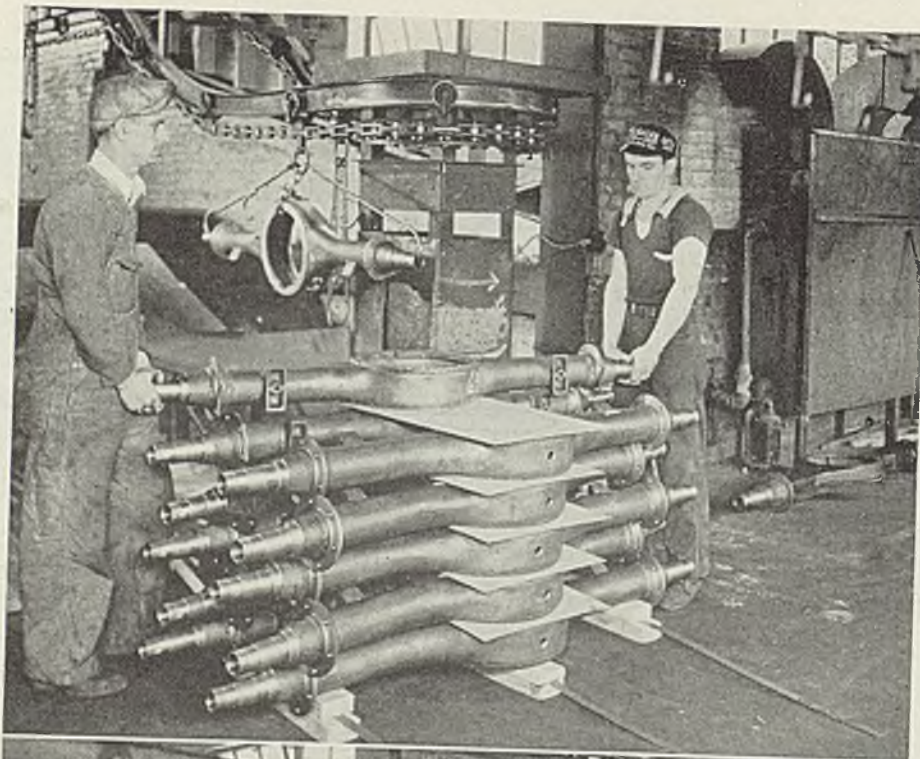
Thread-Cutting Screws . . . Locking Screws





## Costs Cut 40 Per Cent

*Packaging in 20-unit groups, steel strapped on standard wood skids affords important economies in handling steel axle housings in storage and between plants. Method easily adapted to wide range of products.*



■ A METHOD of handling and shipping steel products has cut the producer's handling costs about 40 per cent, increased the pay load of a freight car 60 per cent and has effected comparable savings for the consignee. It utilizes power trucks in loading freight cars for shipment of partly completed auto parts between a manufacturer of steel axle housings and a Cleveland automotive products plant.

Formerly, housings in the producer's plant were taken from the end of the production line by two men and loaded upon 2-wheel trucks, four housings to a truck. They were taken to storage, piled by hand and later withdrawn from storage, taken to freight car by hand truck and stowed in the car by two men. The railroad got loadings of 200 housings per car by this method and the housing manufacturer paid \$26.90 to get the 200 housings from production through storage to freight car.

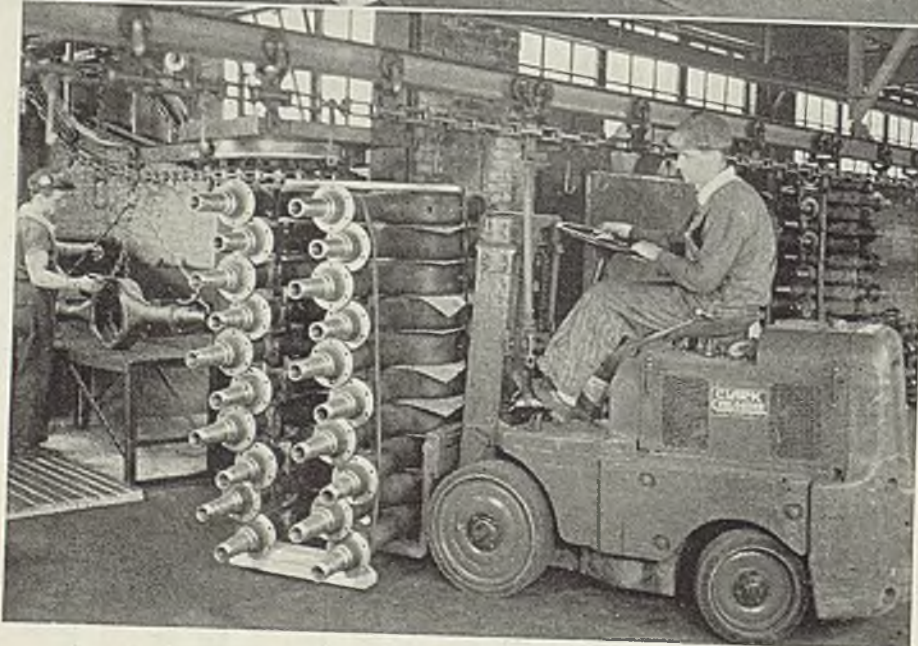
### More Economies Possible

The advent of a new type of industrial truck, the gas-powered Carloader, opened opportunity for important economies for the manufacturer and his customer. Purchase orders now specify that housings must be assembled in unit loads of 20 housings each, steel strapped to wood skids of certain

*(Please turn to Page 72)*

Upper, first step in new handling method is to stack housings as they come from end of conveyor as shown here. With 20 units in place, they are steel strapped on a standard skid

Lower, second step is transfer of the unit package shown here from conveyor line to storage. Photos courtesy Clark Equipment Co., Buchanan, Mich.





*"Something more than  
just Ferro Silicon"*



*Ohio Ferro-Alloys Corporation  
Canton, Ohio*



# Cuba Is Becoming Important Supplier of Manganese Ore

(Continued from Page 22)

variably subjected to stress as well as to corrosive environments. Stress often accelerates the rate of corrosion, sometimes causing actual breaks well below the breaking strength of the alloy even when the corrosive condition is mild. Laboratory and service corrosion tests, however, seldom take account of this important factor, he said. The phenomenon, he added, occurs in many metal systems under different names.

Mr. Dix presented data obtained on a few alloy systems and suggested a theory which he thought to be generally applicable. He expressed the hope that through a more thorough understanding of the whole phenomenon, metallurgists, engineers and users of metal may cooperate in the more effective selection of alloy compositions and the design of machines and structures.

## Cuba Increases Production

Importance of Cuba as a source of manganese ore supply for American consumers was emphasized by F. S. Norcross Jr., president and general manager, Cuban Mining Co., Cristo, Oriente, Cuba. Since the World war, he said, the United States has been dependent upon foreign sources for more than nine-tenths of its high-grade ore. During 1936, 1937 and 1938, imports for consumption averaged 736,000 tons a year. During the same period, domestic shipments averaged 21,000 tons a year. Of the imports, Russia accounted for an annual average of 280,000 tons, the Gold Coast (West Africa) 208,000 tons, India 74,000 tons and Brazil 72,500 tons.

In 1936, India and Brazil ranked third and fourth, but were displaced in 1937 and 1938 by Cuba. From less than 1 per cent of United States imports in 1931, the island republic, he said, increased its shipments to more than 27 per cent in 1938. Cuba's average for this 3-year period was 97,000 tons and its total for 1938 was 131,000 tons.

As tonnage ore was of low grade in Cuba, a concentration process had to be developed. When the Freeport Sulphur Co. purchased the Cuban American Manganese Corp., which in turn owned all of the stock of the Cuban Mining Co., considerable progress in the development of a concentration method was made. Construction of a plant, including dams for water supply,

transport facilities and initial mining development, was completed in July, 1932.

In the few years that followed there were various setbacks, including three major floods, a major earthquake and a revolution, followed by a revolutionary strike of workers all over the island. Moreover, the United States-Brazilian tariff agreement in 1935 cut the protective tariff on manganese by 50 per cent. As Cuban manganese enters duty free, Mr. Norcross pointed out, this cut made uneconomical further operations at costs then current. Hence improvements to cut operating costs had to be worked out, with a result that the Freeport company today has invested something more than \$3,000,000 in this Cuban manganese ore development, the speaker declared.

In addition to assuring this nation a nearby source of high-grade manganese vital for national defense plans, development of the process in Cuba is significant for its possible application to domestic manganese deposits, which are of a grade similar to Cuban ores, Mr. Norcross said.

## Describes Concentration Process

Incidentally, he pointed out that in the grave emergency of the World war the United States started almost from scratch and under the stimulation of high prices succeeded by 1918 in producing a peak of 311,000 tons, about 35 per cent of its consumption that year.

He went into considerable detail with respect to the history and development of the Cuban properties, with an interesting discussion on the



Charles H. Herty Jr.  
Delivered seventeenth annual A.I.M.E.  
Howe Memorial lecture

concentration process which the company employs.

The process developed for the concentration of ores, consists of the following steps after the ore is removed from the mine pit—jigging and fine grinding in ball mills to provide maximum "unlocking" of mineral particles, flotation of the manganese mineral, quickening and filtering, de-watering drag and nodulizing in a rotary kiln to produce a tough, lumpy porous product easily shipped.

Ore being extracted at present averages about 17 to 18 per cent manganese, the speaker said. However, the company's plant, he said, has concentrated ore as low as about 13 per cent to the grade of 50 per cent or better required for making ferro for the steel industry. The operating and reserve properties of the company are located within a district centering on the town of Cristo, 10 miles inland by rail from Santiago.

## Sulphur Affects Surface Quality

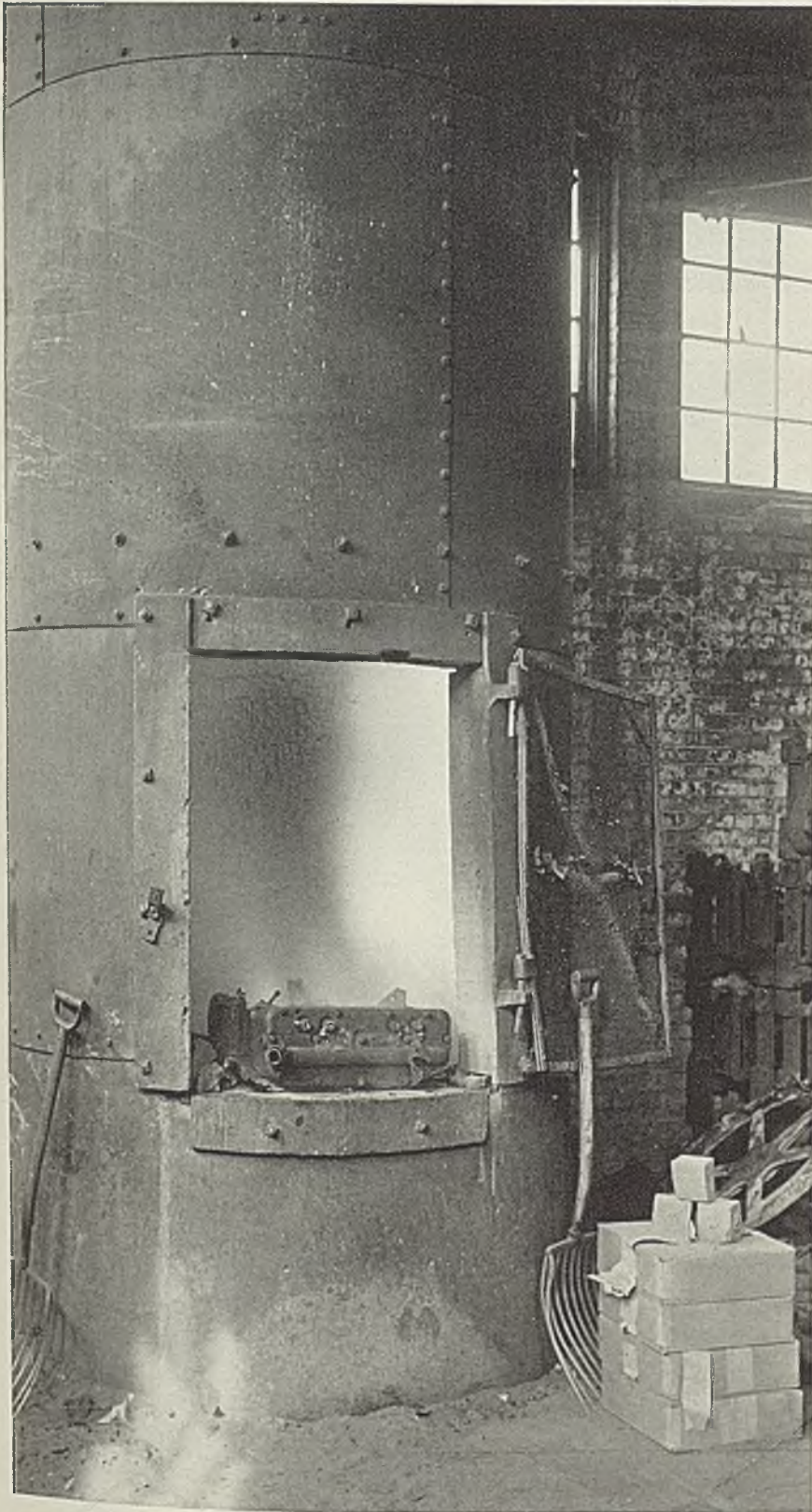
H. B. Emerick, metallurgical department, Jones & Laughlin Steel Corp., Aliquippa, Pa., outlined an effort made to evaluate individual influences of various factors in steel-making and rolling operations upon surface quality of semifinished steel products, and presented some conclusions which he said were not entirely theoretical, but rather were based upon several years critical observation of mill yields and rejections and were supported by actual data wherever possible.

The important influence of quality of blast furnace iron on steel quality was emphasized by presentation of data which, the speaker pointed out, definitely established iron sulphur as the controlling factor in semifinished steel surface quality. Conditions of melting in the open hearth, slag-metal relationships, temperature control and deoxidation practices were analyzed in terms of steel rejections and reconditioning costs. Fundamental considerations of pouring practice and mold practice were discussed and their relation to quality control indicated. Attention also was called to the increasing importance of blooming mill heating and rolling practices in connection with surface quality.

Chemical composition of killed steel has a decided effect on its hot working properties and surface characteristics, according to Gilbert Soler, resident manager, Steel & Tubes division, Timken Roller Bearing Co., Canton, O. Composition, he said, limits the state of deoxidation, influences the gas content, and controls the freezing range. It also determines the physical properties of the steel, which modify the



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thermo behavior of the ingot during solidification. The combination of these factors, Mr. Soler said, control to a large extent the crystallization characteristics and cast structure of the metal.

The phase structure and hot working properties of steel are influenced and limited by chemical composition. Physical properties, he continued, restrict the rate of heating and cooling of the steel, especially in the transformation range. The extent of scaling and surface decarburization is modified by the chemical composition of the steel.

In a paper, "Relation of Ingot Surface as Reflected by Mold-Wall Surface to Billet or Bloom Surface," T. J. Woods, metallurgical department, Republic Steel Corp., Buffalo, dealt with relationship of ingot surface and sub-surface defects, such as blowholes, cracks, and so forth, present on the average ingot, to the defects found on the direct rolled product, billets and blooms. By direct rolled, the speaker said he meant there was no intermediate heating between breakdown of the ingot and the finished billet or bloom.

#### Ingot Defects Carry Through

Results of experiments indicate, Mr. Woods said, that aside from rolling defects, such as laps, collar-ing, and so forth, the ingot surface is responsible for practically all other defects which appear on the rolled product. He added that all ingots of all heats contain blowholes in varying amounts, near the bottom in particular. The experiments were conducted on hot topped, medium carbon and alloy steels strongly deoxidized to produce fine McQuaid-Ehn grain size. They were made on 100-ton open-hearth furnaces.

In a paper, "Slag-Metal Relationships in the Basic Open-Hearth Furnace," Karl L. Feters and John Chipman, department of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., presented results of a statistical analysis of the relationship between slag and metal near the end of the heat. The study was confined to tests taken on an open bath prior to addition of deoxidizers, but not immediately after ore or other additions. Metal samples were obtained in the closed "bomb" type of mold, which affords the most consistent method in the general use of the determination of its oxygen content, it was said. Data on 424 heats were contributed by eight steel-producing companies, comprising a total of 650 metal samples, most of which were accompanied by simultaneous slag samples.

Discussing formation of inclusions in steel castings, Walter Crafts,



Edgar H. Dix Jr.

Delivered nineteenth annual A.I.M.E. Institute of Metals lecture

John J. Eagan and W. D. Forgeng, research metallurgists, Union Carbon & Carbide Research Laboratories Inc., Niagara Falls, N. Y., declared that although many elements reduce the tendency to porosity in steel castings, manganese, silicon, aluminum, calcium, titanium and zirconium appear to be most generally suitable for the purpose. The manganese and silicon contents, they declared, are usually maintained in a fairly constant range. Silicon-killed castings often are made to be sound with little or no addition of the stronger degasifiers.

In many cases, however, it was pointed out, it is more practical to utilize the stronger degasifying elements, aluminum, calcium, titanium and zirconium. Since they greatly modify the composition, shape and distribution of the nonmetallic inclusions, and thereby the ductility, the strong deoxidizers must be used in such a way as to form the least harmful types of inclusions.

#### Solidification Mechanism Sought

As the reasons for failure always to obtain good results have not been obvious, an effort was made by the authors to determine the mechanism of solidification of steels deoxidized to include certain types of inclusions. Diagrams representing the mechanism of their formation were constructed from the appearance of the nonmetallic constituents and not only illustrated limiting features of specific deoxidizing treatments with respect to inclusion formation and ductility, but also indicated a relation between inclusions and resistance to hot tearing. Three different types of deoxidation treatment were used for obtaining sound castings with relatively high ductility.

In summation of a paper, "Equilibrium in Liquid Iron with Carbon and Silicon," L. S. Darken, research laboratory, United States Steel Corp.,

Kearny, N. J., asserted that application of the law of mass action to the homogeneous equilibria involving carbon and silicon in molten iron, on the assumption that the molecular species Fe-C and Fe-Si are present in such solutions, lead to the development of data that brought them into substantial accord. These data, he said, included the solubility of graphite in liquid iron and iron-aluminum and iron-silicon melts; the vapor pressure of the iron-carbon system at high temperatures and the CO-CO<sub>2</sub> ratio in equilibrium with them; the heat of formation of iron carbide; the equilibrium between silicon in low-carbon molten steels and the respective oxides in the slag phase, and the deoxidizing characteristics of silicon.

The consistency of the results of the calculations was regarded as the indication that the use of the simple form of the law of mass action was justified in the treatment of data on solutions in liquid iron provided that compound formation in the liquid was taken into account.

#### Another Correlation Obtained

The speaker stated that although the method of treatment presented lead to a consistent picture, which was in accord with a variety of experimental results, it was known to him that at least one entirely different method of treatment lead to a correlation of experimental data that was essentially equally satisfactory. The validity of the extension of the method used must depend upon further and more accurate experimental data, Mr. Darken said.

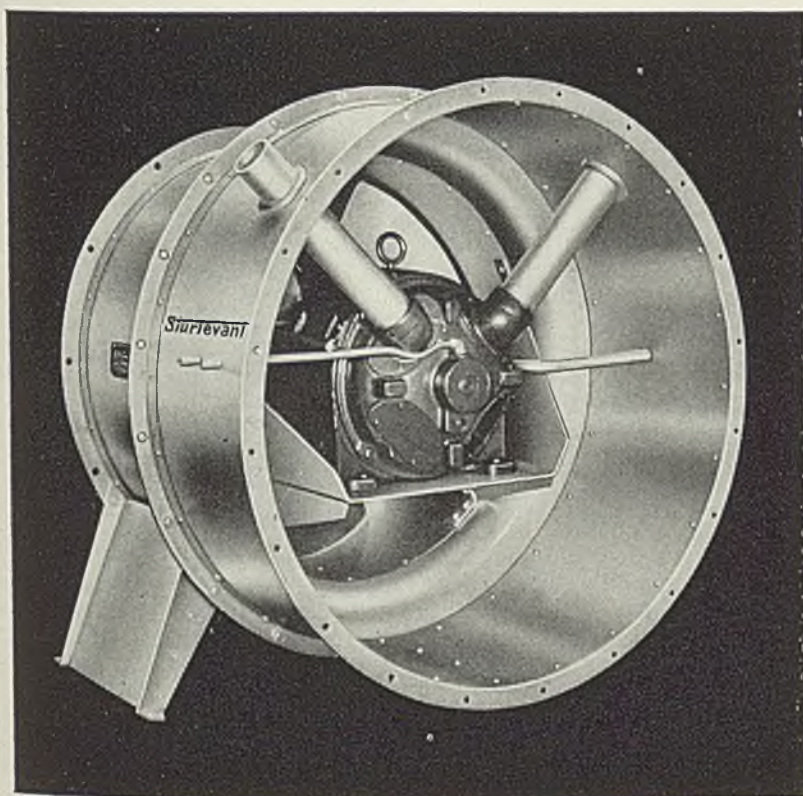
Solubility of nitrogen in liquid Fe-Cr and Fe-V alloys was discussed by R. M. Brick, instructor of metallurgy, Yale university, New Haven, Conn., and J. A. Creevy, the Stanley Works, Bridgeport, Conn. Among conclusions were that the relation between solubility and pressure appeared to follow Siverts' square-root law; that the solid alloys of Fe-Cr-N formed a eutectoid structure at some temperature below their melting points, with the nitrogen content of the structure in the vicinity of 8 per cent by weight; that while the limiting nitrogen content of liquid chromium at one atmosphere pressure was about 4 per cent by weight, solid chromium at 900 degree cent. absorbed 13.7 per cent by weight; and that nitrogen lowered the freezing point of iron-chromium alloys, but greatly raised the melting point of iron-vanadium alloys. At the same time, liquid alloys of the latter elements dissolved considerably great quantities of nitrogen it was said.

(Concluded next week)

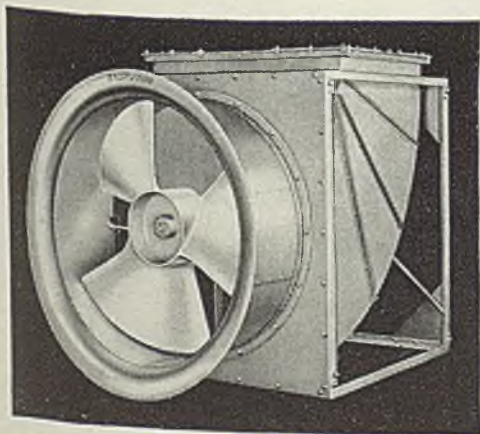


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USED FOR WORLD'S LARGEST INSTALLATION



Sturtevant Axiflo Pressure Fan, Arrangement 4, such as used for world's largest automotive sheet metal spray booth installation. In this installation, the fans were installed with enclosed pipe ventilated motors in the exhaust ducts, as the fumes handled were non-flammable.



Sturtevant Axiflo Pressure Elbow Fan, designed for installation where it is not desirable to place motor or drive in the air stream. Air is discharged into the elbow, resulting in no appreciable capacity loss due to the addition of elbow.

Handle large air volume  
against resistance—  
with high efficiency

THESE 16 Sturtevant Axiflo Pressure Fans were selected to meet the exacting requirements of the largest automotive sheet metal spray booth installation in the world. They are used to exhaust air and fumes from spray booths, and they work against the resistance of water curtains, water sprays, and system duct work.

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The Sturtevant Axiflo Pressure Fan is designed specifically to handle large air volumes against wind and system resistance. They assure the following outstanding advantages for a wide variety of ventilating, air conditioning, fume removal, and other application:

1. *Reduce first cost*—because of comparatively low price.
2. *Cut power consumption*—have mechanical efficiency of over 79%.
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## Excess Ash in Coke

*Effect of reduced ash content on economics of blast furnace operation is analyzed. Means outlined for improving efficiency, output not used much here although adopted in Europe*

■ THE ECONOMICAL aspects of washing coal are of interest because of the far-reaching effects of excess ash in coke produced. Preparation before coking by washing or other means is common. An important problem, however, is: How much money can be spent economically in coal preparation and to what extent is it economical to prepare this coal.

As an illustration, assume that by reasonable methods it is possible to reduce ash in the coal to where ash in the coke is 12 per cent, but by additional expense it can be brought down to produce coke with an ash content of 10 per cent. This additional expense is made up of additional investment, labor and loss of coal, as all coal shows some actual waste in washing. The question

By JAMES P. DOVEL  
James P. Dovel & Co.  
1415 North Thirtieth street  
Birmingham, Ala.

then becomes: What is the difference in value between a coke of 10 per cent ash and one of 12 per cent.

This difference in value depends on for what purpose the coke is to be used. For ordinary purposes such as domestic heating, the difference in value does not appear to exceed the 2 per cent difference in ash, but if this coke is to be shipped to some point where the freight rate is, say, \$5 per ton, 2 per cent could also be saved on this item.

If the coke is to be used in manufacturing pig iron, the problem is

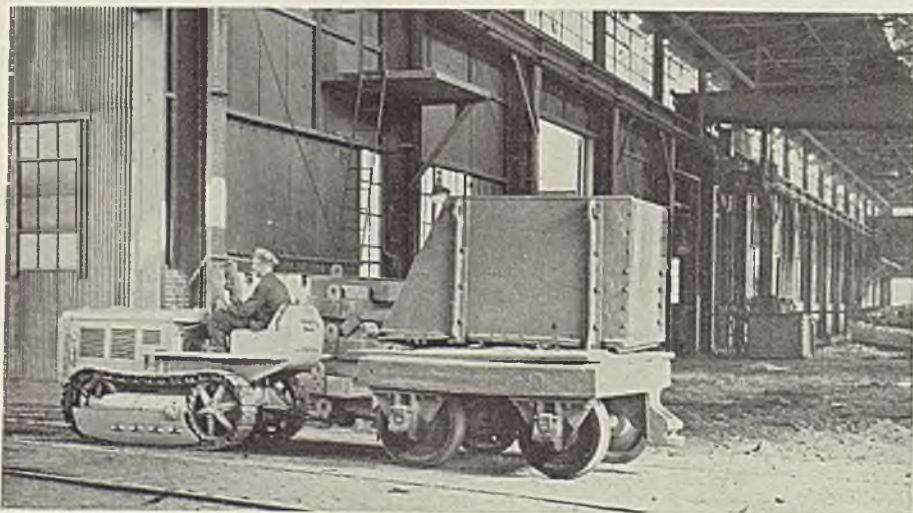
much more complicated. Assume the coke is delivered at the blast furnace with these items referred to above already charged. The additional 2 per cent ash in the 12 per cent coke will require its equivalent weight in limestone and its equivalent weight in coke to put it through the furnace. This mild looking 2 per cent with all its charges added thus has to be multiplied by three to get it through the furnace. It now amounts to about 6 per cent of the cost of the coke at the furnace.

### Furnace Efficiency Decreased

Then it becomes necessary to involve about 6 per cent or more of the furnace capacity in taking care of the original 2 per cent ash in the coke. This decreases the efficiency of the blast furnace just that much. This 6 per cent will include labor and all overhead charges such as investment, taxes, etc., in fact, everything except the ore and coke plus 6 per cent of the net profits. With all of these items considered and charged to the difference between a 10 and a 12 per cent ash coke, the engineer will be in position to determine just how much money he can spend in the preparation of coke. He also can add to this figure a 2 per cent loss on the entire cost of operating his by-product plant.

This analysis leads us up to another and more important problem: Can anything be done to increase the efficiency of the blast furnace? The answer is "Yes." Much already has been done. Some good coke blast furnaces were built in the Birmingham district in the eighties. These furnaces had at that time an anticipated production of from 100 to 150 tons per day. The furnaces which I have in mind were rather slow in reaching a production of 150 tons per day up until the year

## Tractor Serves as Intraplant Locomotive



■ This 25-horsepower diesel tractor is used as an intraplant locomotive at Standard Steel Works Co., Burnham, Pa. It hauls miscellaneous plant equipment to where it is needed and can handle castings weighing up to 35 tons. Loads are placed on car trucks regularly used on the plant's railroad tracks. Photo courtesy Caterpillar Tractor Co., Peoria, Ill.



1910 and had not averaged 200 tons per day.

At that time a great many companies were building new and larger furnaces practically on the same lines of the older furnaces except larger in proportion in the bottom section. While these furnaces, being larger, produced a greater tonnage, efficiency of carbon content remained about the same for a considerable time until the proportionate hot-blast capacity was increased. The old furnaces which I have in mind and which I had opportunity to secure the data on were not torn down and rebuilt as had been customary for several years prior to that time. A general line of improvement was put into effect by increasing the stove capacity and power plant capacity to where these same furnaces would produce 260 tons per day with the carbon efficiency improved considerably, mostly due to the increase in hot-blast temperature. These improvements have been pretty generally adopted by practically all operators.

#### More Air Required

To produce tonnage of these proportions required a greatly increased volume of air, which in turn produced large quantities of dust. Since the very inception of the art it has been considered absolutely necessary to place the charge in the furnace in such a way that there would be a path of least resistance to the gases through the center. This is why the stock is distributed over a bell valve. Due to the nature of these two materials there was a much larger proportion of the ore adjacent to the wall as these two materials when dumped over a bell valve do not form the same line of repose—the ore at a much greater angle than that of the coke. Therefore, the more dense condition of the stock is at or near the outside or next to the wall with a more porous section or path for the gases to pass through the center.

After much observation and research it was found that a similar path of least resistance could be created around the outside without changing the established path of least resistance through the center. To do this required enlarging top section of the furnace to almost double the original area, this change reducing the dust carrying capacity of the gases by 90 per cent and at the same time producing a much better direct contact between gases and ore.

The only obstacle in the way of making this radical change much sooner than it was made was the anticipated rapid destruction of the inwall. As soon as an adequate inwall cooling system was discovered, the system was put into operation

and immediately resulted in an increase of 16 per cent in the blast furnace efficiency, reducing coke consumption per ton of iron by a minimum of 400 pounds.

Saving 400 pounds of coke per ton of iron together with a net saving of 16 per cent in entire operating cost of the plant and 16 per cent of the net profits on the product is the item that might well mean the difference between success and failure on a commercial blast furnace. It also was found that the furnace could be blown enough faster to produce 30 per cent more iron per day. Incidentally, this increase in output corresponds very nearly to the increase in cubical volume above the mantle. No change in volume was made below the mantle.

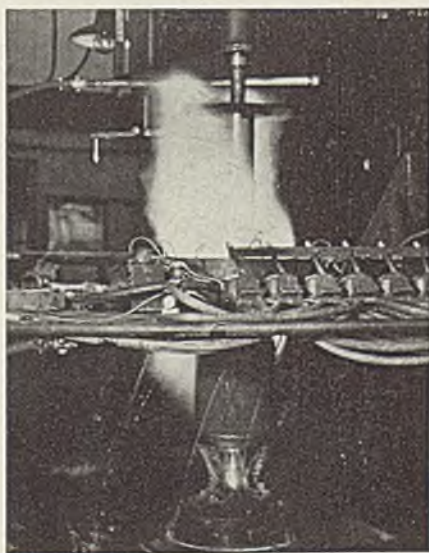
While this line of improvement commenced in the year 1923, only eight blast furnaces have taken advantage of this great improvement even though these facts were thoroughly established by the year 1930 in this country, but they are being adopted in Europe.

The only reason assigned for this must be that operators do not like to take the risk of a radical change in their blast furnaces. The figures above have been verified in actual practice.

#### Flame-Hardening Process Gives Greater Hardness

■ Higher degree of hardness in steel and alloy iron rolls, mandrels, etc., is obtained by Farrel-Birmingham Co. Inc., Ansonia, Conn., through a new vertical combination method of flame-hardening developed by The Linde Air Products Co., 30 East Forty-second street, New York. By its utilization, the company is able to raise hardness of an 0.65 to 0.70 carbon steel cylindrical object to

Flame-hardening a roll by vertical combination method



90 or better on Type C scleroscope. Tests in hardening a special dry sand alloy cast iron known as Farre-flame resulted in an average hardness of 80.

Another advantage is that rolls flame-hardened by this method show no measurable distortion. Process is continuous, uses a large number of flame tips and is followed immediately by a water spray quench. Advantageous applications of this method are said to include: Rubber engraving rolls, embossing rolls, calender rolls under certain conditions, various mandrels where excessive pressure or wear must be taken into consideration, certain applications for rolling mills, dough machines and wearing surfaces of bearers in printing machinery.

#### Study of Burned-Clay Products Industry

■ *Marketing Burned-Clay Products*, by A. Hamilton Chute; cloth, 374 pages, 6 x 9 inches; published by Ohio State University, Columbus, O.; supplied by STEEL, Cleveland, for \$3.50.

This study of the location and importance of burned-clay industries in the United States and problems of manufacturers of these products is addressed to manufacturers and distributors and to students of marketing interested in detailed description of the marketing organization of an industry.

The "commodity approach" employed makes possible a concrete delineation of the actual channels, practices and problems involved. For manufacturers and distributors, data from variety of sources are summarized and analyzed so that a bird's-eye view of the industry, its development, present importance, marketing history, present policies, practices and problems may be had. In the interest of readers concerned primarily with marketing aspects of the study technical terminology has been kept at a minimum.

It includes all the authentic figures on production, sales, imports, exports, tariff rates, sales by channels and other information taken from published and unpublished government and trade association reports. It includes detailed figures on the relative importance of various marketing channels for each product division.

#### Rustproof Fish Hooks

■ Production on a commercial basis of a rustproof fish hook with high strength made of Z nickel, a new heat-treatable alloy containing approximately 98 per cent nickel, has been announced by Bill DeWitt Baits, division of Shoe Form Co., Auburn, N. Y.



## Costs Cut 40 Per Cent

(Concluded from Page 64)

dimensions to accommodate the steel fingers of the truck.

By the improved method, housings are assembled in these unit loads of 20 housings each right at the conveyor line, placed in storage, withdrawn from storage and stowed in freight cars, 320 housings to a car—handling 20 housings as a unit throughout these operations. The cost of these handling operations totals \$26.24 per car or \$0.082 per housing. This compares with \$0.1345 per housing by the hand truck method, a clear saving at the shipping end of almost 40 per cent.

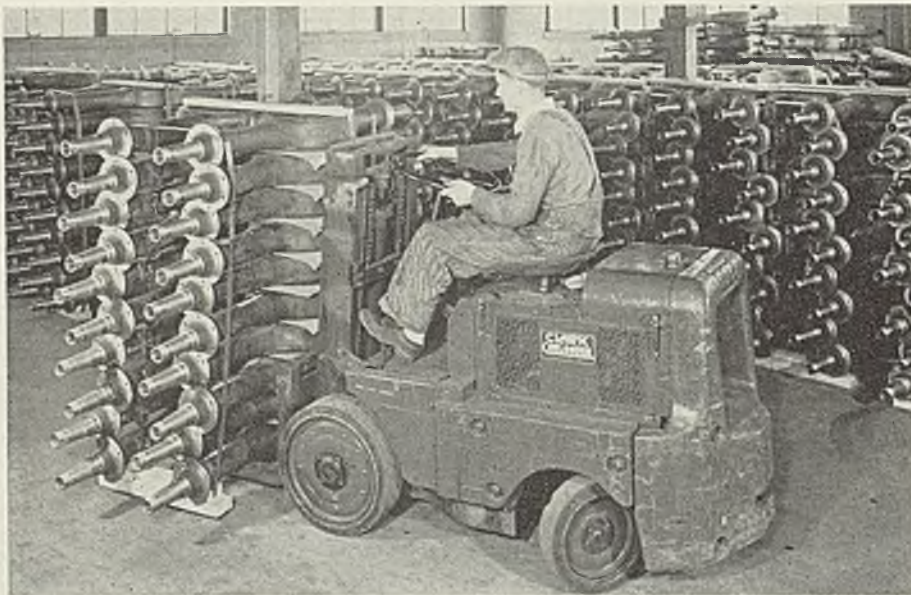
Sequence of operations is shown in accompanying illustrations. At the assembly plant in Cleveland, the operations occur in the reverse order and with comparable savings. The housings never leave the wood skid from the time they are finished at the production plant until they are needed at the customer's assem-

bly line. These savings are the result of an agreement upon a standard type of package and the adoption of identical truck equipment by shipper and consignee. The cost figures in detail are:

OLD METHOD	
(200 housings per car)	
Labor to unload conveyor and move to storage .....	\$ 4.74
Labor to move from storage to freight car and assemble in racks .....	12.60
Lumber .....	8.56
Nails .....	1.00
<b>Per car of 200 housings .....</b>	<b>\$26.90</b>
	or \$0.1345 per housing

Upper, third step, the package of 20 housings is taken from storage by power truck

Lower, now 320 housings can be loaded into a freight car that formerly took only 200 units. Truck with short wheel base easily maneuvers in car



CARLOADER METHOD	
(16 bundles of 20 housings each, per car)	
Labor unloading conveyor and strapping bundle of 20 .....	\$ 0.40
Moving to storage with Car-loader .....	.10
Moving to freight car from storage .....	.15
Sawing lumber and assembling skid strips .....	.15
Lumber .....	.19
Steel strapping .....	.65
	<b>\$ 1.64</b>
<b>Per car of 320 housings .....</b>	<b>\$26.24</b>
	or \$0.082 per housing.
<b>Saving per housing \$0.0525, almost</b>	<b>40 per cent.</b>

## Problems of Thermal Insulation Discussed

■ *Symposium on Thermal Insulating Materials*, 125 pages, 6 x 9 inches; published by American Society for Testing Materials, Philadelphia; supplied by STEEL, Cleveland, for \$1.25 in heavy paper, \$1.50 in cloth.

Four technical papers constitute the body of the symposium, with discussions from the floor. They were delivered at a regional meeting of the society at Columbus, O., March 8, 1939. The gathering was sponsored jointly by committee C-16 on thermal insulating materials and committee C-8 on refractories. The purpose was to point out important problems in standardization and research.

The papers include: "Factors Influencing Thermal Conductivity of Materials," by J. B. Austin; "Discussion of Test Methods for Determining Physical Properties of Thermal Insulation," by H. H. Rinehart; "One Consumer's Problems in Selecting Thermal Insulation," by E. T. Cope and W. F. Kinney; "Effect of Solar Radiation on Heat Transmission Through Walls," by F. C. Houghten, Carl Gutberlet and Albert A. Rosenberg of the research laboratory of the American Society of Heating and Ventilating Engineers.

## Underground Exploration

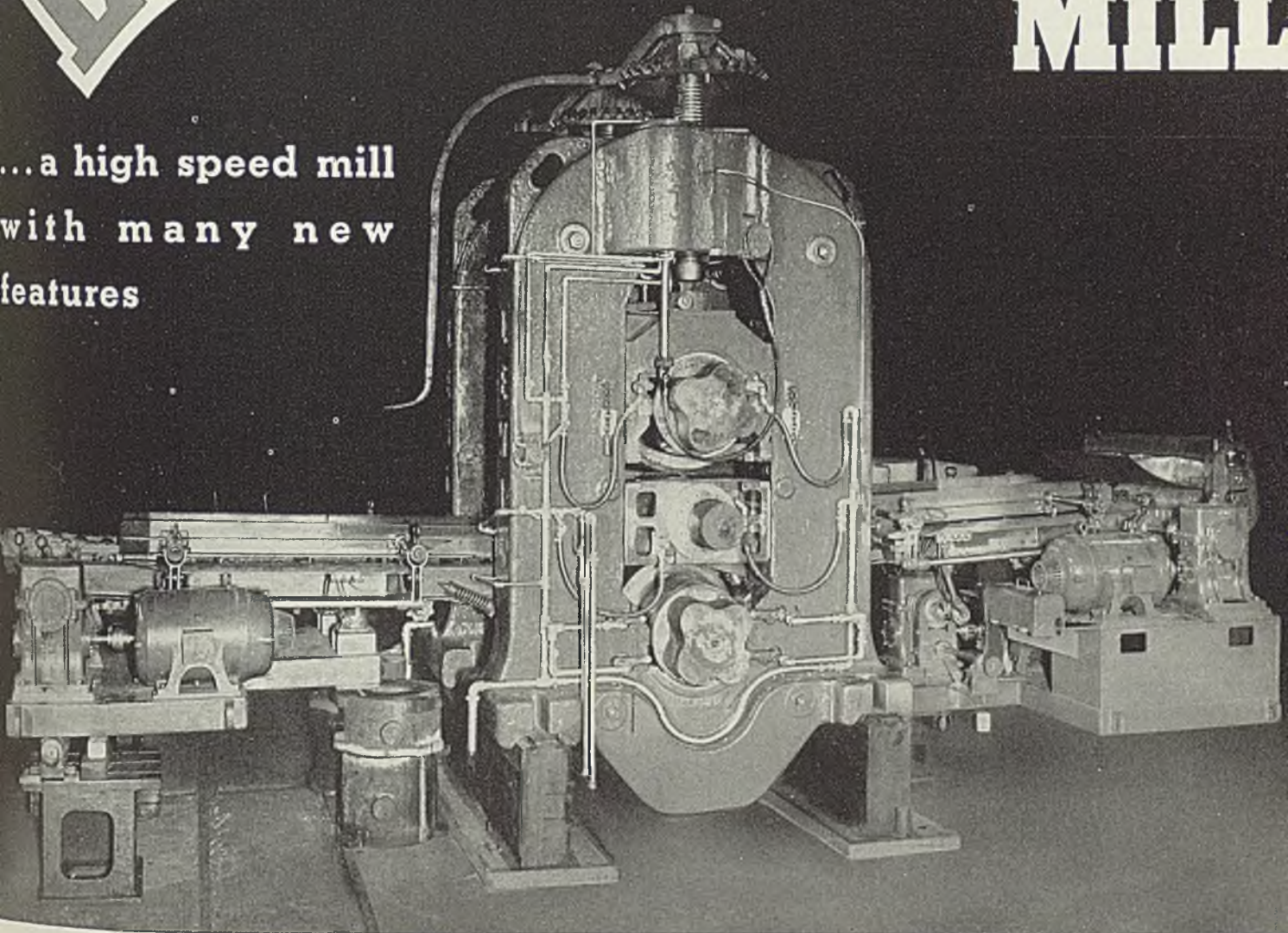
■ Improved 1940 M-scopes used to locate and measure depth of buried metal are announced by Fisher Research Laboratories, Palo Alto, Calif. Instrument consists of a transmitter and receiver of radio waves and denotes presence of metal, magnetic and nonmagnetic, by an increase in output of receiver. Pipes, dead ends, insulated joints, stubs are said to be located easily.

An 8-tube M-scope costs \$95 and a set with a maximum depth range of 250 feet costs \$175.



# LEWIS THREE HIGH JUMP TYPE MILL

...a high speed mill  
with many new  
features



**R**OLLS sheets from  $\frac{5}{8}$ " down.

Illustration shows mill with hand operated screwdown. It can also be equipped with power operated screwdown if desired.

This mill can be equipped with either fabric water bearings with water sprays or bronze bearings.

Middle roll can be changed in four minutes;

all rolls can be changed in 48 minutes.

Roller and catcher tables are designed for high speed in reversing, tilting and retarding with all controls accessible from floor.

All moving parts in constant sight of both operators.

Lewis Three High Mills are short cuts to economical operation.



## LEWIS FOUNDRY & MACHINE

DIVISION OF BLAW-KNOX CO.



# New Production Punching Unit

■ A NEW hydraulic punching unit fabricated by Progressive Welder Co., 737 Piquette avenue, Detroit, employing a balanced-spring principle, enables a manufacturer of windshield and window-trim moldings to reduce greatly time required for punching and countersinking mounting holes in such moldings. The unit is comprised of from 12 to 16 individual hydraulic punching units, a nesting form for work and an air-hydraulic booster to operate punching units.

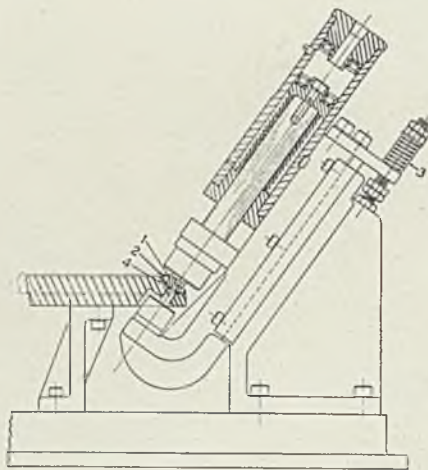
Upwards of 200 moldings per hour, with from 12 to 16 holes each, are now being turned out per fixture (one operator per fixture) with the new equipment. Some of this saving also is attributable to eliminating necessity for accurate manual positioning of work, this function being provided by punching units themselves without cam dies.

An unusual feature is that although units are of single-acting construction, actual operation is in two directions. When hydraulic pressure is first admitted to unit, piston moves toward work, bringing a die into contact with work and

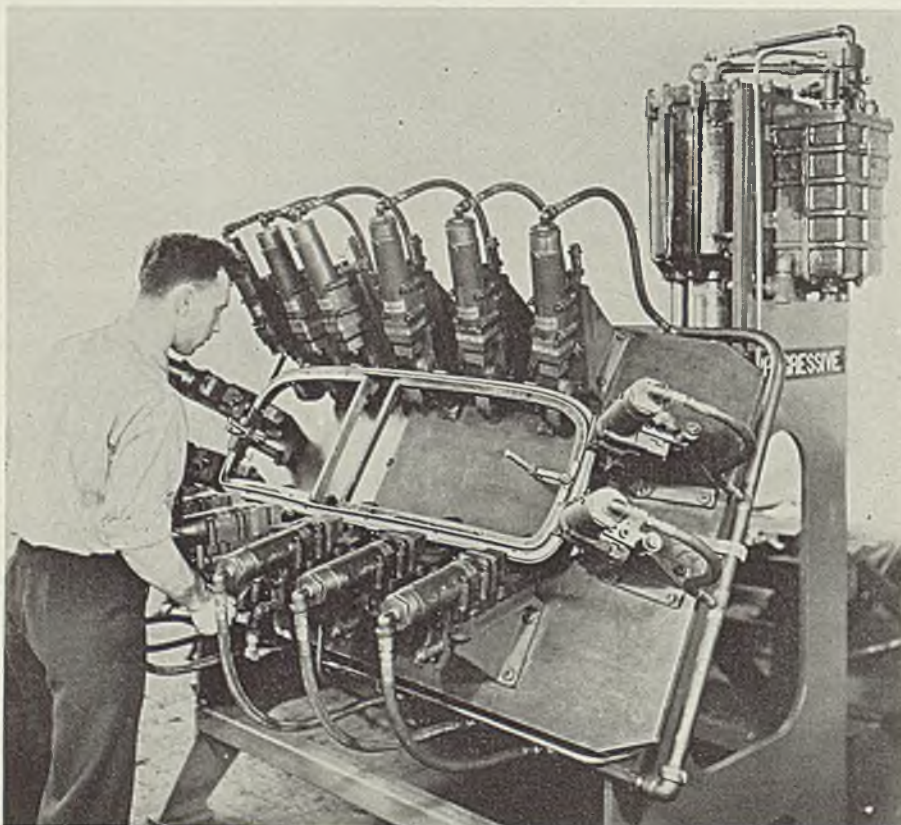
holding it securely against nesting form. As forward movement ceases, pressure increases within cylinder, causing cylinder to move away from piston against spring pressure. To cylinder of units is connected punch and counterpunch which pierce work from far side.

In operation, hand clamps at each end of nesting form position work until operator presses starting button, which brings die of each punching unit into contact with work under low hydraulic pressure (90 pounds), clamping it securely in the nesting form. Resulting back pressure trips main pressure switch and brings hydraulic booster into full action to complete punching.

Reference to accompanying dia-



Punching-countersinking fixture employing balanced-spring type punching units mounted on self-contained windshield garnish molding punching fixture. Upwards of 200 pieces per hour (16 holes per piece) is current production rate



gram will show how hydraulic pressure entering cylinder brings die (1), also acting as work clamp, against work (2) and completes punching and counterpunching in a single stroke by means of backward movement of carriage on which punching unit and punch are mounted. When stroke is completed and pressure relieved, stripping spring (3) retracts punch from work with nesting form (4) acting as stripping plate.

Following return of the carriage to normal position, piston spring moves piston into original position, hand clamps are opened, work removed and operation repeats.

Two such fixtures, one for windshield and one for rear-window garnish moldings, similar in operation and employing identical and interchangeable punching units, already are in operation. Punching unit is covered by patent 2118648.

## Reports of Fourth Enamel Forum Available

■ Copies of proceedings of the fourth annual forum of the Porcelain Enamel Institute are now available from the institute's headquarters, 612 North Michigan avenue, Chicago.

In addition to the papers delivered at meetings held at Ohio State university last October, the book also gives a verbatim report of discussions which followed each paper.

Most recent technical improvement in enameling process, fine grinding and cast iron enameling by the dry process, is covered as well as work done by the bureau of standards on chipping resistance and development of standard tests. Other discussions deal with drawing compounds and use of softened water in cleaning and pickling process, architectural enameling, and several general subjects of interest to managements, such as health hazards in pickling and inspection and packing problems. Copies may be obtained for \$2.

## Iodine Antiseptic

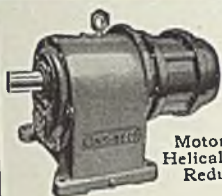
■ A nonalcoholic solution of iodine known as Isodine-Davis, claimed to be superior to the alcoholic tincture of iodine, is being supplied by Davis Emergency Equipment Co., 55 Van Dam street, New York. Solution is said to have same antiseptic properties as tincture of iodine but to be less painful when applied, not to burn or destroy tissues, and to penetrate more deeply.

Solution is supplied in 2-cubic-centimeter and 10-cubic-centimeter applicators and in unit cartons containing 10 swabs, each of which represents an individual treatment.

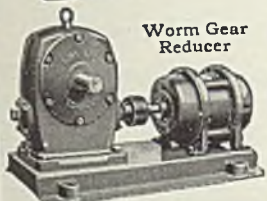


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FOUNDRY  
SERVICE..**

**NOT ONE CENT for REPAIRS!**



Motorized  
Helical Gear  
Reducer



Worm Gear  
Reducer

**OTHER LINK-BELT POSITIVE  
DRIVES INCLUDE:**



SILENT  
CHAIN DRIVE



ROLLER  
CHAIN DRIVE



P.R. VARIABLE  
ROLLER DRIVE



P.L.V. GEAR  
SPEED-VARIATOR

● Maybe there are tougher operating conditions than those in a foundry... but sand, grit and fumes are no respecter of equipment. Serving a 10-year stretch in this type of plant without calling for a cent's worth of repairs is pretty convincing evidence that Link-Belt Speed Reducers are built for dependability. In the Century Foundry, St. Louis, nine Link-Belt Speed Reducers have run over ten years, four for nine years, and one for one year, without trouble or expense. Similar performance records from numerous plants of all types show that Link-Belt Speed Reducers deliver reliable, efficient, trouble-free service under the most adverse conditions. Your requirements can be met, too, by some of the herringbone, worm gear, helical gear or positive variable units in the Link-Belt line. Send for catalogs of any or all of the positive drive units illustrated. Address:

**LINK-BELT COMPANY**

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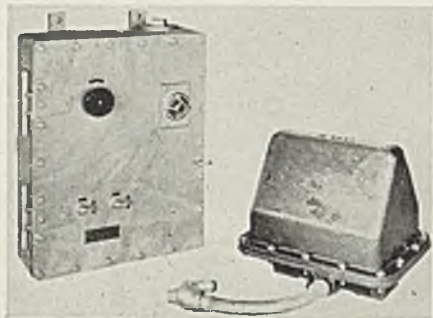
**LINK-BELT  
SPEED REDUCERS**





## Vibrator and Controller

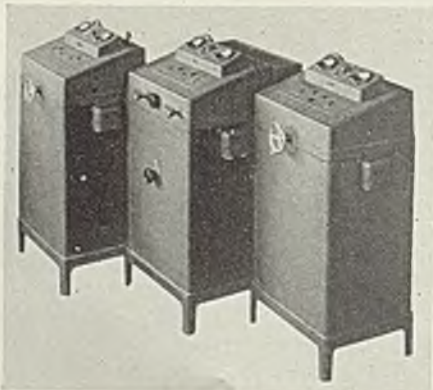
■ Syntron Co., Homer City, Pa., announces Explosion Proof vibrator, suitable for use in highly flammable or explosive atmospheres, for attachment to bins, hoppers, chutes, etc., to prevent arching over and hanging up of material and to in-



sure free flow at all times. Heavy, pulsating electromagnet is fully encased in electric-furnace steel case with ground joints and an armored cable lead. Remote electric control panel containing a rectifier, operating switches and rheostat for controlling vibrator's power is in a cast-iron case with ground joints and approved explosion-proof fittings.

## Electric Power Units

■ Harry W. Dietert Co., 9330 Rose-lawn avenue, Detroit, offers three electric power source units for spectrochemical analysis on any type of spectrograph. Each is mounted on inclined switchboard panel and has



voltmeter, ammeter, automatic timer, safety relay, power control and necessary switches.

Shown at left in illustration is 3-kilowatt ARL arc rectifier unit for exciting sample with 250-volt, 4 to 14-ampere direct current. At center is ARL high-voltage spark unit for exciting sample with 35,000-volt, 2-kilowatt alternating spark current. At right is 5-kilowatt high-voltage arc unit for exciting sample with 2500-volt, 2 to 5-ampere alternating arc current.

## Portable Paint Sprayer

■ Electric Sprayit Co., Sheboygan, Wis., announces portable series 500 paint sprayers with twin cylinder compressor, suitable for general maintenance and equipment painting and small production work. Compressor is mounted on a heavy sheet steel base with four 2½-inch diameter rubber-tired casters. It is V-belt driven by either a ½-horsepower electric motor or a ¾-horsepower gasoline engine. Opposed connecting rods are said to assure balance and freedom from vibration and compressed air is free from pulsation.

Diaphragm-type compressor seals off crankcase from cylinder head. Diaphragms are of laminated construction, last more than 500 hours and are easily replaced. Compressor displacement is 5.10 cubic feet



per minute and spraying pressure over 40 pounds.

Gun, of pressure feed, internal mixing type, is furnished complete with round and fan spray nozzles, as well as with an angle spray nozzle for spraying ceilings. Complete assembly without motor or engine lists at \$32.50.

## Power Squaring Shears

■ Niagara Machine & Tool Works, 637 Northland avenue, Buffalo, announces power squaring shears available for 10-gage to ½-inch thick, inclusive. Convenient arrangement of controls and gages permits more working strokes per hour. Each turn of handwheel equals ¼-inch of gage bar travel, and stainless steel scale on gage bracket indicates position of gage bar to nearest ¼-inch. Dial indicates gage position to nearest 1/64-inch. Plunger indexing handle en-

gages locking holes for each 1/128-inch of gage bar travel. Gage is rapidly adjusted for taper cutting.

Drive mechanism, including 14-point sleeve clutch with built-in



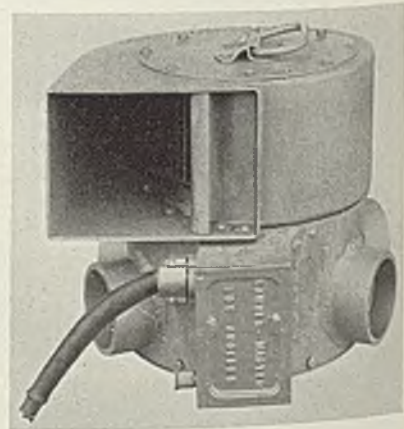
single stroke mechanism and all gears are enclosed in oiltight case. Single stroke mechanism can be disconnected for continuous operation. Safety lock prevents engagement when adjusting knives or gages. V-belt drive with guard is standard equipment. Massive beds are to form rigid, strong backbone for entire shear and solid support for lower knife. Large, fitted keys at each end of bed permit alignment of bed and housings. Recessed hand grooves on working surface of bed and full length T-slots are other features.

## Capacity Indicator

■ Sprague Products Co., North Adams, Mass., is marketing a new motor starting capacitor indicator, known as Motormike, which serves as emergency condenser for 110-volt 60-cycle motors, and has range from 54 to 180 microfarads in six steps. Extra heavy-duty sections are said to take overload and can be used for continuous motor starting service. Steel case 7½ x 6½ x 6 inches has carrying handle and metal flap in front. Indicator costs \$29.90.

## Portable Blowers

■ Sawyer Electrical Mfg. Co., 5715 East Leneve street, Los Angeles, offers Master portable blowers for ventilating, removing dust, exhaust-



ing poisonous fumes at welds, etc. No. 3 blower, illustrated, weighs less than 45 pounds and is said to deliver more than 1150 cubic feet

STEEL



of air per minute at 3 inches of static pressure constantly, at 20-degree Cent. rise.

The totally enclosed gasproof motor is enclosed in intake air housing so it is air-cooled by air delivered. Blower is 12 inches high and will pass through an opening 21 inches in diameter. Blower No. 4 will pass through a standard manhole 12x17 inches. No. 5 blower weighs less than 45 pounds and delivers more than 600 cubic feet of air per minute at 3 inches of static pressure constantly, at 20 degrees Cent. rise.

## Switch Housing

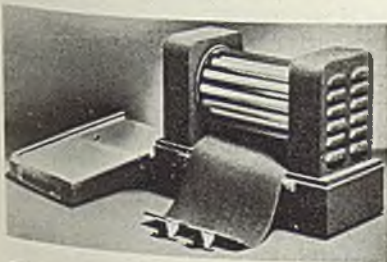
■ Micro Switch Corp., Freeport, Ill., announces die-cast housings with either open or closed top for any Micro switch. Bottom plate is removable for making connections. Terminals accommodate No. 14 solid wire. No sealing or pigtailed are employed. Hub takes a standard 1/2-inch conduit and wires are brought directly into switch. All Micro



switch electrical characteristics, movement and pressure differentials are maintained and Underwriters'-listed construction is used.

## Photochemical Printer

■ A. B. Dick Co., 720 West Jackson boulevard, Chicago, announces Mimeograph photochemical printer for transferring opaque drawings on translucent cloth or paper to a sensitized stencil sheet. Stencil is then developed and placed in the Mimeograph duplicator for black-and-white reproduction in quantity. Time of procedure from finished tracing to



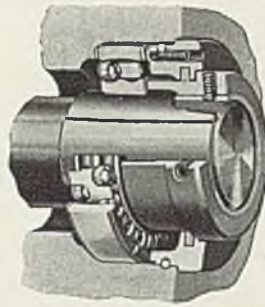
finished copies is said generally to be less than 25 minutes, and average price of materials for produc-

ing the stencil less than 25 cents.

Assembly includes portable printer, developing plate and all necessary accessories except chemicals and stencil sheets.

## Ball Bearing Units

■ Ahlberg Bearing Co., 3025 West Forty-seventh street, Chicago, has developed CJB Simplex machine units in three series for light, medium and heavy loads with either single-row, double-row or self-aligning bearings. In light series, bearings are mounted directly on shaft. Medium and heavy units mount

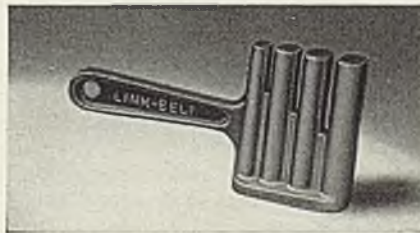


through a split adapter sleeve in a tapered bore bearing. Retaining caps are optional either in open type as illustrated or closed type, the latter sealing the bearing completely. Expansion or nonexpansion units are also optional at same cost.

New nondrag seal uses neoprene as sealing material. Labyrinth-type seal is said to be frictionless and to effectively prevent entrance of dirt.

## Chain Detacher

■ Link-Belt Co., Indianapolis, has developed Easy chain detacher to facilitate detaching and assembling of steel Link-Belt chains. Chain links are brought into proper position with one hand while other hand uses hammer. Tool has sufficient weight



to act as a backing against which to knock chain apart, and can be used on shop bench or on the job.

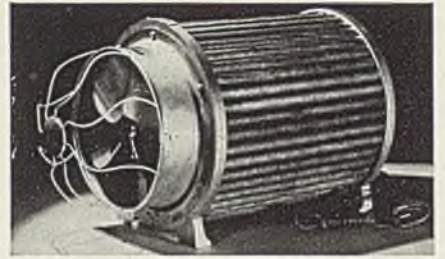
Made of Promal, tool accommodates all sizes of steel links. It weighs 3 1/4 pounds and costs \$1.00.

## Odor Adsorber

■ Dorex division, W. B. Connor Engineering Corp., 114 East Thirty-second street, New York, has developed portable squirrel cage Odor Adsorber for removing odors, gases, vapors, smoke and fumes from ventilating air. Electric motor, draw-

ing in foul air and delivering purified air, is only moving part.

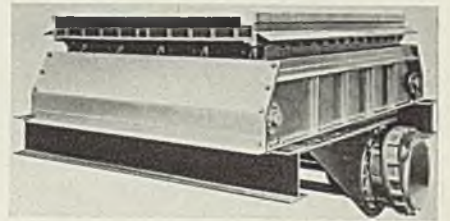
Processed highly-activated granular, coconut-shell carbon is adsorp-



tion medium, which is claimed to hold more than 20 per cent of its own weight of adsorbed matter. Adsorber keeps odors below "threshold" level, concentrations below which they are not noticeable to average person.

## Shake-Out Screen

■ Robins Conveying Belt Co., 15 Park Row, New York, announces its foundry shake-out screen to shake sand from castings or flasks weighing up to 4 tons. Motion of screening surface is rapid and sharp, loosening sand quickly. Hot sand cannot get near any moving part of

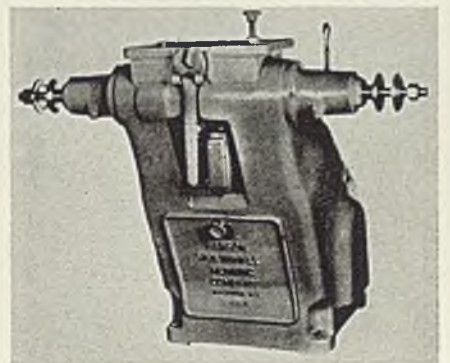


vibrating mechanism or bearings of screen, eliminating damage from abrasion and need for special cooling. Top surface is 2 feet above floor.

The screen is designed to withstand heavy loads or shocks and is made in sizes from 4 x 10 1/2 feet to 5 x 14 feet.

## Polishing Lathe

■ Hanson-Van-Winkle Munning Co., Matawan, N. J., has developed new model lathe for buffing and polish-



ing metals. Known as type MI, lathe is compactly built and designed to eliminate vibration. Spindle turns

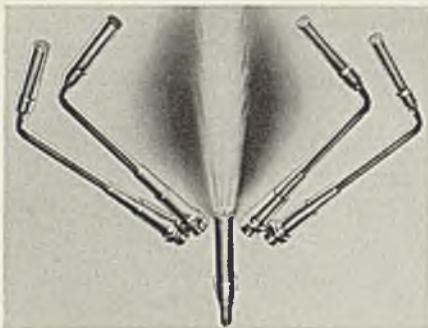


on ball bearings of oversize capacity, lubricated by an oil reservoir. Spindle drive is through heavy duty, high speed V-belts and machined sheaves. It has 12-inch spindle overhang for work clearance.

Changing of V-belts can be made without disturbing spindle bearings or alignment. Spindle speeds range from 1800 to 3600 revolutions per minute. Tray is included for composition and tools. Also included is a wrench hook, start-stop lever and an automotive spindle brake. Base dimensions on all sizes are 26 x 24 inches. Sizes available include 3, 5, 7½ and 10 horsepower.

## Multiple Tips

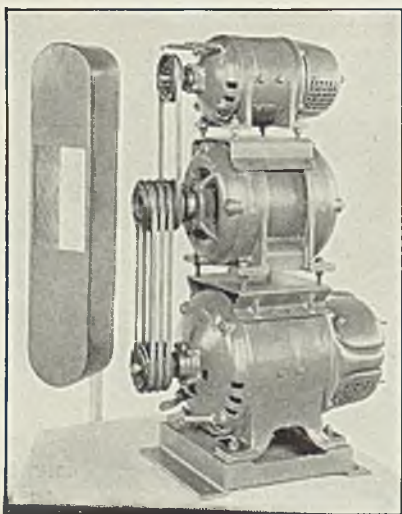
■ Bastian-Blessing Co., 242 East Ontario street, Chicago, offers Rego GXH multiple tips in four sizes claimed to hard-surface without



leaving soft spots or pinholes. Multiple-hole tip permits high heat output with soft, brush-like flame eliminating turbulence in weld puddle. Wide flame facilitates keeping weld zone and rod in protective carbonizing flame envelope, eliminating oxidation. Individual mixer in each tip permits correct gas mixing and economical operation. Tips are designed for use with standard Rego GX or SX welding torch handles.

## Motor-Generator Set

■ Allis-Chalmers Mfg. Co., 1126 South Seventieth street, Milwaukee, has developed pyramid-mounted ar-



range of three-machine motor-generator sets in sizes up to and including 10 kilowatts. Generator, induction motor and exciter, each a self-contained machine, are assembled one above the other, thus requiring floor space equal only to generator mounting dimensions. Generator and exciter are driven by Texrope V-belts from motor shaft, adjustment being provided in motor and exciter base plates.

## Cutting-Off Machine

■ American Instrument Co., Silver Spring, Md., has introduced cutting-off machine of bonded-abrasive wheel type. It cuts glass, quartz, ceramics, metals, etc., in form of sheets, rods, tubes and blocks. Cuts up to 3½ inches can be made by 12-inch diameter rubber-bonded abrasive wheel, 0.04 to 0.06-inch thick, without chipping or breaking material.

Machine is suitable for slicing tubing and making short cuts, and is said to cut 1½-inch diameter glass tubing in 1/32-inch lengths having smooth, parallel, unchipped edges. Machine consists of noncorrosive cutting table adjustable for cuts of various angles, cutting wheel direct-connected to a 115-volt 60-cycle alternating-current motor, and centrifugal pump.

## Soldering Iron

■ Stanley Tools, New Britain, Conn., announces plug-tip electric soldering irons having heating unit hermetically sealed to prevent corrosion. Unit is wound around hollow core and conducts uniform flow of heat to plug tip. Hardwood handles include adjusting sleeve. Copper plug tips are available with



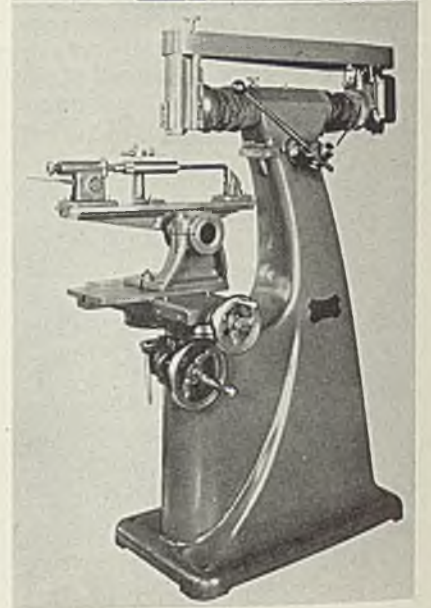
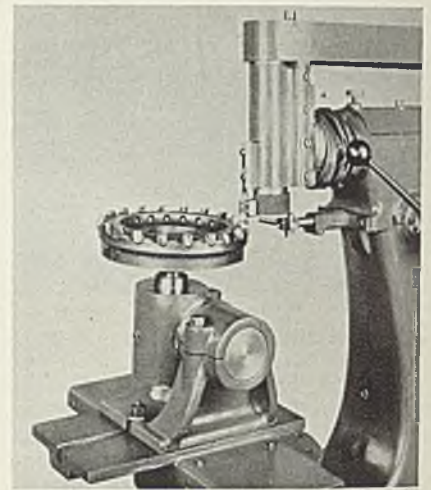
or without metal coating to protect surface. Each iron has 6 feet of heater cord, cord strain relief and a tool rest stand. Irons are made in four sizes: 105 watts, ⅜-inch tip diameter; 150 watts, ½-inch tip diameter; 200 watts, ⅝-inch tip diameter, 350 watts, ¾-inch tip diameter.

## Tool, Cutter Grinder

■ Oliver Instrument Co., Adrian, Mich., has designed a tool and cutter grinder for all types of milling cutters and reamers which is said to have a minimum number of attachments.

The bottom illustration shows machine with centers in place, and top illustration shows adjustable Timken bearing head with taper

for mounting the various types of cutters for which it is adapted. Work is held stationary and grind-



ing wheel traverses cutting edge of cutter. Grinding wheel is carried on forward end of a ram, which slides in a fixed bearing at upper end of pedestal. Motor is carried on rear end of ram and is belted to grinding spindle.

Grinding wheel has a 10-inch stroke and a 15-inch bearing. It is traversed by means of a rack and gear which in turn are actuated by a lever adjustable to position of operator.

Other advantages claimed are: Operator stands in a natural and convenient position; work is directly in line of sight; it is easier to guide the cutter against the lip rest. Small number of fixtures necessary means less time in adapting machine to various types of cutters. Face mills up to 14 inches in diameter can be ground on face and periphery at one setting of cutter in antifriction bearing.

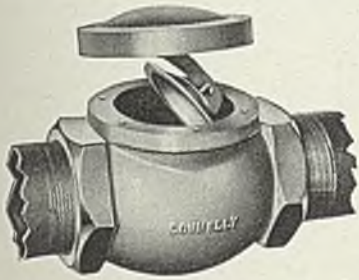
Many odd types, such as dovetail cutters, are easily ground with same fixture. Special fixtures have been developed for grinding round corners on end mills, for small end



mills, for broach grinding, tap grinding, point thinning, etc.

### Pressure Valves

■ Connelly Iron Sponge & Governor Co., 3154 South California avenue, Chicago, offers back-pressure valves for horizontal and vertical pipe lines. They consist of a



body casting with a movable disk engaging upon a seat. Pressure drop through valve is said to be about 1/10-inch water column greater than equivalent lengths of same size pipe. Aluminum valve disk is cupped for strength. Standard valve seat is ground, metal to metal. Body castings are designed for 125 pounds line pressure, smaller sizes being of bronze and larger sizes of cast iron.

Type HR valve, made in a wide range of sizes and specifications, can be cleaned by removing cap and withdrawing working parts without disturbing pipe line. Type HV features sensitivity and balance for vertical mounting. Movable disk is said to open and close positively with slightest backflow.

### Dust Collectors

■ Torit Mfg. Co., Walnut and Exchange streets, St. Paul, announces self-contained quiet-operating dust collectors which carry away dust-laden air around polishing and grinding wheels. Dust-laden air is drawn from hoods surrounding grinding wheels to series of chemically-treated spark-resistant cloth filter bags. Heavy particles fall into a tray beneath bags, while lighter



particles adhere to outside of filter-bags. Filtered air passes through motor chamber above filter bags and then out an exhaust vent on top of cabinet, into the room. Collectors are available in three sizes to gather

dust from wheels up to 16 inches in diameter with capacities of 150 to 600 cubic feet per minute.

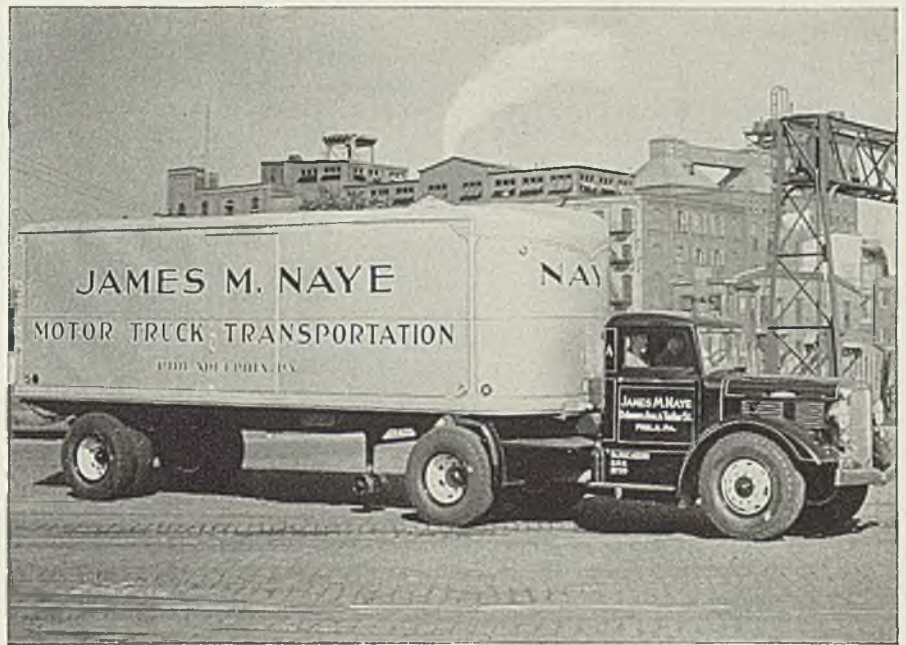
### Safety Test Lamp

■ Sittler Co., 1133 West Van Buren street, Chicago, offers SG-100 test lamp and voltage indicator in which safety fuses are eliminated. Indicator bullseye is mounted on test prod for visibility, excessive voltage burns out lamp filament only, lamp is easily replaced and resistor limits current to low value. On 110-volt circuit, current is only about 20 milliamperes and similar low values at higher voltages. These

low currents prevent danger of tripping relays when checking control panels. Price of test lamps is \$3.50.

### DC Motor Furnishes Alternating Current

■ Kato Engineering Co., Mankato, Minn., has introduced a line of direct-current motors which drive equipment and furnish 60-cycle alternating current. Uses include operation of relays and controls, machine tools, processing machinery, and synchronous motors as used on time cycle equipment.



## Trucks CAN Talk Business!

• Here's the kind of truck-trailer that can give a fast-moving sales talk of its own—and leave a decidedly favorable impression too!

ARMCO PAINTGRIP galvanized sheets for top and body panels help take this motor transport out of the "just-another-trailer" class. That smooth, handsome body finish makes a stand-out advertisement on busy streets and highways.

You may not make or buy trucks, but it may be that you can profit in 1940 by using ARMCO PAINTGRIP in your products. This

paintable galvanized metal has a special bonderized finish that takes paint and helps preserve it. There are no zinc oxides at the surface to dry out paint and rob it of its elasticity. And you save on the finishing costs because acid etching is out.

Whatever you make of sheet metal that has to be painted, you can make better and more salable by using ARMCO PAINTGRIP. Shall we send you more information pertaining to your specific needs? Just address The American Rolling Mill Company, 480 Curtis Street, Middletown, Ohio.



# ARMCO PAINTGRIP



## Sling Chain

(Concluded from Page 56)

sary; a  $\frac{3}{4}$ -inch chain is required with leg spread of 90 degrees, and a 1-inch chain if legs spread 140 degrees.

On 3 or 4-legged slings, remember the load probably will never divide evenly. So this must be given consideration in selecting proper type and size of chain.

Proper hookup is important. Chains are at their best when subjected to direct tension, free from kinks, bends and twists. Such hazards should be eliminated by all means wherever possible.

Too often proper care of sling chains when not in use is neglected. An occasional oil spray will well pay in prevention of rust. Actual tests show an increase of 10 to 25 times in life of chain when lubricated properly on applications where link wear is severe.

### Stresses Periodic Inspection

Periodic inspection of all sling chains is most important. When shipped, sling chains have an accurate dimension stamped on the brass identifying tags. If overall length has increased more than 1 per cent, either the sling has worn or it has been overloaded appreciably. A 4 to 5 per cent stretch on any chain indicates it should be discarded or at least rerated. When links are no longer perfectly free, the sling should be scrapped in the interest of safety.

With slings of heat-treated steel and alloy materials, the yield point is relatively high. Thus, 1 or 2 per cent elongation is indicative of severe overloading, and a careful link-by-link inspection should be made when found to detect any possible link damage.

Due to possibility of work hardening, iron sling chains should be heat treated at various intervals. On heat-treated and alloy steel chains, reheat treatment and repairs are not recommended unless done at the chainmaker's plant where supervision and correct facilities are available and will be found economical.

Inspection records when kept accurately will serve to place responsibility for condition of slings on the inspector, thus causing him to use more care in this most important duty.

### Ventilated Buffs

■ Ventilated buffs, called Airway, development of Jackson Buff Corp., 21 Forty-first avenue, Long Island City, N. Y., are said to permit 50 to 100 per cent higher speeds and faster and more economical cutting without ridging work. Made in all grades

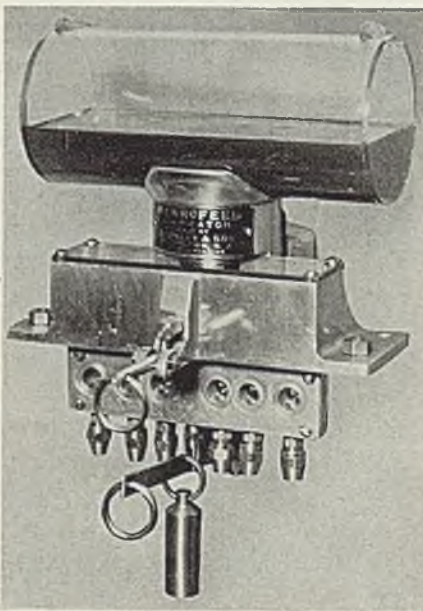
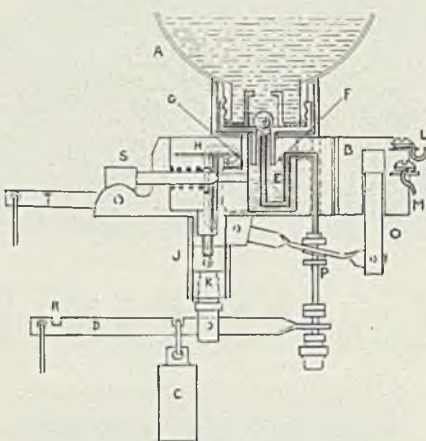
of cloth, buffs are available in diameters of 5 to 18 inches.

Each buff is used with metal center plates and flanges arranged to allow centrifugal action of buff to draw air in at sides of wheel, and pump it out radially between buff sections. This is said to keep buff cool under most severe operating conditions. Special sheeting is used for cutting or coloring, according to requirements. Center plates and flanges are made to suit customer's spindle diameters. Buffs also are made by MacFarland Mfg. Co. Inc., same address, an allied interest.

### Automatic Oiling by Wick-Type Lubricator

■ An electric, gravity lubricator, Mykrofeed, has been developed by Bromley & Son, Kearny, N. J., to control and automatically oil machinery. Lubricator contains no pumps, ratchets and needle valves, and the only wearing parts in lubricator are five small pins. In feed and controls, dependence is almost

Gravity type wick feed lubricator is turned on and off electrically by operation of machine it lubricates



entirely upon gravity. Reservoir is transparent plastic Lucite, body of lubricator is aluminum, drip tubes and outlet fittings of brass.

Referring to diagram, lubricator functions as follows: Fill cap of reservoir A is held off its seat by a pin actuated by either solenoid B or hand weight C which can be shifted from position shown to notch R on lever D. When ball valve in fill cap is open, oil falls into constant-level chamber E until oil level reaches outlet nozzle and liquid-seals opening F. Flow then stops and remains so until feed wicks reduce level and admit air into reservoir. Directly communicating with constant-level chamber E is a shallow trough G in which lie intake ends of wicks, one of which, with its holder, is shown at H. Bottom of trough G is slightly below oil level in constant-level chamber. This automatically keeps wick wells full and wicks saturated.

### Feed Rate Is Constant

Inlet side of wicks has almost no capillary lift. What lift there is remains fixed for any given lift adjustment and feed rate is constant. Raising or lowering wick unit gives wide variation in feed rate without change of wicks. Sight-feeds J, covered by unbreakable Lucite, show feed rate.

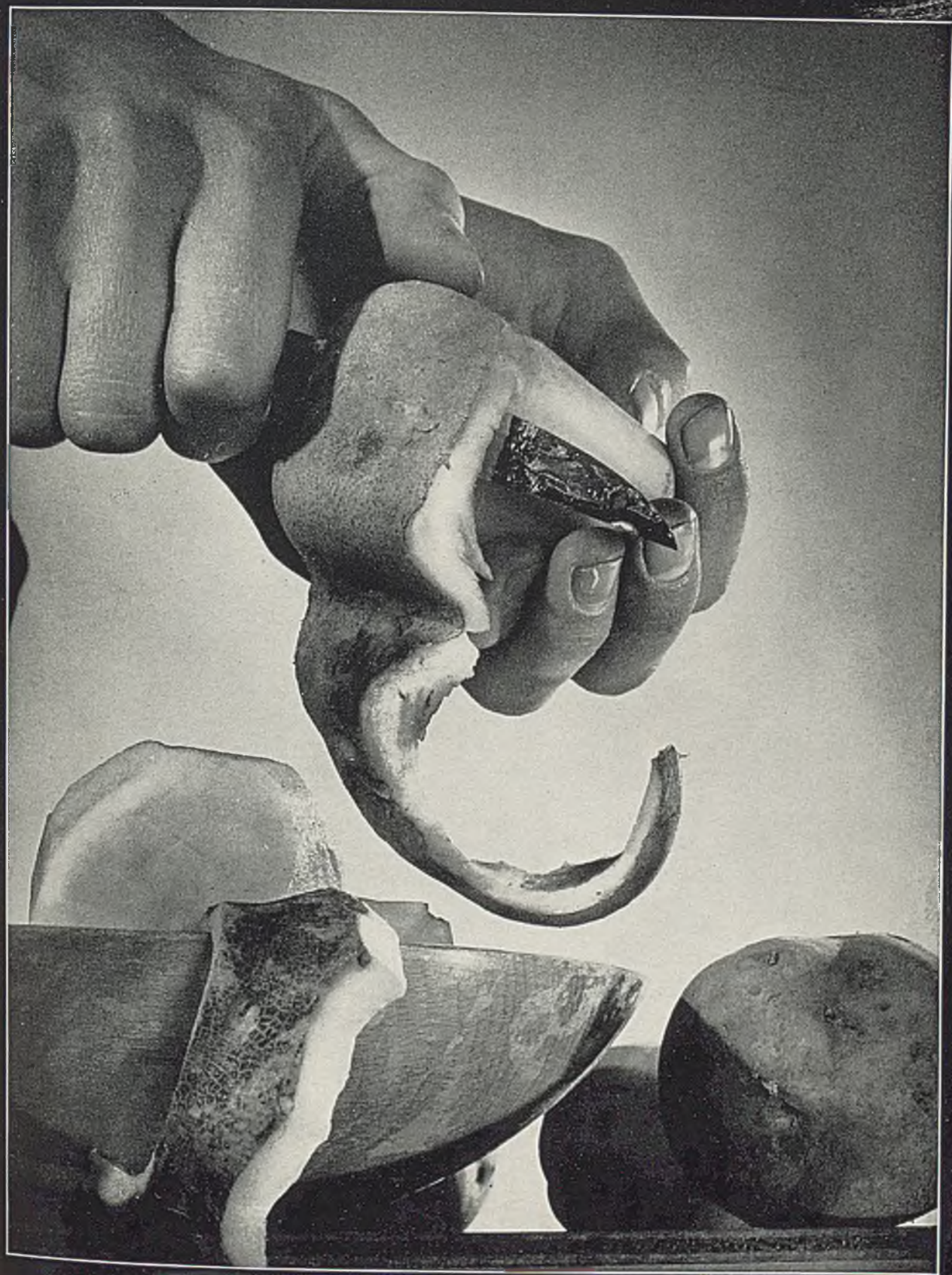
When lubricated machine and lubricator are shut down, wicks continue to feed oil from wick-unit wells slowly and at a decreasing rate, and empty wells in several hours.

Solenoid terminals L and M are connected across motor circuit of lubricated machine, and the lubricator goes on and off with motor switch. Where machine is power-driven, electric control is had by using lighting circuit and a make-and-break switch on clutch. Mechanical control also can be obtained. Mykrofeed handles all red and pale oils up to 2000 seconds viscosity at all necessary feed rates. For flood feed or excess feed, oil flows direct from constant-level chamber, by-passing wicks to bearings when self-closing valve S is opened by holding down lever T.

### Welding Fumes

■ Toxicity of welding fumes is being investigated by Dr. Emmrich von Haam, Ohio State university, Columbus, O., who states that most of the current conclusions concerning injurious effects of electric arc welding have been based upon incomplete observations. In the experimental approach to this problem, laboratory animals are exposed to vapors and gases of arc welding over different periods of time, and the pathological effect of the gases is studied by examining tissues of the animals.





**IT'S EASY TO SEE WASTE HERE!**

*Out...*



## 79 Working Days

(Concluded from Page 48)

on in one coat. This is a special resilient nondenting cement, unaffected by water or food wastes and continually self-disinfecting. It was applied on basement as well as first and second floors.

Fig. 10 shows appearance of a completed interior. Note supporting columns and ceiling girder, flat steel underside of cellular roof units, lights fed through cells. Partition toward rear room is a cellular steel assembly. Floor is cellular steel with concrete fill over which ¼-inch Hubbellite finish has been applied and is completely available for any number and location of floor outlet heads for 110-volt and telephone services. Some are installed. These may be changed, or new outlet head cut in where and when desired.

Fig. 11 is outside view of completed building with cellular steel roof, partitions, floors, bonded metal wall panels and other steel sections described above.

### Construction Details Interesting

Most interesting is the construction report detailing the number of working days required for the more important operations in erection of this building. Briefly, time required for the various operations was as follows: Excavation, 2 days; placing of footing forms and pouring footings, 4 days; erection of forms and pouring foundation walls, 15 days; water-proofing foundation walls, 6 days; placing, erecting and fastening structural steel, 5 days; erecting cellular steel, including unloading, hoisting, placing, aligning and welding for first and second floors, 4½ days; brick-ing outside walls, 16 days; pouring and waterproofing basement slab, 3 days; pouring fill on first and second floors, 3 days; pouring fill on basement slab, 2 days; applying insulation board and waterproofing to roof deck, 5½ days; erecting skylights and ventilators, 3 days; erecting masonry partitions, 14 days; erecting cellular steel partitions, 2 days; plastering walls, 17 days; painting ceiling (two coats in basement, first and second floors), 11 days; laying tile on lobby floor, 2 days; laying monolithic (one-coat ¼-inch) finish over fill on basement, first and second floors and stairs, 10 days; erecting bonded metal wall panels in various offices, the conference room and lobby, 5 days; electrical work, 40 days; plumbing and steamfitting, 45 days. The general contractor on this job was Austin Co., 16112 Euclid avenue, Cleveland.

Total erection time of only 79 working days definitely demonstrates the speed which this construction permits. Already its economies are being extended to other

structures including service stations, mill office buildings and similar light-duty structures. Other types of cellular units are used for multistory buildings and heavy-duty structures.

## Modern Pioneers

(Concluded from Page 26)

Schmidt, Westinghouse Electric & Mfg. Co., Philadelphia; Clarence H. Thayer, Sun Oil Co., Philadelphia; Dr. Vladimir K. Zworykin, RCA Mfg. Co. Inc., Camden, N. J.

Joint Awards — Harris S. Campbell, Agnew E. Larsen, Harold F. Pitcairn and Paul H. Stanley, Autogiro Co. of America, Philadelphia, (Pitcairn Autogiro Co.).

Max Carter Batsel, George Lisle Beers, Rene Albert Braden, George Harold Brown, Wendell LaVerne Carlson, Lewis Mason Clement, Edward Washburn Kellogg, Winfield Rudolph Koch, Harry Ferdinand Olson, and Irving Wolff, Radio Corp. of America, RCA Victor division, RCA Mfg. Co., Camden, N. J.

Randall Clarence Ballard, Alda Vernon Bedford, Ralph Shera Holmes, Ray David Kell; William Arthur Tolson, Arthur William Vance, Charles Jacob Young, RCA Victor division, RCA Mfg. Co. Inc., Camden, N. J.

Special award — Joseph S. Pecker, consulting engineer, Philadelphia.

The following E. I. du Pont de Nemours & Co. men were honored for the development of Nylon and other outstanding chemical discoveries:

Willard E. Catlin, Donald D. Coffman, Winfield W. Heckert, Benjamin W. Hawk, George D. Graves, Wilbur A. Lazier, John B. Miles Jr., Wesley R. Peterson, Frank K. Signaigo, Edgar W. Spanagel, all of Wilmington, Del.

William Stansfield Calcott, Albert Smith Carter and Arnold Miller Collins of Wilmington, and Frederick Baxter Downing, Penns Grove, N. J.

Edmund M. Flaherty and Maurice Valentine Hitt, of Wilmington, and Earle G. Pitman, Parlin, N. J.

Richard G. Woodbridge, Wilmington, with Alfred L. Broadbent, Pasadena, Calif.

Herbert Wilkens Baudt and Clyde Overbeck Henke, Wilmington.

Alfred T. Larson and Donald J. Loder, Wilmington.

Ronald A. McGlone and Stephen J. Roskosky, of Flint, Mich.; Roy A. Shive, Bound Brook, N. J.; Francis S. Stewart, Southgate, Calif.

Hamilton Bradshaw and Edgar Hugo Hollau, Wilmington.

Herbert O. Albrecht, John W. Iliff, William W. Lewers, John Richardson Jr., Paul Robinson, and Harry B. Young, all of Philadelphia, and Merlin H. Brubaker, Oswald H. Greager, Horace H. Hopkins, Gor-

don D. Paterson, of Wilmington, and Frank A. McDermott.

Allen H. Lawrence, and Frederick W. Miller, Wilmington.

Harold W. de Ropp, and Harry C. Hetherington, of Charleston, W. Va.

Honorable mention—Henry Lloyd Alexander, James Eliot Booge, Euclid W. Bousquet, Clark W. Davis, Joseph Deinet, J. C. Downs, Hubert du Pont, Willing Bayard Foulke, Forest J. Funk, Ivan Gubelmann.

Stanley L. Handforth, James Karr Hunt, Ralph A. Jacobson, Joseph Adam Jenemann, Henry Jordan, John L. Keats, William E. Kirst, Herbert August Lubs, Ralph Robert Lulek.

A. D. McCallum, John W. McCoy, Frank W. Parker, Donald A. Rankin, Swanie Siguard Rossander, Charles John Sala, Paul L. Salzberg, Joseph Harrel Shipp, Otto Stallmann, Guy B. Taylor, Chaplin Tyler, Clifford A. Woodbury, John Merlyn Youel.

## January Industrial Gear Sales Up 10.8 Per Cent

■ Industrial gear sales in January were 35.1 per cent greater than in January, 1939, and 10.8 per cent ahead of last December, according to the American Gear Manufacturers' association, Wilkinsburg, Pa.

Association's index for January increased to 123, up 32 points from 91 in corresponding 1939 period. December index stood at 111, down 15 from November's 126.

Index is based on 100 for 1928 average.

## January Scrap Melt Shows Small Decline

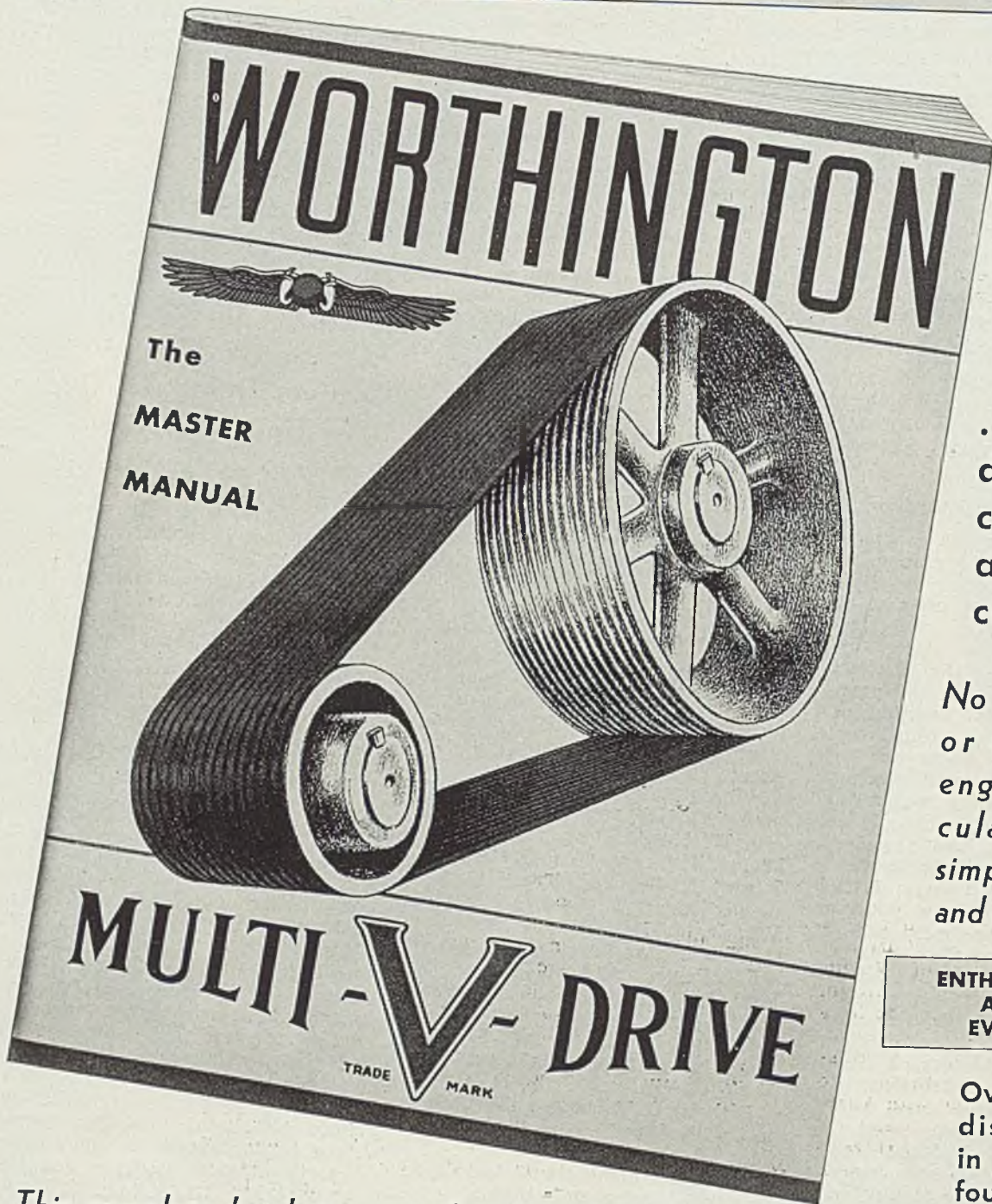
■ Institute of Scrap Iron and Steel Inc., New York, reports domestic consumption of iron and steel scrap in January was 3,775,000 gross tons, against 3,805,000 tons in December and 2,495,000 tons in January, 1939. From 70 to 75 per cent of January consumption was melted by steelworks in producing new steel, 20 per cent by foundries and the remainder miscellaneous.

Exports in December, 1939, declined to 206,402 tons, the lowest since September, 1938. November exports were 272,656 tons and December, 1938, 323,691 tons. Current ratio of domestic consumption to exports is about 18 to 1, according to the institute.

■ Board of governors, Commodity Exchange Inc., New York, last week appointed Harold L. Bache chairman of a special committee to investigate practicability of establishing a futures market for trading in iron and steel scrap. Exchange reported investigation had been requested by scrap dealers and consumers.



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# Steel Market Activity Continues To Decline

*Ingot production settling more slowly  
but buying is restricted. Some users  
have good outlook for ensuing 90 days*

■ STEEL markets continue to follow the pattern of recent weeks. Buying is unchanged or lighter, and backlogs and shipments still tend downward.

Steelmaking is receding less rapidly, the national average last week being off 2 points to 69 per cent. This compares with 55 per cent a year ago. Ingot production remains in excess of new business, consequently a further adjustment between supply and demand is indicated.

Individual orders for most products are small. Circumstances surrounding mill deliveries and prices encourage buying for only early needs, with purchases also restricted by tonnage in consumers' inventories and due against previous commitments. Cancellations of old orders have been relatively few, although in some cases buyers are requesting postponement of shipments.

It is still problematical how soon depletion of mill backlogs and absorption of consumers' excess stocks will result in more active buying, since some uncertainty is attached to the probable course of consumption the next 90 days.

Seasonal betterment in operations of the automotive and building industries with the approach of spring is probable. Brisk activity in shipbuilding and in production of machine tools, aircraft and certain types of armament appears assured, while relatively good export demand for iron and steel products apparently will continue so long as existing European conditions prevail. Farm equipment builders anticipate active business in tractors and implements.

Old orders for railroad equipment steadily are being worked off, and additional buying will be necessary by spring to maintain recent heavy shipments of freight car material. No significant inquiries currently are pending although some are contemplated.

Recent shrinkage in automobile assemblies moderated last week, total output of 95,050 units being a drop of only 930 from the week before. This extended the margin over production a year ago to 19 per cent. Last week's reduction was accounted for largely by General Motors Corp.

Steel awards for heavy engineering construction have been boosted sharply by several large orders in the far West. Placements include 16,599 tons for

the Pit river bridge, California, 11,857 tons for dry docks at Pearl Harbor, Hawaii, 6398 tons for a Los Angeles dam and 2800 tons for a Bell Telephone Laboratories Inc. building in New Jersey. A grade crossing elimination program at Rockaway, N. Y., will take 25,000 tons of structurals. Adverse weather continues to hamper building work in some sections.

Export business is well sustained. In view of the slackening in domestic orders this quarter, foreign buying represents a larger portion of total tonnage than was true last quarter, when it was about 10 per cent of total volume.

No serious dents have appeared in the steel price structure. Producers are encouraged by maintenance of base quotations on recent automotive purchases, since concessions in the past frequently have had their origin in motor car centers. The finished steel price composite of \$56.10 compares with \$56.50 a year ago.

Scrap prices continue weak, despite recent heavy snowstorms in eastern states which interfered with collection and preparation of old material. Lower quotations in several districts brought the scrap composite down 29 cents to \$16.79. This is the lowest in five months and a drop of \$5.37 from the peak last October.

Tin plate production is off 5 points to 60 per cent, and releases also have moderated. Export business in tin plate is improving, with foreign orders still carrying a differential over domestic prices.

Additional blast furnaces are being shut down as a result of curtailed needs in steelmaking. Foundry requirements are fairly steady, the melt comparing favorably with that of January, while shipments of foundry coke also are sustained.

Steelmaking schedules vary widely among different districts. For example, last week Birmingham was unchanged at 90 per cent and Detroit declined 1 point to 92 per cent, while Youngstown was off 1 point to 43 per cent. Sharpest decline was 6 points to 68½ per cent at Chicago. Other reductions included 3 points to 66 at Pittsburgh, 3½ points to 66½ at Cleveland and 2 points to 68 at St. Louis. Buffalo advanced 9½ points to 70. Unchanged areas were eastern Pennsylvania at 68, Wheeling at 86, New England at 63 and Cincinnati at 61.

## MARKET IN TABLOID ★

### *Demand*

*Fairly steady; some products less active.*

### *Prices*

*Maintained on most products; scrap off further.*

### *Production*

*Down 2 points to 69 per cent.*



# COMPOSITE MARKET AVERAGES

	Feb. 17	Feb. 10	Feb. 3	One Month Ago Jan., 1940	Three Months Ago Nov., 1939	One Year Ago Feb., 1939	Five Years Ago Feb., 1935
Iron and Steel . . . .	\$37.00	\$37.01	\$37.03	\$37.09	\$37.50	\$36.37	\$32.54
Finished Steel . . . .	56.10	56.10	56.10	56.10	55.90	56.50	54.00
Steelworks Scrap . . .	16.79	17.08	17.38	17.48	20.06	14.87	11.66

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

## COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Feb. 17, 1940	Jan. 1940	Nov. 1939	Feb. 1939	Pig Iron	Feb. 17, 1940	Jan. 1940	Nov. 1939	Feb. 1939
Steel bars, Pittsburgh . . . . .	2.15c	2.15c	2.15c	2.25c	Bessemer, del. Pittsburgh . . . . .	\$24.34	\$24.34	\$24.34	\$22.34
Steel bars, Chicago . . . . .	2.15	2.15	2.15	2.25	Basic, Valley . . . . .	22.50	22.50	22.50	20.50
Steel bars, Philadelphia . . . . .	2.47	2.47	2.47	2.57	Basic, eastern, del. Philadelphia . . . . .	24.34	24.34	24.34	22.34
Iron bars, Chicago . . . . .	2.30	2.30	2.15	2.15	No. 2 foundry, Pittsburgh . . . . .	24.21	24.21	24.21	22.21
Shapes, Pittsburgh . . . . .	2.10	2.10	2.10	2.10	No. 2 foundry, Chicago . . . . .	23.00	23.00	23.00	21.00
Shapes, Philadelphia . . . . .	2.215	2.215	2.215	2.215	Southern No. 2, Birmingham . . . . .	19.38	19.38	19.38	17.38
Shapes, Chicago . . . . .	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati . . . . .	22.89	22.89	22.89	20.89
Plates, Pittsburgh . . . . .	2.10	2.10	2.10	2.10	No. 2X, del. Phila. (differ. av.) . . . . .	25.215	25.215	25.215	23.215
Plates, Philadelphia . . . . .	2.15	2.15	2.275	2.15	Malleable, Valley . . . . .	23.00	23.00	23.00	21.00
Plates, Chicago . . . . .	2.10	2.10	2.10	2.10	Malleable, Chicago . . . . .	23.00	23.00	23.00	21.00
Sheets, hot-rolled, Pittsburgh . . . . .	2.10	2.10	2.00	2.15	Lake Sup., charcoal, del. Chicago . . . . .	30.34	30.34	30.34	28.34
Sheets, cold-rolled, Pittsburgh . . . . .	3.05	3.05	3.05	3.20	Gray forge, del. Pittsburgh . . . . .	23.17	23.17	23.17	21.17
Sheets, No. 24 galv., Pittsburgh . . . . .	3.50	3.50	3.50	3.50	Ferromanganese, del. Pittsburgh . . . . .	105.33	105.33	105.33	85.27
Sheets, hot-rolled, Gary . . . . .	2.10	2.10	2.00	2.15	Scrap				
Sheets, cold-rolled, Gary . . . . .	3.05	3.05	3.05	3.20	Heavy melting steel, Pittsburgh . . . . .	\$17.75	\$18.15	\$21.90	\$15.65
Sheets, No. 24 galv., Gary . . . . .	3.50	3.50	3.50	3.50	Heavy melt. steel, No. 2, E. Pa. . . . .	16.25	16.80	19.25	13.25
Bright bess., basic wire, Pitts. . . . .	2.60	2.60	2.60	2.60	Heavy melting steel, Chicago . . . . .	15.75	16.45	17.45	14.00
Tin plate, per base box, Pitts. . . . .	\$5.00	\$5.00	\$5.00	\$5.00	Rails for rolling, Chicago . . . . .	18.25	19.05	20.50	17.25
Wire nails, Pittsburgh . . . . .	2.55	2.55	2.55	2.45	Railroad steel specialties, Chicago . . . . .	18.50	18.50	20.50	16.00
Semifinished Material					Coke				
Sheet bars, Pittsburgh, Chicago . . . . .	\$34.00	\$34.00	\$34.00	\$34.00	Connellsville, furnace, ovens . . . . .	\$4.75	\$4.75	\$5.00	\$3.75
Slabs, Pittsburgh, Chicago . . . . .	34.00	34.00	34.00	34.00	Connellsville, foundry, ovens . . . . .	5.75	5.75	6.00	5.00
Rerolling billets, Pittsburgh . . . . .	34.00	34.00	34.00	34.00	Chicago, by-product fdry., del. . . . .	11.25	11.25	11.25	10.50
Wire rods, No. 5 to 3/8-inch, Pitts. . . . .	2.00	2.00	1.92	1.92					

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

*Except when otherwise designated, prices are base, f.o.b. cars.*

<b>Sheet Steel</b>	Granite City, Ill. . . . .	3.60c	Plates . . . . .	21.50 22.00 25.50 30.50	Buffalo . . . . .	2.10c
<b>Hot Rolled</b>	Middletown, O. . . . .	3.50c	Sheets . . . . .	26.50 29.00 32.50 36.50	Gulf ports . . . . .	2.40c
Pittsburgh . . . . .	Youngstown, O. . . . .	3.50c	Hot strip . . . . .	17.00 17.50 24.00 35.00	Birmingham . . . . .	2.10c
Chicago, Gary . . . . .	Pacific Coast points . . . . .	4.00c	Cold stp. . . . .	22.00 22.50 32.00 52.00	St. Louis, del. . . . .	2.50c
Cleveland . . . . .	<b>Black Plate, No. 29 and Lighter</b>				Pacific Coast points . . . . .	2.70c
Detroit, del. . . . .	Pittsburgh . . . . .	3.05c	<b>Steel Plate</b>			
Buffalo . . . . .	Chicago, Gary . . . . .	3.05c	Pittsburgh . . . . .	2.10c	<b>Tin and Terne Plate</b>	
Sparrows Point, Md. . . . .	Granite City, Ill. . . . .	3.15c	New York, del. . . . .	2.29c	<b>Tin Plate, Coke (base box)</b>	
New York, del. . . . .	<b>Long Ternes No. 24 Unassorted</b>		Philadelphia, del. . . . .	2.15c	Pittsburgh, Gary, Chicago . . . . .	\$5.00
Philadelphia, del. . . . .	Pittsburgh, Gary . . . . .	3.80c	Boston, delivered . . . . .	2.46c	Granite City, Ill. . . . .	5.10
Granite City, Ill. . . . .	Pacific Coast . . . . .	4.50c	Buffalo, delivered . . . . .	2.33c	<b>Mfg. Terne Plate (base box)</b>	
Middletown, O. . . . .	<b>Enameling Sheets</b>		Chicago or Gary . . . . .	2.10c	Pittsburgh, Gary, Chicago . . . . .	\$4.30
Youngstown, O. . . . .	No. 10 No. 20		Cleveland . . . . .	2.10c	Granite City, Ill. . . . .	4.40
Birmingham . . . . .	Pittsburgh . . . . .	2.75c 3.35c	Birmingham . . . . .	2.10c	<b>Bars</b>	
Pacific Coast points . . . . .	Chicago, Gary . . . . .	2.75c 3.35c	Coatesville, Pa. . . . .	2.10c	<b>Soft Steel</b>	
<b>Cold Rolled</b>	Granite City, Ill. . . . .	2.85c 3.45c	Sparrows Point, Md. . . . .	2.10c	(Base, 20 tons or over)	
Pittsburgh . . . . .	Youngstown, O. . . . .	2.75c 3.35c	Claymont, Del. . . . .	2.10c	Pittsburgh . . . . .	2.15c
Chicago, Gary . . . . .	Cleveland . . . . .	2.75c 3.35c	Youngstown . . . . .	2.10c	Chicago or Gary . . . . .	2.25c
Buffalo . . . . .	Middletown, O. . . . .	2.75c 3.35c	Gulf ports . . . . .	2.45c	Duluth . . . . .	2.15c
Cleveland . . . . .	Pacific Coast . . . . .	3.35c 3.95c	Pacific Coast points . . . . .	2.60c	Birmingham . . . . .	2.15c
Detroit, delivered . . . . .	<b>Corrosion and Heat-Resistant Alloys</b>		<b>Steel Floor Plates</b>		Cleveland . . . . .	2.15c
Philadelphia, del. . . . .	<b>Pittsburgh base, cents per lb.</b>		Pittsburgh . . . . .	3.35c	Buffalo, delivered . . . . .	2.25c
New York, del. . . . .	<b>Chrome-Nickel</b>		Chicago . . . . .	3.35c	Detroit, delivered . . . . .	2.47c
Philadelphia, del. . . . .	No. 302 No. 304		Gulf ports . . . . .	3.70c	Philadelphia, del. . . . .	2.52c
Middletown, O. . . . .	Bars . . . . .	24.00 25.00	Pacific Coast ports . . . . .	3.95c	Boston, delivered . . . . .	2.49c
Youngstown, O. . . . .	Plates . . . . .	27.00 29.00	<b>Structural Shapes</b>		New York, del. . . . .	2.50c
Pacific Coast points . . . . .	Sheets . . . . .	34.00 36.00	Pittsburgh . . . . .	2.10c	Gulf ports . . . . .	2.50c
<b>Galvanized No. 24</b>	Hot strip . . . . .	21.50 23.50	Philadelphia, del. . . . .	2.21 1/2c	Pacific Coast points . . . . .	2.75c
Pittsburgh . . . . .	Cold strip . . . . .	28.00 30.00	New York, del. . . . .	2.27c	<b>Rail Steel</b>	
Chicago, Gary . . . . .	<b>Straight Chromes</b>		Boston, delivered . . . . .	2.41c	(Base, 5 tons or over)	
Buffalo . . . . .	No. No. No. No.		Bethlehem . . . . .	2.10c	Pittsburgh . . . . .	2.15c
Sparrows Point, Md. . . . .	410 430 442 446		Chicago . . . . .	2.10c	Chicago or Gary . . . . .	2.25c
Philadelphia, del. . . . .	Bars . . . . .	18.50 19.00 22.50 27.50	Cleveland, del. . . . .	2.30c	Detroit, delivered . . . . .	2.15c
New York, delivered . . . . .					Cleveland . . . . .	2.15c
Birmingham . . . . .						



—The Market Week—

Buffalo .....	2.15c
Birmingham .....	2.15c
Gulf ports .....	2.50c
Pacific Coast points .....	2.75c

**Iron**

Chicago, .....	2.15c
Philadelphia .....	2.37c
Pittsburgh, refined .....	3.50-8.00c

**Reinforcing**

<i>New Billet Bars, Base*</i>	
Chicago, Gary, Buffalo, Cleve., Birm., Young, Sparrows Pt., Pitts. ....	2.15c
Gulf ports .....	2.50c
Pacific Coast ports .....	2.60c

**Rail Steel Bars, Base\***

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm. ....	2.15c
Gulf ports .....	2.50c
Pacific Coast ports .....	2.60c

\*Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.

**Wire Products**

<i>Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads</i>	
Standard and cement coated wire nails .....	\$2.55
(Per pound)	
Polished fence staples ..	2.55c
Galv. barbed wire, standard 12 gage two-point hog, 80-rod spool \$2.88; two-point cattle, 80-rod spool .....	\$2.70
Annealed fence wire ..	3.05c
Galv. fence wire .....	3.30c
<i>Woven wire fencing (base C. L. column) .....</i>	
Single loop bale tier, (base C. L. column) ..	56.00
<b>To Manufacturing Trade</b>	
<i>Base, Pitts. - Cleve. - Chicago - Birmingham (except spring wire)</i>	
Bright bess., basic wire ..	2.60c
Galvanized wire .....	2.65c
Spring wire .....	3.20c
Worcester, Mass., \$2 higher on bright basic and spring wire.	

**Cut Nails**

Carload, Pittsburgh .....	\$3.85
---------------------------	--------

**Cold-Finished Bars**

	Carbon	Alloy
Pittsburgh .....	2.65c	3.35c
Chicago .....	2.65c	3.35c
Gary, Ind. ....	2.65c	3.35c
Detroit .....	2.70c	*3.45c
Cleveland .....	2.65c	3.35c
Buffalo .....	2.65c	3.35c
*Delivered.		

**Alloy Bars (Hot)**

(Base, 20 tons or over)			
Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem .....	2.70c		
Detroit, delivered .....	2.80c		
<b>Alloy</b>			
S.A.E. Diff. S.A.E. Diff.			
2000 .....	0.35	3100 .....	0.70
2100 .....	0.75	3200 .....	1.35
2300 .....	1.55	3300 .....	3.80
2500 .....	2.25	3400 .....	3.20
4100 0.15 to 0.25 Mo. ....			0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. ....			1.10
5100 0.80-1.10 Cr. ....			0.45
5100 Cr. spring flats .....			0.15
6100 bars .....			1.20
6100 spring flats .....			0.85
Cr. N., Van. ....			1.50
Carbon Van. ....			0.85
9200 spring flats .....			0.15
9200 spring rounds, squares 0.40			
Electric furnace up 50 cents.			

**Strip and Hoops**

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

<b>Hot Strip, 12-inch and less</b>	
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham .....	2.10c
Detroit, del. ....	2.20c
Philadelphia, del. ....	2.42c
New York, del. ....	2.46c
Pacific Coast points ..	2.70c
<b>Cooperage hoop, Youngs., Pitts.; Chicago, Birm.</b>	
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown Chicago .....	2.80c
Detroit, del. ....	2.90c
Worcester, Mass. ....	3.00c
Carbon .....	2.80c
0.26-0.50 .....	4.30c
0.51-0.75 .....	6.15c
0.76-1.00 .....	8.35c
Over 1.00 .....	8.35c
Worcester, Mass. \$4 higher.	
<b>Commodity Cold-Rolled Strip</b>	
Pitts.-Cleve.-Youngstown	2.95c
Chicago .....	3.05c
Detroit, del. ....	3.05c
Worcester, Mass. ....	3.35c
Lamp stock up 10 cents.	

**Rails, Fastenings**

<b>(Gross Tons)</b>	
Standard rails, mill. ....	\$40.00
Relay rails, Pittsburgh 20-100 lbs. ....	\$32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham. ....	\$40.00
Do., rerolling quality ..	39.00
<b>Cents per pound</b>	
Angle bars, billet, mills. Do., axle steel .....	2.70c
Spikes, R. R. base .....	3.00c
Track bolts, base .....	4.15c
Car axles forged, Pitts., Chicago, Birmingham. ....	3.15c
Tie plates, base .....	2.15c
Base, light rails 25 to 60 lbs., 20 lbs., up \$2; 16 lbs., up \$4; 12 lbs., up \$8; 8 lbs., up \$10. Base railroad spikes 200 kegs or more; base plates 20 tons.	

**Bolts and Nuts**

<i>F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, for full containers additional 10%.</i>	
<b>Carriage and Machine</b>	
½ x 6 and smaller .....	68.5 off
Do. larger, to 1-in. ....	86 off
Do. 1 ½ and larger .....	64 off
Tire bolts .....	52.5 off
<b>Stove Bolts</b>	
In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in. ....	60 off
Step bolts .....	68.5 off
Plow bolts .....	68.5 off

**Nuts**

Semifinished hex. U.S.S. S.A.E.		
½-inch and less. ....	67	70
¾-1-inch .....	64	65
1 ½ and larger .....	62	62
<b>Hexagon Cap Screws</b>		
Upset, 1-in., smaller .....	70.0 off	
<b>Square Head Set Screws</b>		
Upset, 1-in., smaller .....	75.0 off	
Headless set screws .....	64.0 off	

**Piling**

Pitts., Chgo., Buffalo .....	2.40c
Gulf ports .....	2.85c
Pacific coast ports .....	2.90c

**Rivets, Washers**

<i>F.o.b. Pitts., Cleve., Chgo., Bham.</i>	
Structural .....	3.40c

¾-inch and under .....	65-10 off
<b>Wrought washers, Pitts., Chl., Phila., to jobbers and large nut, bolt mfrs. i.c.l. \$5.40; c.l. \$5.75 off</b>	

**Welded Iron, Steel Pipe**

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2 ½ and 1 ½ less, respectively. Wrought pipe, Pittsburgh base.

<b>Butt Weld</b>			
	Steel	Blk.	Galv.
In. ½ .....	63 ½	54	
¾ .....	66 ½	58	
1-3 .....	68 ½	60 ½	
<b>Iron</b>			
¾ .....	30	13	
1-1 ¼ .....	34	19	
1 ½ .....	38	21 ½	
2 .....	37 ½	21	

<b>Lap Weld</b>			
	Steel	Blk.	Galv.
2 .....	61	52 ½	
2 ½-3 .....	64	55 ½	
3 ½-6 .....	66	57 ½	
7 and 8 .....	65	55 ½	
9 and 10 .....	64 ½	55	
11 and 12 .....	63 ½	54	

<b>Iron</b>			
2 .....	30 ½	15	
2 ½-3 ½ .....	31 ½	17 ½	
4 .....	33 ½	21	
4 ½-8 .....	32 ½	20	
9-12 .....	28 ½	15	

<b>Line Pipe</b>			
	Steel	Blk.	Galv.
1 to 3, butt weld .....	67 ½		
2, lap weld .....	60		
2 ½ to 3, lap weld .....	63		
3 ½ to 6, lap weld .....	65		
7 and 8, lap weld .....	64		
10-inch lap weld .....	63 ½		
12-inch, lap weld .....	62 ½		

	Blk.	Galv.
¾ butt weld .....	25	7
1 and 1 ½ butt weld .....	29	13
1 ½ butt weld .....	33	15 ½
2 butt weld .....	32 ½	15
1 ½ lap weld .....	23 ½	7
2 lap weld .....	25 ½	9
2 ½ to 3 ½ lap weld .....	26 ½	11 ½
4 lap weld .....	28 ½	15
4 ½ to 8 lap weld .....	27 ½	14
9 to 12 lap weld .....	23 ½	9

**Boiler Tubes**

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

<b>Lap Welded</b>			
	Sizes	Gage	Steel
1 ½ "O.D. ....	13	\$ 9.72	\$23.71
1 ¾ "O.D. ....	13	11.06	22.93
2 "O.D. ....	13	12.38	19.35
2 ¼ "O.D. ....	13	13.79	21.68
2 ½ "O.D. ....	12	15.16	21.68
2 ¾ "O.D. ....	12	16.58	26.57
3 "O.D. ....	12	17.54	29.00
3 ½ "O.D. ....	12	18.35	31.36
4 "O.D. ....	11	23.15	39.81
4 ½ "O.D. ....	10	28.66	49.90
5 "O.D. ....	9	44.25	73.93
6 "O.D. ....	7	68.14	.....

<b>Seamless</b>			
	Sizes	Gage	Hot Rolled
1 "O.D. ....	13	\$ 7.82	\$ 9.01
1 ¼ "O.D. ....	13	9.26	10.67
1 ½ "O.D. ....	13	10.23	11.79
1 ¾ "O.D. ....	13	11.64	13.42

2" O.D. ....	13	13.04	15.03
2 ¼ "O.D. ....	13	14.54	16.76
2 ½ "O.D. ....	12	16.01	18.45
2 ¾ "O.D. ....	12	17.54	20.21
3 "O.D. ....	12	18.59	21.42
3 ½ "O.D. ....	12	19.50	22.48
3 ¾ "O.D. ....	11	24.62	28.37
4 "O.D. ....	10	30.54	35.20
4 ½ "O.D. ....	10	37.35	43.04
5 "O.D. ....	9	46.87	54.01
6 "O.D. ....	7	71.96	82.93

**Cast Iron Pipe**

<b>Class B Pipe—Per Net Ton</b>	
6-in., & over, Birm. ....	\$45.00-46.00
4-in., Birmingham ..	48.00-49.00
4-in., Chicago .....	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy. ....	49.00
Do., 4-in. ....	52.00

Class A Pipe \$3 over Class B Std. ftgs., Birm., base \$100.00

**Semifinished Steel**

<b>Rerolling Billets, Slabs (Gross Tons)</b>	
Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young, Birm., Sparrows Point. ....	\$34.00
Duluth (billets) .....	36.00
Detroit, delivered .....	36.00

<b>Forging Quality Billets</b>	
Pitts., Chl., Gary, Cleve., Young, Buffalo, Birm. ....	40.00
Duluth .....	42.00

<b>Sheet Bars</b>	
Pitts., Cleveland, Young, Sparrows Point, Buffalo, Canton, Chicago. ....	34.00
Detroit, delivered .....	36.00

<b>Wire Rods</b>	
Pitts., Cleveland, Chicago, Birmingham No. 5 to ½-inch incl. (per 100 lbs.)	\$2.00
Do., over ½ to 1 ½-in. incl.	2.15
Worcester up \$0.10; Galveston up \$0.25; Pacific Coast up \$0.45.	

<b>Skelp</b>	
Pitts., Chl., Youngstown, Coatesville, Sparrows Pt.	1.90c

**Coke**

<b>Price Per Net Ton</b>	
<b>Beehive Ovens</b>	
Connellsville, fur. ....	\$4.35- 4.60
Connellsville, fdry. ....	5.00- 5.75
Connell, prem. fdry. ....	5.75- 6.25
New River fdry. ....	6.25- 6.50
Wise county fdry. ....	5.50- 6.50
Wise county fur. ....	5.00- 5.25

<b>By-Product Foundry</b>	
Newark, N. J., del. ....	11.38-11.85
Chicago, outside del. ....	10.50
Chicago, delivered. ....	11.25
Terre Haute, del. ....	10.75
Milwaukee, ovens. ....	11.25
New England, del. ....	12.50
St. Louis, del. ....	11.75
Birmingham, ovens. ....	7.50
Indianapolis, del. ....	10.75
Cincinnati, del. ....	10.50
Cleveland, del. ....	11.05
Buffalo, del. ....	11.25
Detroit, del. ....	11.00
Philadelphia, del. ....	11.15

**Coke By-Products**

<i>Spot, gal., freight allowed east of Omaha</i>	
Pure and 90% benzol. ....	16.00c
Toluol, two degree .....	25.00c
Solvent naphtha .....	27.00c
Industrial xylol .....	27.00c
<i>Per lb. f.o.b. Frankford and St. Louis</i>	
Phenol (less than 1000 lbs.) .....	14.75c
Do. (1000 lbs. or over)	13.75c
<i>Eastern Plants, per lb.</i>	
Naphthalene flakes, balls, bbls. to jobbers .....	6.75c
<i>Per ton, bulk, f.o.b. port</i>	
Sulphate of ammonia .....	\$28.00



## Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	\$24.00	\$24.50	\$23.50	\$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

†Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

### Delivered from Basing Points:

Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and \$1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	23.50	23.50	23.00	.....
St. Louis from Birmingham	23.12	.....	22.62	.....
St. Paul from Duluth	25.63	25.63	.....	26.13

†Over 0.70 phos.

### Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., \$28.50, base; \$29.74 delivered Philadelphia.

Gray Forge	Charcoal
Valley furnace	Lake Superior fur.
Pitts. dist. fur.	do., del. Chicago
	Lyles, Tenn.

### †Silvery

Jackson county, O., base: 6-6.50 per cent \$28.50; 6.51-7—\$29.00; 7-7.50—\$29.50; 7.51-8—\$30.00; 8-8.50—\$30.50; 8.51-9—\$31.00; 9-9.50—\$31.50; Buffalo, \$1.25 higher.

### Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus \$1 a ton.  
 †The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.  
 Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

## Refractories

Per 1000 f.o.b. Works, Net Prices	Ladle Brick (Pa., O., W. Va., Mo.)
Fire Clay Brick	Dry press
Super Quality	Wire cut
Pa., Mo., Ky.	Magnesite
First Quality	Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk
Pa., Ill., Md., Mo., Ky.	net ton, bags
Alabama, Georgia	Basic Brick
New Jersey	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.
Second Quality	Chrome brick
Pa., Ill., Ky., Md., Mo.	Chem. bonded chrome
Georgia, Alabama	Magnesite brick
New Jersey	Chem. bonded magnesite
Ohio	Fluorspar
First quality	Washed gravel, duty pd., tide, net ton
Intermediate	Washed gravel, f.o.b. Ill., Ky., net ton
Second quality	carloads, all rail. Do, barge
Malleable Bung Brick	No. 2 lump
All bases	
Silica Brick	
Pennsylvania	
Joliet, E. Chicago	
Birmingham, Ala.	

## Ferroalloy Prices

Ferromanganese, 78-82%, lump and bulk, carlots	11.00c	Do, spot	145.00	¾-in., lb.	14.00c
tide., duty pd.	\$100.00	Do., ton lots	117.5c	Do., 2%	12.50c
Ton lots	110.00	Do., less-ton lots	12.00c	Spot ¼c higher	
Less ton lots	113.50	67-72% low carbon:		Silicon Briquets, contract carloads, bulk, freight allowed, ton	\$69.50
Less 200 lb. lots	118.00	Car-Ton Less loads lots ton		Ton lots	79.50
Do., carlots del. Pitts.	105.33	2% carb.	17.50c 18.25c 18.75c	Less-ton lots, lb.	3.75c
Spiegeleisen, 19-21% dom.		1% carb.	18.50c 19.25c 19.75c	Less 200 lb. lots, lb.	4.00c
Palmerton, Pa., spot.	32.00	0.10% carb.	20.50c 21.25c 21.75c	Spot ¼-cent higher.	
Do., 26-28%	39.50	0.20% carb.	19.50c 20.25c 20.75c	Manganese Briquets, contract carloads, bulk freight allowed, lb.	5.00c
Ferrosilicon, 50% freight allowed, c.l.	69.50	Spot ¼c higher		Ton lots	5.50c
Do., ton lot	82.00	Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb.	0.95	Less-ton lots	5.75c
Do., 75 per cent	126.00	Calcium molybdate, lb. molyb. cont., f.o.b. mill	0.80	Spot ¼c higher	
Do. ton lots	142.00	Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots	\$1.23	Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton	\$97.50
Silicomanganese, c.l., 2½ per cent carbon	103.00	Do., less-ton lots	1.25	Do, spot	102.50
2% carbon, 108.00; 1%, 118.00		20-25% carbon, 0.10 max., ton lots, lb.	1.35	34-40%, contract, carloads, lb., alloy	14.00c
Contract ton price \$12.50 higher; spot \$5 over contract.		Do, less-ton lots	1.40	Do, ton lots	15.00c
Ferrotungsten, stand., lb. con. del. cars	2.00-2.10	Spot 5c higher		Do, less-ton lots	16.00c
Ferrovandium, 35 to 40%, lb., cont.	2.70-2.80-2.90	Ferrocolumbium, 50-60%, contract, lb. con. col. f.o.b. Niagara Falls	\$2.25	Spot ¼c higher	
Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, \$3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% \$3 unitage	75.00	Do., less-ton lots	2.30	Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb.	\$2.60
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del.		Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill	0.80	Do, 100-200 lb. lots	2.75
		Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton	\$142.50	Do, under 100-lb. lots	3.00
				Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant	80.00c



# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials*

	Soft Bars			Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets			Cold Rolled Strip	Cold Drawn Bars		
	Bands	Hoops	Hot Rolled				Cold Rolled	Galv. No. 24	Carbon		SAE 2300	SAE 3100	
Boston	3.98	4.16	5.16	3.85	3.85	5.66	3.81	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	4.50	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.75	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	...	5.05	...	4.05	...	...
Norfolk, Va.	4.15	4.25	...	3.90	3.90	5.45	3.75	...	5.40	...	4.15	...	...
Buffalo	3.35	3.82	3.82	3.62	3.40	6.40	4.20	4.40	4.50	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	...	4.75	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.85	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	5.00	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.98	3.54	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.95	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	...	5.00	...	4.30	...	...
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	...	5.25	...	4.31	...	...
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.75	...	4.40	...	4.39	...	...
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	...	5.71	...	4.69	...	...
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	...	4.75	...	4.43	...	...
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	...	4.80	5.00	4.60	...	...
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	...	5.25	...	...	...	...
Seattle	4.00	4.00	5.35	3.40	3.50	5.75	3.95	6.50	4.75	...	5.75	...	...
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	...	5.75	...	...
Los Angeles	4.15	4.65	6.45	4.00	4.00	6.40	4.30	6.50	5.25	...	6.60	10.65	9.80
San Francisco	3.50	4.00	6.00	3.35	3.35	5.60	3.40	6.40	5.15	...	6.80	10.65	9.80

—S A E Hot-rolled Bars (Unannealed)—

	1035-	2300	3100	4100	6100
	1050	Series	Series	Series	Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	...
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	...	...	...	...
Norfolk, Va.	...	...	...	...	...
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	...	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, any quantity in New York, 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis, Tulsa; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

## CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Feb. 15

Export Prices f.o.b. Port of Dispatch—

Domestic Prices at Works or Furnace—

*By Cable or Radio*

*Last Reported*

	British gross tons U. K. ports		Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons		**Quoted in pound pounds sterling £ s d	£ s d		French	Belgian	Reich			
	£ s d			£ s d			Francs	Francs	Mark					
Foundry, 2.50-3.00 Si...	\$23.70	6 0 0	\$30.67		3 12 0	Fdy. pig iron, Si. 2.5.	\$21.33	5 8 0(a)	\$17.65	788	\$28.65	850	\$25.33	63
Basic bessemer...			19.59		2 6 0	Basic bess. pig iron...	20.05	5 1 6(a)	...	...	26.96	800	27.94	(b)69.50
Hematite, Phos. .03-.05	24.69	6 5 0	...		...	Furnace coke.....	5.78	1 9 2	5.04	225	10.45	310	7.64	19
Billets.....	\$29.13	7 7 6	\$31.95		3 15 0	Billets.....	33.08	8 7 6	26.05	1,163	40.44	1,200	38.79	96.50
Wire rods, No. 5 gage..	44.93	11 7 6	59.64		7 0 0	Standard rails.....	1.81c	10 3 0	1.46c	1,455	2.06c	1,375	2.38c	132
Standard rails.....	\$37.53	9 10 0	\$48.99		5 15 0	Merchant bars.....	2.29c	12 16 0††	1.45c	1,454	2.06c	1,375	1.98c	110
Merchant bars.....	2.41c	13 9 0	2.74c		7 4 0	Structural shapes....	2.04c	11 8 0††	1.41c	1,414	2.06c	1,375	1.93c	107
Structural shapes.....	2.17c	12 2 6	2.81c		7 8 0	Plates, ½-in. or 5 mm.....	2.06c	11 10 6††	1.85c	1,848	2.42c	1,610	2.29c	127
Plates, ½ in. or 5 mm.	2.31c	12 18 0	3.37c		8 17 6	Sheets, black.....	2.89c	16 2 6	2.19c	2,193	2.85c	1,900†	2.59c	144†
Sheets, black, 24 gage or 0.5 mm.....	3.04c	17 0 0	3.06c		8 1 0°	Sheets, galv., corr., 24 ga. or 0.5 mm.....	3.32c	18 12 6	2.85c	2,850	4.58c	3,050	6.66c	370
Sheets, gal., 24 ga., corr.	3.49c	19 10 0	4.38c		12 1 0	Plain wire.....	3.22c	18 0 0	2.25c	2,250	3.00c	2,000	3.11c	173
Bands and strips.....	2.19c	12 5 0	2.74c		7 4 0	Bands and strips... ..	2.42c	13 11 0††	1.63c	1,632	2.18c	1,450	2.29c	127
Plain wire, base.....	3.49c	19 10 0	3.04c		8 0 0									
Galvanized wire, base.	4.16c	23 5 0	3.63c		9 11 3									
Wire nails, base.....			3.52c		9 5 0									
Tin plate, box 108 lbs.	\$ 6.22	1 11 6	...		...									

British ferromanganese \$100.00 delivered Atlantic seaboard duty-paid.

†British ship-plates. Continental, bridge plates. \$24 ga. \$1 to 5 mm. basic price.  
 British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel.  
 (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed.  
 ††Rebate of 15s on certain conditions.  
 \*\*Gold pound, sterling not quoted. \$\$\$Last prices, no current quotations.



# IRON AND STEEL SCRAP PRICES

*Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices*

<b>HEAVY MELTING STEEL</b>			
Birmingham, No. 1	16.00-16.50	Buffalo	10.00-10.50
Bos. dock No. 1 exp.	15.00-15.50	Chicago	9.50-10.00
New Eng. del. No. 1	15.00	Cincinnati, dealers	5.25- 5.75
Buffalo, No. 1	16.00-16.50	Cleveland, no alloy	8.50- 9.00
Buffalo, No. 2	14.00-14.50	Detroit	†7.50- 8.00
Chicago, No. 1	15.50-16.00	Eastern Pa.	11.00-11.50
Chicago, auto, no alloy	14.50-15.00	Los Angeles	4.00- 5.00
Chicago, No. 2 auto	12.50-13.00	New York	†6.50- 7.00
Cincinnati dealers	13.50-14.00	Pittsburgh	10.50-11.00
Cleveland, No. 1	15.50-16.00	St. Louis	†6.50- 7.00
Cleveland, No. 2	14.50-15.00	San Francisco	5.00
Detroit, No. 1	†13.00-13.50	Toronto, dealers	6.50
Detroit, No. 2	†12.00-12.50	Valleys	11.50-12.00
Eastern Pa., No. 1	17.00-17.50	<b>SHOVING TURNINGS</b>	
Eastern Pa., No. 2	16.00-16.50	Buffalo	12.50-13.00
Federal, Ill.	13.50-14.00	Cleveland	9.50-10.00
Granite City, R. R.	14.75-15.25	Chicago	10.00-10.50
Granite City, No. 2	13.50-14.00	Chicago, spcl, anal.	12.50-13.00
Los Angeles, No. 1	14.50-15.50	Detroit	†9.50-10.00
Los Angeles, No. 2	13.50-14.50	Pitts., alloy-free	12.00-12.50
L. A., No. 1 f.a.s.	16.00-17.00	<b>BORINGS AND TURNINGS</b>	
L. A., No. 2 f.a.s.	15.00-16.00	<i>For Blast Furnace Use</i>	
N. Y. dock No. 1 exp.	14.50	Boston district	†4.50- 4.75
Pitts., No. 1 (R. R.)	18.25-18.75	Buffalo	10.50-11.00
Pittsburgh, No. 1	17.50-18.00	Cincinnati, dealers	4.25- 4.75
Pittsburgh, No. 2	16.00-16.50	Cleveland	9.50-10.00
St. Louis, R. R.	†14.75-15.25	Eastern Pa.	10.00-10.50
St. Louis, No. 2	†13.50-14.00	Detroit	†7.50- 8.00
San Francisco, No. 1	14.50-15.50	New York	†5.75- 6.00
San Francisco, No. 2	13.50-14.50	Pittsburgh	†10.00 (Nom.)
Seattle, No. 1	14.50-15.50	Toronto, dealers	6.00
Toronto, dlrs., No. 1	11.00	<b>AXLE TURNINGS</b>	
Valleys, No. 1	17.50-18.00	Buffalo	16.50-17.00
<b>COMPRESSED SHEETS</b>			
Buffalo, new	14.50-15.00	Boston district	†9.50-10.00
Chicago, factory	14.75-15.25	Chicago, elec. fur.	16.00-16.50
Chicago, dealers	13.25-13.75	East. Pa. elec. fur.	16.50-17.00
Cincinnati, dealers	12.75-13.25	St. Louis	†10.00-10.50
Cleveland	15.00-15.50	Toronto	6.00- 6.50
Detroit	†13.50-14.00	<b>CAST IRON BORINGS</b>	
E. Pa., new mat.	17.00-17.50	Birmingham	7.50
E. Pa., old mat.	14.00-14.50	Boston dist. chem.	†8.00- 8.50
Los Angeles	12.00-13.00	Buffalo	10.50-11.00
Pittsburgh	17.50-18.00	Chicago	9.50-10.00
St. Louis	†10.50-11.00	Cincinnati, dealers	4.25- 4.75
San Francisco	13.50-14.00	Cleveland	9.50-10.00
Valleys	17.00-17.50	Detroit	†7.50- 8.00
<b>BUNDLED SHEETS</b>			
Buffalo, No. 1	14.00-14.50	E. Pa., chemical	14.50-15.00
Buffalo, No. 2	12.50-13.00	New York	†7.00
Cleveland	11.50-12.00	St. Louis	†5.00- 5.50
Pittsburgh	16.00-16.50	Toronto, dealers	6.00
St. Louis	†8.50- 9.00	<b>RAILROAD SPECIALTIES</b>	
Toronto, dealers	9.75	Chicago	18.25-18.75
<b>SHEET CLIPPINGS, LOOSE</b>			
Chicago	9.75-10.25	St. Louis	†15.50-16.00
Cincinnati, dealers	8.75- 9.25	<b>ANGLE BARS—STEEL</b>	
Detroit	†9.25- 9.75	Chicago	18.00-18.50
St. Louis	†9.50-10.00	St. Louis	†15.50-16.00
Toronto, dealers	9.00	<b>SPRINGS</b>	
<b>BUSHELING</b>			
Birmingham, No. 1	13.00	Buffalo	19.50-20.00
Buffalo, No. 1	14.00-14.50	Chicago, coil	19.00-19.50
Chicago, No. 1	14.25-14.75	Chicago, leaf	18.00-18.50
Cincin., No. 1, deal.	10.00-10.50	Eastern Pa.	21.00-21.50
Cincin., No. 2, deal.	3.25- 3.75	Pittsburgh	21.50-22.00
Cleveland, No. 2	9.50-10.00	St. Louis	†17.00-17.50
Detroit, No. 1, new	†12.50-13.00	<b>STEEL RAILS, SHORT</b>	
Valleys, new, No. 1	16.00-16.50	Birmingham	16.00-16.50
Toronto, dealers	5.00- 5.50	Buffalo	21.50-22.00
<b>MACHINE TURNINGS (Long)</b>			
Birmingham	5.00	Chicago (3 ft.)	18.50-19.00
<b>Ores</b>			
<b>Lake Superior Iron Ore</b>		Chicago (2 ft.)	18.75-19.25
Gross ton, 51 1/4 %		Cincinnati, dealers	20.00-20.50
Lower Lake Ports		Detroit	†19.50-20.00
Old range bessemer	\$5.25	Pitts., 3 ft. and less	21.50-22.00
Mesabi nonbessemer	4.95	St. Louis, 2 ft. & less	†18.50-19.00
High phosphorus	4.85	<b>STEEL RAILS, SCRAP</b>	
Mesabi bessemer	5.10	Birmingham	15.50
Old range nonbessemer	5.10	Boston district	†14.00-14.50
<b>Eastern Local Ore</b>		Swedish low phos.	
Cents, unit, del. E. Pa.		14.00	
Foundry and basic		North African low phos.	
56-63%, contract.		14.00	
<b>Foreign Ore</b>		Spanish, No. African basic, 50 to 60%	
(Prices nominal)		14.00	
Cents per unit, c.i.f. Atlantic		Chinese wolframite, short ton unit, duty paid	
Manganiferous ore, 45-55% Fe., 6-10% Mn.	14.00-15.00	\$23.00-23.50	
		Scheelite, imp.	
		\$23.50-24.50	
		Chrome ore, 48% gross ton, c.i.f.	
		\$26.00-28.00	
		Eastern Pa.	
		23.00-23.5	
		St. Louis, 1 1/4-3 1/4"	
		†16.50-17.0	
		<b>CAR WHEELS</b>	
		Birmingham, iron	
		16.00	
		Boston dist., iron	
		†13.00-13.25	
		Buffalo, steel	
		21.00-21.50	
		Chicago, iron	
		17.00-17.50	
		Chicago, rolled steel	
		17.50-18.00	
		Cincin., iron, deal.	
		16.50-17.00	
		Eastern Pa., iron	
		20.00-20.50	
		Eastern Pa., steel	
		21.00-21.50	
		Pittsburgh, iron	
		19.50-20.00	
		Pittsburgh, steel	
		21.50-22.00	
		St. Louis, iron	
		†17.00-17.50	
		St. Louis, steel	
		16.50-17.00	
		<b>NO. 1 CAST SCRAP</b>	
		Birmingham	
		15.00	
		Boston, No. 1 mach.	
		†15.00-15.25	
		N. Eng. del. No. 2	
		14.00-14.50	
		N. Eng. del. textile	
		18.25-18.75	
		Buffalo, cupola	
		16.50-17.00	
		Buffalo, mach.	
		17.50-18.00	
		Chicago, agri. net.	
		13.00-13.50	
		Chicago, auto net.	
		15.00-15.50	
		Chicago, railroad net	
		14.00-14.50	
		Chicago, mach. net.	
		14.50-15.00	
		Cincin., mach. deal.	
		15.75-16.25	
		Cleveland, mach.	
		20.00-21.00	
		Detroit, cupola, net.	
		†14.50-15.00	
		Eastern Pa., cupola	
		19.50-20.00	
		E. Pa., No. 2 yard.	
		15.50-16.00	
		E. Pa., yard fdry.	
		16.50-17.00	
		Los Angeles	
		16.50-17.00	
		Pittsburgh, cupola	
		17.50-18.00	
		San Francisco	
		15.50-16.00	
		Seattle	
		16.00-16.50	
		St. Louis, breakable	
		†14.00-14.50	
		St. Louis agri. mach.	
		†17.00-17.50	
		St. L., No. 1 mach.	
		†17.75-18.25	
		San Francisco	
		16.00-17.00	
		Toronto, No. 1	
		mach., net dealers	
		15.50	
		<b>HEAVY CAST</b>	
		Boston dist. break	
		†12.25-12.50	
		New England, del.	
		15.00-15.50	
		Buffalo, break	
		14.50-15.00	
		Cleveland, break, net	
		15.25-15.75	
		Detroit, auto net.	
		†15.50-16.00	
		Detroit, break	
		†11.00-11.50	
		Eastern Pa.	
		17.50-18.00	
		Los Ang., auto, net.	
		13.00-14.00	
		New York break.	
		†14.00-14.50	
		Pittsburgh, break	
		15.00-15.50	
		<b>STOVE PLATE</b>	
		Birmingham	
		10.00	
		Boston district	
		†10.50-11.00	
		Buffalo	
		13.00-13.50	
		Chicago, net	
		9.00- 9.50	
		Cincinnati, dealers	
		8.25- 8.75	
		Detroit, net	
		†9.00- 9.50	
		Eastern Pa.	
		15.00	
		New York, fdry.	
		11.00	
		St. Louis	
		†11.00-11.50	
		Toronto, dealers, net	
		11.50	
		<b>MALLEABLE</b>	
		New England, del.	
		20.00-21.00	
		Buffalo	
		16.50-17.00	
		Chicago, R. R.	
		18.50-19.00	
		Cincin., agri., deal.	
		13.25-13.75	
		Cleveland, rail	
		21.50-22.00	
		Eastern Pa., R. R.	
		21.50-22.00	
		Los Angeles	
		12.50	
		Pittsburgh, rail	
		21.00-21.50	
		St. Louis, R. R.	
		†16.00-16.50	
		<b>Manganese Ore</b>	
		<i>Including war risk but not duty, cents per unit cargo lots.</i>	
		Caucasian, 50-52%	
		48.00-50.00	
		So. African, 50-52%	
		48.00-50.00	
		Indian, 49-50%	
		nom	
		Brazilian, 48-52%	
		46.00-48.00	
		Cuban, 50-51%, duty free	
		61.20	
		<b>Molybdenum</b>	
		Sulphide conc., per lb., Mo. cont., mines	
		\$0.75	

<b>Ores</b>		<b>Swedish low phos.</b>		<b>Manganese Ore</b>	
Lake Superior Iron Ore		14.00		<i>Including war risk but not duty, cents per unit cargo lots.</i>	
Gross ton, 51 1/4 %		North African low phos.		48.00-50.00	
Lower Lake Ports		14.00		Caucasian, 50-52%	
Old range bessemer	\$5.25	Spanish, No. African basic, 50 to 60%		48.00-50.00	
Mesabi nonbessemer	4.95	14.00		So. African, 50-52%	
High phosphorus	4.85	Chinese wolframite, short ton unit, duty paid		nom	
Mesabi bessemer	5.10	\$23.00-23.50		Brazilian, 48-52%	
Old range nonbessemer	5.10	Scheelite, imp.		46.00-48.00	
		\$23.50-24.50		Cuban, 50-51%, duty free	
		Chrome ore, 48% gross ton, c.i.f.		61.20	
		\$26.00-28.00		<b>Molybdenum</b>	
				Sulphide conc., per lb., Mo. cont., mines	
				\$0.75	



## Sheets, Strip

Sheet & Strip Prices, Pages 86, 87

**Cleveland**—Order cancellations are few, but buyers are requesting postponement of shipments in some instances. The latter circumstance is not sufficiently general to indicate any marked recession in consumption. Buyers with large inventories prefer stable prices, at least until excessive stocks have been worked off, and no unusual pressure against quotations is noted.

**Chicago**—Sheet and strip production has been cut to an estimated 60 per cent, with further declines indicated by current low business volume. Automotive sheet buying still is moderate and consumption is receding. Makers of domestic appliances and farm equipment are maintaining active requirements.

**Boston**—Orders for narrow cold strip are fairly numerous but small, current volume being about 45 per cent of shipments, with the latter declining. Reduced backlogs are resulting in moderate curtailment in production. Consumption continues active and is increasing in a few industries, but buyers, having taken in considerable steel against old orders, have not reduced inventories materially as a general rule. Deliveries are now normal except on a few specialties. Competition for business is keener, but prices have not weakened. Sheet buying is slack, most consumers and distributors operating on inventories.

**New York**—Demand is being stimulated by heavier specifications from household equipment manufacturers, particularly refrigerator and stove makers. Needs of motor and other electrical appliance builders also are substantial. Releases from drum manufacturers continue to decline. Sheet deliveries show little change. Narrow cold strip buying is no better than 50 per cent of shipments, with both backlogs and production lower. Consumption is steady but users' inventories remain relatively large.

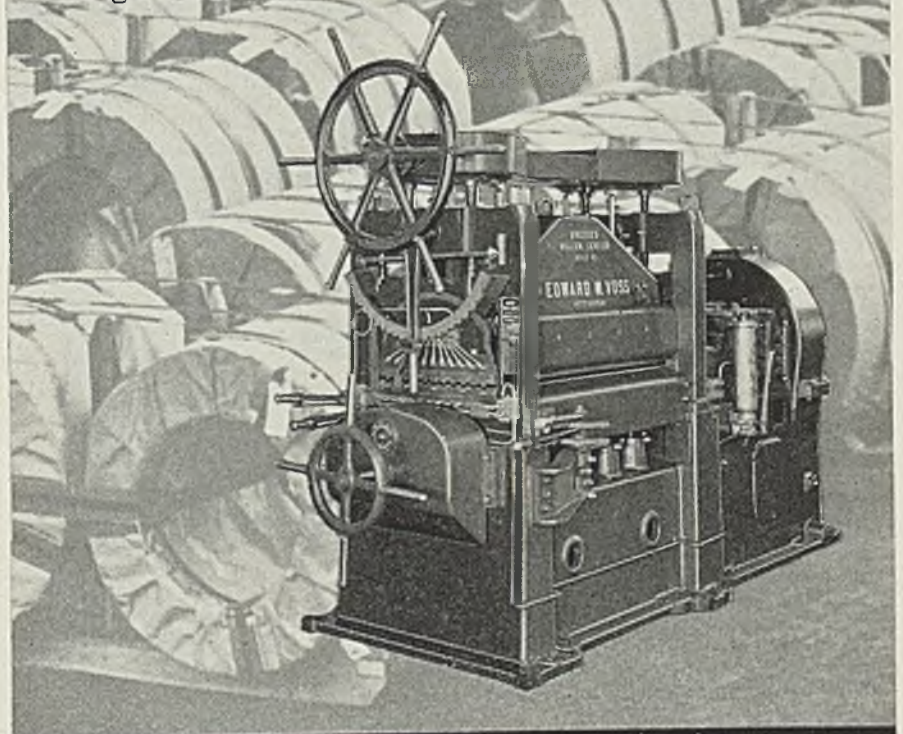
**Philadelphia**—Both hot rolled and enameling sheet prices have successfully withstood a severe test on replacement buying. Cold reduced and galvanized sheets also are holding well. Two stove makers have released material previously held up, and additional automotive releases also are reported.

**Cincinnati**—Sheet buying is unchanged, continuing smaller than shipments. Miscellaneous demand is fair but is reduced by inactivity among several stove makers. Heavier buying of automotive sheets is expected to bolster output. Export sales are fair but represent only a

# Ungerer Leveling SELLS STEEL

**S**TEEL does not sell itself, as many who sell it already know. But in the sale of sheet and strip, a really flat product has a pronounced influence on the careful buyer.

It is easy to understand, then, why the installation of a new Ungerer leveler is of as much interest to the sales department as it is among the operating men.



**Edward W. Voss  
MACHINERY**  
2882 WEST LIBERTY AVENUE  
DORMONT · PITTSBURGH, PA.



small proportion of total business.

**St. Louis**—Improved consumption of galvanized sheets with appearance of more open weather has yet to be felt in mill sales, since jobbers are interested in liquidating stocks further. No appreciable change in buying is expected for another 30 days.

**Birmingham, Ala.**—Output of sheets, while somewhat off from the peak of last year, remains reasonably good and is estimated at better than 85 per cent. Roofing especially has shown less activity. Strip is

being turned out in fair volume only.

**Toronto, Ont.**—While local interests state no sheets are available for spot delivery, forward bookings continue in good volume. Two or three producers are arranging for increased production, and new facilities are expected to be ready for operation in early summer. A fairly large overflow of Canadian sheet business is going to the United States, and this may be enlarged by increased shipbuilding and automotive demand.

# Plates

Plate Prices, Page 86

**Cleveland**—Early delivery generally is available on new business, although some mills with fairly heavy releases at hand are asking three to four weeks. Shipments largely are at the expense of backlogs. Little business in freight car material is actively pending to replace heavy tonnages now being moved.

**Boston**—Plate demand still lags, buying being in small scattered lots for prompt delivery. Pending specified projects are few, although small tank needs are up slightly for fueling systems at air bases, on which bids are now being taken. Boiler and structural shops are placing little tonnage, and while shipyard releases are steady, there have been no gains. On the small volume of business being placed, deliveries, now normal with eastern Pennsylvania mills, are a growing factor.

**New York**—About 24,000 tons of steel, mostly plates, will be required for two ocean liners of 35,000 tons displacement each, on which bids will be opened by the maritime commission May 7. These will be the largest vessels ever to be built in American shipyards. Plate demand continues spotty, with specifications tending to level off. Deliveries are easier as production continues ahead of orders. Prices generally are firm at 2.10c, Claymont.

**Philadelphia**—Two light cruisers requiring 7000 tons of plates may go to a Camden, N. J., builder. Pusey & Jones still has 4400 tons of plates for two C-1 boats. A third interest is expected to release a substantial tonnage within six weeks. Railroad demand is quiet except for a small amount of repair work. Atlantic Coast Line will repair 1000 freight cars at Waycross, Ga. More interest is noted in flanged heads for tanks.

**Birmingham, Ala.**—Plates remain one of the most active products, due largely to carry-over tonnage from last year in both railroad and shipbuilding specifications. Some tonnage is being booked, but the volume of current business is rather disappointing.

**Seattle**—No large projects involving plates are immediately pending, local shops reporting a normal volume of seasonal overhaul work and new jobs, most involving less than 100 tons each. The proposed 320-mile crude oil pipe line from Cut Bank, Mont., to Spokane for Inland Refineries Inc. likely will not be decided for 60 days. Bids were opened Feb. 14 for a unit of

**ENAMELING GOHI IRON SHEETS**

**GLOBE BRAND TRADE MARK**

**KCB COPPER STEEL**

**GENUINE OPEN HEARTH IRON GOHI PURE IRON - COPPER ALLOY**

**NEWPORT PROCESS PATENTED GALVANNEALED**

**NEWPORT SHEETS ELECTRICAL**

**LONG TERNE SHEETS**

**NEWPORT PROCESS PATENTED DE-LUXE METAL**

**ANDREWS STEEL**

*Your requirements of Quality Iron and Steel Sheets are fully met by Newport*

Stoves and ranges; hospital equipment; automobile parts and accessories; display signs; cookware; electrical parts; drainage structures; building materials; furniture; refrigerators; farm implements; precision instruments; filing cabinets . . . wherever high quality is essential, there you'll find critical manufacturers using iron and steel sheets bearing one or more of Newport's well known trade-marks. For Newport produces a family of sheets, each doing its own job best; each the leader in its field.

If you are now using sheets by Newport you know their many advantages. If you are not among Newport users you'll find it highly profitable to standardize on Newport as your source of supply for all your iron and steel sheet requirements.

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the Fort Peck, Mont., dam, 580 tons.

**San Francisco**—Demand for plates is confined to lots of less than 100 tons and few inquiries of size are in the market. Exeter Refining Co., Long Beach, Calif., has been granted a permit to construct a 35,000-barrel oil tank, taking slightly over 100 tons. To date this year 14,467 tons have been booked, compared with 11,448 tons for the same period a year ago.

**Toronto, Ont.**—Inquiries for ship-building needs are prominent, and some improvement in demand also is reported from boiler and tank builders. Producers report backlogs extend several months, and consumers are turning to the United States for quick delivery.

## Bars

Bar Prices, Page 86

**Pittsburgh**—A new list of extras on hot-rolled alloy steel, incorporating a few minor changes recently instituted, has been issued by Carnegie-Illinois Steel Corp. These include changes in the extra for magnaflux testing and slight revisions in classification on etch test extras. The list supersedes that of Aug. 15, 1939.

**Cleveland**—Most orders are small and while the aggregate shows little change, no upward trend is apparent. Forging shops are less active, and auto parts interests generally show effects of the seasonal recession in motor car assemblies. Consumption continues ahead of orders, with stocks of users and distributors being reduced.

**Chicago**—Merchant bar demand is unimproved and in some quarters continues to ease off. Farm equipment needs are among the heaviest, but automotive production, having declined somewhat, has not maintained requirements as well. Numerous miscellaneous bar users are believed leaning heavily on stocks. Little significant betterment in buying is seen until March.

**Boston**—Well maintained demand for alloy stock is outstanding in bar buying, which on the whole is light. Chain-making and machine tool and miscellaneous manufacturing account for most alloy requirements. Bids close Feb. 23 on 264 tons, grade V, hot-rolled nickel-steel round bars for Boston navy yard. Shipyard specifications are steady, but plain carbon material specifications have slackened and deliveries have improved.

**New York**—While bar consumption is active in several lines, including electrical equipment, machine tool, textile machinery and air-

plane engines, buying is down substantially from a few weeks ago. Heavy stocks preclude important replacement orders from warehouses. Railroad equipment builders are tapering specifications with the decline in their backlogs. Bar deliveries have improved further.

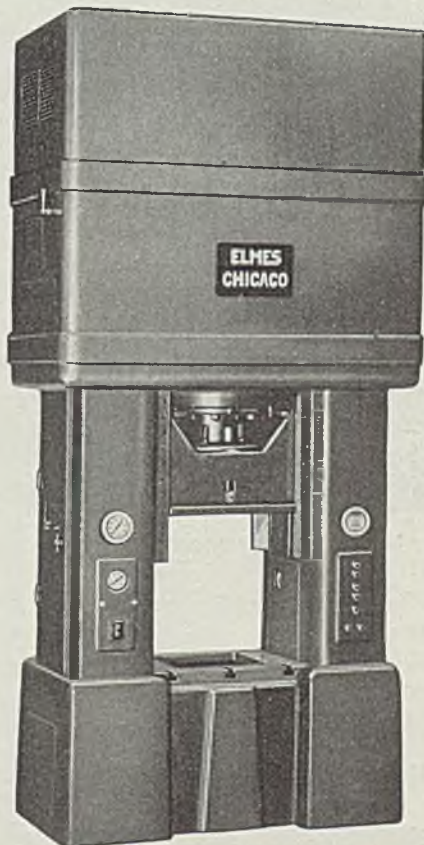
**Philadelphia**—A large consumer of cold drawn screw stock has depleted inventories and contemplates early purchases. Generally, however, bar users are fairly well covered and are ordering only small lots. Some warehouse buying of

hot and cold rolled bars is reported. Deliveries average ten days to several weeks, depending on specifications. New mill extras effected last year are holding well despite pressure.

**Birmingham, Ala.**—Bars maintain their position as leader, largely because of demand from producers of agricultural implements. As usual, concrete reinforcing is among the most active of bar specifications.

**Buffalo**—Recession in bar mill schedules appears to have flattened out, at least temporarily. Re-

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◀ Here's a press that truly can go fast . . . in fact, it's one of the fastest hydraulic presses of its type ever built. And, along with speed goes several improvements which assure quality of output and ease of operation.

The new automatic controls are extremely accurate and sensitive. By a speedy adjustment any pressure up to maximum may be obtained. All moving parts are pressure lubricated. Control equipment is fully enclosed. Especially convenient for setting dies. Several other important features. Ask for full information.

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leases constitute the major source of demand as buying still is moderate. Increased inquiries are looked for shortly from motor and aircraft manufacturers. Warehouses are placing small orders.

## Wire

Wire Prices, Page 87

**Pittsburgh**—Wire markets show little life. Manufacturers' wire is slower, although automotive buying is imminent, some having already appeared. Prices are steady. A

firmer tone also is reported on merchant products, although this may be deceptive because of small volume of inquiries. Warehouse orders are small, but fairly active buying for spring is indicated.

**Boston**—Further reductions in finishing operations are being made by wire mills, incoming tonnage being about half that shipped. Backlogs are rapidly being depleted and shipments are declining. Buying is mostly to fill small gaps in consumer stocks. Deliveries are practically normal on the more common items. Users still have substantial inven-

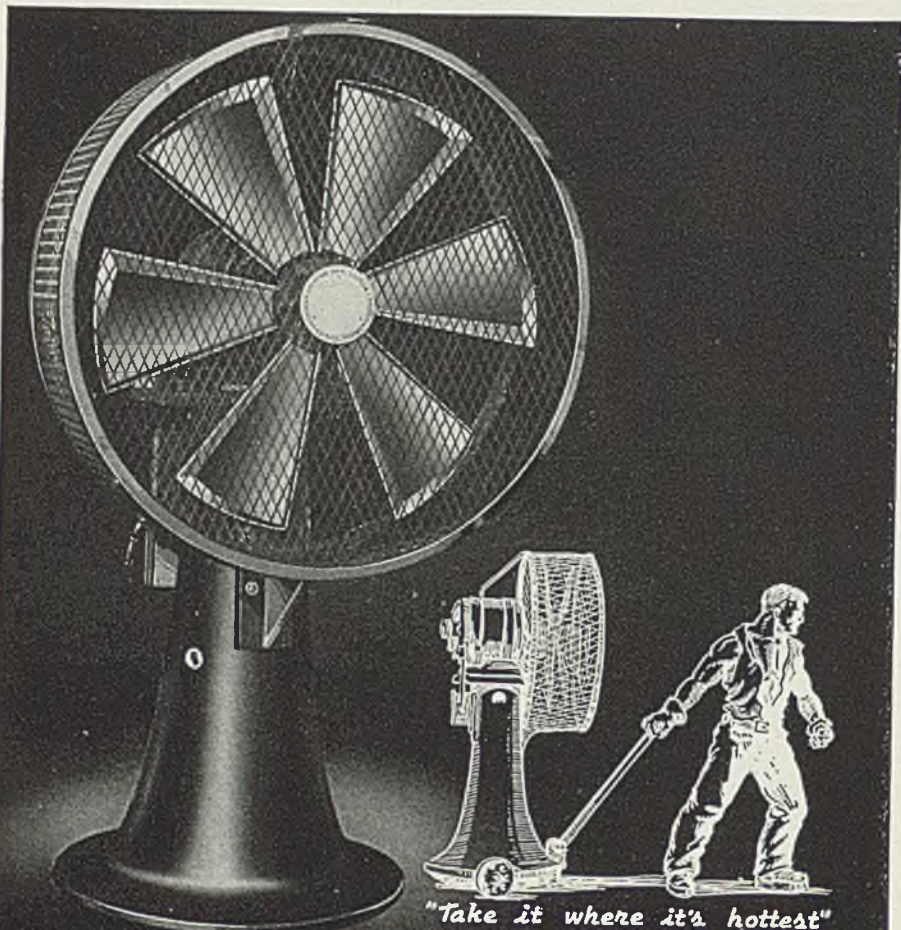
tories in numerous instances, although consumption is well maintained.

**Cleveland**—Business is unchanged or slower and is marked principally by small orders. Consumption of manufacturers' wire is off in some directions, partly for seasonal reasons, with requirements drawn in a measure from inventories and releases against previous orders. No marked recovery in buying is seen soon.

**Chicago**—Improvement in buying recently has been slight, but a more definite recovery is expected shortly since inventories are believed light in relation to current consumption. Needs of farm equipment and household utility manufacturers continue substantial. Hardware and automotive accessory interests are buying small lots, mostly for fill-in purposes.

**New York**—Wire buying is slow, incoming volume being about 45 per cent of shipments. This ratio, prevailing for several weeks, has resulted in steady reduction of backlogs and some curtailment in production. Consumers continue to operate largely on inventories, but the extent the latter are being reduced is a matter of conjecture in view of the fact users have been specifying fully against orders and taking substantial shipments until recently. Improvement in demand for merchant products has been hampered by weather conditions.

**Birmingham, Ala.**—All items in wire products are moving in good volume, including nails and wire fencing, although current orders have not kept abreast of production and shipments. Production is estimated at close to 90 per cent.



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Engineers and Manufacturers

# PERKINS MAN COOLERS

TRADE MARK REG. U. S. PAT. OFF.

## Pipe

Pipe Prices, Page 87

**Cleveland**—Pipe continues relatively more active than most steel products, despite the handicap of recent weather on building work. Standard pipe business is slower in some areas but is provided a favorable outlook by prospective residential construction. Line pipe producers have moderate backlogs, with some additional lines under consideration.

**Chicago**—Department of public works, Chicago, is taking bids Feb. 20 on 203 tons of standard special castings for water pipe, 3-inch to 24-inch sizes.

**New York**—New York city has placed 2285 tons of cast pipe with United States Pipe & Foundry Co. and Donaldson Iron Works and is expected out late in March for a

STEEL



# Rails, Cars

Track Material Prices, Page 87

Except for a few small lots of freight and passenger cars railroads show no interest in the market. While nothing definite is developing carbuilders believe additional rolling stock will be required soon and further buying is expected early in the year.

Rolling of rails against tonnages placed late last year will be under-

taken by mills as the season for track work approaches, specifications being filed now for early delivery.

## Car Orders Pending

National Tube Co., two gondolas and six hoppers.  
Nickel Plate, fifty 70-ton covered hoppers.

## Buses Booked

Twin Coach Co., Kent, O.: Fifteen 40-passenger for Surface Transportation Corp.,

much larger tonnage. Domestic inquiry and buying have improved, while export purchasing includes 2000 tons for Central America. New York city pipe included cement-lined material.

**Birmingham, Ala.**—Noticeable slackening is evident in cast iron pipe, due to a falling off in larger bookings. The quarter, however, will be satisfactory.

**Seattle**—Inquiry is more active with weather conditions improved. The week's awards included 250 tons of 6-inch at Spokane, and 100 tons of 4 to 8-inch at Pasco, Wash., to H. G. Purcell, Seattle. Bids are in at Everett, Wash., for 400 tons of 6 to 12-inch and at Seattle for 140 tons of 16-inch for the East Forty-fifth street improvement.

**San Francisco**—Further improvement in demand for cast iron pipe is noted. Awards for the week aggregated 1733 tons, bringing the year's total to date to 3328 tons, compared with 4959 tons in 1939. National Electric Products Corp., was awarded 2,000,000 feet of black pipe for work in connection with the cooling of the Friant dam, Central Valley project, Calif.

## Cast Pipe Placed

1000 tons, 6 to 12-inch, Phoenix, Ariz., to United States Pipe & Foundry Co., Burlington, N. J.  
250 tons, 6-inch, for Spokane, Wash., to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.  
100 tons, 4 to 8-inch, for Pasco, Wash., to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.

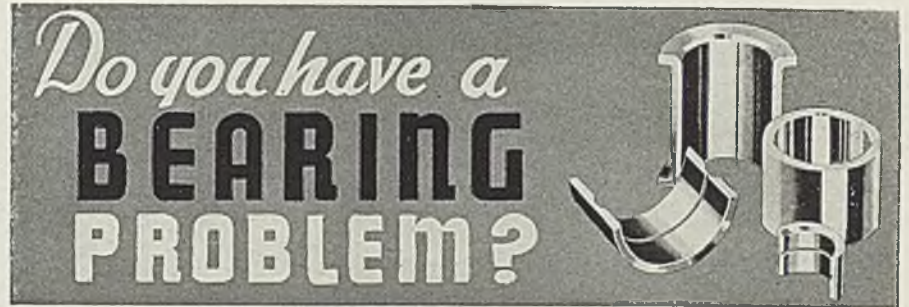
## Cast Pipe Pending

540 tons, 18-inch, Class B pipe, Billings, Mont.; bids opened.  
400 tons, 6 to 12-inch; bids in at Everett, Wash.  
240 tons, 6-inch, procurement division, treasury department, Topeka, Kans.; bids in.  
110 tons, 4-inch Class 150; bids at Seattle, Feb. 19.

## Tin Plate

Tin Plate Prices, Page 86

Tin plate operations are down 5 points to 60 per cent. Shipments also are off slightly but ahead of production for some mills. General line can needs account for most demand. Possibility of heavier than normal food packs is seen in the bad crop weather which has cut down on fresh food supplies for northern markets and which, in turn, will require larger lots of canned goods. Export business is improving, and shipments of canned foods also are expanding. Foreign orders still carry a differential over domestic prices.



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Bronx, N. Y.; ten 41-passenger for Kansas City Public Service Co., Kansas City, Mo.; ten 41-passenger for United Electric Railway, Providence, R. I.; five 31-passenger for Motor Transit Co., Jacksonville, Fla.; five 40-passenger for Steinway Omnibus Corp., New York.

## Shapes

Structural Shape Prices, Page 86

**Pittsburgh**—Inquiries are fairly numerous. Industrial expansion is involved in most new work, al-

though a fair number of government jobs are appearing. Awards are mostly for public projects.

**Chicago**—Fabricated shape orders are little changed, but inquiries are more active. Bridges account for most of recent awards, including 734 tons for a structure at West Salem, Ill. Plain shape demand from equipment builders is sustained.

**Boston** — Inquiry is moderately heavier, due largely to expanding government defense program for additional buildings at navy yards and air bases. Pending bridge tonnage is

small, although additional stringer spans for Massachusetts close March 5. Private and industrial building has been slow to improve, although awards include 235 tons for a storage building, Maplewood, Mass.

**New York**—A grade crossing elimination program at Rockaway, N. Y., the first section of which closes Feb. 28, will take about 25,000 tons of steel. The opening inquiry is for 9800 tons. An alternate also involves close to 3200 tons of H piles. Awards are heavier, including 2800 tons for Bell Telephone Laboratories Inc., New Providence township, New Jersey.

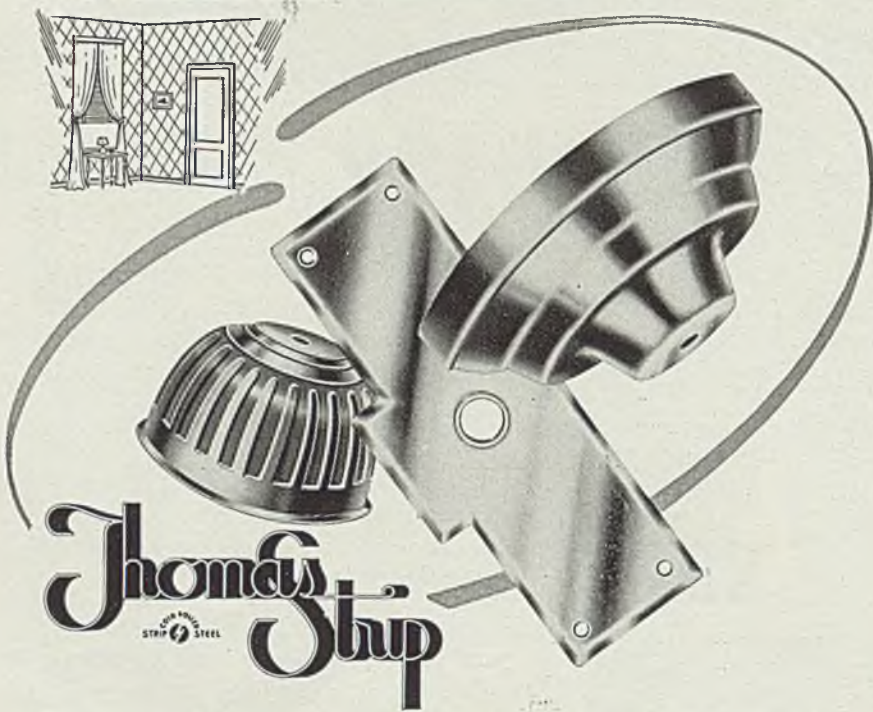
**Philadelphia**—John McShain Inc., Philadelphia, is low on the war department office building taking 4500 tons. A fair sized tonnage is pending, but new business generally is light.

**Buffalo** — Although little immediate improvement in orders is indicated, the outlook is regarded as more encouraging. Largest of prospective jobs is the 6000-ton Rainbow bridge to replace the collapsed Honeymoon bridge at Niagara Falls. Bids are set for March 20. A \$4,000,000 grade crossing elimination program for Erie county this year involves 17 individual jobs.

**Seattle**—Plans will be out shortly for the Washington state Kettle river bridge involving about 1000 tons and additional placements for the navy air bases in Alaska are expected soon. Shops have substantial backlogs.

**San Francisco** — Featuring the structural market was the award of the largest project in over a year, 16,595 tons for the Pit River bridge on the Central Valley project, Calif., to American Bridge Co., Pittsburgh. Columbia Steel Co. took 6398 tons, including 3900 tons of bearing piles and 2400 tons of sheet steel piling, for the Sepulveda dam, Los Angeles, and Bethlehem Steel Co. was awarded 11,857 tons, including 7878 tons of H columns, 1775 tons of sheet steel piling and 2204 tons of structural shapes, for dry docks at Pearl Harbor, T. H. Pending busi-

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STAMPINGS made from pre-coated Thomastrip are produced at greater speeds and lower costs. Deep drawing and forming operations are aided. Finishing and handling operations are simplified. Buffing and polishing are reduced—often eliminated. Electro coatings applied to cold strip at the Thomas Mill will not crack, peel nor flake—they offer a short-cut to high quality production of finished parts.

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STEELS THAT STIMULATE PROGRESS

BRIGHT FINISH UNCOATED, AND ELECTRO COATED WITH NICKEL, BRASS, COPPER, BRONZE, ZINC AND TIN

### Shape Awards Compared

	Tons
Week ended Feb. 17	49,490
Week ended Feb 10	18,917
Week ended Feb. 3	7,415
This week, 1939	9,961
Weekly average, year, 1940	18,939
Weekly average, 1939	22,411
Weekly average, January	13,938
Total, to date, 1939	171,440
Total, to date, 1940	131,574

Includes awards of 100 tons or more.



ness now exceeds 10,500 tons, most of which, it is expected, will be placed within the next 30 days.

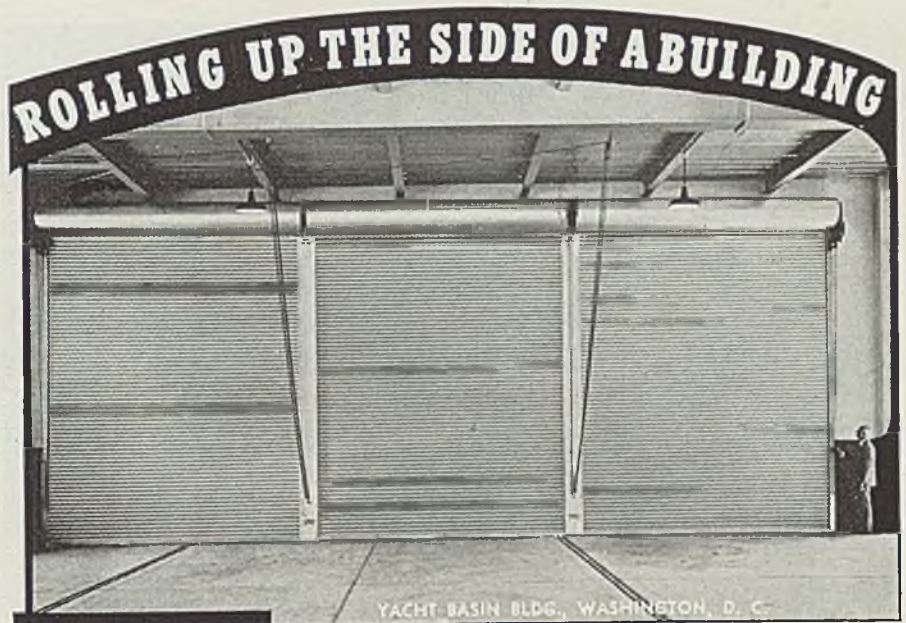
**Birmingham, Ala.**—In contrast to expectations, shapes have improved somewhat in spot orders, although off considerably from the peak of the last quarter. Production is about 65 per cent, and much tonnage is going into private construction.

### Shape Contracts Placed

- 16,595 tons, Pit river bridge, Central Valley project, Calif., to American Bridge Co., Pittsburgh, Pa.
- 11,857 tons, including 7878 tons of H columns, 1775 tons of sheet steel piling and 2204 tons of structural shapes, two dry docks, Pearl Harbor, T. H., to Bethlehem Steel Co., Bethlehem, Pa.
- 6398 tons, including 3900 tons of bearing piles, 2400 tons of sheet steel piling and 98 tons of structural shapes, Sepulveda dam, Los Angeles, to Columbia Steel Co., San Francisco.
- 2800 tons, building, Bell Telephone Laboratories Inc., New Providence township, New Jersey, to Bethlehem Fabricators, Bethlehem, Pa., through John Lowry Inc., New York, contractor.
- 1700 tons, state bridge over Merrimac and Butler lake, St. Louis, to Stupp Bros. Bridge & Iron Co., St. Louis.
- 1350 tons, Dutch Kills bridge, Queens, New York, to Harris Structural Steel Co., New York.
- 1215 tons, Dooker Hollow bridge, Pittsburgh, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 1060 tons, building, group No. 2, state school for mental defectives, Willowbrook, Staten Island, New York, to Belmont Iron Works, Philadelphia, through Silverblatt & Lasker, New York, contractors.
- 785 tons, housing project, Pittsburgh, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 734 tons, state highway bridge, West Salem, Ill., to Joseph T. Ryerson & Son Inc., Chicago.
- 540 tons, state bridge, Petersburg, Ill., to Bethlehem Steel Co., Bethlehem, Pa.
- 520 tons, kitchen and dining units, state school for mental defectives, Willowbrook hospital, Staten Island, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Andrews & Andrews, New York, contractor; bids Feb. 8, Albany.
- 350 tons, laboratory and shop buildings, Ft. Monmouth, N. J., for war department, to Bethlehem Steel Co., Bethlehem, Pa.
- 350 tons, substation, Bonneville, Oreg., for army engineers, to Bethlehem Steel Co., Bethlehem, Pa.
- 350 tons, warehouse and maintenance buildings, Kelly Field, Texas, to Mosher Steel Co., Houston, Tex.; Hill & Combs, San Antonio, contractors.
- 337 tons, Bonneville power house roof, to Bethlehem Steel Co., Bethlehem, Pa.
- 300 tons, post office building, Milwaukee, to Worden-Allen Co., Milwaukee.
- 240 tons, sheet piling, Standard Oil Co. dock, Green Bay, Wis., to Inland Steel Co., Chicago.
- 240 tons, storage building, Friend Bros., Maplewood, Mass., to A. O. Wilson Structural Steel Co., Boston.
- 216 tons, copper bearing piles, Smith river bridge, Del Monte county, Calif., to Bethlehem Steel Co., Bethlehem, Pa.
- 200 tons, factory buildings, for Lindsay Wire Weaving Co., Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.

- 200 tons, bridge, Massachusetts avenue, Washington, to Bethlehem Steel Co., Bethlehem, Pa.
- 193 tons, state highway bridge, Mt. Pufaski, Ill., to A. F. Anderson Iron Works, Chicago.
- 185 tons, building, Mohawk Paper Mills, Cohoes, N. Y., to Utica Structural Steel, Inc., Utica, N. Y.
- 155 tons, bridge FAP-489, Perry county, Tennessee, to Bristol Steel & Iron Co., Bristol, Va.
- 140 tons, bridge FA GH 191-D (2) Lee county, Arkansas, to Clinton Bridge Works, Clinton, Iowa.
- 130 tons, manufacturing and storage building, American Sales Book Co.,

- Buffalo, N. Y., to R. S. McMannus Steel Construction Co., Buffalo; reported last week as going to an un-stated fabricator.
- 125 tons, bridge FAP-452 (A) Benton, Ark., to Arkansas Foundry Co., Little Rock, sublet to Virginia Bridge Co., Roanoke, Va.
- 120 tons, gymnasium, state university, Ames, Iowa, to Iowa Steel & Iron Works, Cedar Rapids, Iowa.
- 120 tons, foundry building, Harwick Stove Works, Cleveland, Tenn., to International Steel Co., Evansville, Ind.
- 115 tons, bridge FAP-492-A (1) Shelby county, Tennessee, to Virginia Bridge Co., Roanoke, Va.



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You can get better results and cut door costs in your plant with Kinnear Rolling Doors. They're built in any size, for any opening, in old or new buildings, and with motor or mechanical control.



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A two-door-wide opening can be cleared, on either side.



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**The KINNEAR Manufacturing Company**  
 1780 - 1800 FIELDS AVE., COLUMBUS, OHIO  
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### Shape Contracts Pending

- 5000 tons, first building unit, war department, Washington, John McShain Co., Philadelphia, low, bids Feb. 9, Washington.
- 2600 tons, State of Oklahoma, highway bridges; low bidders include: Custer county, 1100 tons, Moran & Buckner, Oklahoma City, Okla.; Harper county, 310 tons, Brooks & Dahlgren, Oklahoma City, Okla.; Bryan county, 248 tons, O. J. Pharoah, Henrietta, Okla.; Mayes county, 295 tons, Glen E. Blas, Tulsa, Okla.; Pittsburgh county, 151 tons, Lewis Construction Co., Muskogee, Okla.; Cordell county, 197 tons, F. D. Ford, Cordell, Okla.
- 2500 tons, Fort Hamilton high school, Brooklyn.
- 1800 tons, borough hall building, Queens, New York, bids Feb. 24.
- 1100 tons, buildings, General Motors Corp., Buick Motors division, Flint, Mich.
- 950 tons, 13-story apartment, Bronx, N. Y.
- 725 tons, bridges, Elkton, Md.; Langenfelder Co., Baltimore, low on general contract.
- 600 tons or more, trash racks, stop logs, etc., Bonneville dam; bids in to United States Engineer.
- 550 tons, structural laboratory superstructure, 9277, for United States navy, Philadelphia.
- 530 tons, dead end towers and supports, Bonneville project; bids Feb. 19, in-

- terior department, Portland, O. pro. 769.
- 500 tons, steel piling, Cuyahoga r straightening program, Cleveland Western Foundation Co., Cleveland, general contractor.
- 500 tons, building and alterations, Joseph E. Seagram & Son, Louisville, Ky.
- 500 tons, state bridge over Cataw river, Rock Hill, S. C.
- 400 tons, shop building, United States Gypsum Co., Flushing, N. Y.
- 350 tons, chemical building, Toledo, for city.
- 345 tons, research flight building, Moff Field, Calif.; James B. Barnes Construction Co., Santa Monica, Calif. low on general contract at \$227,700.
- 330 tons, bottling plant, for Frankfort Distilleries, Dundalk, Md.
- 300 tons, submarine mine depot, Norfolk, Va., bids Feb. 21, to United States engineer.
- 300 tons, additions to building, for Seltilla Magneto Co., Sidney, N. Y.
- 270 tons, state bridge, route 35055, O Forge, Pa.
- 250 tons, material for navigation lock Gravel Switch, Ky., for Tennessee valley authority.
- 250 tons, bridge, Dubuque, Iowa, for Illinois Central railroad.
- 200 tons, state bridge over Rocky river Iva-Antreville, S. C.
- 200 tons, housing project, Bridgeport, Conn., for city.
- 200 tons, converter building extension Phelps-Dodge Corp., Douglas, Ariz., bids in.
- 180 tons, subway station section D-2-A Chicago, bids Feb. 29.
- 171 tons, highway span, Allen Park, Wayne county, Mich., bids Feb. 21.
- 160 tons, including 150 tons steel castings, upper and lower lock gates, Kentucky dam; bids Feb. 28 to Tennessee valley authority, Knoxville, Tenn.
- 150 tons, beam spans, Thermopolls, Wyo., bids in.
- 150 tons, high service pumping station, Toledo, O., for city.
- 128 tons, west section, upper dock, Forty-third street, Armour & Co., Chicago, bids in.
- 125 tons, low service pumping station, Toledo, O., for city.
- 120 tons, state bridge, Pleasant Hill, Ill.
- 110 tons, addition to building, for St. Mary's hospital, Waterbury, Conn.
- 105 tons, bridge, Pleasant Hill, Ill., bids in.



Handling FERROMANGANESE from cars to stock pile this Blaw-Knox Bucket unloads an average of 7 cars per eight hour shift. The former cost of \$.65 per ton was reduced to \$.25 per ton.

This bucket handles LIMESTONE in pieces ranging from 6" to 12" from dock to 50-60 ton gondola, filling car in an average time of 20 minutes.

It unloads SPIEGEL from 50-60 ton car in 1½ hours without teeth, and handles PIG IRON from stock pile at the rate of about ¾ Cu. Yds. per grab.

Blaw-Knox Buckets are designed to meet Steel Mill requirements—put your bucket problems up to Blaw-Knox.



### Ferroalloys

Ferroalloy Prices, Page 88

New York—Movement of ferromanganese and other ferroalloys reflects continued decline in steelmaking, and in view of the shorter month, February shipments may be the lowest since last summer. Prices are unchanged. Tungsten ore quotations are easier but without sufficient business to provide a test.

Moore Steam Turbine Corp., Wellsville, N. Y., wholly owned subsidiary of Worthington Pump & Machinery Corp., Harrison, N. J., will henceforth be conducted as the Moore Steam Turbine division of the corporation.

# BLAW-KNOX

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# BUCKETS

Digging  
and  
Rehandling



# Reinforcing

Reinforcing Bar Prices, Page 87

**Pittsburgh**—Awards and inquiries are few, although considerable tonnage is awaiting placement. Prices are spotty, a factor in delaying some purchases, while the reduced level of mill backlogs is stimulating competition.

**Chicago**—The market continues quiet despite fairly large pending tonnages. Activity in small lots is relatively good. A South Chicago grain elevator will take 190 tons.

**Boston**—Pending reinforcing tonnage is heavier. Inquiry is featured by 625 tons, pressure tunnel, Springfield, Mass., closing March 1, and 225 tons, housing project, Bridgeport, Conn. While the building outlook has improved, the bulk of active construction includes government structures involved in the defense program. Bridge and highway work lags. Buying is mostly in small lots.

**New York**—Inquiries are headed by 1225 tons for Long Island railroad grade crossing eliminations. Awards are light, outstanding being 560 tons, including reinforcement trusses, for the Thomas A. Edison bridge, Raritan river, New Jersey. Bid openings for highway work are few, and pending volume of mesh is small. Bar prices are soft.

**Philadelphia**—District fabricating shops are averaging less than 50 per cent operations, reflecting current slow business. Prospects for private work are more encouraging.

**Seattle**—Small tonnages feature the market but the aggregate is not heavy. Several important projects are developing in this area. Meanwhile rolling mill operations have been curtailed. Bethlehem Steel Co., Seattle, has taken 130 tons for a quay at the Puget Sound navy yard.

**San Francisco**—The outstanding reinforcing bar letting went to Bethlehem Steel Co., 2096 tons for two dry docks at Pearl Harbor, T. H.

## Concrete Bars Compared

	Tons
Week ended Feb. 17.....	5,671
Week ended Feb. 10.....	7,320
Week ended Feb. 3.....	16,530
This week, 1939.....	4,302
Weekly average, year, 1940..	8,437
Weekly average, 1939.....	9,197
Weekly average, January....	7,410
Total to date, 1939.....	84,603
Total to date, 1940.....	59,062

Includes awards of 100 tons or more.

Awards totaled 2445 tons and brought the year's aggregate to 14,479 tons, compared with 22,773 tons for the same period last year. Pending business exceeds 19,500 tons.

## Reinforcing Steel Awards

2096 tons, two dry docks, Pearl Harbor, T. H., to Bethlehem Steel Co., San Francisco.

1260 tons, invitation 321949, procurement division, treasury department, New York, to Truscon Steel Co., Youngstown, O.


1100 tons, addition to city hospital, St. Louis, to Laclede Steel Co., St. Louis;

H. B. Deal & Co., contractor. 560 tons, including 330,659 lineal feet reinforcement trusses, contract 6, Thomas A. Edison bridge, Raritan river, Sayreville-Woodbridge, New Jersey, to Bethlehem Steel Co., through John G. English Inc., New York, and Joseph Nesto Co., Newark, N. J., joint contractors.

250 tons, building superstructure, navy yard, Washington, to Ceco Steel Products Corp., Washington; Harwood-Nebel Construction Co., Washington, contractor.

175 tons, highway project, route 35, section 14B, New Jersey, to Joseph T. Ryerson & Son Inc., through Eisenberg Construction Co., Camden, N. J.

130 tons, Puget Sound navy yard quay,



1906-1940

# DAMASCUS

## Manganese and Alloy Steel CASTINGS

FROM ½ TO 1000 POUNDS

Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

We are in position to manufacture specialties made of manganese and alloy steel castings and invite concerns to write us about their requirements.

**DAMASCUS STEEL CASTING CO.**  
 New Brighton, Pa.  
 (Pittsburgh District)



# Behind the Scenes with STEEL

## Screwy

■ The Eagle Lock Co. makes screws as well as locks, and screw machines have a regrettable tendency to produce an overlarge percentage of culls—screws with improper threading or without points, etc. Eagle was taking a nice beating on all those rejects until one guy hatched an idea. He painted the rejects all sorts of bright colors, made up some rods with fishing lines tied to them and a little magnet on the end of each line. The idea is to fish for screws with the magnet, each color counting so much. The kids go for it. Eagle named the game "Screwy" and now is bringing out a smaller edition called, "Just A Little Screwy." If sales keep up we understand the company will have to look around for screw machinery that is capable of turning out more rejects!

## Causing Trouble

■ Rod C. (Noblitt - Sparks) Pruitt relates sadly that the boys over in Columbus, Ind., are still struggling over our walled city problem and that it is costing the company serious money. Let it never be said we stoed in the way of industrial progress.

Confidentially, the answer is 9 miles.

## We Like It

■ Mr. Pruitt doesn't fool though, when he has something more serious to say. What's more we won't attempt to argue with his flat-footed statement: *STEEL is the best trade magazine published.*

## English Relatives

■ Did you notice the nice mention our great uncle Ambrose got on page 46 of last week's issue? He sure must be doin' a good job over there in England if he can afford to buy one of those 20,000-pound drop hammers from Chambersburg Engineering. It's about time us

Shrdlus forgive him for changing his name to Ambrose Shrdlow, what with the war and everything.

## Watch For It

■ We warn you now not to miss the article in next week's issue on the weldability of high-sulphur steels. It is written by J. H. Hruska, metallurgical engineer, Electro-Motive Corp. and goes thoroughly into an important subject on which only limited information is available.

## Definitions

■ Regardless of what Webster has to say, a *recession* is a period in which you tighten up your belt; a *depression* is a time in which you have no belt to tighten; and when you have no pants to hold up, then, dear reader, it's a *panic*.

## Help, Mr. Woodall!

■ Robt. A. Lamb (Standard Rwy. Equip.), puzzle solver *par excellence*, crashed through to save the class from flunking Walter Cronenwett's spring deflection problem and then offers \$5,400 as the number of cannon balls in that pile last week. There's a swell chance we're wrong but we got 121,090, the same as Herbert Reith of Carnegie-Illinois. Are we Reith or Wrong?

## Simple But Tricky

■ This one's different. Just read this sentence:

FEDERAL FUSES  
ARE THE RESULT  
OF YEARS OF SCI-  
ENTIFIC STUDY  
COMBINED WITH  
THE EXPERIENCE  
OF YEARS.

Now count the F's in that sentence. Only once, don't go back and count them again. The correct answer is the page number of Baker-Raulang's nice looking ad.

SHRDLU

to Bethlehem Steel Co., Seattle; General Construction Co., Seattle, general contractor.

100 tons, warehouse and maintenance buildings, Kelly Field, Texas, to Ceco Steel Products Corp., Houston, Tex.; Hill & Combs, San Antonio, contractors.

## Reinforcing Steel Pending

4000 tons, officers' quarters, Panama Canal zone; bids Feb. 28.

1225 tons, first section grade crossing elimination, Long Island Railroad, Rockaway, N. Y.; bids Feb. 28.

1200 tons, first unit, building, war department, Washington; John McShain Co., Philadelphia, low, bids Feb. 9, Washington.

625 tons, Mill river pressure tunnel, Springfield, Mass.; bids March 1.

500 tons, dam, Nimrod, Ark., Perry and Yell counties; bids Feb. 27.

300 tons, bridge over Elk river, Cecil county, Maryland; bids Feb. 13.

300 tons, housing project, South Norwalk, Conn., Caulway Co., New York, contractor.

240 tons, superstructure, building 200, navy yard, Washington.

192 tons, Washington state Kettle River bridge piers; bids to Olympia, Feb. 27.

175 tons, highway project, route 29, sections 3B, 1C and 2C (widening) Union county, New Jersey; Franklin Contracting Co., Newark, low, \$313,852.53, bids Feb. 9, Trenton.

170 tons, highway project, Allamuchy-Hackettstown Road, section 2, Hackettstown, N. J.; bids March 1, E. Donald Sterner, state highway commissioner, Trenton.

100 tons, highway project, route 6, sections 11B and 12A, relocation, Pine Brook bridge, Essex-Morris counties, New Jersey; Joseph Nesto Co., Newark, low, \$104,108.46; bids Feb. 9, Trenton.

100 tons, highway project, Pennsville-Salem Road, Salem county, New Jersey; bids March 1, E. Donald Sterner, state highway commissioner, Trenton.

Unstated, 343-foot Oregon state viaduct, Washington county; bids in at Portland.

## Pig Iron

Pig Iron Prices, Page 88

**Pittsburgh**—Pig iron production is declining slowly, and shipments are somewhat lighter. Jones & Laughlin has shut down one Pittsburgh furnace, leaving the district 39 active stacks out of 50. Hand-to-mouth buying is expected to continue until spring. H. C. Frick Coke Co. has closed the last of its recently active beehive coke ovens, numbering about 1000, principally in order to divert coal to by-product ovens of Steel corporation subsidiaries. Coal supplies of the latter had been reduced by interference of ice with river shipments. About 2500 beehive ovens still are active, lowest in five months. Beehive furnace coke prices are easier.

**Chicago**—Sales are almost negligible. Releases so far this month

STEEL



are off about 40 per cent compared with January. Generally, foundry melt is still good, although a few specialty lines are off seasonally. Foundries are cutting heavily into stocks. By-product foundry coke shipments are 10 per cent ahead of last month and likely to hold the gain. March is expected to be a better month for pig iron sales and releases.

**Boston**—Buying is light and shipments have declined further. Combination of slower demand for castings and fairly substantial shipments early in the year has worked to slacken activity, and indications are little buying will develop before mid-March when more consumers will consider second quarter needs. There has been some reduction in melt, although most schedules are maintained.

**New York**—Buying is expected to continue sluggish until some time next month. Consumers are drawing against stocks and old orders, and the melt has made no important gains so far this year. Machine tool builders continue the leading consumer group.

**Philadelphia**—Consumers are comfortably covered on nearby requirements and no buying movement is in early prospect, although a steel foundry may take 1000 tons. Export demand is quiet despite more attractive prices.

**Buffalo**—Shipments to foundries show little further recession, and some sellers report the movement so far this month ahead of January. Most foundries are working four to five days a week, some on lighter heats, with iron stocks at certain plants relatively light. Orders are light, but unfilled business will support shipments.

**Cincinnati**—Shipments probably are at the low point for this quarter, with requirements of stove, furnace and farm implement makers commencing to expand. As in previous weeks, demand for machine tool castings is the main supporting factor. Pig iron contracts now expiring are being replaced by new ones at the full market.

**St. Louis**—Demand is retarded by heavy shipments late in 1939. Some deliveries scheduled for January and February have been held up, but there have been no cancellations. Stove foundries in the Belleville, Ill., district have resumed operations at three days a week after having been down for three to five weeks. Heavier schedules are expected about March 1.

**Birmingham, Ala.**—Except Sloss' No. 4 furnace in North Birmingham, all the district's blast furnaces are active and prospects are satisfactory, although some disappointment

is expressed over failure of shipping instructions to materialize in anticipated volume.

**Toronto, Ont.**—Merchant pig iron sales have started to improve, orders for the week totaling around 1500 tons, principally from small melters. Forward bookings continue dull. Daily melt is beginning to expand, now holding around 70 per cent.

## Scrap

Scrap Prices, Page 90

**Pittsburgh**—Snow blanketed the district and stopped all scrap operations. However, the market remains weak and little change is in sight unless mills demand immediate shipments on outstanding or-

ders. Buying is absent and prices are largely nominal. Brokers are finding it impossible to pick up material of any kind, and so far there has been no distress material appearing.

**Cleveland**—Prices are lower but no distress tonnage has appeared. Dealers have become buyers and are accumulating material. Quotations on most grades are down 50 cents to \$1.

**Boston**—Scrap prices for domestic shipment continue to ease, several grades being off 50 cents or more for delivery to eastern Pennsylvania and New England. Included are borings and turnings, busheling, No. 1 and 2 cast and shafting, the reduction in the latter being \$1.50 per ton to \$17.00 to \$17.50 f.o.b. Demand is light, district steelworks taking little scrap while foundries continue to



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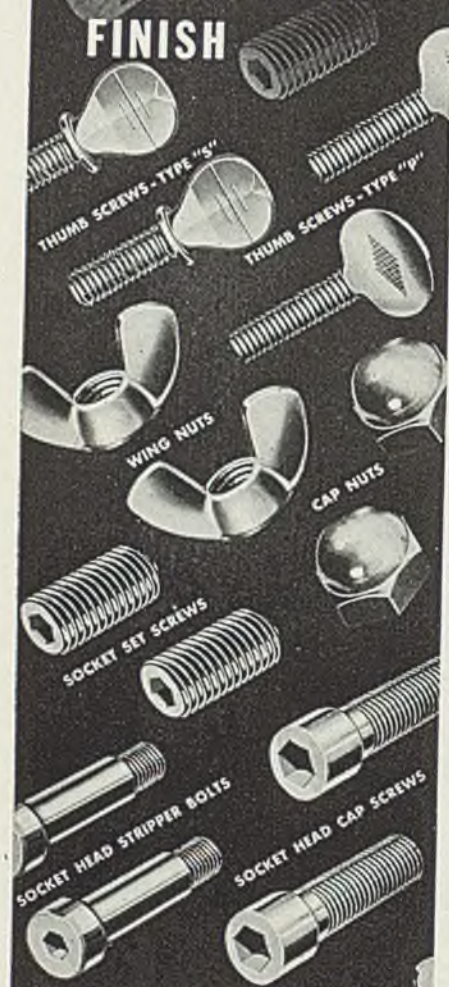
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Produced by an improved process, developed through years of experience in the manufacture of precision screw products, Parker-Kalon Wing Nuts, Cap Nuts, Thumb Screws and Socket Screws have the quality that wins unqualified approval of engineers and production men. Write for free samples . . . compare . . . see for yourself. Stocked by reliable industrial distributors near you.  
**PARKER-KALON CORP.**  
200 Varick St., New York, N. Y.

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*Cold-forged*

**SOCKET SCREWS  
WING NUTS · CAP NUTS  
THUMB SCREWS**

SOLD THROUGH REPUTABLE DISTRIBUTORS

buy minimum lots. Boat loading for export is heavier, two vessels taking close to 6500 tons, mostly heavy melting steel. As shippers covered substantially against this tonnage, pricing for export is not heavy, with buyers for dock delivery unchanged.

**Chicago**—Heavy melting steel is slightly firmer, following an easier trend early last week. The market generally is quoted \$15.50 to \$16. No material is understood to be available at less than \$15.50, although previously some sales by dealers were reported at \$15.25 and \$15. Most other grades are unchanged but are nominal in a number of instances. Mill stocks have been reduced the past few months.

**New York**—Domestic buying is sluggish, with shipments and collections hampered by transportation difficulties resulting from the recent storm. Prices continue to decline, most grades being off close to 50 cents. These include borings, turnings and heavy melting steel for domestic consumption. Export demand is featured by a new inquiry for Japan. Uncertainty as to cargo space is retarding purchases against old export orders. A substantial tonnage already has been accumulated on barges.

**Philadelphia**—Scrap shipments have been checked abruptly by severe weather, but prices have weakened further. Several sales are reported, ranging from 500 to 1000 tons, with No. 1 steel bringing \$17, No. 2 selling at \$16, borings and turnings \$10 and machine shop turnings \$11. Heavy breakable cast is firm at \$18. Stove plate and grate bars have sold at \$15. Export markets are quiet.

**Buffalo**—While a few small sales have been reported within the lower price range posted a week ago, there is a dearth of offerings at these levels. Considerable confusion prevails among both consumers and dealers regarding prices, while inclement weather also is a factor in retarding the flow of available scrap. A small sale of cast iron borings is reported within the prevailing range of \$10.50 to \$11.

**Cincinnati**—Prices are weaker, with demand and consumption declining. Dealers are refraining from stock additions and collections are light. Prices on many grades are nominal. Railroad lists this month have been small.

**St. Louis**—The market is easier, prices being off 25 to 50 cents, with heavier offerings appearing. Slowing down in steelmaking is a deterrent to more active demand from mills. No. 2 steel is down 50 cents, dealers paying \$13.75 to \$14, f.o.b. consuming point.

**Birmingham, Ala.**—Continued weakness is reported in the local

scrap market with prices tending downward. Some No. 1 cast and stove plate is moving to foundries, but steel items are not in great demand.

**Toronto, Ont.**—Better undertone has developed in scrap, both as regards demand and offerings to dealers. Consumers of steel scrap are in the market, and good orders are reported from Hamilton melters. A small order for steel turnings disclosed little material available. Iron scrap also is more active, especially cast and stove plate.

**San Francisco**—Further reductions in heavy melting steel are expected and buying by mills is confined to replacement. Generally, the tone of the market is weak as mill operations continue to decline. While at least one vessel is being loaded at San Francisco for Japan, it is understood the movement applies only to back orders and no new movement is reported. No. 1 heavy melting steel, f.o.b. cars metropolitan area, Los Angeles and San Francisco, continues \$14.50 to \$15.50 with No. 2 quoted \$13.50 to \$14.50.

## Warehouse

Warehouse Prices, Page 89

**Cleveland**—Business is spotty but little changed in total. A fairly steady trend is in prospect until next month when the season is expected to have a stimulating influence.

**New York**—Leading warehouses have reduced No. 18 gage and heavier galvanized sheets to 4.75c base and No. 20 gage and lighter to 4.50c. This results from a highly competitive situation, prices having been widely shaded recently. Business is well maintained and with some jobbers is ahead of last month, improved buying of specialties being notable.

**Philadelphia**—Business is a shade better than in January, but orders are small. Prices are holding well, including galvanized sheet quotations.

**Buffalo**—Although sales are off from January, business still is considered good and well ahead of the rate a year ago.

**Cincinnati**—Sales hold at the early February rate and are less active than a month ago. Demand is retarded by influence of the weather on outdoor projects and by improved deliveries offered by mills.

**St. Louis**—Business has improved slightly this month, but January sales were retarded by weather. Further gains are expected with approach of spring.

**Seattle**—Jobbing houses report sheets, bars and light plates in best



demand, total volume being satisfactory, increased sales expected within 30 days. Public agencies are furnishing much of the business. There is no change in prices.

## Steel in Europe

Foreign Steel Prices, Page 89

London—(By Cable)—Production of steel and iron in Great Britain continues at high pressure, mainly for government requirements and war materials. Steel mills are, for the most part, booked until second half for commercial users. Tin plate producers are engaged on a lathe contract for export to France, restricting exports to other markets.

Belgium and Luxemburg report export trade is restricted mainly to neighboring markets as strong American competition is met in overseas trade.

## Congdon & Carpenter In Business 150 Years

■ Congdon & Carpenter Co., Providence, R. I., dealer in steel, metals and hardware, founded in 1790, is observing its sesquicentennial this year. In observance of the completion of 150 years of business the company has issued a booklet covering the history and growth.

The period has covered practically all the history of the United States, Rhode Island having ratified the constitution during 1790, the last of the original 13 colonies to do so. From the small warehouse of that day to the present large institution, growth has kept pace with changes in demand and methods. G. Maurice Congdon, president, is the fourth generation of the Congdon family, descended from Joseph Congdon, the founder.

## Iron and Steel Industries Create 3,135,000 Jobs

■ More than 3,135,000 or nearly 40 per cent of 8,569,200 wage earners engaged in manufacturing in 1937, were employed in the iron and steel industry and its principal manufacturing customers.

American Iron and Steel institute, in a study of the latest manufacturers' census, reports steel and principal steel consuming industries represented nearly 45 per cent of total manufacturing industries' payrolls. Steelworkers and workers in steel-using industries received \$4,536,000,000 in wages in 1937. Aggregate of \$10,113,000,000 was paid to manufacturing industry workers that year. Manufactured goods produced in

1937 were valued at nearly \$61,000,000,000. Products of the steel industry were valued at about \$4,000,000,000 or 7 per cent of the total.

Products made from iron and steel, says the institute, exceeded \$20,000,000,000 in value. This was about 33 per cent of the total value of industrial production, and five times that of iron and steel produced.

## Steel Buying Nations Use 12,000,000 Tons in 1937

■ Steel consumption in nations which import all or most of their requirements totaled nearly 12,000,000 tons in 1937. According to estimates of the American Iron and Steel institute, consumption of steel in those countries represented about 12½ per cent of the 96,000,000 tons used that year throughout the world.

Almost 80 per cent of the steel consumed by countries where little or no steel is produced came from England, France, Germany and Belgium-Luxemburg. Ten per cent came from United States; remainder from other steel-exporting nations.

Nonproducing countries of Europe consumed nearly 2,500,000

tons; South American nations about 1,500,000; those parts of the British empire not engaged in steelmaking, approximately 1,000,000 tons.

Many nations, such as Sweden, South Africa, Mexico and Canada, producing some steel, generally import more than half their requirements.

Countries which transact most of the world's steel export business produced about 77 per cent of the world's steel in 1937. Russia, Italy and Japan, which export little steel, produced about 20 per cent of the total.

Average steel consumption per capita in important steel-producing nations is 350 pounds per year. Nations producing little or no steel use 28 pounds per capita.

## Need 60 Per Cent Steel Rate for Profit in Scrap

■ Steelmaking at 60 per cent of capacity has become necessary for the scrap iron and steel industry to operate at the "break even" point, declared Benjamin Schwartz, vice president, Schiavone Bonomo Corp., Jersey City, N. J. Former director general, Institute of Scrap Iron & Steel, Mr. Schwartz told members of the Oklahoma Waste Trade asso-

# RODINE RULES IN PICKLING

Just a little RODINE, added to the pickling solution, controls the acid—saves acid and metal, lessens brittleness, and lowers pickling costs. RODINE more than pays its way.

Tell us the kind of metal you pickle, the acid used, its concentration, and the temperature of the bath. We will then recommend the proper form of RODINE for your use.

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ciation, Feb. 11, there has been a gradual decline in use of purchased scrap for open hearth furnaces.

Bureau of mines reports, he said, show that in 1935 purchased scrap approximated 28½ per cent of the entire open hearth melt. By 1938 purchased scrap used had declined to 23½ per cent; percentage of pig iron used in open hearths had increased from 43 to 48½ per cent of the melt in the same interval.

Consequently, said Mr. Schwartz, comparatively little scrap buying

took place until steelmaking exceeded 60 per cent of capacity. With market scrap increasing annually in volume, he further pointed out, the trend to use less scrap creates a surplus which must inevitably flow to other nations in a free market.

## Republic Steel Improves Warren, O., Hot Strip Mill

■ Improvements to Republic Steel Corp.'s No. 3 hot strip mill and open-hearth crane runway at Warren, O., providing longer coils to meet customer's demands and increasing mill capacity were announced last week.

F. E. Flynn, manager, Republic's Warren-Niles district, reported a new heating furnace, with capacity for 30-foot billets, is being installed. Roughing, intermediate and finishing stands are also being rearranged. New swing type, hot cut shear is being placed at furnace's discharge side; present horizontal edgers are being replaced by a motor-driven edger and four push-type edgers.

Crane runway in the open-hearth department is being strengthened to permit handling of 170-ton heats. Improved equipment for charging of open hearths is also to be installed.

## Tin Output Spurred by War Demands in 1939

■ International Tin Research and Development council, The Hague, in a current statistical bulletin gives figures for the tin industry in 1939. War conditions have made collection of accurate figures difficult.

World production in the final four months of 1939 (war months) is estimated at 96,400 gross tons, against 87,300 tons in the first eight months, making a total for the year of 183,700 tons, compared with 149,700 tons in 1938 and 209,100 tons in 1937.

World apparent tin consumption in the last four months of 1939 is estimated at 63,300 tons, against 102,400 tons in the first eight months, a total of 165,700 tons for the year. This compares with 151,500 tons in 1938 and 199,100 tons in 1937.

Use of tin in manufacture averaged 13,200 tons for the first eight months, with an estimate of 14,500 tons in September and 15,000 tons in October. Total stocks at the end of 1939 were 50,400 tons compared with 49,400 tons at the close of 1938.

## Nonferrous Metals

**New York**—Recent price cutting in nonferrous metal markets ceased last week and a much firmer undertone developed. Sales of copper increased steadily while those of lead were in excess of producers' intakes of ore and scrap.

**Copper**—Sentiment in the domestic market strengthened due to the fact that it was more profitable to sell in the export market than to consumers in this country; that the flow of red metal scrap to smelters dried up as dealers awaited an advance in prices; that the January statistical report showed a reduction of 24,044 tons in refined stocks to a total of 135,441 tons, (equivalent to less than one and one-half months' supply at the January shipment rate of 91,428 tons). No offerings of electrolytic copper were made under 11.25c, Connecticut, to domestic buyers nor under 10.40 to 10.50c, f.a.s., to exporters. Sales averaged over 2000 tons daily, the highest since December. Casting copper advanced Friday to 11.00c.

**Lead**—Sellers were forced to place a large portion of new inquiry each day on waiting lists despite bookings of substantial tonnages from reserve stocks. Turnover for the week was the best in about three months, firming the market at the 4.85-cent, East St. Louis, level.

**Zinc**—A further drop in unfilled business on producers' books brought closer the time when consumers will enter the market for increased tonnages. Producers are in a well-sold position and appear content to await the expected buying pickup. Prime western held steady at 5.50c, East St. Louis.

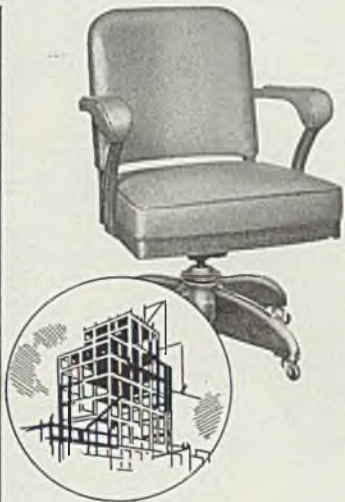
**Tin**—Great Britain expressed through diplomatic channels its concern over the re-exportation of tin from the United States to Russia and neutral countries surrounding Germany. Unless the traffic is halted Great Britain will take action to make sure that tin entering the United States will be consumed domestically. After rising sharply on Monday Straits tin prices declined steadily from 46.00c to around 45.00c at the close.

**Antimony**—Prices were unchanged at 14.00c, duty paid New York, for American spot in a dull market.

## Equipment

**New York**—Machine tool orders are numerous and would probably be heavier but for extended de-

CHAIRS SMARTLY STYLED IN STEEL



## Modern Office Chairs— Built to Endure

Harter Steel Chairs, for fine offices, are noteworthy for their ease and comfort—for their modern flowing lines and for their sturdiness.

Chairs in the Columbian Suite, illustrated above, are equipped with moulded form rubber cushions. This is in line with the latest trend, for wherever comfort is of paramount importance in seating, there you will now find foam rubber in use.

More and more business leaders are turning to Harter. They know that in so doing they will get smartly styled steel chairs—chairs that offer the last word in comfort plus extra long wear.

These business leaders also know that Harter Posture Chairs are outstanding in the posture chair field. Harter Posture Chairs are designed to make good sitting posture easy and natural. There is a Harter chair for every type of seated work. The Harter Corporation, Sturgis, Michigan.

# HARTER



## Nonferrous Metal Prices

Feb.	Electro, del. Conn.	Copper Lake, del. Midwest	Casting, refinery	Straits Tin New York Spot	Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
10	11.25	11.25	10.87 1/2	45.25	45.00	5.00	4.85	5.50	20.00	14.00	35.00
12	Holiday.										
13	11.25	11.25	10.87 1/2	46.00	45.75	5.00	4.85	5.50	20.00	14.00	35.00
14	11.25	11.25	10.87 1/2	45.62 1/2	45.50	5.00	4.85	5.50	20.00	14.00	35.00
15	11.25	11.25	10.87 1/2	45.25	45.12 1/2	5.00	4.85	5.50	20.00	14.00	35.00
16	11.25	11.25	11.00	45.12 1/2	45.00	5.00	4.85	5.50	20.00	14.00	35.00

\*Nominal.

### MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.25c Conn. copper

Sheets	
Yellow brass (high)	18.15
Copper, hot rolled	19.87
Lead, cut to jobbers	9.25
Zinc, 100 lb. base	11.00
Tubes	
High yellow brass	20.90
Seamless copper	20.37
Rods	
High yellow brass	14.11
Copper, hot rolled	16.37
Anodes	
Copper, untrimmed	17.12
Wire	
Yellow brass (high)	18.40

### OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass	
New York	7.00-7.25
Cleveland	7.50-7.75
Chicago	7.50-7.75
St. Louis	7.75-8.00
Heavy Copper and Wire	
New York, No. 1	8.75-9.00
Cleveland, No. 1	8.75-9.00

Chicago, No. 1	8.75-9.00
St. Louis	8.75-9.25

### Composition Brass Turnings

New York	6.75-7.00
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### Light Copper

New York	6.75-7.00
Cleveland	6.75-7.00
Chicago	6.75-7.00
St. Louis	6.75-7.00

### Light Brass

Cleveland	3.50-3.75
Chicago	4.25-4.50
St. Louis	4.50-4.75

### Lead

New York	4.25-4.50
Cleveland	4.37 1/2-4.50
Chicago	4.25-4.50
St. Louis	4.00-4.25

### Zinc

New York	3.00-3.25
Cleveland	3.00-3.25
St. Louis	3.25-3.50

### Aluminum

Mixed, cast, Cleveland	10.25-10.50
Borings, Cleveland	7.25-7.50
Clips, soft, Cleveland	15.75-16.00
Misc. cast, St. Louis	8.75-9.00

### SECONDARY METALS

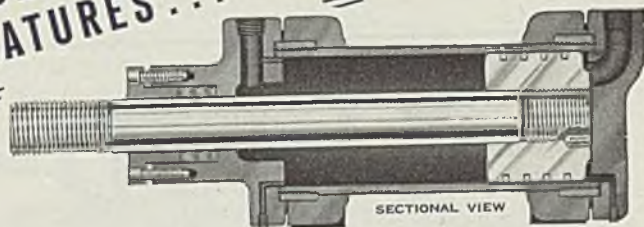
Brass ingot, 85-5-5-5, less carloads	11.75
Standard No. 12 aluminum	14.50-15.00

liveries on most lines, including even the more standard units. Some builders, for instance, are sold ahead on radial drills to August. Heavier machinery goes into October and early next year. As a result more business is being placed on a delivery basis. Airplane engine and assembly plants, leading buyers in recent weeks, are contemplating additional purchasing, with government pressure for priority on deliveries to this industry effective. Orders for tooling in connection with manufacture of an improved rapid-fire infantry rifle at the Springfield, Mass., armory and a New Haven, Conn., arms maker are about complete, several hundred thousand dollars being involved. Large orders from aircraft engine shops loom, and while there are 18 such builders in the country, for the immediate future at least, due to improved design and product, most business is likely to be centered around four.

**Chicago**—Last week was cited as a good one by machinery selling interests. Both new bookings and inquiries have increased. There is a possibility February may end as one of the best months for orders in some time. More railroad activity is noted. Milwaukee railroad is expected to re-advertise a sizable list when its budget is approved later this month. Subway contractors and electrical equipment makers are buying well, although demand as a whole is scattered, with practically all industries represented. Machine tool business is better than in December and about as good as last month. Heavy machinery orders are reported behind January but may wind up the month better.

**Seattle**—Public works projects are the most active although private interests, particularly mining and shipyards, are placing their requirements. Bonneville project, Portland, has issued the following calls: Feb. 16, two crawler type diesel tractors, double drum hoists and 30-foot cranes, Spec. 781; Feb. 19, truck mounted crane for Ampere station, Spec. 782; Feb. 20, six distributing transformers for Bonneville, Spec. 785; Feb. 26, four 230-kv oil circuit breakers for Napavine and Ampere, Spec. 791; March 1, two oil circuit breakers, 793. Tacoma, Wash., will open bids Feb. 21 for four vertical turbine pumps for South Tacoma station. Denver has called tenders March 20, Spec. 893, for furnishing the following for Coulee dam: Generator control equipment, switchgear, 460-volt station service and auxiliary power equipment, battery chargers and 250 volt distributing equipment. U. S. engineer, Bonneville, bids March 5 for distribution centers.

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# Construction and Enterprise

## Ohio

AMHERST, O.—Village, C. A. Cooper, mayor, plans power plant to cost \$145,000 and probably will open bids in three weeks.

CANTON, O.—City, L. W. J. Cooper, is planning water supply expansion to include for immediate use a 30-inch well with capacity of 5,000,000 gallons daily and for long-range improvement, development of Northwest water field to obtain permanent daily water supply of 10,000,000 gallons.

CARROLLTON, O.—Carroll electric co-operative, Frank W. Fishel, president, plans 270 miles of electric power lines. Plans have been sent to Washington for approval. Engineer is to be hired after allotment.

CLEVELAND, O.—C. S. Bush Iron & Steel Inc. has incorporated at 250 shares, no par.

DAYTON, O.—Wright field, contracting officer, will take bids to Mar. 4 for 7 brake drum lathes (circular 40-1081) and 33 combination buffer and polishing machines, 28 combination grinder and buffing machines, 224 grinders (circular 40-1073).

HAMLER, O.—Village, C. G. Hissong, plans water system including elevated tank. A. H. Smith Co., 2140 Ashland, Toledo, is engineer.

KENTON, O. — Kenton Structural & Ornamental Iron Works Inc. has incorporated with 250 shares, no par. N. L. Greenlee, 50 West Broad street, Columbus, O.

## Pennsylvania

OIL CITY, PA.—The Keystone Public Service Co., E. W. York, vice president, Drake building, will build addition to power house to cost \$250,000. Work is to start in March by owner's forces.

SHARON, PA. — Pennsylvania Power Co., 19 East Washington street, New Castle, Pa., W. H. Sammis, president, plans improvements to power plants costing \$1,000,000 and will take bids

on some portions of work, doing remainder with own forces.

## Michigan

ADRIAN, MICH.—City, Walter E. Frazier, engineer, plans waterworks improvements to cost \$175,000. Consulting engineer is A. H. Smith Co., 2140 Ashland, Toledo, O.

BAY CITY, MICH.—Henry C. Weber Construction Co., was awarded contract for addition to plant of National Electric Welding Machines Co., Bay City.

IRONWOOD, MICH.—City plans construction of municipal lighting plant.

## New Jersey

TRENTON, N. J.—Benedict-Miller Inc., Newark, N. J., has incorporated with 1000 shares preferred and 1500 shares common, all no par, for steel products.

## Alabama

GADSDEN, ALA.—City has plans by Weideman & Singleton, Engineers, Candler building, Atlanta, Ga., for waterworks improvements.

## North Carolina

CHARLOTTE, N. C.—Piedmont Fertilizer Co., J. Thurston Kiser, 109 Sterling road, let contract to J. J. McDevitt Co. for fertilizer plant at Pinoca.

## Missouri

KANSAS CITY, MO.—City proposes a \$90,000 addition to Transcontinental & Western Air Inc. building at municipal airport.

KANSAS CITY, MO.—Directors of water district No. 6, south of Kansas City, authorized issuance of \$84,000 revenue bonds for water supply. Bond election will be Feb. 20. Frank Rope is attorney.

KOCH, MO.—Board of public service, St. Louis, received low bid of \$75,710 from Robert Paulus Construction Co., 2205 Ann avenue, St. Louis, for alterations and additions to power plant building at Robert Koch Hospital. Lecoutour-

Parsons Construction Co., 4121 Forest Park boulevard, St. Louis, was second low at \$78,591. This is PWA project 1673-F.

## Arkansas

MORRILLTON, ARK.—Fire damage to warehouse for storing linters at Morrillton Cotton Oil Mill plant was \$50,000.

## Oklahoma

TULSA, OKLA.—City, W. F. McMurray, water superintendent, will probably open bids in June on \$55,000 water works improvements.

## Minnesota

MOORHEAD, MINN.—City, R. G. Price, is taking bids to March 4 on switchboard for municipal power plant. Helmick, Edesky & Lutz, 412 Essex building, Minneapolis, Minn., are engineers.

SLEEPY EYE, MINN.—City, Jens S. Jensen, city clerk, is planning power plant and distribution system. WPA has approved project. G. M. Orr & Co., 542 Baker Arcade building, Minneapolis, Minn., are engineers.

## Texas

OMAHA, TEX.—City, R. Horn, mayor, plans elevated tank, well and distributing system to cost \$40,000. Freese & Nichols, Capps building, Fort Worth, Tex., are engineers.

SAN ANTONIO, TEX. — Constructing quartermaster, Fort Sam Houston, awarded contract at \$21,438 to Darby Products & Steel Plate Co., Kansas City, Kans., for 200,000-gallon elevated steel water tank at Kelly Field, Tex.

## North Dakota

GRAND FORKS, N. DAK.—Nodak rural electric co-operative, J. Donnelly, president, is planning diesel power plant, 3 units, 500 kilowatts to cost \$225,000. Elerbe & Co., 1021 First National Bank building, St. Paul, Minn., are engineers.

## South Dakota

ABERDEEN, S. DAK. — City, Lydia Kohlhoff, city auditor, is considering plans by Fred A. Gefke, Sioux Falls, S. Dak., for power plant.

RAPID CITY, S. DAK.—Black Hills electric co-operative, Steven Kyle, secretary, has applied for REA funds for 200 miles of power lines. Walter Walking, 1110 St. Cloud, Rapid City, S. Dak., is engineer.

## Nebraska

LINCOLN, NEBR.—Petitions have been filed with A. C. Tilley, state engineer, Statehouse, Lincoln, for formation of Lincoln public power district for building power lines in Lancaster county. George Craven, attorney, Lincoln, represents applicants.

OMAHA, NEBR.—Nebraska Power Co., J. E. Davidson, president, has asked permission from state railway commission to build 46 miles of power lines in Dodge, Washington and Sarpy counties.

SCHUYLER, NEBR. — State railway commission granted permission to Elkhorn Valley Power Co. to build one mile of power line in Colfax county.

SCOTTSBLUFF, NEBR.—State railway commission granted permission to Western Public Service Co. to build a short power line in Garden county.

ST. PAUL, NEBR.—State railway commission granted permission to Howard county rural public power district to build 13 miles of power lines.

## Iowa

BEDFORD, IOWA—City, H. E. Nelson, clerk, is extending time for bids to March 5 on waterworks improvements to cost

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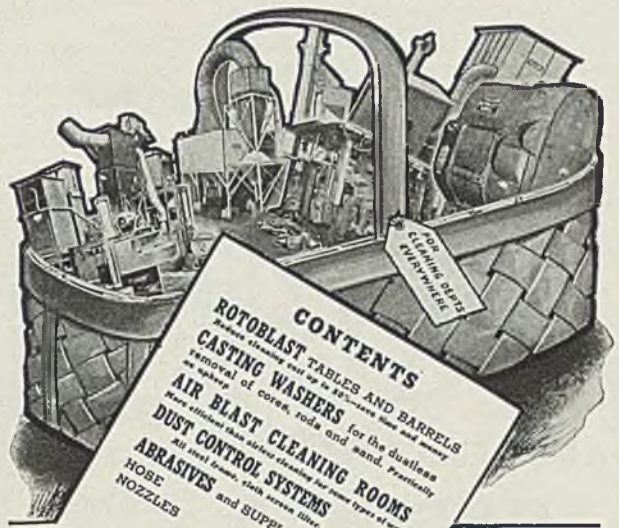
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\$36,755. Stanley Engineering Co., Muscatine, Iowa, is engineer.

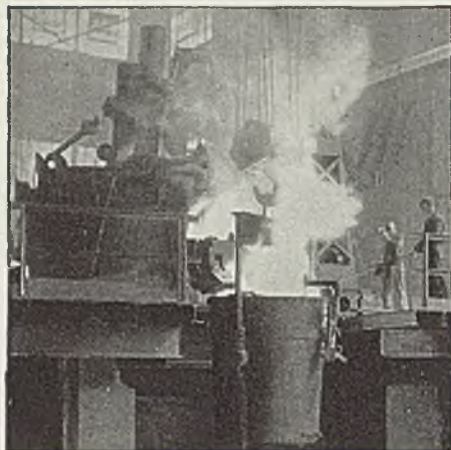
CALMAR, IOWA—City, Kenneth Meyer, mayor, has approved revenue bonds and will take bids about April 15 on electric light and power plant. Hubbard Engineering Co., 415 North La Salle street, Chicago, is engineer.

CASCADE, IOWA—Village, Leo Cooney, mayor, is taking bids to March 12 on power station switchboard, bus structure, cable and wiring as per specifications of Stanley Engineering Co., Muscatine, Certified check of 5 per cent to accompany bid.

DES MOINES, IOWA—Polk county, L. O. Linstrum, auditor, will make \$27,500 improvements to heating and power plant at county farm.



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HANCOCK, IOWA—City, H. C. Blair, mayor, will vote Feb. 28 on an \$8000 bond issue to partly finance a water-works.

JAMAICA, IOWA — City is planning sewage treatment plant to cost \$75,000. Buell & Winter Engineering Co., 508 Insurance Exchange building, Sioux City, engineer.

MAQUOKETA, IOWA — City, J. C. Thorne, city manager, is planning sewage disposal plant to cost \$35,000. This is a WPA project. Consoer, Townsend & Quinlan, 211 West Wacker drive, Chicago, are engineers.

MUSCATINE, IOWA—First Iowa hydro-electric co-operative has filed with federal power commission a declaration of intention to build a 20,000-horsepower hydro-electric project on Cedar river in Muscatine and Cedar counties.

OELWEIN, IOWA—City, J. B. Henderson, mayor, will take bids about March 20 on electric light and power plant. Hubbard Engineering Co., 415 North La Salle street, Chicago, is engineer.

WAUKON, IOWA—City, John Dotseth, mayor, will take bids about April 10 on electric light plant and distribution system. Hubbard Engineering Co., 415 North La Salle street, Chicago, is engineer.

#### Wyoming

CASPER, WYO.—Northern Pipe Line Co., R. H. Nichols, president, Casper, Wyo., has permission for \$500,000, 100-mile pipeline from Casper to Billy Creek gas field to supply gas for Sheridan and Buffalo. Work is to start in May.

EVANSTON, WYO.—City, Dr. J. H. Holland, mayor, is seeking financial aid to build a \$90,000 sewage disposal plant for city and state hospital.

FORT WASHAKIE, WYO.—REA approved 25 miles of power lines from Pavillion to Fort Washakie by Riverton rural power co-operative, E. W. Beckman, president.

#### Montana

HARLOWTON, MONT.—Montana Power Co., 40 East Broadway, Butte, Mont., Frank M. Kerr, president, is planning a 45-mile power line from Harlowton to Lavina and a 45-mile line from Lavina to Billings to cost \$200,000.

HUNTLEY, MONT.—Yellowstone valley electric co-operative, J. E. Pickens, superintendent, has awarded \$52,560 contract to D. M. Manning, Hysham, Mont., for 50 miles of power lines in Yellowstone county. J. M. Garrison, state water conservation board, Helena, Mont., is engineer.

#### Idaho

COUER D'ALENE, IDAHO—Kootenai county REA received bids Feb. 15 for a 70-mile power line extension.

#### Pacific Coast

LOS ANGELES, CALIF.—R. J. M. Co., 2436 East Eighth street, will build warehouse 179 x 96 feet to cost \$30,000.

MILTON, OREG.—City and Freewater, Oreg., plan a joint sewage disposal system to be submitted to vote in near future.

ONTARIO, OREG. — Voters approved \$32,000 bond issue to finance water system extension and improvement. L. R. Stedman, Baker, Oreg., is engineer. Bids will be taken soon.

HOQUIAM, WASH.—Acme Door Co. plans a \$60,000 power installation, including large boiler and 1000-kilowatt steam turbine. Company will purchase

a molding machine and is considering further improvements.

SEATTLE, WASH.—Silver Creek Gold & Lead Corp., 1600 Northern Life Tower, has been organized by J. P. Martin and associates; capital is \$100,000.

SEATTLE, WASH.—International Metals Development Inc., 955 Dexter Horton building, has increased capital from \$125,000 to \$300,000.

SEATTLE, WASH. — Providence Hospital has awarded contract to Hendrickson-Alstrom Co., Seattle, Wash., for a \$50,000 laundry, two stories, 42 x 100 feet. John W. Maloney, Yakima, Wash., is architect.

VANCOUVER, WASH.—Northwestern Electric Co. is extending power lines five miles to serve dredging operations on Lewis River.



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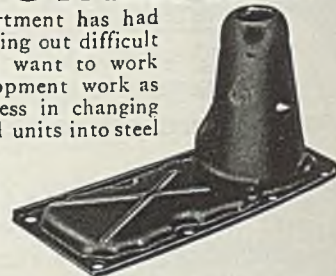
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GRINDER, plain No. 10 B & S 6 x 20" SPD  
HAMMER, Board drop. 400 lb. Bliss  
HAMMER, 300 lb. Beaudry, power BD  
HAMMER, 200 lb. Bradley Up. helve MD  
KEYSEATER 2½" x 24" Morton, SPD  
LATHIE, 24" x 20' L & S Selective Hd. MD  
NIBBLER, No. 1 Campbell 6" tht. BD or MD  
NUT RUNNER, No. 4 B & D ¾" AC or DC  
PLANNER 30 x 30" x 8' Cln. 1 R1, 1sh, MD  
PRESSES, OBI 18 Bliss (2); 4 L & J  
PRESSES, OBI No. 1 Thomas, motor 3/60  
PRESSES, Punch P-2 Ferracute MD (late)  
PRESSES, Punch equal 5½ Bliss, plain  
PRESSES, SS, SC, TR, 59¼ Toledo 8" st.  
PRESSES, Wheel, 200 Ton 93" x 14', MD  
PUNCH & SHEAR SE No. 3 L & A 6" & 15" thts.  
RIVETERS, Grant 103 & 120 motor drive  
RIVETERS, High Speed 5-A belt drive  
SHAPER, 28" American, gear box MD  
SHAPER, 21" American & Averbek: 24" Milw.  
SHEAR, Bar No. 3 United cap 2½" sq. MD  
STANLEY UNISHEAR B-36 cap. ¼" MD  
STANLEY UNISHEAR O-36 cap. 14 ga. MD  
WELDER, Arc 280 Amp. Hampton (new)

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EQUIPMENT CORPORATION

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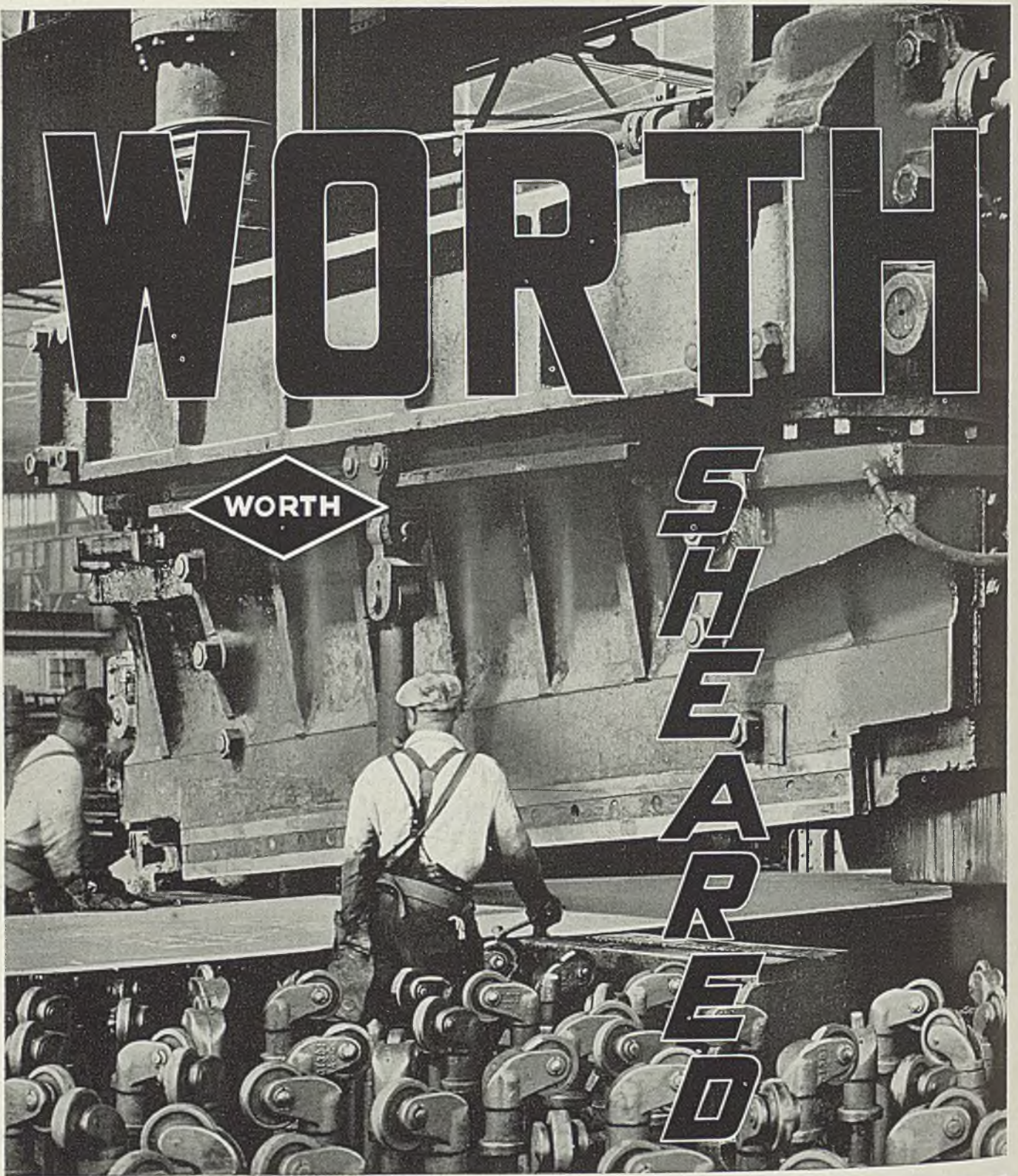


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