STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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IN THE PICKLE HOUSE..

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THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET
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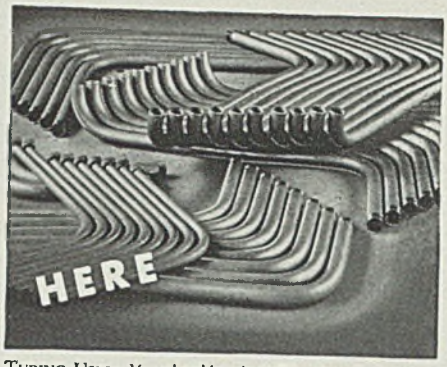
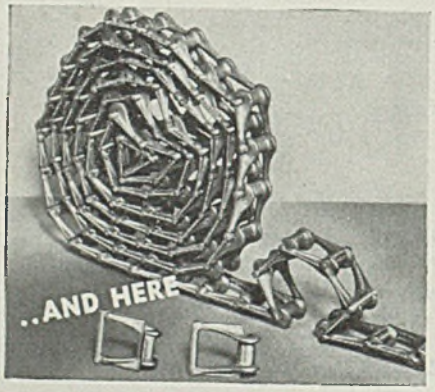
*Monel is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined, rolled and marketed solely by International Nickel.



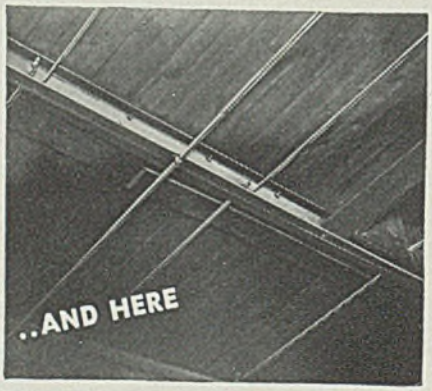
TUBING USES—*Monel tubing in I.P.S. sizes finds many uses in the pickling plant. These 2" and 1" I.P.S. Monel tubes are used as thermo-couple protection tubes and as steam jet tubes in connection with a large continuous strip pickling installation. (Photo courtesy of the Wiesner-Rapp Co. Inc., Buffalo, N. Y.)*

WOOD STAVE PIPE—*700 ft. of 12" x 3" shell, wood stave pipe spirally wound with No. 4 B&S Monel wire, was supplied to a large steel company for conveying waste acid from their pickle house. Acid consists of 1 to 7% sulfuric, a small muriatic content at times, water, iron sulfate and small quantities of sand and steel scale. The pipe is covered with a heavy asphalt and sawdust coating and is installed in earth under a concrete floor, the total load on the pipe being about 1500 lbs. per sq. ft. (Photo courtesy of Michigan Pipe Company.)*

TIE-ROD LUGS—*Monel tie-rod lugs are used with Monel tie-rods and nuts on round and oval wood tanks. All standard sizes are available. Cast Monel conveyor chain link also shown.*



CONVEYOR CHAINS—*Important links on continuous pickling equipment—Forged Monel conveyor chain is finding increasing use in pickling service where dependability, high strength and excellent corrosion resistance are required. (Photo courtesy of Steel Improvement & Forge Co., Cleveland, Ohio.)*



ROOF TRUSS TIE-RODS AND NUTS—*A large Kentucky steel mill installed Monel tie-rods and nuts as beam supporting members in the roof truss of the pickle house. Lamella type woven roofs also employ Monel tie-rods for permanency under such corrosive conditions.*

..AND HERE!

OTHER PROVEN USES OF MONEL

Bolts, Nuts, Washers • Screws and Nails • Utensils • Wire Rope and Sash Cord • Heating Coils • Cast "S" Monel Steam Jets • Aprons • Monel Covered Rolls • Scuff Plates on Tanks • Sheet Scrubber Tanks • Stirrups in Tanks • Chains and Yokes • Sheet Separator Hair Pins

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

ADJUSTMENTS to conform with the Wagner act now seem to be the order of the day. Some employers, in accordance with Section 8, declare they are withdrawing recognition of their employe representation groups as agencies for collective bargaining. In other instances, employes are divorcing the representation organization from employer jurisdiction and are attempting to continue its functions on a self-supporting basis. No one knows the ultimate answer to industry's labor relations problem, but it may be that the independent employes, seeking freedom from exploitation by mercenary outsiders (p. 39), may find the key to a democratic system of collective bargaining that will endure.

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Steel Earned 4.39% in 1936

Leading steel producers in 1936 earned an average profit equivalent to $2.67 per ton of ingot capacity and 4.39 per cent on capitalization. These figures compare with $1.22 and 2.09 per cent, respectively, for 1935. The analysis (supplement facing p. 38), from which these figures are derived, is made possible by the cooperation of the comptrollers, auditors or treasurers of the reporting companies. The analysis has been prepared by A. J. Hain, managing editor of STEEL. Earnings for the 22 companies, representing 92.2 per cent of the nation's total ingot capacity, were $168,709,405 in 1936 compared with $77,393,192 in 1935—a gain of 118 per cent.

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Convention Season Is Here

American industry is knee-deep in the spring convention season. The United States chamber of commerce, American Trade Association Executives, Association of Iron and Steel Engineers, and other groups convened last week. This week the National Machine Tool Builders association (p. 22), National Association of Sheet Metal Distributors, American Foundrymen's association and other organizations will meet. It is a significant fact that invariably in the sessions of these conventions, whenever discussion strays away from technical and engineering topics, it turns to the problems of public relations and labor relations. How to win and hold the good will of employes and of the man in the street is the most timely question to which an employer can direct his attention. Hundreds of industrialists are giving this problem the right-of-way over all other executive matters. It is industry's No. 1 job.

• • •

Help Layman Know Industry

Republic Steel last week observed the formal opening of a new plant (p. 42) for manufacturing wire and wire nails. In accordance with a practice which seems to be gaining favor in the iron, steel and metalworking industries, Republic's officials invited a group of agricultural engineers, farm leaders, farm paper editors, business paper editors and industrialists (p. 24) to inspect the new establishment on the day of its opening. This is good policy from the standpoint of public relations. The more the layman knows about industry, the better he will understand industry's problems . . . . Read Robert E. Kinkead's brief discussion under the heading "Cash for Ideas" (p. 68). What he says about two methods of "abolishing poverty" probably will make you think.

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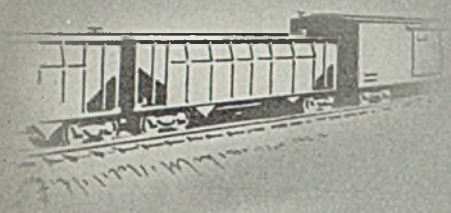
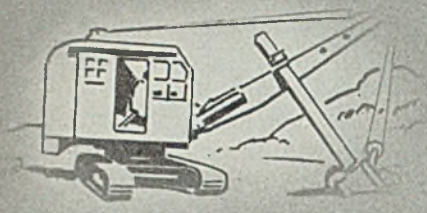
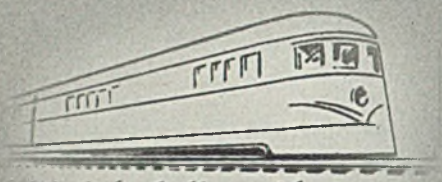
Cites Record of Tool Builders

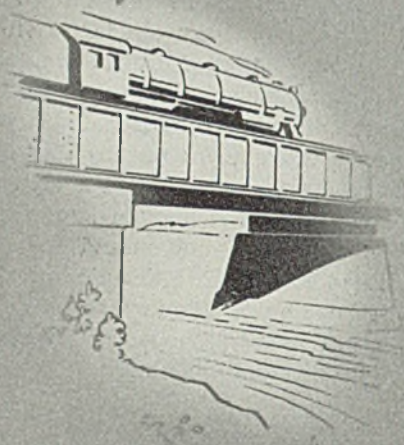
Clayton R. Burt, president of the National Machine Tool Builders' association (p. 21) makes an impressive case for the machine tool industry when he cites its record during and since the depression. Employment has increased from 16,000 at to low point to 60,000 at the present time. Wages have risen from a weekly average of $21 in 1934 to $30.74 early in 1937. The industry "has led the procession in establishing sound training courses." It is committed to the principle of "more goods for more people" and a means of furthering full employment for all who honestly want to work. But—all that the machine tool industry, as well as other industries, is doing in these constructive ways is being offset by restrictive governmental activities. Again we say that now is a good time for the "breathing spell" Mr. Roosevelt promised.

E. L. Shaner









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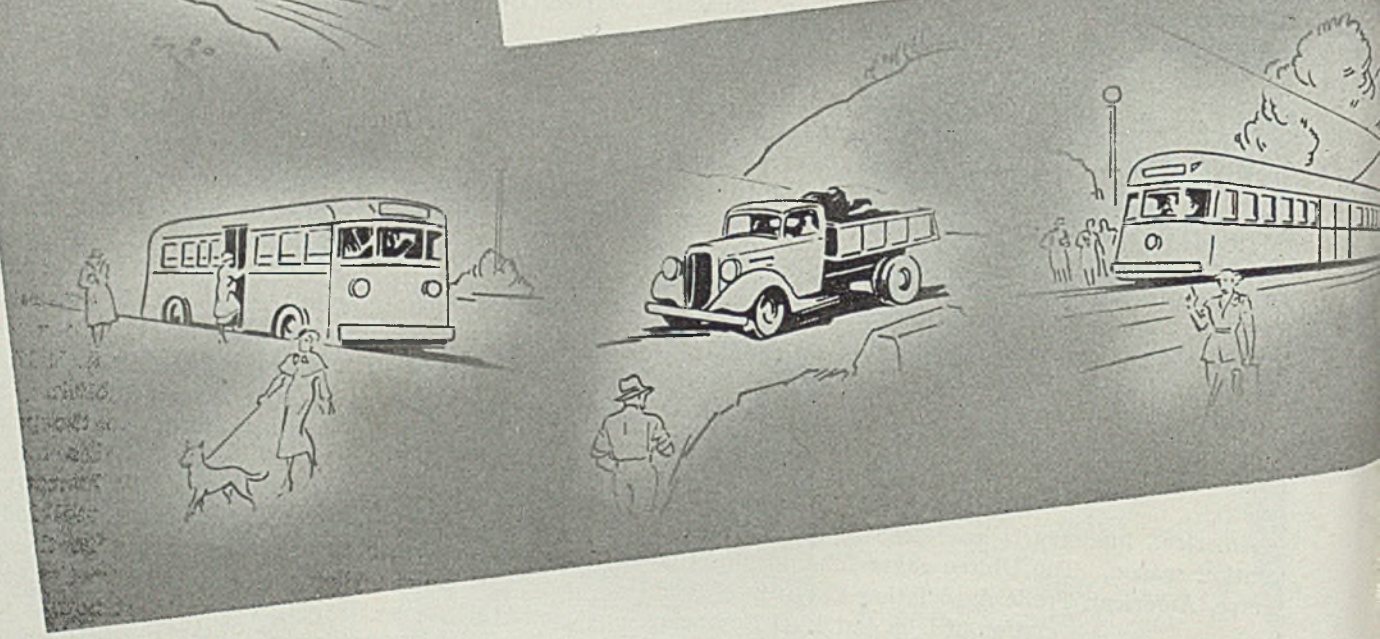
INLAND STEEL



SHEETS • STRIP • TIN PLATE • BARS • RAILS • PILING • REINFORCING BARS • PLATES • STRUCTURALS

INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in Detroit, Kansas City, Milwaukee

Steel's First Quarter Profits 482 Per Cent Over Last Year; $5.24 Per Ton on Ingots

FIRST 15 leading integrated producers of steel to report for the first quarter show an aggregate net profit of $66,248,036 for that period.

In the same quarter last year the identical producers made only $11,380,717, but in the fourth quarter their earnings aggregated $49,294,899.

Their ingot capacity represents 87.4 per cent of the country's total. Assuming their experience to be typical, the indicated net earnings for the entire industry in the first quarter were $75,462,000, or $5.24 per ton on the 14,390,787 tons of ingots produced. The indicated per ton earnings in the first quarter last year were $1.39, and in the fourth quarter $4.23. All producers substantially improved their financial position over the first and fourth quarters last year.

U. S. Steel Pays $20,000,000

United States Steel Corp. directors last week ordered disbursement of more than $20,000,000 to preferred stockholders and disclosed first quarter earnings were the best for any period since 1930. The preferred dividend amounts to $5.75 a share, $4 on account of arrears and the regular quarterly dividend of $1.75. Dividends are payable May 29 to stockholders of record May 1.

This action reduces accumulated arrears to $5.25 a share, compared to $16.25 a year ago. Net quarterly profit was $28,561,533, equal after regular preferred dividend requirements to $2.55 per common share. For first quarter, 1936, net earnings were $3,376,304, or 94 cents for preferred shares only.

First quarter operations of corporation's subsidiaries averaged 82.6 per cent of capacity, with the rate increasing as quarter progressed. Shipments were 3,698,041 tons, or 82.8 per cent of capacity, compared with 2,144,570 tons, or 45.5 per cent of capacity for first quarter, 1936.

First quarter earnings and net income were:

Earnings	$45,260,205
Net income earned for capital stock	28,561,533
Dividends declared on preferred:	
$1.75 per share accrued for the quarter	6,304,919
$4.00 per share on account of arrearages	14,411,244
Balance, surplus for the quarter	$ 7,845,370

Expenditures during the first period for improvements and for paying maturing bonds and other capital obligations of subsidiaries totaled approximately $17,400,000. Extensive rehabilitation of plants and facilities is underway. On April 1 the corporation had an unexpended balance of about $160,000,000 of authorized appropriations for this program.

Net working assets, exclusive of dividends declared and unpaid, were as follows: Dec. 31, 1935, $389,123,253; Dec. 31, 1936, $391,330,566; March 31, 1937, $411,081,436.

Corporation had 246,321 employes during first period of 1937, compared with 198,269 in corresponding quarter of 1936, an increase of 24.2 per cent. Payrolls for the initial period this year totaled $104,456,482, against $69,259,055 for the same period last year, an increase of 50.8 per cent.

BETHLEHEM NETS $8,293,833, EQUAL TO $2.01 PER SHARE

Bethlehem Steel Corp.'s first quarter earnings totaled $8,293,833, equal to $2.01 per common share, best first period income since 1930. Directors last week declared a dividend of $1 on common stock and regular payments of $1.75 on 7 per cent preferred and 25 cents on 5 per cent $20 shares. Common dividend was second since Feb. 15, 1932. Bethlehem paid $1.50 to common shareholders last December.

First quarter earnings in 1936 were $603,065. In 1930, first period income was $10,077,486. Second quarter business is expected to be "as high as the first and probably a little higher," said Eugene G. Grace, president. Current opera-

First Quarter Financial Statements Compared

All figures are profits except where asterisk denotes loss.

	First Quarter 1937	First Quarter 1936	Fourth Quarter 1936	Ingot Capacity, gross tons
U. S. Steel Corp.	$28,561,533	$3,376,304	$20,650,780	25,722,400
Bethlehem Steel Corp.	8,293,833	603,065	5,291,492	9,360,000
Republic Steel Corp.	5,567,063	361,031	3,253,273	6,053,000
Jones & Laughlin Steel Corp.	1,982,394	933,279*	2,076,280	3,660,000
Youngstown Sheet & Tube Co.	4,886,020	1,897,229	3,719,115	3,120,000
National Steel Corp.	5,695,819	2,377,145	3,999,424	2,700,000
American Rolling Mill Co.†	2,400,000	743,904	2,073,009	2,531,120
Inland Steel Co.	5,008,774	1,934,632	3,779,523	2,340,000
Wheeling Steel Corp.	1,308,807	10,922	2,046,529	1,750,000
Otis Steel Co.	702,396	148,676	584,690	828,000
Allegheny Steel Co.	551,054	336,964	532,092	476,000
Sharon Steel Corp.	475,778	212,615	482,482	450,000
Granite City Steel Co.	142,002	61,217	98,611	400,000
Continental Steel Corp.	279,447	87,280	371,704	280,000
Ludlum Steel Co.	393,116	163,012	335,895	38,000
Totals	$66,248,036	$11,380,717	$49,294,899	59,708,520
FINISHING CAPACITY ONLY				
Acme Steel Co.	$1,094,941	$391,853	$711,021	.....
Superior Steel Corp.	86,120	29,088	.....	.....
PIG IRON CAPACITY ONLY				
Interlake Iron Corp.	$372,202	$17,301	.....	Pig Iron 1,215,000

†Estimated.

tions are at about 98 per cent of capacity. First quarter output averaged 87.1 per cent of capacity, compared with 75 per cent in the previous quarter and 45.3 per cent in first period, 1936.

Estimated value of orders on hand March 31 rose to $151,061,818 from $123,690,462 at end of previous quarter and $78,469,055 on March 31, 1936. The company now has 94,000 workers employed, compared to 75,000 in 1929.

Mr. Grace stated he does not share fears of a business boom recently expressed by Washington officials. Of costs, he said: "I feel that prices of commodities and materials are not going up to any great extent. I do not anticipate in the near future any trend that would increase production costs."

REPUBLIC EARNS $5,567,063 NET DURING FIRST QUARTER

Consolidated net profit of Republic Steel Corp. and subsidiaries for first quarter after all charges, including estimated income tax and surtax on undistributed profits, totaled $5,567,063. This compares with net profit of $3,253,273 for previous quarter and $361,031 for first quarter of 1936. Provision for estimated federal taxes was $2,250,000 including $925,000 for estimated surtax on undistributed profits.

The corporation reports net current assets at March 31 (prior to acquisition of Gulf States Steel Co.) in excess of $75,000,000, not including funds held by mortgage trustee from proceeds of bonds sold in November, which are held specifically for property improvements. Expenditures for improvements in past quarter were more than $8,250,000.

Since Jan. 1 funded debt of the corporation has been reduced more than $15,000,000 through conversion of convertible bonds into common stock.

NATIONAL STEEL REPORTS RECORD QUARTERLY NET

National Steel Corp., Pittsburgh, reports net income, after all charges except provision for tax on undistributed profits, for first quarter of $5,695,819.24, equal to $2.63 per share. These earnings represent highest net income for any three-month period in the corporation's history. Net profit in first quarter, 1936, was $2,377,144.69, equal to $1.10 per share.

Earnings reflect, in part, higher profits resulting from increased capacity made possible by expansion of subsidiaries, Weirton Steel Co., Weirton, W. Va., and the Great Lakes Steel Co., Detroit. Further important additions to capacity are now under construction. National Steel Corp. recently announced that with completion of improvements company's total ingot capacity will exceed 3,250,000 tons.

SHEET & TUBE PAYROLLS 65 PER CENT ABOVE LAST YEAR

Payrolls of the Youngstown Sheet & Tube Co. are 65 per cent higher than at this time last year, Henry G. Dalton, chairman, told shareholders at the annual meeting in Youngstown, O., last week.

"Since our last annual meeting," Mr. Dalton said, "there have been two general wage increases. The last increase at present rate of operations and working conditions will increase wage costs more than $8,000,000 a year.

"These facts are important in view of some erroneous statements contrasting wage increases with price increases prevailing in the steel industry. In April, 1936, wage earners were receiving on an average 68½ cents per hour whereas now they are receiving on the average 87½ cents per hour.

Payrolls for 1936 totaled $36,748,000. For first quarter of 1937 the figure was $11,676,000.

Common dividend of $1,100,000 was paid by the company April 1.

This was the first payment of any dividend to owners of common shares since July 1, 1931.

The chairman announced $24,199,000 of the $30,000,000 3½ per cent convertible debentures issued last year have been converted into 387,184 common shares and $290,000 of the debentures have been redeemed for cash, leaving $5,512,000 of debentures outstanding and a total of 1,587,184 common shares now issued.

Improvements to plants scheduled for 1937 will cost about $13,500,000, of which about $11,500,000 remains to be spent.

INLAND TO PAY EXTRA, NET EARNINGS ARE $5,008,774

Earnings of $5,008,774, equal to $3.34 a share, were reported by Inland Steel Co., Chicago, for first quarter. Directors declared a dividend of $1 a share and an extra of 50 cents, payable June 1 to stockholders of record May 14.

Inland's net profit in first quarter, 1936, was $1,934,632, or $1.34 a share on capital stock. For the 12 months ended March 31, the company and subsidiaries, exclusive of Milcor Steel Co. for second quarter of 1936, earned $15,929,538 after all charges except federal tax on undistributed profit for last three months, equal to $10.63 a share.

J. & L. EARNS $1,982,394, $1.65 FOR COMMON STOCK

First quarter net profit of Jones & Laughlin Steel Corp., Pittsburgh, totaled $1,982,394 after operating expenses, depreciation, depletion, interest and all taxes except federal surtax on undistributed profits.

This is equal to $1.65 per share for 576,320 common shares outstanding after allowing for $1.75 a share for preferred dividend for quarter. In first quarter last year the corporation had a net loss of $933,279.

WHEELING STEEL EARNINGS $1.89 ON COMMON SHARES

Wheeling Steel Corp. and subsidiaries report for the quarter ending March 31 net profit of $1,308,807 after all charges, federal income taxes, etc., equal after quarterly dividend requirements on 6 per cent preferred, to $1.89 a share of common. This compares with profit of only $10,922, or 3 cents a preferred share, in the March, 1936, quarter. Unpaid cumulative dividends on the

19 Consumers Report 62.8 Per Cent Gain in Earnings

NET earnings of 19 companies among equipment manufacturers and other leading steel consumers show an average increase of 62.8 per cent for the first quarter over the comparable period last year. All figures in the following table are net earnings, except where asterisk denotes loss.

	First Quarter 1937	First Quarter 1936
Caterpillar Tractor Co., Peoria, Ill.	2,773,368	1,936,779
A. M. Castle & Co., Chicago	298,000	95,150
Transue & Williams Steel Forging Corp., Alliance O.	78,349	33,515
Bridgeport Machine Co., Wichita, Kans.	175,897	77,878
American Brake Shoe & Foundry Co., New York	842,432	505,446
Truscon Steel Co., Youngstown, O.	* 49,484	* 66,119
Clark Controller Co., Cleveland	148,371	52,518
Twin Coach Co., Kent, O.	166,224	100,054
Pittsburgh Screw & Bolt Corp., Pittsburgh	517,523	165,056
Eaton Mfg. Co., Cleveland	836,779	583,382
National Malleable & Steel Castings Co., Cleveland	1,148,393	186,055
General Electric Co., Schenectady, N. Y.	11,626,408	7,086,830
Keystone Steel & Wire Co., Peoria, Ill.	378,154	332,646
Minneapolis-Honeywell Regulator Co., Minneapolis	406,468	195,276
S. R. Dresser Mfg. Co., Bradford, Pa.	436,550	383,862
Maytag Co., Newton, Iowa	616,204	590,594
Briggs & Stratton Corp., Milwaukee	429,171	321,850
Doehler Die Casting Co., Toledo, O.	351,957	209,622
Kelsey-Hayes Wheel Corp., Detroit	177,677	325,860

6 per cent preferred stock amount to 24 per cent.

Expenses and losses directly attributable to the floods of March, 1936, and January, 1937, in the amounts of $306,565 and $923,613, respectively, have been charged directly to the surplus account.

MULLINS INCREASES STOCK; 200,000 SHARES TO SHARON

Henry A. Roemer, Sharon Steel Corp. president, told the annual shareholders' meeting in Sharon, Pa., last week, that "Incoming business is very encouraging. Backlogs are largest in our history."

Stockholders of Mullins Mfg. Co. authorized directors to declare a 100 per cent stock dividend to holders of Class B common stock at a date to be fixed by the board. To provide for the stock dividend and payment in stock to Sharon Steel for plant property and assets of Youngstown Pressed Steel Co., a subsidiary, acquired by Mullins, shareholders voted to increase authorized Class B common to 560,000 shares from 172,550. Of the newly-authorized Class B stock, 200,000 shares will be transferred to Sharon Steel.

C. H. Butts, J. H. Hillman Jr., B. E. Kibbee, H. A. Roemer and George Whitlock, of Sharon Steel, and H. N. Preston, Chicago, were elected to the Mullins board. G. R. Gibson, Andrew MacCloud and Richard White were re-elected members.

Nation's Prosperity Depends On Machine Tool Industry

BY CLAYTON R. BURT*
President, National Machine Tool Builders' Association

WHITE light of publicity today is turned full upon all manufacturing enterprises. Every act of every business administrator is dissected under the microscope of political expediency, in the seeming hope of finding some unworthy motive hidden in it. There are as many interpretations placed upon isolated facts as there are commentators.

When the country was in the throes of a severe depression it was understandable there should be some attempt to fix a cause. Reform always is popular when the public spirits are low. Even punitive reform gives some comfort to a harrassed people, so far as it enables them to place blame for the disaster upon someone else.

But now recovery is accomplished; the reform legislation is on the statute books, and still the hurling of epithets goes on. The harangue against bankers and managers of public utilities and railroads having worn a bit thin, the manufacturers of durable goods appear to be next in line for a belaboring at the hands of politicians hot upon the trail of personal power. At a time when every plant is operating to capacity, all the ills of humanity are laid at the door of industry.

It would be presumptuous for machine tool builders to speak for related industries, but we can lay bare the facts, as one division, and the basic one among the durable goods industries.

Reserves Are Depleted

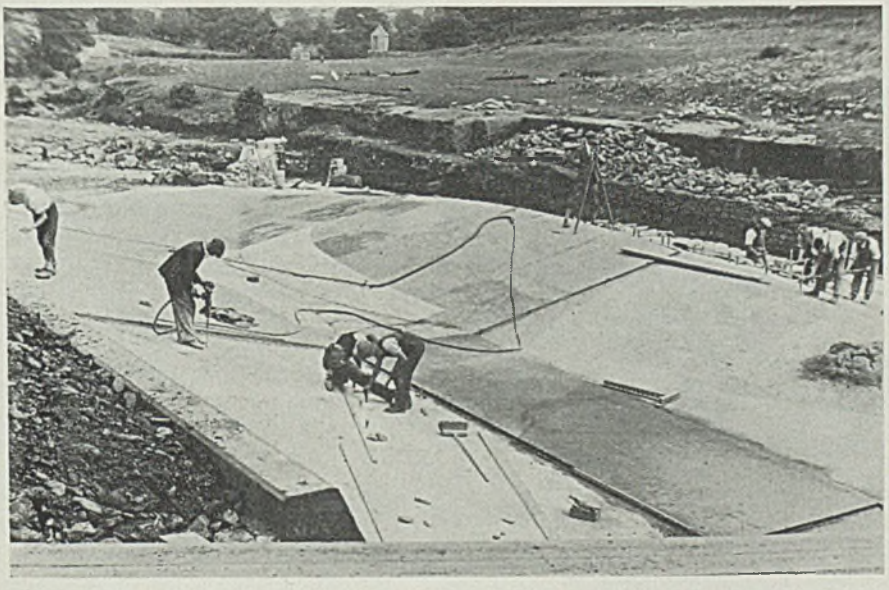
The machine tool industry came through the most severe depression on record with its capital reduced by more than 40 per cent; representing expenditures in excess of income due to the costs of holding together the nucleus of each organization through five terribly lean years, during which most of the overhead costs, such as taxes, insurance, development and the variety of money contributions plants make to their respective communities, all had to come out of previously earned reserves.

Hundreds of thousands of dollars of reserves were spent for research and development work to redesign machines to handle new materials to better advantage, work to closer limits of accuracy, and better manufacture the new products created to coax back an unwilling market. More thousands were invested in training men. As the outlook slowly improved, men were returned to their old jobs, former skills rebuilt, and new men trained to replace those whom death, disability and transfers to other jobs had lost to the industry.

A working force of skilled engineers, machinists and operators was rebuilt from a minimum of 16,000 men in January, 1934, to an estimated 60,000 at the present time. For a small industry that is a real feat. Average weekly earnings of

*Mr. Burt is also president of the Pratt & Whitney division, Niles-Bement-Pond Co., Hartford, Conn.; the accompanying article is abstracted from his address before the thirty-fifth convention of the association in Chicago, May 3-4.

Stainless Steel Used in Large Flume Meter



A VENTURI flume meter of stainless steel fixed in the bed of the River Derwent, Derbyshire, England, is now being used for such a purpose, it is reported, for the first time. Two of the meters are placed side by side to measure the flow of water. The stainless steel, made by Firth-Vickers, prevents the accumulation of moss and other material thus insuring accurate reading. The steel is 18 gage, and the lining is composed of a number of individual plates, bent to contour, with edges bent outward and imbedded in a concrete base

workmen, including all types of labor, according to the department of labor figures, increased from $21 in January, 1934, to $30.74 by January of this year. Since then they have increased further.

The machine tool industry has never ceased to provide government with the necessary equipment upon which national defense rests, even though this has meant meeting the higher costs of the Walsh-Healey requirements, which demand payment of time and a half for all work over an 8-hour day and a 40-hour week, and the keeping of costly detailed records.

The industry has maintained interest in the welfare of various communities, contributing heavily to their support through taxes and service expenditures, also taking an active interest in the education of the young people who lean toward technical careers. Wherever there are machine tool plants there you will find the best equipped trade and technical schools and co-operative colleges. The industry has led the procession in establishing sound training courses for young men to supplement their school work.

Industry Has Responsibility

Machine tool builders are committed to the principle of "more goods for more people" as a means of creating full employment for all who honestly want to work. The records of past achievements in this country prove this principle sound. Increased mechanization, made possible by constantly improving machine tools to fit more and more exacting tasks, has brought to the consumer a wealth of goods and services little known 50 years ago.

Prosperity of the country rests squarely upon the maintenance of a sound and prosperous machine tool industry. Any restrictions, economic or political, which divert the attention of the machine tool builder from his primary function of designing and supplying needed industrial equipment is a drag upon progress.

The term prosperity implies more than a climbing index number of production, or a rising curve on a piece of white cardboard. Prosperity is a condition of well being of all the people. In money economy, it has to do with the people's income from any source, and particularly with what goods and services that income will buy. An era of prosperity is one in which all the people have opportunity to provide for their families adequate food, clothing, shelter and surplus comforts to accord with their station or their diligence.

Indexes of manufacturing production are within one point of the 1929 average. Employment is within 5 per cent of the 1929 average. Average hourly wages are considerably above 1929. Weekly earnings, in spite of shortened working weeks, are in most industries as high as 1929 and their purchasing power is higher. In the results to date everybody has shared; the wage and salary earners in increased income; the stockholder in a return of dividends; the government in enormously higher tax collections; and the consumer in more and better goods for his money.

Against these gains appear, as dead weight upon immediate further progress, the enormously increased costs of federal, state and local governments, the cost of maintaining extended relief programs, the cost of social security; all these reflected in taxes; a federal deficit of $35,000,000,000, foreshadowing still higher taxation; labor unrest, particularly fomented strikes which cost workmen millions in lost wages and assessments.

It has happened many times in the past, as it is happening now, that impatience with the ordered advance has led to attempts to force progress along certain lines by creating a so-called planned economy. The planning always is to be done by self-appointed groups, usually political, ostensibly in the interest of the people, but almost invariably ending in special privilege to a few and an actual diminution of benefits to the many. The present governmental efforts to control industry and agriculture, which have for their aim the equalization of wealth regardless of individual effort or contribution, differ only in detail from many others that have gone before. In the long run a great many of the ambitious plans that are being carried on regardless of budgetary bounds will fail, will be brushed aside, and eventually will be forgotten. A few may prove worthwhile, and those we hope may be lasting. Cost of the experiment, however, remains to be paid for.

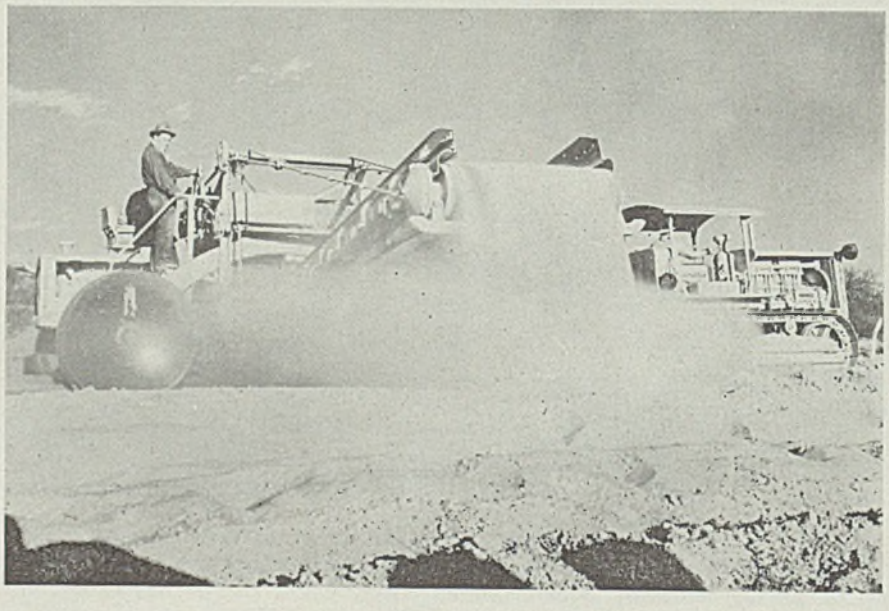
MACHINE TOOL BUILDERS IN SPRING CONVENTION

SOUNDING the keynote of the spring convention of the National Machine Tool Builders association at the Edgewater Beach hotel in Chicago, was Mr. Burt's address at the opening session Monday. The two-day meeting was divided into three sessions, added features being luncheon and dinner meetings Monday.

Following Mr. Burt's address, Tell Berna, general manager of the association, reported on what machine tool builders are doing. Two discussions concluded the opening session, the first on practical aspects of depreciation by J. K. Mathieson of Philadelphia and R. E. W. Harrison of Philadelphia; and the second on the relation of builders and dealers, by Howard W. Dunbar, Norton Co., and J. Roy Porter, Marshall and Huschart Machinery Co.

Speaker at the luncheon meeting was Dr. James S. Thomas of Clarkson College of Technology and the Chrysler Institute of Engineering, who reviewed, "What the Machine Has Done to Mankind."

Steel Equipment Giving Arizona New Outlet to Sea



These units, consisting of a Caterpillar diesel tractor, pulling a diesel-powered elevating grader, are at work in the Sonora desert, Lower California, Old Mexico. They are building a railroad bed connecting northern districts with Lower California, giving Arizona a more direct connection with the sea

April Pig Iron Makes Small Gain; Four More Stacks In

ALTHOUGH production of coke pig iron increased again in April, the size of the gain indicated that operations may be close to the top for the present cycle. Active blast furnaces reached a new high since October, 1929, but here also there was evidence that activity is leveling off.

Production figures for April, including operators' estimates for the last one or two days of the month, reveal that the average daily rate was 113,469 gross tons, the highest since October, 1929, with 115,747 tons. Compared with the rate of 111,951 tons per day in March, the April figure was an improvement of 1518 tons, or 1.3 per cent. The rate in April, one year ago, was 80,316 tons per day.

Total output in April was 3,404,060 gross tons, which, compared with the 3,470,470 tons of March, was a loss of 66,410 tons, or 1.9 per cent. This is accounted for by the fact that April was a one-day shorter month. Production in April, 1936, was 2,659,643 tons.

MONTHLY IRON PRODUCTION

Gross Tons

	1937	1936	1935
Jan.	3,219,741	2,029,304	1,478,443
Feb.	3,020,006	1,838,932	1,614,905
March	3,470,470	2,046,121	1,770,990
April	3,404,060	2,409,474	1,671,556
Tot. 4 mo.	13,114,277	8,323,831	6,535,894
May		2,659,643	1,735,577
June		2,596,528	1,558,463
July		2,595,791	1,520,340
Aug.		2,711,726	1,759,782
Sept.		2,728,257	1,770,259
Oct.		2,991,794	1,978,379
Nov.		2,949,942	2,066,293
Dec.		3,125,192	2,115,496
Total		30,682,704	21,040,483

In the first four months of 1937, production has aggregated 13,114,277 tons, this being a gain of 4,790,446 tons, or 57 per cent, over the 8,323,831 tons made in the corresponding period of 1936. Output in the first four months of 1935 was only 6,535,894 tons.

Relating production to capacity, operations in April were at the rate of 83.7 per cent, as compared with 82.0 per cent in March, 79.5 per cent in February and 59.1 per cent in April a year ago.

Operating blast furnaces on April 30 totaled 186, this number being the best since October, 1929, when 203 were making iron. This was an increase of four over the 182 active on March 31. Only 143 were blowing at the end of April a year ago. During the month, six nonmerchant or steelworks furnaces resumed and one was blown out; of the merchant units, one resumed and two were blown out. The latter were units in Alabama removed from service for relining.

AVERAGE DAILY PRODUCTION

Gross Tons

	1937	1936	1935	1934
Jan.	103,863	65,461	47,692	39,537
Feb.	107,857	63,411	57,675	45,385
March	111,951	66,004	57,120	52,438
April	113,469	80,316	55,719	57,873
May		85,795	55,986	66,370
June		86,551	51,949	64,563
July		83,735	49,043	39,630
Aug.		87,475	56,767	34,199
Sept.		90,942	59,009	29,969
Oct.		96,509	63,818	30,689
Nov.		98,331	68,876	31,930
Dec.		100,813	68,242	33,161
Ave.	109,285	83,832	57,694	43,774

Furnaces blowing in during April were: In Ohio: One River, Republic Steel Corp.; Lorain No. 2, National Tube Co.; Central D, Carnegie-Illinois Steel Corp; Martins Ferry, Wheeling Steel Corp. In Indiana: Gary No. 4, Carnegie-Illinois Steel Corp. In Maryland: Maryland D, Bethlehem Steel Co. In Colorado: Minnequa D, Colorado Fuel & Iron Co.

Stacks blowing out or banking were: In Alabama: Woodward No. 3, Woodward Iron Co.; City No. 1, Sloss-Sheffield Steel & Iron Co. In New York: One Buffalo, National Steel Corp.

Republic Steel Corp. has completed scrapping of the Upson blast furnace at its Upson works, Cleveland. Built in 1879, this stack was acquired by Republic when it absorbed Bourne-Fuller Co. in 1930. The furnace, long inactive, had a capacity of 80,000 gross tons of basic iron. With demolition of this unit, the total number of potential furnaces in the United States is reduced from 242 to 241.

APRIL IRON PRODUCTION

	No. in blast last day of Apr.	Mar.	Total tonnage Merchant	Nonmerchant
Ohio	43	39	103,699	668,188
Penna.	63	63	128,697*	1,012,887*
Alabama	14	16	94,983	115,142
Illinois	15	15	86,178	227,537
New York	12	13	35,550	191,429
Colorado	3	2		
Indiana	16	15	5,900*	541,827
Maryland	6	5		
Virginia	1	1		
Kentucky	2	2		
Mass.	0	0		
Tenn.	1	1		
Utah	1	1	9,500*	182,543*
West Va.	3	3		
Michigan	4	4		
Minnesota	2	2		
Missouri	0	0		
Total	186	182	464,507*	2,939,553*

*Includes ferro and spiegeleisen.

Housewife Ahead of Navy as Steel Consumer

The peaceful activities of a single refrigerator manufacturer last year accounted for twice as much steel as the United States navy needs to complete a half-dozen destroyers and three cruisers now under construction, according to figures revealed by B. P. Watkins, director of purchase for the Kelvinator division, Nash-Kelvinator Corp. Mr. Watkins listed steel purchases for Kelvinator as in excess of 50,000,000 pounds.

RATE OF OPERATION

(Relation of Production to Capacity)

	1937[1]	1936[2]	1935[3]	1934[4]
Jan.	76.6	48.2	34.2	28.3
Feb.	79.5	46.6	41.4	32.5
March	82.5	48.5	41.0	37.5
April	83.7	59.1	40.0	41.4
May		63.1	40.2	47.5
June		63.6	37.2	46.3
July		61.5	35.2	28.4
Aug.		64.3	40.7	24.5
Sept.		66.9	42.5	21.5
Oct.		71.0	45.8	22.1
Nov.		72.3	49.5	22.8
Dec.		74.2	49.0	23.7

[1]Based on capacity of 49,512,737 gross tons, Dec. 31, 1936; [2]capacity of 49,777,893 tons, Dec. 31, 1935; [3]capacity of 50,845,741 tons, Dec. 31, 1934; [4]capacities of 50,975,561 tons, Dec. 31, 1933. Capacities by American Iron and Steel Institute.

Italian Farmers Prefer American-Built Tractors

Due to shortage of farm implement at a season when the crop outlook is rather satisfactory, there seems to be a rather good demand for farm implements in Italy, according to Assistant Commercial Attache, Malcolm P. Hooper, Rome, in a report to the department of commerce.

The shortage is being felt principally in the tractor line. American tractors are much more in favor than the type manufactured in Europe.

Steel and Zinc Groups Co-operate

CLOSER co-operation between the steel industry and zinc trade was indicated at the nineteenth annual meeting of the American Zinc Institute Inc., in St. Louis, April 26-27.

The galvanizers' committee, composed of the technicians and operators in the sheet departments at steel plants, held sessions with the institute and continued the discussion of technical galvanizing on April 28. Attendance of steel men was larger than in former years.

In prior meetings emphasis was placed on galvanized sheets, but it is now planned to arouse more interest in galvanized wire. Both groups are equally interested in gaining more farm business for steel. It was said that steel lost considerable trade among the farmers "because of too-thinly coated galvanized sheets which soon rusted away." This situation, it was added, is being corrected as a result of the institute's "better galvanizing campaign." It has been found that a 2-ounce coating per square foot—1 ounce on each side—will make sheets last almost indefinitely.

Current Practice Discussed

Current practice in galvanizing, problems facing the industry, and zinc market developments were discussed by well-known authorities. The Tuesday afternoon session, presided over by F. G. White, chief of the department of metallurgy and inspection of the Granite City Steel Co., when technical subjects were discussed, proved to be one of the most interesting.

Addresses included "The Use of Pure Zinc in Hot Galvanizing," by J. J. Enlow, assistant manager of Lysaght Dominion Sheet Metal Corp. Ltd.; "Equipment for Machine Galvanizing," by F. W. Brown, superintendent of the galvanizing division of Inland Steel Co.; and "Wire Galvanizing," by C. A. Kellogg, chief metallurgist of Continental Steel Corp.

Officers were re-elected.

Small Scrap Dealers Form Own Institute

American Institute of Waste Materials has been provisionally organized by Max Silverstein, Kenton, O., president, to provide benefits of co-operation to small dealers in all lines of scrap materials. A permanent organization will be effected early in May at a general meeting of dealers at Cleveland.

The organization plans to correct some abuses to which the smaller units have been subjected and which may be removed by concerted action through a central selling plan and inspection in rejections. Another aim will be to oppose any regulation of scrap exports by the government. It is planned to make the new group supplementary to the Institute of Scrap Iron and Steel Inc., though entirely separate, giving the benefits of co-operation to the smaller units not formerly covered.

It is estimated that about 5000 dealers in various lines of waste material are eligible to membership in the institute.

Great Lakes Acquires Steel House Fabricating Division

Purchase of the Stran-Steel Corp., Detroit, subsidiary of Kelsey-Hayes Wheel Co., by Great Lakes Steel Corp., Detroit, was announced last week. Stran-Steel has been prominent in development work in connection with steel frame houses and is reputed to be the country's largest producer of light metal framing for home construction. It will henceforth be known as the Stran-Steel division of Great Lakes Steel Corp.

The acquisition will give Great Lakes, a National Steel Corp. unit, a foothold in the steel house field.

Republic's Mill "To Serve Farms"

COMPLETION of Republic Steel Corp.'s new South Chicago mill for the production of electro-galvanized wire, field fence, barbed wire, nails and a variety of other wire products was observed April 27 by a formal inspection by officials of the company and their guests, including agricultural engineers, farm leaders, metallurgists and representatives of the business press. The plant is described on pages 42-45.

"When we decided to go into the manufacture of special steel products for the farm, it was not just with the idea of adding so much tonnage to our total," T. M. Girdler, Republic's chairman, told the group.

"We were determined to contribute something to agriculture and for that purpose established an agricultural extension bureau with an experienced agricultural engineer in charge. We have been conducting extensive research with a view to the proper specification and application of steel products on the farm. This plant is just the first step in a program through which we hope to serve the nation's farms in the same way as we have its industries, with special steels for every purpose."

Others speakers were R. J. Wysor,

Republic Officials at Opening of New Wire Mill

REPUBLIC STEEL CORP. officials welcomed the country's leading agricultural engineers and other guests at the formal opening of its new wire mill in South Chicago last week. J. L. Hyland, Chicago, district manager of Republic, right, was host for the occasion. Shown with him are, left to right, E. M. Richards, assistant to the vice president in charge of operations; N. J. Clarke, vice president in charge of sales; T. M. Girdler, chairman; C. M. White, vice president in charge of operations; and R. J. Wysor, president

president; N. J. Clarke, vice president in charge of sales; C. M. White, vice president in charge of operations, and J. L. Hyland, Chicago district manager. Their addresses revealed that improvements now being completed by Republic shortly will increase its ingot producing capacity from the present 6,500,000 tons to approximately 7,000,000 tons.

Announcement also was made that Republic recently established at the University of Iowa, Ames, Ia., a fellowship for the study of agricultural requirements in terms of cooperation from the steel industry.

Efficiency in Industry Is Aid to Employment

A study of productive efficiency related to unemployment has been made by economists for the Farrel-Birmingham Co. Inc., Ansonia, Conn., and published in a booklet. The conclusion is that unemployment is relatively greatest in industries with low productive efficiency.

Three periods of the business cycle are included, 1923-1929, prosperity; 1930-1933, depression; 1933-1936, recovery. The conclusion, based on figures of the census bureau, is:

"The contention that re-employment of the unemployed is to be achieved by reducing productivity per capita has no basis in fact. The presence of unemployment in industry side by side with increased productive efficiency has induced a sort of primitive reasoning that the two are cause and effect. The facts are that the industries with highest efficiency and employing the fewest persons per $100,000 of conversion values show generally the best records for increasing and maintaining total employment. They do so for the obvious reason that they successfully market more units of output and hence need more men and more man-hours to produce them."

Enjoins Attorney General In Aluminum Co. Suit

United States District Judge R. M. Gibson, Pittsburgh, last week issued a temporary order enjoining Attorney General Homer S. Cummings from prosecuting the government's anti-trust suit against the Aluminum Co. of America. Order was based upon petition by company's counsel which cited a similar suit filed by the government in May, 1912, paralleling in detail the current action.

Wagner Act Cannot Stand Long, National Chamber of Commerce Told

THE trouble with the Wagner act," James W. Hook told members of the United States Chamber of Commerce at their annual convention in Washington last week, "is the fact that it assumes the employer in every case is not only as strong and able a bargainer as the majority of his employes, but, also, as his employes and the federal government combined."

Mr. Hook, who is president, Geometric Tool Co., New Haven, Conn., pointed out that the act defines the rights of employes, but provides no penalties if they are exceeded. "It prescribes penalties for employers for not recognizing these employes' rights, but omits giving the employers any rights for themselves. Such an act cannot stand long. Ultimately, it must be amended so as to penalize excesses by both labor and management.

Bargaining Must Be Free

"Employes cannot be given the right to bargain collectively and at the same time be permitted to hold the threat of economic death over the employer if he does not accept their terms. Bargaining is no longer such if the free exercise of the will of any one of the bargainers is thwarted by fear or threat of reprisals."

B. C. Heacock, president, Caterpillar Tractor Co., Peoria, Ill., addressing the convention on "Working Conditions in Manufacturing Plants," said he believes "each employer will arrive at the right answer under his own circumstances if he keeps in mind that he is producing for the customer with the customer's money; that he has no right to customer patronage but must continually earn such patronage, and if he will then fairly apportion the net proceeds between owner and worker, retaining only a proper share for management."

Edward F. McGrady, assistant secretary of labor, told the delegates that "unless labor, grouped collectively, can have its expert representatives, wholly independent of employer influence, speak for it with a powerful voice, there is no real bargaining at all and wage rates are only an arbitrary decree of a more or less beneficent despotism fixing the conditions of labor in its own untrammeled discretion."

Must Respect Sanctity of Contracts

McGrady told the conference that "the essence of successful labor relations is an unvarying respect for the sanctity of contracts. Labor knows that it can expect no countenance in public opinion unless it respects its contracts, and it knows further that without the respect of public opinion, it cannot live."

James A. Farrell, former president, United States Steel Corp., discussed the present trend in foreign trade. He said that "in our efforts to recover our foreign markets by means of reciprocal trade agreements, American public opinion has repudiated in no uncertain terms the theory that our domestic markets are capable of absorbing that proportion of our total national production which finds its way abroad, and that the maintenance of our national economy is independent of our external trade."

Mr. Farrell called attention to the fact that a significant trend in our export trade is the increasing prominence our exports of manufactured products again play in our balance.

"The task of all countries is that of creating conditions favorable to trade expansion," he said.

C. G. Conley, president, Mt. Vernon Bridge Co., Mt. Vernon, O., gave a short talk to trade association ex-

$7,000,000 "Move" For Irvin Sheet Mill

MOVING 5,000,000 cubic yards of earth to strip an iron ore mine was not uncommon when new mines were being opened in the Lake Superior district, but to move over 2,000,000 cubic yards today to locate a steel mill is—news.

STEEL, *March 22, p. 19, reported how United States Steel Corp. had changed its plans for building a continuous broad strip-sheet mill at Clairton, Pa., and had purchased a 600-acre tract in the Monongahela valley as a site for the mill, to be named in honor of William A. Irvin, president.*

Now on this site is a large mound, which has to be removed before the mill is built. Only heavy equipment of the type used in the large government projects is available; contractors estimate it will take three and a half to four months, moving 34,000 cubic yards per day, to do the job. Lowest bid is $7,000,000—just to prepare the ground for that mill.

ecutives who met simultaneously with the national chamber. He spoke on the income tax law and after discussing the present act called attention to the fact that "if the law is not revised, the corporations adversely affected will be forced to the wall and hence employment greatly reduced as well as prices of capital goods raised considerably."

Mr. Conley said that the result will not be good for the country because, "failures are always disastrous, less companies will be in existence to pay tax, the public will pay more for the capital goods products, employment will be reduced, demand for consumer goods will be reduced, there will be a scarcity of capital goods producers when the public is in need of their services, and the income tax law will produce less total tax."

Sheet & Tube Refuses SWOC Contract; American Union Plan Is Postponed

THE Steel Workers Organizing committee, which now claims a majority of the steel industry's 540,000 wage earners, concentrated efforts last week on leading independent producers, hoping for a contract with at least one of them.

Youngstown Sheet & Tube Co., it was reported, offered to bargain through SWOC representatives with their employes, but rejected a contract. Committee leaders would not comment on their probable course of action, except to issue the following statement:

"After a three and a half hour conference with officials of Youngstown Sheet & Tube Co., Youngstown, O., yesterday, they refused to sign an agreement."

The company's position was understood to be that since it is complying with the Wagner labor act and is paying wages as high as anywhere in the industry, the employes' position could not be improved by signing a contract with the SWOC.

Meanwhile, in conformity with the Wagner act, the industry generally served notice that all financial support for employe representation plans would be withdrawn.

SWOC Faces Cut Rate Competition

At Pittsburgh works of Jones & Laughlin Steel Corp. a new organization known as the Pittsburgh Works Employes association was conducting a membership drive on the basis of dues of 25 cents per month, compared to SWOC's dues of $1 per month. Ralph Martin, organizer of the American Union of Steelworkers in Carnegie-Illinois plants, announced an abandonment of the membership drive temporarily.

Other developments included:

Filing of charges against Bethlehem Steel Co. and Bethlehem Steel Corp. before the national labor relations board by SWOC.

Demand for an election at the East Pittsburgh, Pa., plant of Westinghouse Electric & Mfg. Co. by the United Electrical & Radio Workers Union, a CIO affiliate.

Anncuncement by the SWOC that it had obtained contracts with 92 iron, steel and metalworking companies.

Marks Beginning of General Attack

In connection with its charges filed against Bethlehem, the SWOC stated that "this marks the beginning of a general attack on company unions which have not yet been disbanded since the Supreme Court decision."

Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, announced that it had severed relations with employe representation plan in a statement filed with the labor relations board in Washington.

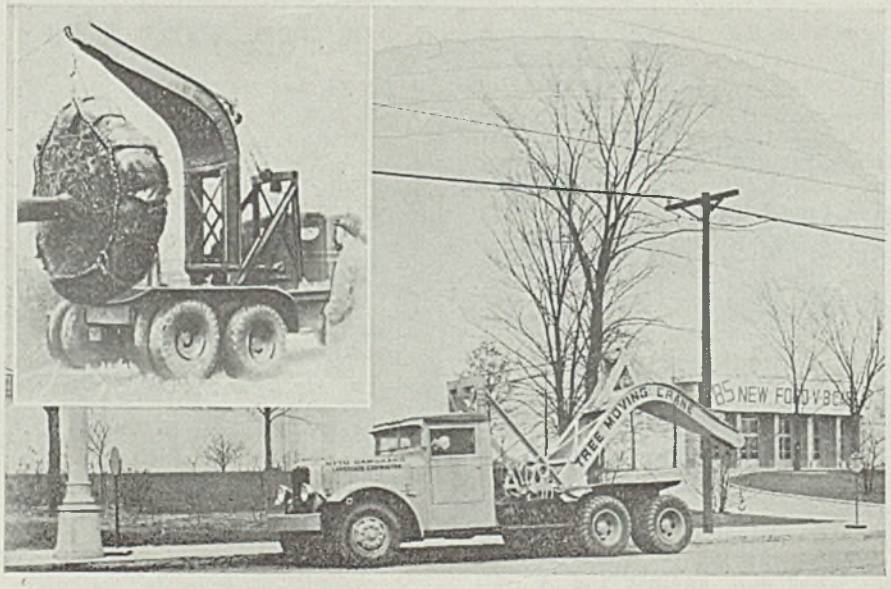
In a letter to employes, B. F. Fairless, president, said Carnegie-Illinois "will discontinue any financial contribution to the plans; will not furnish any facilities for the election or for other activities of employes or employe representatives under the plans; will not furnish any stenographic or other office service or facilities for activities of employes or representatives under the plans.

Claim to a majority of steel workers was made by Philip Murray, SWOC chairman, at opening of the two-day convention of the Amalgamated Association of Iron, Steel and Tin Workers in Pittsburgh. Murray asserted 325,000 members had been enrolled in the ten-months drive.

Order prevailed along the labor front in Detroit last week, as 15,000 Packard workers took time off Wednesday to mark pink ballots signifying their choice as to collective bargaining representatives, in the first election held in automotive plants under terms of the Wagner act. District NLRB offiicials conducted the election.

Final count showed the workers in favor of the UAW as bargaining agency, by a vote of 11,588 to 2655. Conferences resumed Friday on a list of demands presented by the UAW to the management.

Crane Unit Moves, Transplants Heavy Trees



ONLY one operator is required to move and transplant large trees with this crane. Equipped with steel rope and a single and double-drum winch, each operated independently, the unit is capable of handling a 45-foot tree weighing 18,000 pounds. Inset shows tree being swung on steel cradle preparatory to being transplanted in front of Ford rotunda, River Rouge, Mich. Photo courtesy Gar Wood Industries

Production

STEELWORKS operations last week averaged 91 per cent, off ½ point. This was due mainly to temporary interruptions caused by the flood in the Pittsburgh and Wheeling districts. Details follow:

Pittsburgh — Flood conditions necessitated precautionary measures again last week and a number of open hearths were shut down for one and two turns. As a result, operations were down 5 points to 90 per cent. Recovery has been speedy.

Wheeling—Down 8 points to 88 per cent, as a result of last week's precautionary measures because of high water. The slight suspensions were purely temporary.

Chicago — Increased 1 point to 85½ per cent, a new peak for the year. From present indications, output will hold around the present level the balance of the quarter. One producer is rehabilitating additional open-hearth facilities for operation within the next ten days.

Central eastern seaboard—Operations averaged 70½ per cent last week. Tonnage required for specified jobs on which protections expired April 30, is a bolstering factor.

New England—At 93 per cent, ingot production was off 7 points. Needed repairs to several open hearths have been delayed a week or more due to heavy demands for steel in finishing departments.

Cincinnati—Rose 4 points to 90 per cent, all but three open hearths being active.

St. Louis—Ingot production was stepped up sharply last week to 94 per cent, which contrasts with 82 per cent during the past three months.

Detroit—Gained 5 points, with all open hearths of the two district producers melting.

Birmingham — Averaged 83 per cent, a gain of 3 points. Indications point to a higher rate soon, as every available furnace is being prepared for production.

Buffalo—Continued at 93 per cent, with 40 open hearths active. No early slackening in production is in evidence.

Youngstown—Advanced 1 point to 87 per cent, with 77 open hearths and three bessemers engaged. Youngstown Sheet & Tube Co. plans to take off four open hearths this week and Republic Steel Corp. may also have a recession.

Cleveland-Lorain — Unchanged at 79½ per cent, with 31 open-hearth furnaces active.

District Steel Rate

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended May 1	Change	Same week 1936	Same week 1935
Pittsburgh	90	— 5	63	37
Chicago	85½	+ 1	71	51
Eastern Pa.	70½	+11	44½	28½
Youngstown	87	+ 1	78	50
Wheeling	88	— 8	92	79
Cleveland	79½	None	79½	54
Buffalo	93	None	70	27
Birmingham	83	+ 3	69	54½
New England	93	— 7	78	30
Detroit	100	+ 5	100	82
Cincinnati	90	+ 4	84	†
St. Louis	94	+12	†	†
Average	91	—½	69½	44

†Not reported.

Steel Plants Resume; High Waters Cause Slight Damage

Steelworks operations in some parts of the Pittsburgh and Wheeling districts were temporarily hampered again last week, for the third time this year, by high water.

At Pittsburgh the flood reached a crest of 35 feet Tuesday. As soon as the water began to subside preparations started toward resumption of operations at steel plants which had suspended as precautionary measures. Total damage from the water was believed slight. Government forecasters expected that the district around Portsmouth and Cincinnati would not be seriously affected.

March Exports, Imports In Marked Gains Over 1936

March exports of iron and steel semimanufactures were valued at $14,638,000 compared with $6,594,000 for the same month of last year. Exports of steel mill manufactures were $5,867,000, against $2,417,000.

Imports of iron and steel mill products amounted to $2,185,000; and in March last year, $1,844,000. Ferroalloy imports were valued at $2,023,000 compared with $1,197,000.

FTC Not Considering New Basing Point Complaint

Federal trade commission officials last week denied Washington news reports stating the commission is considering issuing a general complaint against use of the basing point by the steel industry.

Commission officials believe their case against the cast iron soil pipe makers involving the basing point issue could be taken as a precedent.

Meetings

INSTITUTE ANNOUNCES PART OF ITS MEETING PROGRAM

WRIGHT PATMAN, congressman from Texas, will discuss the Robinson-Patman law at the forty-sixth general meeting of the American Iron and Steel institute, Waldorf-Astoria, New York, May 27.

Program of the meeting includes morning, afternoon and evening sessions, an informal luncheon and banquet. E. G. Grace, president, Bethlehem Steel Corp., and president of the institute, will preside at the morning session and make the opening address. Other features of this session are the address by Mr. Patman and a paper, "Growth and Incidence of Taxation," by George O. May, senior partner, Price, Waterhouse & Co., New York.

Four papers appear on the afternoon session program as follows: "Fundamentals of Safety and Accident Prevention in Steel Plants," by L. H. Burnett, vice president, Carnegie-Illinois Steel Corp., Pittsburgh; "Technological Advances in Steel Products," by C. M. White, vice president, Republic Steel Corp., Cleveland; "Stainless Steels," by Dr. V. N. Krivobok, associate director of research, Allegheny Steel Co., Brackenridge, Pa.; and "Operating Practices in Foreign Iron and Steel Plants," by Dr. G. B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Details for the evening session have not been announced.

WIRE GROUP IS ARRANGING MEETING IN PITTSBURGH

Members of the Wire association will conduct a regional meeting at the William Penn hotel, Pittsburgh, evening of May 21. Nonmembers of the association are invited to attend. Admission will be by tickets which are to be obtained from the association's secretary, Richard E. Brown, 17 East Forty-second street, New York.

Two papers are scheduled for the meeting as follows: "Cold Heading Wire," by C. L. Harvey, chief metallurgist, Lamson & Sessions Co., Kent, O.; and "Metallurgy of Steel Wire," by B. L. MacCarthy, chief metallurgist, Wickwire Spencer Steel Co., Buffalo.

FARM EQUIPMENT INSTITUTE TO CONVENE IN CHICAGO

Forty-fourth annual meeting of the Farm Equipment institute will be held at the Palmer House, Chicago, Oct. 6-7. Robert A. Jones, 608 South Dearborn street, Chicago, is secretary of the organization.

Men of Industry

FRED C. KINDLER has been appointed manager of steel casting sales, Mackintosh-Hemphill Co., Pittsburgh. Mr. Kindler left a similar position with Otis Steel Co., Cleveland, with whom he was connected for approximately 26 years in the steel foundry department in various capacities.

George F. Walker, connected with sales development at the H. H. Robertson Co., Pittsburgh, for approximately 20 years, has joined the sales staff of Mackintosh-Hemphill, and will be interested chiefly in the steel casting division.

♦ ♦ ♦

Robert J. Linney has been advanced to the position of general manager, Chateaugay Ore & Iron Co., Lyon Mountain, N. Y.

♦ ♦ ♦

W. B. Coullie, general sales manager, Harbison-Walker Refractories Co., Pittsburgh, has been elected a director of the company.

♦ ♦ ♦

A. T. Brown has been elected to the board of directors, Caterpillar Tractor Co., Peoria, Ill., in place of H. P. Mee. Other members were re-elected.

♦ ♦ ♦

Louis Dulien, president, Dulien Steel Products Inc. of Seattle, New Orleans and New York, has been elected president, Pacific Northwest chapter, Institute of Scrap Iron and Steel Inc.

♦ ♦ ♦

George Maily has become associated with Sack Inc., Cambridge, Mass., manufacturer of distinctive furniture trimmings, as foundry organizer and superintendent. Previously he was associated with Gorham Mfg. Co., Providence, R. I.

♦ ♦ ♦

William K. Clow Jr., formerly general manager, Henszey Co., Watertown, Wis., has become identified with the technical staff of Elgin Softener Corp., Elgin, Ill. He will specialize in boiler water conditioning.

♦ ♦ ♦

Walter S. Aylsworth, Martin building, Pittsburgh, formerly western Pennsylvania district representative for Chas. Taylor Sons Co., is now representing Mullite Refractories Co., Shelton, Conn., in the Pittsburgh district in the sale of its products.

♦ ♦ ♦

Leon C. Hulse has been named factory sales engineer, air conditioning division, Gar Wood Industries Inc., Detroit. A graduate mechanical and registered civil engineer, he has been connected with the air conditioning division for the past six years.

♦ ♦ ♦

George T. Griffiths has been appointed assistant general superintendent, Clairton steelworks and furnaces, in charge of river transportation of Carnegie-Illinois Steel Corp., Pittsburgh. He succeeds the late Harry F. Shaw as head of the company's marine ways and inland waterways fleet. Mr. Griffiths joined the company early this year as superintendent of steamers and landings. Prior to that he spent six years as assistant hull inspector of the government steamboat inspection service, and from 1919 to 1931 served as mate, pilot and captain with the former Carnegie Steel Co.

George T. Griffiths

♦ ♦ ♦

Lewis B. Lindemuth, consulting engineer, New York, now in Australia for the Broken Hill Proprietary Co., Ltd., is expected to return to New York in June. He then plans to go to England to continue his work with Richard Thomas & Co. Ltd.

♦ ♦ ♦

H. M. Hall, 108 West Sixth street, Los Angeles, has been named representative by Bodine Electric Co. for the southern portion of California. J. A. Nadon, formerly representative for the entire state of California, will limit his activities to the northern portion.

♦ ♦ ♦

Robert Stoker, formerly superintendent, galvanizing department, Vandergrift, Pa., works of Carnegie-Illinois Steel Corp., has been appointed to a newly created advisory position in the sheet and strip division of the metallurgical department. He will analyze trade problems in all of the company's sales districts.

♦ ♦ ♦

Charles Abeles, formerly assistant sales manager, Koppel Industrial Car & Equipment Co., has joined the sales organization of Easton Car & Construction Co., Easton, Pa., manufacturer of wheeled haulage equipment. He will make his headquarters at the New York office.

♦ ♦ ♦

Ernest H. Tayler, assistant general manager, has been elected vice president in charge of production, International Boiler Works Co., East Stroudsburg, Pa. John B. Kingsley has been named vice president in charge of sales and will be located at the New York office of the company.

♦ ♦ ♦

Henry A. Roemer, J. H. Hillman Jr., B. E. Kibbee, C. H. Butts and George Whitlock, all of Sharon Steel Corp., have been elected directors of Mullins Mfg. Co., Salem, O. H. N. Preston, of Chicago, also was elected to the board, while G. R. Gibson, Andrew McLeod and Richard White were re-elected.

♦ ♦ ♦

Myron C. Taylor, chairman, United States Steel Corp., New York, sailed last week for Europe, to be gone three months. He will make his annual visit to the corporation's European offices, attend the Coronation ceremonies in London and spend some time at his villa in Florence, Italy.

♦ ♦ ♦

C. L. Brackett, who recently was elected a member of the executive committee of the American Institute of Bolt, Nut and Rivet Manufacturers, is president of the National Machine Products Co., Detroit, and not the National Screw & Mfg. Co., as reported in these columns recently.

♦ ♦ ♦

W. F. Anderson, St. Louis; M. C. Bellamy, Seattle; G. W. Curtis, Milwaukee; H. V. Fleming, Birmingham, Ala.; B. E. Keifer, Cincinnati; H. D. Robb, Pittsburgh, and B. M. Tinlin, Huntington, W. Va., have been appointed district managers in charge of steel sales for the steel and tube division, Timken Roller Bearing Co., Canton, O.

♦ ♦ ♦

Floyd L. Greene, executive vice president and a director, was recently elected president, General Refractories Co., Philadelphia. For almost a quarter of a century he has been prominently and actively identified in the refractories business. In 1913 he went to work for the Standard Refractories Co., Claysburg, Pa. which was acquired by General Refractories in 1922. He served in various capacities until in 1936 he was elected executive vice president. He is a director of several subsid-

iaries of the company, and is also a director and member, executive committee, American Refractories institute.

♦ ♦ ♦

Nathaniel B. Randolph, vice president in charge of sales, Granite City Steel Co., Granite City, Ill., has been elected a director of the company.

♦ ♦ ♦

A. J. McDonald, associated with Lebanon Steel Foundry Co., Lebanon, Pa., for many years as eastern district sales manager in charge of the Philadelphia office, has been elected vice president in charge of sales. K. V. Wheeler has been elected vice president and plant manager, and Fred Grotts has been named vice president and metallurgical director.

♦ ♦ ♦

E. C. Williams has been named to the new post of director of purchases for all units of Thompson Products Inc. In his new post he will supervise all buying, centralizing it as much as possible to establish standard practices throughout the organization. For the past 25 years Mr. Williams has served as purchasing agent for the company's main plant at Cleveland.

♦ ♦ ♦

Charles R. Hook, president, American Rolling Mill Co., Middletown, O., has departed on a trip to Europe. In England he will confer with British interests which are cooperating with American Rolling Mill in building a continuous mill in Australia for John Lysaght Ltd. He will also confer with licensees of his company in England, France, Germany and Italy.

♦ ♦ ♦

James E. O'Brien, purchasing agent, Fanner Mfg. Co., Cleveland, has been elected vice president of the sixth district, National Association of Purchasing Agents. He has been actively associated with the Purchasing Agents Association of Cleveland for the past 20 years and has held a number of important positions in that organization including that of president in 1928.

♦ ♦ ♦

W. Frank Detwiler, executive vice president, Allegheny Steel Co., Pittsburgh, was elected president at a meeting of directors April 27. He succeeds the late Harry E. Sheldon. Other officers were re-elected. Directors also were re-elected, and William M. McKelvy, of Pittsburgh, was added to the board.

Mr. Detwiler started with the company in 1909 as a time card employe and rose rapidly to executive status. He became a plant manager in 1918, then general manager, vice president in 1931, and executive vice president and a director in 1934. He is a director, American Iron and Steel institute, and Pittsburgh Army Ordnance association.

♦ ♦ ♦

Fuller F. Barnes, Associated Spring Corp., Bristol, Conn., has been elected president, Spring Manufacturers Association Inc. J. W. Campbell, Cleveland Wire Spring Co., Cleveland, has been elected vice president, and L. A. Wheeler, Bristol, Conn., continues as secretary-treasurer of the association. In addition to Messrs. Barnes and Campbell, directors elected for the ensuing year are L. D. Adams, Barnes-Gibson-Raymond Inc., Detroit; A. G. Bussmann, Wickwire Spencer Steel Co., New York; A. J. Hess, Chicago office, American Steel & Wire Co.; L. C. Humason, Humason Mfg. Co., Forestville, Conn.; J. F. Kamen, Chicago Coil Spring Co., Chicago; E. M. Miller, Miller & Van Winkle Co., Brooklyn, N. Y., and H. F. Plagenz, Cuyahoga Spring Co., Cleveland.

Technical Graduates Take Course in Salesmanship

AN original course of training on marketing technical products is being pursued by a group of young technical graduates under the leadership of Bernard Lester, prominent industrial executive of the Westinghouse Electric & Mfg. Co., and lecturer in the University of Pittsburgh. Westinghouse graduate study program is made up of 25 chosen men selected by their department heads, and the results of such training is attracting wide interest and being watched closely by sales management.

The days of the breezy, smart, slapstick salesman have gone according to Mr. Lester. Engineering selling today is a serious matter and although personality in the individual can add much to his success, the man who will attain a sound and continued success is the one who knows the technique of the product to be sold, the character of the market to be met and above all, is able to interest himself in his customer's problems and their solution.

Bernard Lester

Died:

JOHN L. SMITH, 73, former president, Highland Iron & Steel Co., Terre Haute, Ind., in Los Angeles, recently.

♦ ♦ ♦

Malcolm N. Nesbit, 40, of Oakmont, Pa., prominent in steel circles, April 23 in Louisville, Ky.

♦ ♦ ♦

W. A. Davidson, 66, vice president, Harley-Davidson Motor Co., Milwaukee, pioneer motorcycle manufacturer, in Milwaukee, April 21.

♦ ♦ ♦

H. W. Strong, 66, president, Strong, Carlisle & Hammond Co., Cleveland, wholesale tool and machinery firm, in that city, April 29.

♦ ♦ ♦

Ivo E. Thomas, 61, president, Thomas Machine Co., Madison, Wis., recently. He founded the business ten years ago.

♦ ♦ ♦

Ernest B. Wiggs, 52, a department head for Warner Gear Co., Muncie, Ind., for 17 years, in that city, recently.

♦ ♦ ♦

J. E. Simes, in charge of sulphate sales in the Chicago office of American Steel & Wire Co., at his home in Joliet, Ill., April 26.

♦ ♦ ♦

George Rabone, employed at the Homestead steelworks for more than 40 years prior to his retirement seven years ago in Pittsburgh, April 23.

♦ ♦ ♦

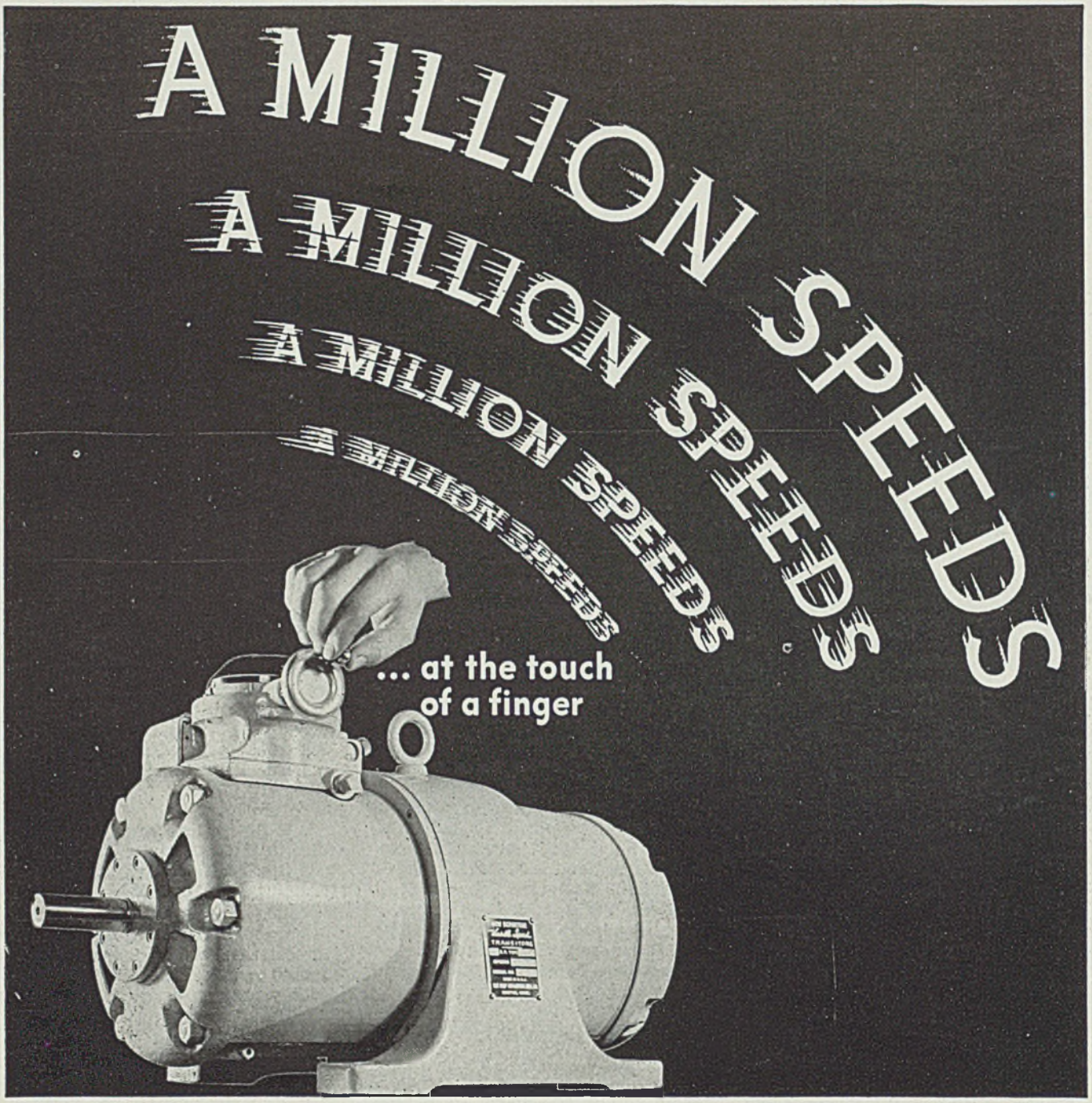
Martin J. Hekking, 67, marine engineer and member of the staff, Babcock & Wilcox Co., New York, in West New Brighton, Staten Island, N. Y., recently.

♦ ♦ ♦

George Puchta, 77, connected with the Queen City Supply Co. and a member, American Supply & Machinery Manufacturers' Association Inc., Pittsburgh, in Manila, P. I., April 18. He was a founder of the Cincinnati Frog & Switch Co., Cincinnati, and also was a former mayor of Cincinnati.

♦ ♦ ♦

Frank I. Smith, 63, field engineer for Otis Elevator Co., at his home in Pittsburgh, April 20. He was a member, Association of Iron and Steel Engineers. He obtained his first executive position through J. A. Schwab, father of Charles M. Schwab, in 1899, being placed in charge of the electrical department at the Homestead steelworks.



The New Departure Variable Speed Transitorq is *outstanding* in the field of speed-changing devices. It is rugged, dependable and extremely compact. It gives an absolutely positive drive, yet speeds may be changed with the utmost ease, actually at the touch of a finger. Because of this ease of operation, Transitorq is particularly well adapted to the use of automatic, direct or remote controls of many kinds. It provides the solution for a wide range of problems in which not merely speed changes but *infinite variation in speed* is required. Send for full information about Transitorq and what it can do to solve your speed problems.

New Departure, Division General Motors, Bristol, Conn., Detroit, Chicago, San Francisco.

NEW DEPARTURE *Variable Speed* **TRANSITORQ**

TRADE MARK

2524-P

MIRRORS OF MOTORDOM

DETROIT

EIGHT years ago the country was in the full flush of prosperity. Stocks were soaring to unbelievably high levels, aided by the dollars of bellboys, scrubwomen and cab drivers. Automobile production zoomed to dizzy heights and weekly was setting new records in the history of the industry. Few suspected the impending burst of the bubble.

Today, after long years of stormy weather, the industry is practically back to the plateau of early 1929. Automobile assemblies for the week ending last Saturday totaled 139,475, highest since the week ending May 18, 1929. Highest figure ever reached by assemblies was only 140,822, for the week ending April 13, 1929. This week undoubtedly will see the latter figure eclipsed, as plants point toward a 150,000 weekly rate.

General Outlook Clouded

Estimates for total April production indicate a figure of 558,320, top monthly total since June, 1929. For the first four months of this year, car output reached an estimated 1,860,000, compared with 1,644,898 for the same period last year, an increase of 13 per cent, and this despite the serious inroads of widespread sitdown strikes. It is believed the four-month total even exceeds that for the first four months of 1929 by a slight margin. Despite this amazing record, Detroit observers are inclined to hold a pessimistic outlook. Unsettlement in the stock market, the gold situation, critical national finances, unruly labor and a business-baiting administration combine to cloud the rosy picture reflected by automobile production.

Production last week moved up 7135 units over the week previous, an increase in which practically all producers shared. Even Ford stepped up from the level maintained for the past month, turning out over 1000 more. Chrysler divisions boosted output 2500, General Motors was up some 2800, and all other producers bulked an additional 1000 units.

ONE explanation behind the early reaffirmation of steel prices for third quarter is the decline in steel buying in recent weeks. Automobile companies had completed buying for current models in many cases and were not particularly interested in further commitments as long as the price at date of delivery was not determinable. On most grades of auto steel deliveries are now well into the third quarter.

Now that the price situation beyond July 1 is cleared up, steel buyers may return to the market, provided auto officials can decide whether to continue on into the fall with current models or to close off present runs early and move up the introduction of new models with their probably higher price tags. The action which Ford takes may play a major part in determining this decision.

This is not to infer there is no buying for new models being done at the moment. Packard, for one, is taking figures on the new jobs, although production on 1937 cars still carries on at a rate of some 680 per day. Revisions and extensions to plant facilities at Packard also are unabated and plans call for expenditures of $1,000,000 monthly on this account until the end of the year at least, it is understood.

Decision has been made to adopt inbuilt headlamps on fenders for the large Packard in next year's series. The design will be similar to that used on the former Pierce-Arrow and now used on the Lincoln 12, but will not be identical with these.

Speaking of lights, the 1938 Cadillac line probably will feature a new type of auxiliary light on the front fenders, along the lines of the present Buick fender parking lights.

Automobile lights have had an interesting evolution since the early days of the shaky acetylene headlamps. There were the well-known Ford headlights which flared to blinding brilliancy as the engine and magneto were speeded up. Generators brought a more even illumination, followed by the two-bulb headlamps for bright and dim service. The single tail-light was duplicated on the other rear fender and a stop-light added to indicate brake application. Then the stop light was incorporated in the tail-light. Now a third rear light is used at the center on some cars.

When closed cars surged to prominence over open jobs, dome lights became the rage. The single dome light now has been replaced with twin side lights on the interior. Dash lights have grown from a single bulb to as many as four. Colored glass came into instrument panels to show up lighting effects more strikingly Lights were added to interiors of glove compartments. Cowl lights for parking use have given way to small lights on front fenders. Service lights attached to 15 or 20 feet of extension cord have been popular accessories. Courtesy lights close to running board also have had their innings. Radio lights and the new German fog lights are other variants.

Your fully equipped modern car may boast as many as 20 different lighting outlets, which means a lucrative business for service stations in replacing defective bulbs, in view of the fact some of the large double-filament styles retail for 50 cents or more.

NONEXCLUSIVE license to manufacturing rights for a new type of automatic transmission have been acquired by Borg-Warner Corp., adding another to the list of automatic transmissions which this company now is prepared to supply. Designer of the new device is T. B. Tyler, consulting engineer, credited with being the designer of the currently-used synchromesh type of transmission.

Known as the monopower drive, the device comprises a first-speed gear, second-speed clutch and direct-

MIRRORS OF MOTORDOM

drive clutch, all actuated by oil pressure through valves regulated by speed of the engine. Control is through the accelerator pedal and an auxiliary knob on the dash. When the direct-drive clutch is operative, the first two stages also are engaged but over-run so they are not effective.

It is understood the device as yet has not had the benefit of any actual service tests as have some other automatic transmissions, but its possibilities are being investigated. R. E. Lassiter is co-inventor of the mechanism.

Steady increase in the use of trailers is giving car designers plenty of headaches when they stop to consider the effect of the added weight on parts such as springs, clutches, transmission gears and frame members. Adding 2500 pounds to the weight which the car must haul reduces appreciably the life of numerous parts of the towing car, but until the trailer fad reaches greater proportions than at present, car builders are not disposed to introduce special models for use with trailers.

Brakes, cooling systems, electrical systems, driveshaft, axle bearings, tires, rear springs, engine and differential all must assume a part of the additional demands imposed by attaching a trailer to the average pleasure car. One of the most important factors to be considered by the trailer owner, both from the standpoint of safety and operating efficiency, is the type of hitch he uses. A number of currently used trailer hitches are decidedly makeshift and hazardous. Efforts are being pushed to standardize these devices.

UNION OF SOUTH AFRICA is enjoying unparalleled prosperity which is reflected in booming sales of American automobiles, according to Harry Dodge, vice president of Graham-Paige International Corp., back from a year's visit abroad. Last year, South Africa bought 51,940 cars and trucks from this country, 12½ per cent of total export sales. Higher prices for gold and brisk demand for diamonds have meant the opening of numerous old mines and the uncovering of new reserves. Two steel mills are in operation.

Packing and shipping of cars for export is no small task. For example, at Chevrolet's Bloomfield, N. J., plant, packers are confronted with the problem of compressing into less than 2000 cubic feet a 12-car shipment which ordinarily would take 5600 cubic feet. All shipping is in units of 12 cars or trucks, all of the same chassis and body model. Twelve packing cases are required to ship the 12 units.

As an example of the compactness achieved, when doors of 12 sedans are crated, the opening left by the 48 windows leaves space in which floor coverings, insulating mats, rubber channel strips and other body materials can be crammed. Material for a dozen gas tanks is packed into less space than would be needed for a single finished tank, by packing ends and body of each one as flat sheets. Seat cushion springs are compressed to one-sixth their normal bulk and wired in place.

Working parts are coated with special oils and generous use is made of waterproof paper to protect shipments from corrosion. All packing cases are waterproofed.

Organizers of the UAW have been invading scrap yards in this territory, attempting to sign up workers and force agreements with owners. Where colored workers are employed it has been the practice to send colored organizers to do the job.

A new type of radiator temperature control of the "winterfront" type has been developed, suitable for use on tractors to reduce the warm-up period and permit a quick switch from gasoline to distillate fuel. Two well-known lines of tractors have standardized on the equipment.

During depression years, winterfronts on the lower-priced cars have been in eclipse, although many higher priced models continue to be equipped with the devices. Appreciable reductions in cost have made their use more attractive recently, and plans are under way to introduce an entirely new type of radiator control this fall on one of the lowest priced cars, according to an official of the Pines Winterfront Co. in Chicago.

ACCESSORY sales are keeping step with and in some cases outdistancing new car sales, reflecting the improved condition of car buyers' pocketbooks and the enhanced appeal of present-day accessories. Graham, for example, reports accessory sales running over 400 per cent ahead of the figure for the same time last year. Among various items which are being bought in good volume are the new amber-colored fog lights, windshield defroster fans which are now being converted to ventilating fans for warm weather, electric clocks, chromium plated fender guides, flexible chrome-spoked stearing wheels, insect screens for radiator grilles and windows, and factory installed radios. . . . Owens-Illinois Glass is rebuilding and modernizing plants at Streator, Ill., and Los Angeles; has made additions to plants in Toledo, O., Baltimore, St. Louis, Newwark, O., and Muncie, Ind.; and recently has acquired control of the Lauterbach Corp., owner of patents on a new type of machine for manufacturing plastic bottle tops. . . . Sears Roebuck will receive its first consignment of 250 tractors from Graham about July 1, and will use them as samples in its various stores. . . . Guides in the DeSoto plant here are provided with portable microphones which they can plug into convenient loudspeakers at numerous points around the plant, permitting their voices to be heard above the surrounding noise by a large group of visitors.

Automobile Production

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

	1935	1936	1937
Jan.	300,335	377,306	399,426
Feb.	350,346	300,874	383,540
March	447,894	438,992	518,715
April	477,059	527,726	†558,320
4 Mos.	1,575,624	1,644,898	†1,860,001
May	381,809	480,571	.....
June	372,085	469,355	.....
July	345,297	451,474	.....
Aug.	245,075	275,951	.....
Sept.	92,728	139,785	.....
Oct.	280,316	229,989	.....
Nov.	408,550	405,702	.....
Dec.	418,317	519,132	.....
Year	4,119,811	4,616,857	.....

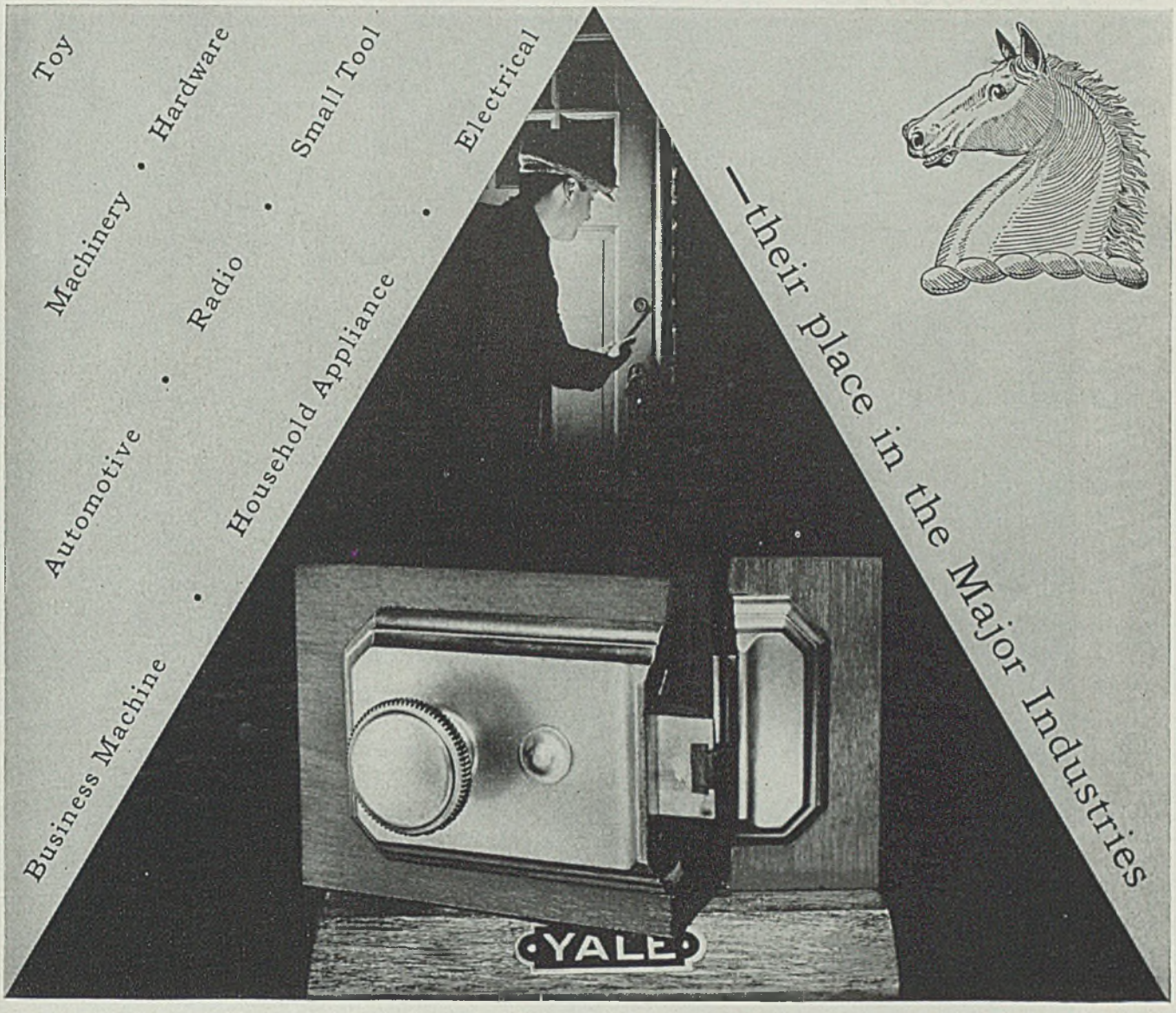
Calculated by *Cram's Reports*

Week ended:	
April 3	97,005
April 10	99,196
April 17	*125,472
April 24	132,340
May 1	139,475

*Revised. †Estimated.

	Week ending May 1	April 24
General Motors	55,455	52,580
Ford	35,875	34,850
Chrysler	31,000	28,500
All others	17,145	16,410

ZINC ALLOY DIE CASTINGS



PROTECTION!
—The Job of the Modern Door Latch

The all-important quality in a door latch is toughness. Appearance is a vital sales factor, of course, but the consumer primarily seeks protection. That the manufacturer of the attractive deadlatch, illustrated here, has chosen ZINC Alloy Die Castings for four of its major parts is an endorsement of the tough, sturdy qualities obtainable with this metal and process—the resulting smart appearance is obvious.

The design of the lock incorporates a new type of latch bolt that can be held in a retracted position by the die cast stop knob or deadlocked against "jimmying" by either the key or knob. This is accomplished by a simple mechanism within a tough, strong case—die cast in two parts of ZINC Alloy. By die casting these three parts, together with the strike plate, the latch has also been produced with a fine, smooth surface that insures economical finishing.

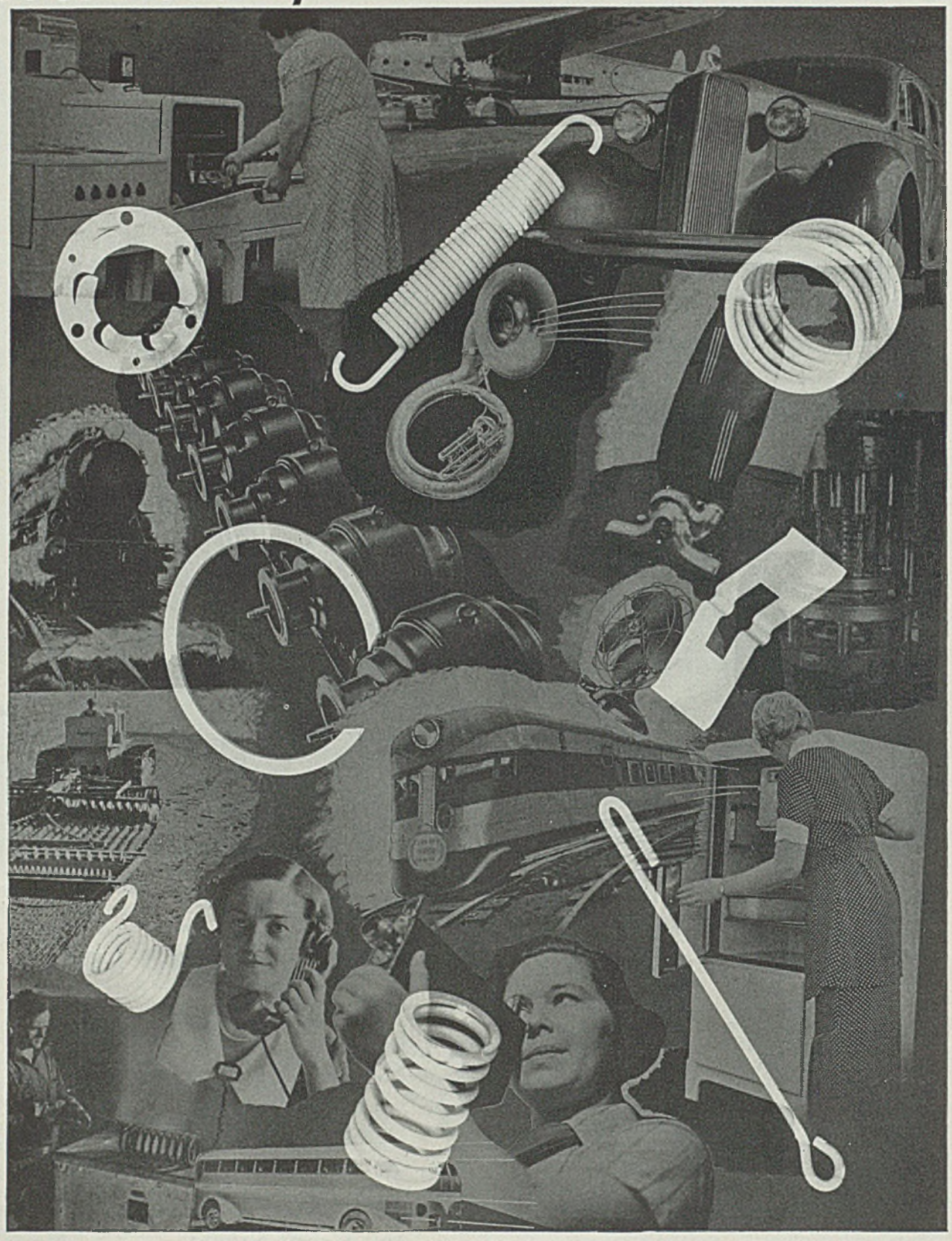
Toughness and smart appearance are only two of the many properties that make ZINC Alloy Die Castings attractive to manufacturers in all the major industries. For additional information, consult any commercial die caster— or write to this Company.

THE NEW JERSEY ZINC CO.
160 Front Street New York

The Research was done, the Alloys were developed, and most Die Castings are specified with

HORSE HEAD SPECIAL (99.99+% UNIFORM QUALITY) ZINC

Wherever there's Motion...you'll find SPRINGS



SPRINGS ARE AN IMPORTANT FACTOR IN TODAY'S LIFE - WITH A FULL REALIZATION OF THIS FACT, B·G·R COMBINES THE SKILL OF CRAFTSMANSHIP WITH THE BEST IN ENGINEERING PRACTICE FOR ONE RESULT—"SPRING PERFORMANCE"

BARNES • GIBSON • RAYMOND TWO PLANTS **DETROIT, ANN ARBOR, MICHIGAN**

DIVISION OF ASSOCIATED SPRING CORPORATION

WINDOWS OF WASHINGTON

WASHINGTON

THE attorney general reported to the President last week that as a result of an investigation by his department lasting almost a year into alleged collusive steel bidding on government contracts, that sufficient evidence could not be gathered by which he considered he could get a criminal conviction. Indications that this would be the outcome of the investigation have been made several times, as far back as last December.

It is a fact that officials of the justice department have intimated repeatedly that not enough material could be gathered that would warrant instituting a case against the steel companies. This was backed up by intimations made for a number of weeks by the attorney general himself at press conferences.

Some parts of the attorney general's statement are causing considerable speculation in Washington. The department said that "the administrative and quasi-judicial remedies in the hands of the federal trade commission may be better adapted to the control of the subject matter of this particular complaint than action by the department of justice." Again the statement says that, "it appears, therefore, that a problem is presented which can be satisfactorily investigated and dealt with through the more flexible remedies of the federal trade commission."

Passes Buck to FTC

Now comes the question as to whether this will be taken by the commission as an order to go ahead with this collusive bidding matter? There are some who feel that this is all that is necessary for the commission to start work on the case.

A snap judgment opinion on this, however, by an official of the commission is to the effect that if the commission does not get a suggestion from the attorney general or the President to go ahead and prosecute this case, that the commission will do nothing "at this time." In other words, the offhand first opinion of the report of the attorney general is that nothing further will be done about it by the commission unless and until something comes to it from higher ups.

If the commission again gets into the picture it is believed there will issue a finding against the steel companies involved. That is shown in the report made to the President in June of last year. Mr. Cummings' statement in part follows:

"The federal trade commission made a report to the President dated June 10, 1936, reaching the conclusion that collusion in maintaining prices accounted for identical bids and that this collusion was particularly evidenced by an agreement of steel producers on June 6, 1935, when, following the decision of the Supreme Court invalidating the NRA codes, they adopted a resolution declaring their intention 'during the present uncertainty to maintain * * * the standards of fair competition which are described in the steel code'.

Made a Thorough Probe

"The question therefore in which this department is concerned is whether the administrative remedies in the control of the federal trade commission, by way of a cease and desist order, should be superseded by criminal or civil proceedings instituted in the courts by this department.

"This department has conducted an extensive investigation over a large part of the country which included examination of the correspondence, files, minutes of directors' meetings and other records of 38 large steel producers, and interviews with 48 steel fabricators, 66 jobbers, many large consumers and the directors who were present at the June meetings of the American Iron and Steel institute.

"After examining the information obtained in the above manner, I conclude that the investigation has not produced sufficient evidence admissible in civil and criminal litigations to make advisable proceedings in court or under the anti-trust acts, as they have been construed by the courts. . .

"This system, long used in the steel industry, not only affects the manufacturers who utilize it and the consumers who are subject to it, but it also presents economic and social questions due to the fact that communities as well as plants have been located and developed with reference to the price structure developed by this system.

"The question before us is broader, however, than that of identical bidding in the steel industry. The type of practices complained of in this instance is widespread throughout many of the basic industries of the country. The difficulty in correcting this situation raises the whole question as to the adequacy of the present anti-trust laws for the solution of the monopoly problem as it now exists in the United States.

"In my opinion, the time has come for the federal government to undertake a restatement of the law designed to prevent monopoly and unfair competition. This proceeds from the conviction that the present laws have not operated to give adequate protection to the public against monopolistic practices."

In conclusion the attorney general recommends that a committee be set up to study the anti-trust laws as to their adequacy, enforcement and desirability of amendment, with the aid of consultant groups.

Abolishes Company Unions

Another matter of considerable interest to the steel industry developed the past week at the national labor relations board when William Beye, counsel for the Carnegie-Illinois Steel Corp., went before the board announcing that company unions were out as far as that company is concerned. He told the board just what the company would do about company unions and announced that in 30 days he would report to the board that this action had been carried out.

The intimation was that then the case of the unions against the company before the board would be

dropped. Lee Pressman, on behalf of the SWOC and Amalgamated, made a brief talk in which he made a statement tantamount to agreeing that the case should be withdrawn from the docket of the commission.

There is little question that the Roosevelt administration is much upset by rising prices and will go to any length to try to stop them. Last week the President made a plea to government clerks to stay out of the stock market. He has sent a letter to the civil service commission on this subject and shortly the commission will notify the various government departments.

New and stringent rules will be drawn up by the government through which a government clerk will not even be able to sell stock that he has had in his possession for a number of years without first asking his superior officer when and where he can sell his stock. This is certainly taking hold of things with a vengeance and shows to what lengths the administration will go to try to get hold of the rapidly rising prices in commodities as well as stocks.

There has been talk here for some time that if the administration finally enters into a trade agreement with England that there will have to be a tariff revision by congress. This is the last thing that is wanted and it will be headed off if possible. The only excuse for a downward revision would be that the President now only has the power to reduce any tariff rate 50 per cent under the law now in force. A downward revision will allow still further reduction. It is not the belief of many government officials that anything along this line will be done but there is much back stage talk along these lines.

LIND ASKS ATTENTION TO MACHINERY EXPORTS

"In selling abroad, American manufacturers have often encountered the opinion and criticism in foreign markets that they have neglected their export markets in periods of brisk domestic demand," said L. M. Lind, chief of the machinery division of the department of commerce, in urging American machinery manufacturers not to neglect their regular customers in foreign markets.

"This opinion," he continued, "justifiable or not, has often handicapped American foreign sales efforts, and the establishment of a steady volume of exports. Foreign buyers, and particularly well established importing houses, prefer to deal with export firms with sound and permanent foreign sales policies upon whom they can depend at all times for prompt service and consideration.

"According to reports," said Mr. Lind, "this situation exists in various foreign machinery markets at the present time with respect, however, to British and German manufacturers who have been increasingly busy in supplying the domestic market. In some cases, this condition has already inconvenienced foreign purchasers and dealers in British and German machinery, and in other cases is expected to. In either case the result is the same, that foreign buyers are looking to other machinery producing countries as sources of supply. American machinery producers have been and are profiting from this situation, and it is to be hoped that they will not create a similar situation abroad with respect to their own foreign sales policies."

INDUSTRIAL EMPLOYMENT EXCEEDS 1929 RECORD

As of April 1 11,000,000 persons were on the payrolls of manufacturers, which was the 1929 level, according to an estimate made by National Association of Manufacturers.

The figures show re-employment from 1933 to April of this year in the iron and steel industry amounting to 450,000 persons and the present day employment in the steel industry is reported by the association to be 70,000 more than in 1929. The association also gives the 1929 average employment in the steel industry as 1,070,000, with the 1933 average at 690,000 and the April 1937 average at 1,140,000 employed persons.

It is stated by the association that the whole estimate comprised the most recent figures available upon the employment situation in manufacturing. It was based on results of a telegraphic survey, coupled with figures of the bureau of labor, the census bureau and the National Industrial Conference board.

The report reveals that 3,310,000 persons have found jobs since 1933, with 2,190,000, or 66 per cent, in the durable goods industries, and 1,120,000, or 34 per cent, in the non-durable goods industries.

LABOR BREACH WIDENS BETWEEN CIO AND AFL

In connection with the ever-widening breach between the A. F. of L. and the CIO, the executive committee of the former has called a special conference of representatives of the A. F. of L. national and international unions to meet with the council at Cincinnati, on May 18. Effort was made at the recent A. F. of L. executive committee meeting to have a special convention called of the entire federation but this was voted down.

The A. F. of L. in a recent statement referred to the CIO as being "steeped in the cesspool of illegality and irresponsibility" and the statement said that the Cincinnati conference was called to marshal the forces of labor in America in support of the executive council's new policy and procedure designed not only to "advance and safeguard the interests of the affiliated unions" but also to "leave open the way to all trade unionists who wish to retain their affiliation with the A. F. of L." and "likewise make it possible for all workers heretofore not affiliated to come within the democratic and constructive fold of the A. F. of L."

DRAPER ASKS FAIR PLAY IN LABOR RELATIONS

Ernest G. Draper, former businessman and now assistant secretary of the department of commerce last week told trade association executives at their convention here that "we need a more comprehensive labor policy, the chief emphasis of which should be placed upon voluntary conciliation, voluntary mediation, disciplined and responsible unions, disciplined and fair minded employers, the frank acceptance by employers of collective bargaining and the right of employes to join, free from coercion, organizations of their own choosing.

"We need, in other words," he continued, "a give and take attitude, in which the chief aim, always to be held in view by both sides, is fair play."

Mr. Draper told the convention that he has no plan of his own "but I believe that a plan could be worked out." He called attention at this point to a labor relations bill recently introduced in the Pennsylvania state legislature. "This bill," said Mr. Draper, "follows closely the principles that have already worked so successfully in the railway field, but with the important difference that it is adapted for use by industrial companies rather than by great public utilities, like the railroads, whose problems in some particulars call for a different type of treatment."

TO AMEND TIN EXPORT ACT BY INCLUDING DROSS

An amendment to the tin conservation act was introduced in the house last week (H.R. 6621) by Representative Hoffman, Michigan. It provides an insertion in section 2 of the tin act after the word "scrap" the words, "or other scrap containing tin, together with drosses." The bill has been referred to the house committee on military affairs.

Management Group Sees Need For Human Engineering

MANAGEMENTS of industrial concerns have been tardy in devoting sufficient attention to the human factor in their businesses. This was the charge made against executives during a two-day conference of the Industrial Management society at the Auditorium hotel, Chicago, April 23-24. What can be done by employers of labor under present-day conditions to rectify this mistake was discussed extensively by those attending the meeting.

The conference, arranged for the benefit of industrial and engineering executives in the midwest, centered on the theme "human engineering in management."

Salary and wage differentials was the subject of one session at which Wally E. George, industrial engineer, American Steel Foundries, Chicago, presided. In his preliminary remarks, Mr. George spoke of the vital necessity of fundamental studies and analysis in the basic principles underlying the proper classification of labor and the application of wage differentials, now that it is apparent organized labor is to take an important position in such arrangements for those it represents. Division of workers into classes with appropriate wage differentials for each classification is one of the fundamentals of the vertical union.

Wage Basis Must Be Changed

This classification and the wage differentials must be applied on a predetermined written basis for groups of men and no longer left to individual negotiations with the foreman, Mr. George pointed out. Also, such grading and classification in a case where offered to the men through their representatives for approval before installation was accepted on presentation for over 95 per cent of the several hundred men involved, indicating that such tasks can be worked out fairly and justly in conference. It is important, however, that the management's representatives know and appreciate the importance of the basic principles involved.

Dr. Forrest A. Kingsbury, associate professor of psychology, University of Chicago, Chicago, presenting a paper on the analytical grading of positions, covered the underlying principles as developed in connection with office positions but these principles, he said, are basically applicable to any type of work. The speaker pointed out that any salary or wage is determined by four sets of conditions, namely: 1. The nature and difficulty of the job; 2. competence of the individual employe; 3. general and local economic conditions; and 4. distorting factors or outside influences.

The function of job grading is to evaluate the first condition, to correct the fourth condition, and these conditions should be distinguished clearly from the second and third conditions which were given little attention in the paper. In this, job grading (measurement of environmental conditions) must be kept clearly distinct from employe rating (measurement of persons).

The objects of job grading, Dr. Kingsbury pointed out, are to establish uniform wage rates for equal grades of work; and establish equitably graded wage rates for unequal grades of work. Job grading establishes for each position not a fixed salary, but a salary-range, within which individual salaries are determined by individual experience and competence.

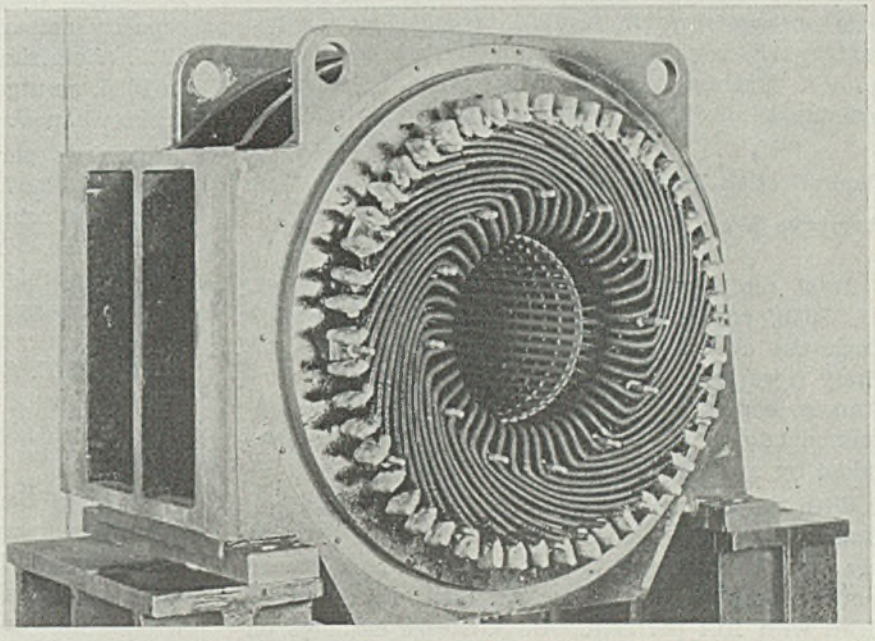
Analytical job grading involves identifying and defining those factors which in varying degree differentiate jobs of unlike grade, the speaker asserted. In this work the grade of a job is determined by the sum of the ratings of that job on the several significant factors. Selection of valid and reliable differentiating factors is the critical step in job grading and the degrees of each factor must be defined in such terms as to constitute equal units and to be reliably applicable. The validity and the relative reliability or self-consistency of gradings should be ascertained and errors causing unreliability corrected.

During the past four years a group of members of the Industrial Management society which was interested in occupational rating work has prepared and tested in practice in eleven companies a manuel or "Occupational Rating Plan." The plan was outlined and discussed by H. Barrett Rogers, time study supervisor, Westinghouse Electric Elevator Co., Chicago, chairman of the group.

This sets forth fundamental procedure based on 27 points, for measuring ability of men for comparative work, as applied to process pro-

(*Please turn to Page* 59)

Generator Uses Nonmagnetic Steel



RECENT development in the use of nonmagnetic steel is shown in the electric generator stator above. The circular steel ring attached to the plate frame directly behind the windings is made of a nonmagnetic steel furnished by the Jessop Steel Co., Washington, Pa. A similar flange is attached to the back of the stator. These flanges measure approximately 43 inches in diameter and are 1⅜ inches. Manufactured by the Crocker-Wheeler Electric Mfg. Co., this generator is the first upon which a nonmagnetic steel has been used for this part

Steel's 11th Annual Financial Survey Shows Strong Rise in Industry's Earnings

STEEL'S eleventh annual financial summary for the steel industry shows that 22 leading producers in 1936 earned a total of $168,709,405, after charges but prior to funded debt interest and dividends.

These producers represent 92.2 per cent of total ingot capacity. Comparable earnings for the identical interests in 1935 were $77,393,192. The 1936 earnings were the highest since 1930, when 20 leading companies reported $198,775,599.

After deducting bond interest, the 22 companies in 1936 had net earnings amounting to $137,572,488, compared with $46,203,567 in 1935. Allowing for preferred dividend requirements of $50,230,976, their 1936 net was $87,341,512, against $585,483 in 1935.

Total earnings of $168,709,405 last year constituted a return of 4.39 per cent on the $3,840,460,829 capitalization. This compares with 2.09 per cent for the same producers in 1935. Substantially the same list of companies reported 0.36 per cent earnings on capitalization in 1934, a deficit of 0.9 per cent in 1933, and a loss of 2.85 per cent in 1932. The highest earnings in recent history for the industry amounted to 9.88 per cent on capitalization, in 1929.

Capitalization Increased $145,084,109; Averages $60.82 Per Ton Ingot Capacity

Total capitalization of $3,840,460,829 as of Dec. 31, 1936, represented an increase of $145,084,109 from the close of 1935. This resulted almost entirely from issuance of bonds. Except in a few instances, common and preferred stock remained approximately unchanged. New financing was undertaken by a number of the larger companies.

With respect to total earnings on capitalization, Ludlum Steel Co. stood at the head of the list last year, with 12.23 per cent. Inland was in second position with 11.79 per cent; and Sharon Steel Corp., third with 10.4 per cent. U. S. Steel's earnings on capitalization amounted to 3.3 per cent, and Bethlehem's 3.25 per cent.

Average capitalization of the 22 producers last year was $60.82 per ton of ingot capacity, compared with $58.45 in 1935. The highest for 1936 was reported by Ludlum, at $224; Crucible Steel reported $120. U. S. Steel's average was $65.28; Bethlehem's $67.18, and Republic Steel Corp.'s $51.12.

Total earnings for the 22 producers averaged $2.67 per ton of ingot capacity in 1936, against $1.22 in 1935. Ludlum Steel Co., specializing in alloys, reported an average of $27.40 last year and $16.78 in 1935, leading all for both years. Of the producers whose principal output is ordinary carbon steel, the Inland Steel Corp. lead with $6.24 in 1936. National Steel Corp. which was first in 1935 with $5.98, dropped to second position last year with $5.50.

Small Companies Report Relatively Large Earnings; Average Is Equal to $2.97 on Common

Again, some of the smaller companies had relatively larger earnings, per ton of ingot capacity, than did the leading interests. United States Steel Corp. reported $2.15 for 1936, and 23 cents for 1935. Bethlehem Steel Corp.'s earnings per ton of ingot capacity amounted to $2.18 last year, and $1.23 in 1935. Bethlehem Steel was fifteenth in the list of 22 in 1936, as regards earnings on the per ton capacity basis, while U. S. Steel was sixteenth.

Earnings per common share for the 22 interests averaged $2.97 last year, against 2 cents in 1935. Inland's earnings per common share were $8.54, up from $6.54. Youngstown Sheet & Tube Co. was second in this list, at $7.03, this company having made a surprising come-back from 1935, when its earnings per common share amounted to only 68 cents. U. S. Steel's earnings were $2.91, contrasted with a loss of $2.77 in 1935. Bethlehem recovered from a loss of 70 cents in 1935 to earnings of $2.09 last year.

Assets of the 22 producers in 1936 totaled $4,243,888,431, compared with $4,035,276,985 in 1935. Current assets were $1,152,754,886, against $998,991,217. Current liabilities were $268,258,547, compared with $184,444,882 in 1935.

STEEL wishes hereby to acknowledge with thanks the co-operation of the comptrollers of the companies listed for the data which they supplied.

Opposite this page is an insert giving detailed comparisons for 1936 and 1935. Additional copies may be had by subscribers on request.

Financial Analysis of Iron and Steel Industry for 1936

Earnings, Capitalization, Assets and Liabilities of 22 Producers Having an Aggregate Annual Ingot Capacity of 63,148,020 Gross Tons

(x) Indicates Loss

	No. Shares Common Stock Outstanding		Par Value		Common Stock		Preferred Stock		Funded Debt		Surplus		Total Capitalization		Net Earnings Before Dividends	
	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935
United States Steel Corp.	8,703,252	8,703,252	100	100	$870,325,200	$870,325,200	$360,281,100	$360,281,100	$112,287,669	$108,577,591	$252,660,717	$252,516,714	$1,682,360,470	$1,678,613,638	$50,583,356	$1,146,708
Bethlehem Steel Corp.	3,191,614	3,194,314	No	No	303,203,330	315,342,389	112,066,440	93,388,700	155,982,619	111,492,169	57,562,527	74,487,447	628,814,916	594,710,705	13,901,006	4,291,253
Republic Steel Corp.	4,127,264	4,046,767	No	No	93,995,228	92,324,312	40,190,050	41,289,750	110,974,148	81,994,648	64,299,963	59,982,460	309,459,389	275,591,170	9,586,922	4,455,734
Jones & Laughlin Steel Corp.	576,320	576,320	100	100	57,632,000	57,632,000	58,713,900	58,713,900	34,595,588	4,857,706	49,304,909	48,477,015	200,246,397	169,680,621	4,129,600	398,715(x)
Youngstown Sheet & Tube Co.	1,384,752	1,200,000	No	No	86,803,097	75,256,097	15,000,000	15,000,000	78,253,000	85,337,000	19,375,547	18,405,729	199,431,644	193,998,826	10,564,501	1,641,162
National Steel Corp.	2,162,277	2,156,977	25	25	54,056,925	53,924,425	None	None	59,000,000	50,000,000	56,131,836	58,284,298	169,188,761	162,208,723	12,541,842	11,136,452
American Rolling Mill Co.	2,319,865	1,735,287	25	25	70,096,509	46,353,759	1,931,900	1,932,400	24,940,494	45,262,559	12,660,859	15,828,049	109,629,762	109,376,766	6,441,677	4,310,130
Inland Steel Co.	1,499,000	1,440,000	No	No	50,566,352	47,000,000	None	None	44,000,000	35,800,000	29,282,078	25,209,307	123,848,429	108,009,307	12,800,545	9,417,818
Wheeling Steel Corp.	388,091	388,070	No	No	19,404,550	19,403,500	38,154,700	38,142,300	33,600,000	29,145,000	18,650,313	19,241,799	109,809,563	105,932,599	4,115,388	3,497,626
Crucible Steel Co. of America	450,000	450,000	100	100	45,000,000	45,000,000	25,000,000	25,000,000	7,750,000	10,000,000	27,360,213	24,813,066	105,056,213	104,813,066	3,120,356	1,268,176
Otis Steel Co.†	891,130	841,002	5	5	4,455,650	4,205,010	11,103,140	11,503,895	10,827,500	10,827,500	5,816,053	4,214,863	32,202,343	30,751,268	1,980,149	2,228,664
Lukens Steel Co.*	317,976	317,976	10	10	3,179,760	3,179,760	None	None	3,633,400	3,633,400	3,532,262	3,405,973	6,865,613	10,595,478	112,205	236,843(x)
Pittsburgh Steel Co.‡	253,500	253,500	100	100	25,350,000	25,350,000	10,475,000	10,475,000	7,144,000	7,465,000	698,479	1,912,759	43,667,479	45,202,759	265,360(x)	1,675,353(x)
Allegheny Steel Co.	750,655	611,095	No	No	4,691,594	3,819,344	3,342,600	3,342,600	None	None	10,689,172	7,245,040	18,723,597	14,407,216	1,829,137	1,151,454
Gulf States Steel Co.	296,069	197,500	No	No	19,807,070	16,850,000	2,000,000	2,000,000	7,000,000	4,625,000	2,535,611	3,129,404	31,342,681	26,604,404	660,112	141,269
Sharon Steel Corp.	377,309	375,000	No	No	3,773,090	9,875,000	4,000,000	None	2,000,000	5,328,000	5,325,196	1,091,412(def.)	12,474,000	12,437,352	1,305,852	1,009,154
Granite City Steel Co.	382,488	254,992	No	No	8,483,821	6,088,821	None	None	None	None	3,574,269	3,649,645	12,058,090	9,738,466	288,687	618,358
Continental Steel Corp.§	200,579	175,590	No	No	5,279,310	6,146,193	2,630,600	2,773,500	1,400,000	1,165,100	3,631,330	1,895,069	12,820,191	11,888,798	736,228	481,978
Midvale Co.	200,000	200,000	No	No	10,574,621	10,574,621	None	None	None	None	1,650,598	1,383,042	12,225,219	11,957,663	1,266,168	496,085
Laclede Steel Co.	206,250	206,250	20	20	4,125,000	4,125,000	None	None	750,000	750,000	1,675,002	1,619,971	5,800,002	5,744,971	240,656	227,351
Vanadium-Alloys Steel Co.‡	210,000	210,000	No	No	2,000,000	2,000,000	None	None	None	None	4,422,119	4,185,950	5,921,063	6,185,950	592,216	357,377
Ludlum Steel Co.	500,000	215,790	1	1	500,000	215,790	None	4,426,000	None	None	8,018,570	2,306,087	8,515,007	6,926,980	1,041,245	637,729
Totals	29,388,391	27,749,682			$1,743,303,107	$1,714,991,221	$684,889,430	$668,269,145	$694,138,418	$596,260,673	$638,857,623	$631,102,275	$3,840,460,829	$3,695,376,720	$137,572,488	$46,203,567

	Total Earnings Before Div. and Int. on Bonds		Earnings Per Common Share		Per Cent Total Earnings on Capitalization		Total Earnings Per Ton Ingot Capacity		Rated Ingot Capacity Gross Tons		Capitalization Per Ton Ingot Capacity		Total Assets		Current Assets		Current Liabilities	
	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935
United States Steel Corp.	$55,501,787	$ 6,106,488	$2.91	$2.77(x)	3.30%	0.36%	$2.15	$0.23	25,772,400	26,657,000	$65.28	$62.97	$1,863,976,519	$1,822,401,742	$485,166,359	$453,183,539	$103,557,710	$69,531,148
Bethlehem Steel Corp.	20,415,453	11,509,020	2.09	0.70(x)	3.25	1.94	2.18	1.23	9,360,000	9,360,000	67.18	63.54	676,060,838	632,134,440	145,635,176	108,742,597	37,626,900	28,434,409
Republic Steel Corp.	14,607,869	8,175,454	1.74	0.49	4.72	2.97	2.41	1.35	6,053,000	6,053,000	51.12	45.53	343,949,673	297,475,879	93,523,639	73,263,322	20,717,154	10,962,710
Jones & Laughlin Steel Corp.	5,321,608	115,832(x)	0.03	7.82(x)	2.66	0.07(x)	1.45	0.03(x)	3,660,000	3,660,000	54.71	46.36	220,670,843	184,965,130	63,065,622	47,519,186	14,461,558	8,519,475
Youngstown Sheet & Tube Co.	14,214,536	5,877,403	7.03	0.68	7.13	3.03	4.56	1.88	3,120,000	3,120,000	63.92	62.18	213,822,894	207,450,396	70,291,596	59,677,893	11,137,190	9,832,109
National Steel Corp.	14,849,830	13,393,218	5.80	5.16	8.78	8.26	5.50	5.98	2,700,000	2,240,000	62.66	72.41	189,530,502	180,515,399	57,212,632	53,226,524	16,602,102	14,859,434
American Rolling Mill Co.	8,348,119	6,793,164	2.73	2.41	7.61	6.21	3.30	2.79	2,531,120	2,431,720	43.31	44.98	128,649,729	122,866,018	44,512,822	42,574,091	17,558,164	12,070,398
Inland Steel Co.	14,603,978	11,370,345	8.54	6.54	11.79	10.53	6.24	5.68	2,340,000	2,000,000	52.93	54.00	137,644,116	118,330,671	48,731,061	36,377,110	9,309,581	6,431,253
Wheeling Steel Corp.	5,592,680	4,787,404	4.71	3.12	5.09	4.52	3.20	2.74	1,750,000	1,750,000	62.75	60.53	118,824,534	113,021,037	43,890,615	37,391,730	6,542,839	5,077,191
Crucible Steel Co. of America	3,507,856	1,918,803	3.05	1.08(x)	3.34	1.83	4.01	2.19	875,000	875,000	120.06	119.79	112,818,358	109,121,748	21,215,210	18,112,991	7,325,564	3,509,382
Otis Steel Co.†	2,695,213	2,947,207	1.30	1.69	8.37	9.58	3.26	3.55	828,000	828,000	38.89	37.14	36,156,078	35,706,303	9,974,287	8,722,743	3,087,227	2,257,235
Lukens Steel Co.*	295,868	51,989(x)	0.35	0.74(x)	4.31	0.49(x)	0.39	0.06(x)	754,000	840,000	9.10	12.60	14,057,275	12,612,084	4,701,590	3,306,206	3,071,079	2,016,606
Pittsburgh Steel Co.‡	252,419	1,118,673(x)	3.93(x)	9.50(x)	0.58	2.47(x)	0.35	1.55(x)	720,000	720,000	59.71	62.44	46,121,064	70,973,348	12,007,254	11,444,968	2,440,022	1,786,951
Allegheny Steel Co.	1,829,137	1,151,454	2.12	1.50	9.77	7.99	3.84	2.42	476,000	476,000	39.34	30.27	22,973,010	24,152,310	9,741,892	7,334,062	4,111,393	2,462,360
Gulf States Steel Co.	942,518	400,471	1.76	0.01	3.00	1.50	1.96	0.83	480,000	480,000	65.30	55.43	33,327,314	27,741,526	6,431,655	4,609,953	1,010,578	727,656
Sharon Steel Corp.	1,477,262	1,320,384	3.46	2.69	10.40	8.10	2.90	2.24	450,000	450,000	27.72	27.63	18,157,938	16,109,164	7,329,782	5,668,443	2,448,672	1,411,352
Granite City Steel Co.	288,687	618,358	0.75	2.42	2.39	6.35	0.72	1.55	400,000	400,000	30.14	24.35	14,363,562	11,747,400	3,671,768	6,486,443	2,050,667	683,679
Continental Steel Corp.§	801,800	565,091	2.78	1.68	6.25	4.75	2.86	2.02	280,000	280,000	45.79	42.46	14,957,122	13,172,235	6,810,724	5,495,742	1,828,256	992,510
Midvale Co.	1,266,168	496,085	6.33	2.48	10.35	4.15	4.72	1.85	268,000	268,000	45.62	44.62	13,823,873	12,941,736	6,616,410	5,703,063	985,262	749,457
Laclede Steel Co.	263,156	254,231	1.17	1.10	4.54	4.43	1.12	1.08	235,000	235,000	24.68	24.41	7,559,629	7,043,239	3,057,849	2,398,000	882,229	401,110
Vanadium-Alloys Steel Co.‡	592,216	357,377	2.82	1.70	10.02	5.78	10.30	6.22	57,500	57,500	102.98	107.58	6,376,700	5,965,171	3,992,816	3,471,435	427,696	253,476
Ludlum Steel Co.	1,041,245	637,729	1.95	1.67	12.23	9.21	27.40	16.78	38,000	38,000	224.08	182.29	10,066,860	8,830,009	5,174,127	4,281,176	1,076,704	1,474,981
Totals	$168,709,405	$77,393,192	$2.97	$0.02	4.39%	2.09%	$2.67	$1.22	63,148,020	63,219,220	$60.82	$58.45	$4,243,888,431	$4,035,276,985	$1,152,754,886	$998,991,217	$268,258,547	$184,444,882

‡ {1935 figures represent period from June 30, 1934 to June 30, 1935. {1936 figures are for the 12 months ending Dec. 31, 1936.

‡ Fiscal year ends June 30.

* Fiscal year ends Oct. 30.

† Had all the 7% prior preference preferred been exchanged during 1936 for the new convertible first preferred, and the dividend requirements of $5.50 paid in full on the new issue, earnings per common share would equal $1.30.

Totals for 1936 and 1935 for the columns, "Net Earnings before Dividends", do not take into consideration the requirement (not actual payments) for preferred dividends. In computing earnings per common share these totals, adjusted for the preferred dividend requirement, are used. In figuring earnings per common share for individual companies the same method is followed. In other computations, total earnings before bond interest or preferred dividend requirement are the base.

Year	Per Cent Earned on Capitalization	Per Cent Loss on Capitalization
1925	5.61	....
1926	6.86	....
1927	5.22	....
1928	6.55	....
1929	9.88	....
1930	4.54	....
1931	0.40	....
1932	....	2.85
1933	....	0.90
1934	0.36	....
1935	2.09	....
1936	4.39	....

Supplement to STEEL, issue of May 3, 1937

Editorial

Needed—A More Democratic System of Labor Relations!

SECTION 8 of the Wagner national labor relations act declares that it shall be an unfair labor practice for an employer "to dominate or interfere with the formation or administration of any labor organization or contribute financial or other support to it; provided, that . . . . an employer shall not be prohibited from permitting employes to confer with him during working hours without loss of time or pay."

The presence of this paragraph in the section of the law pertaining to "unfair labor practices" has given rise to the belief in some quarters that the Wagner act "outlaws" employe representation plans or company unions. It would be more accurate to say that the law attempts to discourage the employe representation plan insofar as it is tied in with representatives of the management of the employing company or is supported financially by it.

There is nothing in the law to prevent employes now enlisted as members of an employe representation group from continuing that organization, providing it is divorced from company "domination," "interference" or "support." In fact, Section 7 provides specifically that "employes shall have the right to self-organization, to form, join or assist labor organizations, to bargain collectively through representatives of their own choosing, and to engage in concerted activities, for the purpose of collective bargaining or other mutual aid or protection."

Heed Wagner Act by Divorcing Representation Plans from Employer "Domination" and "Support"

Therefore, in order to conform with the law in spirit as well as in letter, employers and employes in recent weeks have been seeking methods to preserve the good features of employe representation plans without violating the law. In some cases the employer has taken the initiative by announcing that he has withdrawn recognition of the employe representation group. In others, the employes themselves have taken their employe organization out from under the jurisdiction of the employer, have taken steps to place it on a self-supporting basis financially, and in some instances have sought a state charter for the revamped body.

Every person who knows the fundamental issues involved in the present labor situation appreciates the motives of these employes. They are trying desperately to preserve their independence. They outnumber the members of professional unions probably as much as 8 to 1, and yet their government has passed a one-sided law the insidious purpose of which is to force them to join an organization against their will.

That same law has made it an "unfair labor practice" for an employer to protect his employes from such exploitation. The political alliance between the exploiters and the law-enforcing agencies of the national, state and local governments is such that the employes seeking to preserve their independence can expect little, if any, consideration at the hands of public officials. In short, the employe who does not want to join a professional union is the nation's "forgotten man," in the real sense of the term.

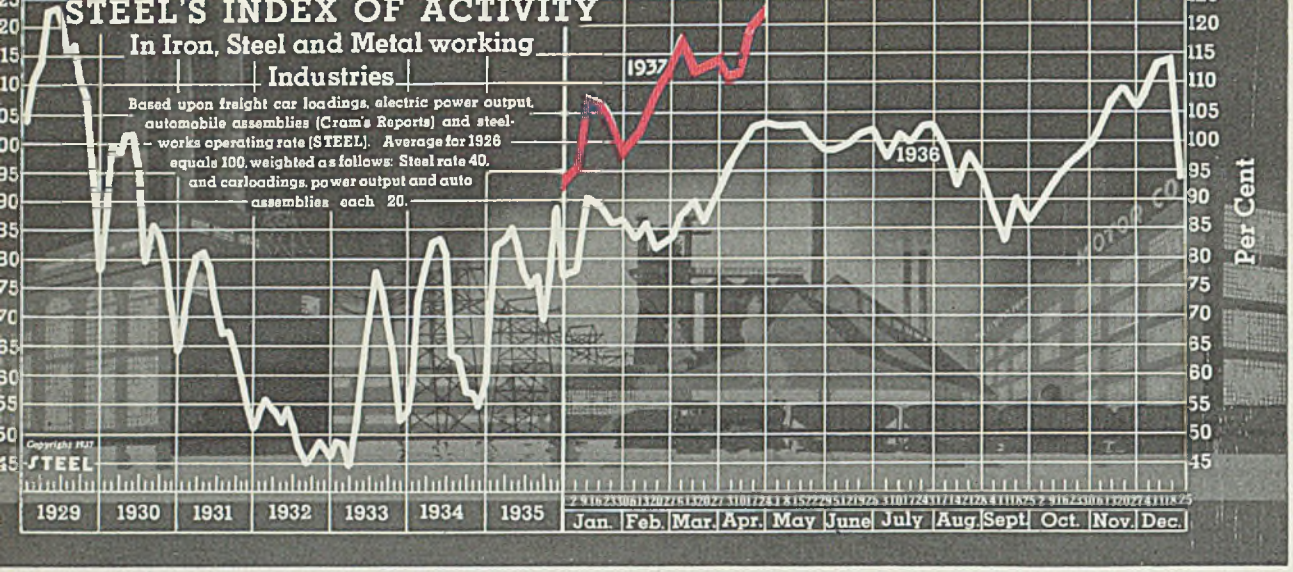
United States Should Evolve More Democratic System Than Dictatorial Closed Union Shop

Every fair-minded citizen will hope that the great body of independent employes can find a way to protect themselves from unwanted affiliation with minority pressure groups. We in the United States should not be too quick to subscribe to the idea that a completely unionized industry—moulded to the British pattern—is suited to our needs. Nor should we be too ready to believe our socially-minded liberal friends who declare that the closed union shop is the last word in true collective bargaining or in labor relations progress. In other words, we should not resign ourselves to the idea that unionization, in its present state of development here or abroad, is the most desirable agency for collective bargaining or that it is the only approach to satisfactory labor relations.

We cling to the hope that the American genius for organization will be capable of evolving a method of collective bargaining far superior to anything in existence today—a system based upon democratic principles, one in which coercion by employer or labor union dictator will be condemned with equal emphasis, and one in which the employe himself will have a right to say, without fear of the consequences, how he wants to deal with his employer.

Another desirable feature would be a greater control of the employe organization in the hands of the employes themselves, rather than in those of outsiders. Responsibility of its actions would be another important asset. Still another point of merit would be economical management of the organization, strict accounting of funds and non-political activity.

It may be that the approach to this ideal lies in the development of the independent employe organization along democratic lines. With proper encouragement, provided legally so as not to violate Section 8, perhaps headway can be made in spite of the unfair limitations of the Wagner act. That encouragement cannot now be furnished by employers, but it could and should be supplied by the enlightened attitude of a fair-minded American public.



STEEL'S index of activity gained 2.1 points to 121.7 in the week ending April 24:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
March 6	117.9	87.7	82.0	78.6	43.4	54.1	79.2	93.8
March 13	112.7	89.7	84.0	79.9	42.7	54.8	80.6	97.5
March 20	113.1	86.0	84.0	79.7	44.6	54.4	81.3	98.1
March 27	114.0	91.2	84.3	79.3	45.2	53.5	80.6	99.6
April 3	112.0	86.8	83.4	79.6	49.1	53.4	81.5	97.6
April 10	112.8	99.6	85.4	82.2	52.6	52.6	80.9	102.3
April 17	119.6†	103.1	86.3	85.0	55.8	53.4	81.1	103.1
April 24	121.7*	103.6	84.6	87.5	59.5	52.3	80.6	103.7

*Revised. †Preliminary.

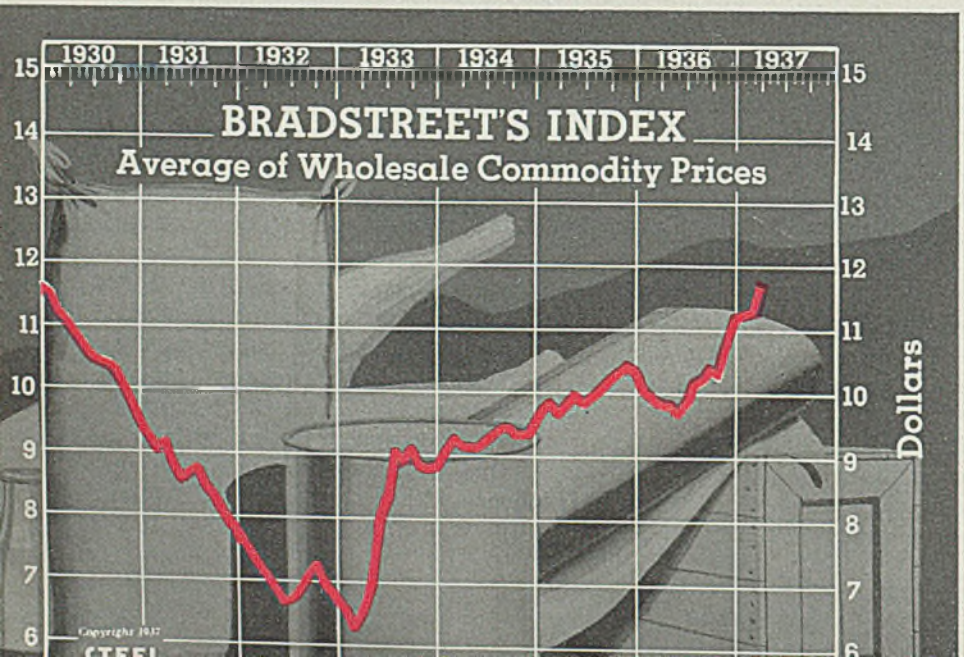
Index of Industrial Activity Climbs Nearer to 1929 Peak

ANOTHER week of respite from serious labor difficulty in the automobile industry, coupled with continued steadiness in freight car loadings, electric power output and steelworks operations, caused STEEL'S index of industrial activity to rise from 119.6 to 121.7 in the week ending April 24. The current figure is the highest recorded since the week ending May 25, 1929.

The principal factor in the gain was an increase in automobile output from 125,472 to 132,340 cars. The latter figure represents the greatest production in any week since 1929. Steelworks continued to operate at 91.5 per cent of capacity, revenue freight car loadings were estimated slightly in excess of 755,000 cars, and electric power output was reported at 2,188,124,000 kilowatt-hours.

A step which may prove to be an important contribution to stability was taken by steel producers when they reaffirmed present prices for third-quarter delivery. This action already has eased the tension in demand and probably will remove the dangers of speculative buying and pyramiding of orders for protection.

Commodity price indexes generally are lower, although the decline in quotations of nonferrous metals and iron and steel scrap has been more marked than in the prices of most of the other commodities.

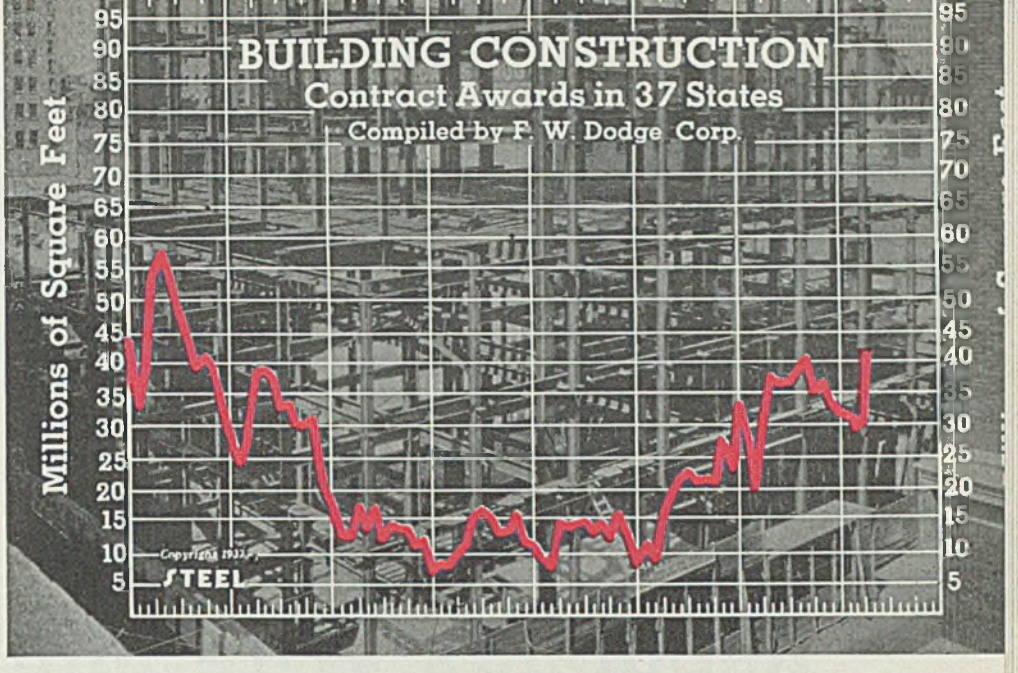


	1937	1936	1935	1934
Jan. 1	$11.13	$10.36	$9.49	$9.01
Feb. 1	11.23	10.02	9.78	9.26
Mar. 1	11.34	9.92	9.79	9.17
Apr. 1	11.81	9.85	9.66	9.16
May 1	....	9.81	9.79	9.14
June 1	....	9.73	9.90	9.24
July 1	....	9.85	9.84	9.32
Aug. 1	....	10.14	9.91	9.48
Sept. 1	....	10.19	10.00	9.45
Oct. 1	....	10.27	10.17	9.27
Nov. 1	....	10.22	10.28	9.29
Dec. 1	....	10.78	10.40	9.49

BUSINESS TREND

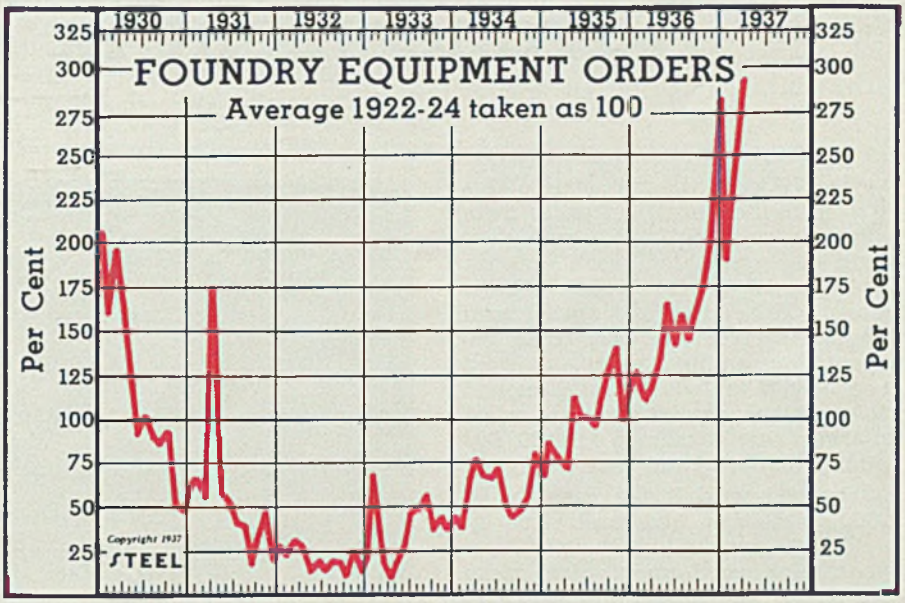
March Building Awards Highest Since 1930

	Square Feet		
	1937	1936	1935
Jan.	33,470,000	27,053,300	11,245,100
Feb.	29,942,100	20,856,700	9,670,300
Mar.	41,567,800	31,257,900	15,845,300
Apr.	.....	37,490,200	19,917,300
May	.....	36,362,100	22,276,200
June	.....	36,883,900	22,878,800
July	.....	38,762,500	21,565,900
Aug.	.....	40,285,100	21,545,400
Sept.	.....	35,448,000	21,365,700
Oct.	.....	36,718,900	27,775,900
Nov.	.....	34,947,500	24,120,700
Dec.	.....	33,632,600	33,441,900



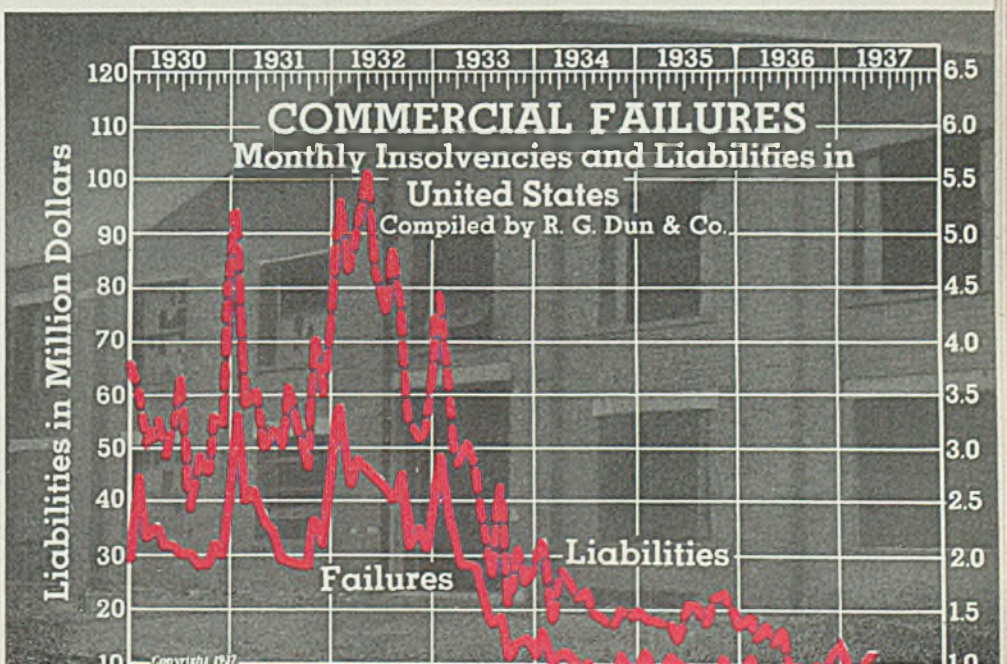
Foundry Equipment Orders Show Sharp Gain in March

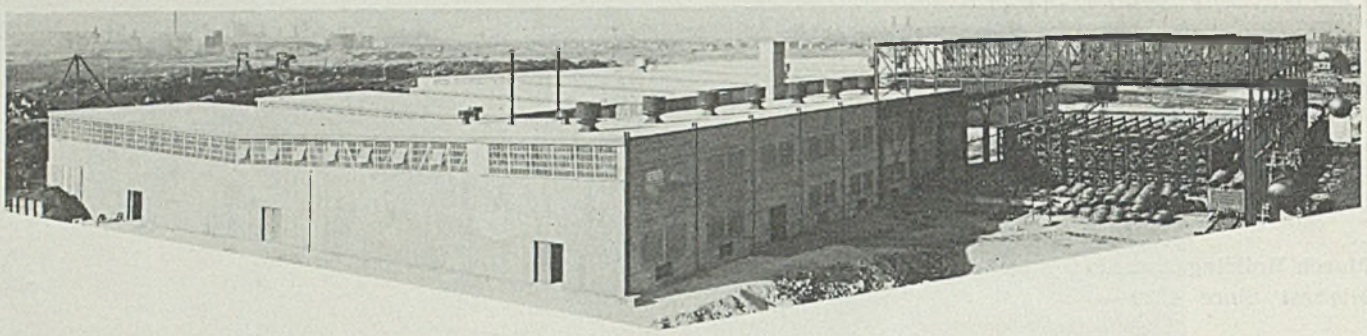
	Per Cent			
	1937	1936	1935	1934
Jan.	190.9	127.0	76.6	37.2
Feb.	249.5	110.4	75.7	65.8
March	294.2	115.0	69.4	75.4
April	.....	134.0	113.2	67.9
May	.....	165.4	100.7	66.5
June	.....	141.4	100.2	70.4
July	.....	159.6	94.0	50.7
Aug.	.....	144.8	113.0	43.1
Sept.	.....	161.0	128.5	46.4
Oct.	.....	173.8	140.0	55.3
Nov.	.....	200.4	100.4	80.4
Dec.	.....	283.3	118.1	66.9



Commercial Failures and Liabilities Point Upward

	Failures, Number		Liabilities, Dollars (000 omitted)	
	1937	1936	1937	1936
Jan.	811	1,077	$8,661	$18,104
Feb.	721	856	9,771	14,089
March	820	946	10,922	16,271
April	.....	830	.....	14,157
May	.....	832	.....	15,375
June	.....	773	.....	9,177
July	.....	639	.....	9,904
Aug.	.....	655	.....	8,271
Sept.	.....	586	.....	9,819
Oct.	.....	611	.....	8,266
Nov.	.....	688	.....	11,532
Dec.	.....	692	.....	12,288





About 177,000 square feet of floor space is provided in Republic's new wire mill at South Chicago, Ill.

Republic's Wire Mill Discloses Advancement in Practice

ONE of the most modern plants in the United States for manufacturing wire and wire nails was opened last week at South Chicago, Ill. by the Republic Steel Corp. More than 100 agricultural engineers, farm leaders, trade paper editors and industrialists visited the new plant which was designed to meet the special needs of rural markets that consumed 4,000,000,000 pounds of fence and wire last year.

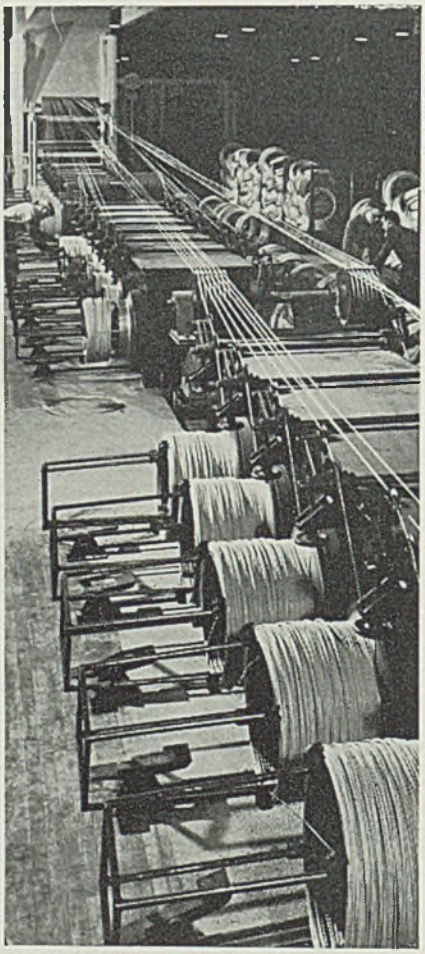
The rod yard has a capacity of 2800 gross tons, and is serviced by a 96-foot span, 5-ton, double-tilting hook, high-speed crane. Steel racks for piling rod coils six high, on edge, in individual lanes are provided to facilitate stocking, handling and classification of rods.

A broadside transfer conveyor, holding 13 rod lifts of 3600 pounds each, is located near the center of the yard, and is used to convey the rods directly into the cleaning house. This conveyor is operated by the cleaning house craneman from an electric push button located convenient to the crane cab.

The cleaning house building is of acid-resisting construction throughout, and employs a number of entirely new features, including the use of glass brick in place of the customary windows. It is serviced by a specially designed 5-ton roller bearing crane.

The cleaning line consists of three reinforced concrete, acidproof brick lined cleaning tanks, one rinse tank, three sull and three lime tanks.

Acid is stored in two 8000-gallon tanks and is fed by gravity to two measuring tanks. The cleaning tanks are heated by jets, and spent acid is discharged from the tanks by a syphon in each tank. Rinsing is accomplished by spray nozzles controlled by a balanced valve which is operated by placing a yoke of rods in the rinsing position. Sulling tanks are provided with special vertical sprays to give proper mist conditions. Lime tanks are steel insulated, and are heated by steam jets with automatic temperature control. A circulating pump provides the necessary agitation and circulation.



Takeup reels at end of 500-foot continuous electrogalvanizing line. Wire emerges from electrogalvanizer with 27 coats of pure zinc at the rate of 578 miles per day

A modern two-lane rod baker, indirect natural gas fired, with automatic temperature control, is located between the cleaning and wire drawing departments. Bakers are of steel panel construction with 4 inches of rock wool insulation. Heated air in each lane is circulated at the rate of about 10,000 cubic feet a minute.

Rods are advanced through the baker on conveyors, similar in design to that in the rod yard. After a lift of rods is deposited on one of the conveyors outside of the bakers by the cleaning house crane, the crane operator presses an electric push button which automatically opens the vertical doors at each end of the baker, advances the conveyor one step, and closes the doors until next operation of push button. In the event the baker line is full, this same button operates a warning bell indicating that fact.

The rods are removed from the

discharge end of the conveyor by an electric lift truck, on a specially designed demountable ram, and are delivered to a ram rack immediately behind the wire drawing machines. At this point the rod coils are butt welded for continuous drawing without rethreading of the wire drawing machines, and are flipped direct from these demountable rams to the wire drawing machines. The arrangement of conveyors and controls makes the operation of the cleaning house nearly automatic.

Wire drawing equipment consists of 11 wire drawing machines, as follows: Three continuous machines for 4, 5, or 6-draft wire; four continuous machines for 3-draft wire, and 4 double deck machines for 1 and 2-draft wire.

These machines are designed for high speed, with variable speed, 230-volt direct-current motors and full magnetic dynamic braking control on each block. All motors and blocks are self-contained and air cooled. Machines will handle up to 400-pound bundles. Continuous pointers are used. The 5-hole machines have a rating of 112.5 available horsepower, and a drawing speed of 1000 to 1400 feet per minute on sizes Nos. 13 to 16 gage from a No. 5 rod. These machines are equipped with 16 or 22-inch diameter interchangeable finishing blocks.

The 3-hole machines have a rating of 90 available horsepower, and a drawing speed of 850 to 1250 feet per minute on sizes Nos. 11 to 12½ gage from No. 5 rod. These machines are equipped with 22 or 24-inch diameter interchangeable finishing blocks.

The double deck machines have a rating of 45 available horsepower, and a drawing speed of 287 to 861 feet per minute on sizes ⅜-inch to No. 10½ gage. Finishing blocks are 24 inch diameter.

Water-cooled tungsten carbide dies are used on all wire drawing machines.

Seven 1-ton, 16-foot span tramrails, and 1-ton, rigid arm hoist with push button control, having a lifting speed of 35 feet per minute, service the wire drawing machines. The hoists are equipped with collapsible spiders for stripping the wire drawing blocks. After the blocks have been stripped the wire is deposited on corrugated steel skids on which specially designed racks, having a capacity of 6000 pounds of wire, have been built.

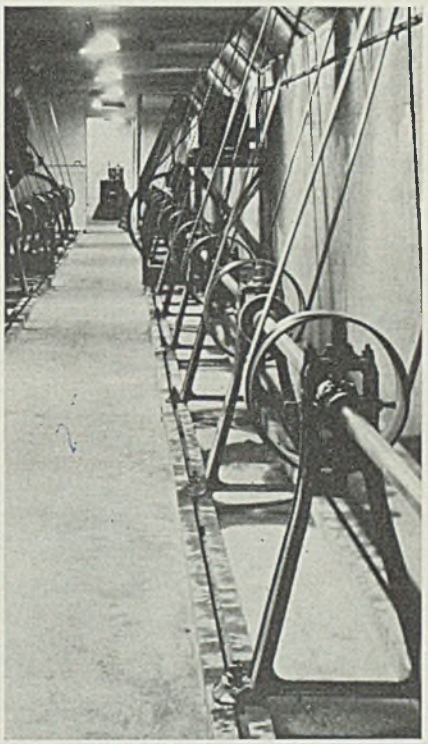
Continuous Galvanizing Unit

Skids are transferred from the wire drawing department into the process storage or finishing departments by an electric lift truck.

The most recent achievements of electrochemistry, metallurgy and industrial engineering have been combined in electrogalvanizing equipment to provide a continuous unit which is approximately 500 feet, from end to end. It is equipped with 80 payoff reels to facilitate continuous operation on the electrogalvanizing line, which has a capacity of 40 strands of wire. Coils transferred from the wire drawing or storage rooms on skids by electric lift trucks are placed on the payoff reels by two tramrail hoists.

After normalizing in a pot of molten lead, as in hot galvanizing, the wire is allowed to cool and passes over sheaves into the cleaning tanks which extend for a distance of 70 feet. The wire passes first through a hot alkaline bath which removes all surplus dirt; then through a water rinse and into the pickle tank where remaining surface impurities are attacked by acid. After another rinse, minute particles still present in the pores and structure of the steel which might prevent a perfect bond are eliminated by passing the wire through an electrolytic flash cleaner, which etches the surface to provide for firm adhesion of the zinc coatings. After another rinse and a final acid dip it then passes through a final rinse into the electrogalvanizing tank. Large rollers hold the strands beneath the surface of the successive solutions and they are kept in line by porcelain sleeves on dividing walls between the various tanks.

The electrogalvanizing tank is 140 feet long, 6 feet wide and 2 feet deep. It requires approximately 43,000 gallons of special galvanizing solution, which circulates in the direction opposite to that of wire travel, passing through filters, three 10,000 gallon settling tanks and a cooling tower. Thirty tons of zinc anodes are immersed in this solution in the bottom of the electrogalvanizing tank as the wires, which function as cathodes, pass through it a little below the surface of the solu-



Subfloor tunnels, which extend for a distance of 1200 lineal feet to accommodate line shafts for operating the belt-driven nail machines on floor above

With all line shafting for driving the nail machines located in tunnels, the new wire mill is able to obtain close adjustment of nail machines

tion at speeds ranging from 35 to 70 feet per minute, depending upon the coating to be applied. The character of the special electrogalvanizing bath makes it possible to deposit 27 successive, even coatings of zinc 99.9 per cent pure upon the copper-bearing steel wire at current densities up to 1500 amperes per square foot, without developing either pores or pits.

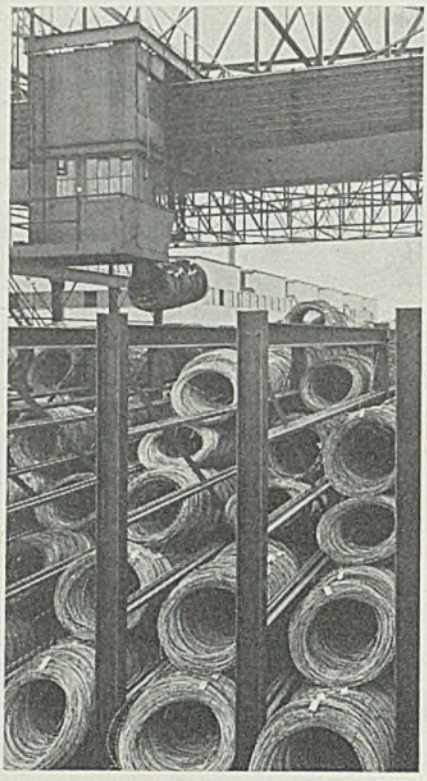
The wire passes out of the tank with its coating already dense and bright. It merely is dipped into a cold rinse to remove adhering solution from the galvanizing tank, then into a hot rinse to remove any final traces and to heat the wire so that, when it enters the air, for winding on the takeup reels, any remaining water will dry quickly. With the coating thickness determined by the flow of current and speed at which the wire passes through the tank, the operator merely sets the speed of the reels and the rheostats of the generator circuits to a setting specified for each desired coating, to insure a uniform, even deposit on the wire.

The takeup frame consists of three separate units, two of these units having fourteen 22-inch blocks each, and one unit 12 interchangeable 16 or 22-inch blocks. Each of these units is separately driven by variable-speed motors.

Setup for Nail Making

The nail making equipment consists of four sets of 14 machines, or a total of 56 machines, producing a complete range of sizes.

These machines are serviced by six 1-ton tramrails, equipped with 1-ton hoists, which handle the wire from skids to reels directly behind the machines. Machines are belt-driven from roller bearing equipped lineshafts located in tunnels underneath the main aisles, each set having a separate lineshaft. This arrangement eliminates unsightly overhead belts and lineshafts, facilitates the oiling of shafts and servicing of belts, and in addition eliminates the shadows which are caused by overhead equipment, thus allowing for a closer adjustment of the machines and better inspection.



Steel racks in which coils of rods are piled 6 feet high provide capacity for 2800 gross tons

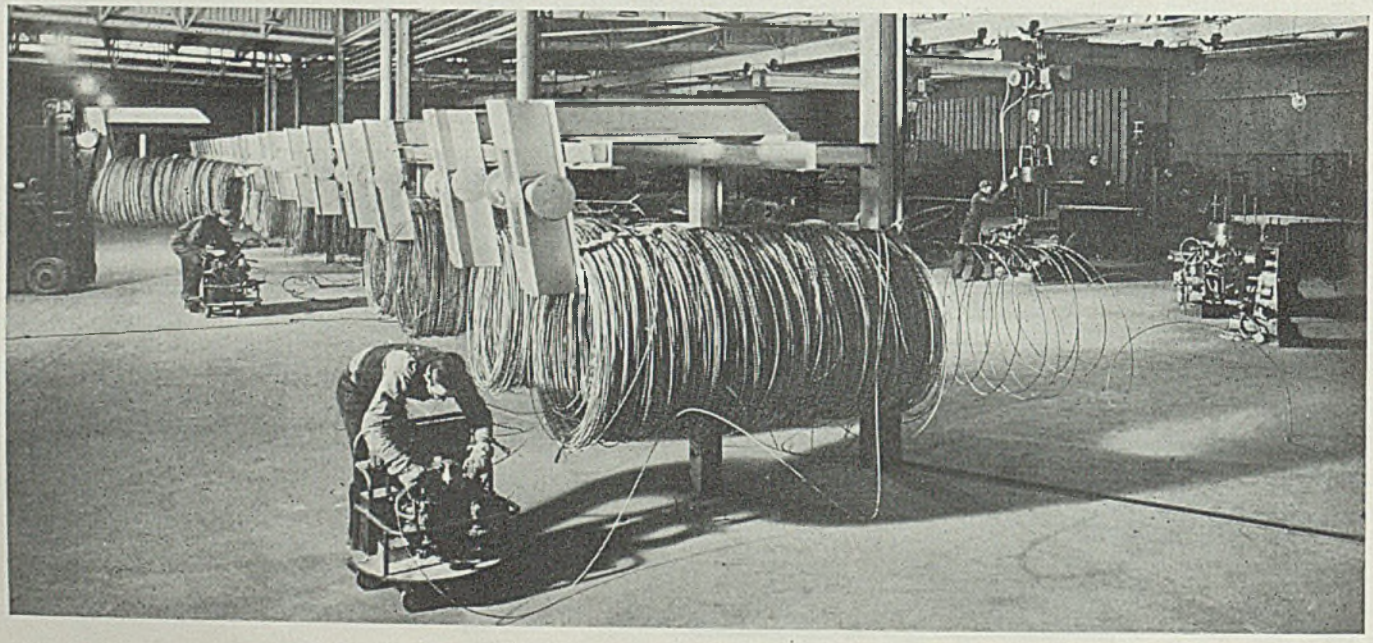
The finished nails are dropped into inspection pans and accumulated on nail carts having a capacity of 1000 pounds each. These carts are equipped with a rigid type of bale which allows them to be picked up by a 1-ton monorail cab operated hoist, without floor assistance, and carried to the nail tumbler charging floor where the hoist operator weighs these carts on a floor type dial scale and then wheels them to the tumblers.

The tumbling equipment consists of nine tumblers, each with a capacity of 40 kegs per charge. These tumblers are individually driven by a 10 horsepower motor through a herringbone gear reducer. Nails are discharged from tumblers to the packing floor where kegs are filled and weighed, and, after heading, are delivered to the warehouse by a conveyor. These filled kegs are stocked by a pallet-fork-lift-truck method.

Large Bale Tie Capacity

Bale tie equipment consists of two bale tie machines with bundling attachment, and has a size range from No. 9 to No. 17 gage in all standard lengths from 7 to 16 feet. Each machine will have a production capacity of eight bundles per hour, each bundle consisting of 250 bale ties. These machines are designed for single loop bale ties and will produce either round or oval loops.

The field fence department consists of three woven field fence machines, and one poultry fence machine. Machines are of the wrap-stay type. The production range of these machines is as follows: All No. 9 gage fence, including No. 9 gage top and bottom; No. 11 gage fence with No. 9 top and bottom; No. 12½ gage fence with No. 10 gage top and bottom; standard heights, 20 or 40 rod rolls, and



Electric lift trucks equipped with yokes of special design handle 3600-pound coils. These are welded end to end for continuous drawing

either 6-inch or 12-inch stays. The poultry fence machines produce No. 14 gage fence with No. 11 gage top and bottom, and No. 15½ gage fence with No. 12½ gage top and bottom, all 6-inch stays, 10 or 20 rod rolls. The operating speed on all machines is 120 stays per minute.

Barb wire equipment consists of 15 machines, 12 of which are for 2-point cattle or hog, and three for 4-point cattle or hog. A special 4-slide machine has been provided for making wire reels for the barb wire.

The nail and barb wire departments are equipped with two gasoline tractors, one of which is of the low lift, and the other a tier lift type.

In deciding upon the electrical equipment for the new wire mill, only the types that would give a high degree of reliability with low maintenance costs were selected. An example of this is cited in the motor selections. Line start, 3-phase motors were used where possible. In the cleaning room, on conveyors and door lifts, high-torque line start induction motors fully enclosed with acidproof windings and ball bearings were used. Cast-iron switch cases and control housings with gasketed doors also were selected for use in this locality where acid fumes are so damaging to electrical equipment.

Induction Motors Used

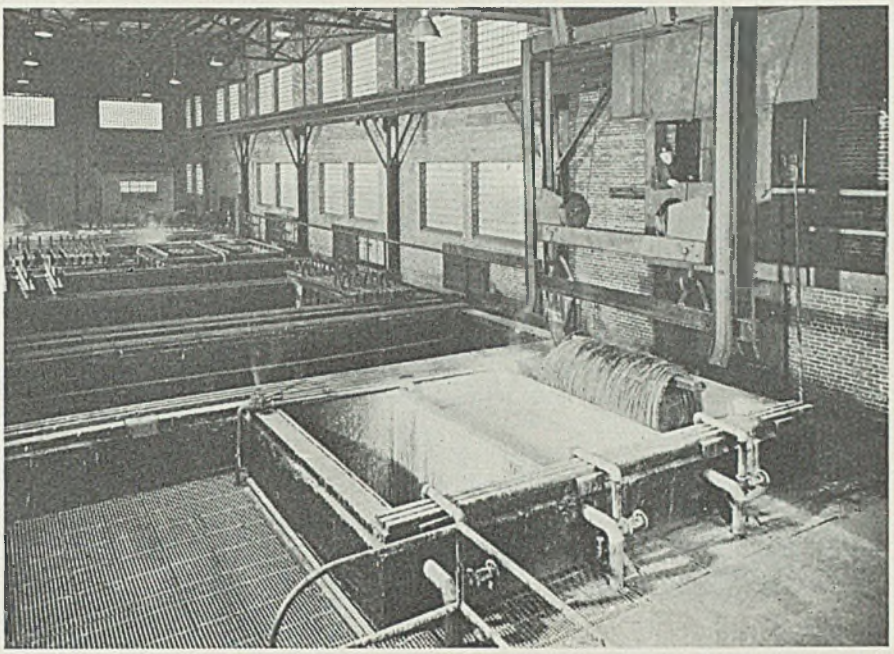
Totally enclosed ball bearing line start induction motors were selected for pointer and hoist motors in the drawing room to prevent lime dust from causing frequent cleaning of rotors.

Induction motors were used throughout the entire nail mill. Individual motor drives on the nail tumblers were used instead of line shaft drive with clutches for each tumbler. With the exception of one motor, all starting equipment in the nail mill is of the line start type, push button operated.

Machines requiring smooth acceleration and large speed ranges were equipped with direct-current motors. Examples of these are found in the continuous wire drawing machines, galvanizing and patenting takeup frames, rod storage and cleaning room cranes.

Throughout the entire mill an observer will note the almost total absence of electrical control apparatus on the operating floors. All important concentrations of electrical control are either found in the tunnels or on elevated platforms, leaving the floors for process material movements free from obstruction by control apparatus and electric wiring.

Direct-current supply, for the first time in any steel and wire mill in the Western Hemisphere, is furnished by a mercury arc rectifier,



Glass block in cleaning house completely eliminates danger of corrosion around window areas

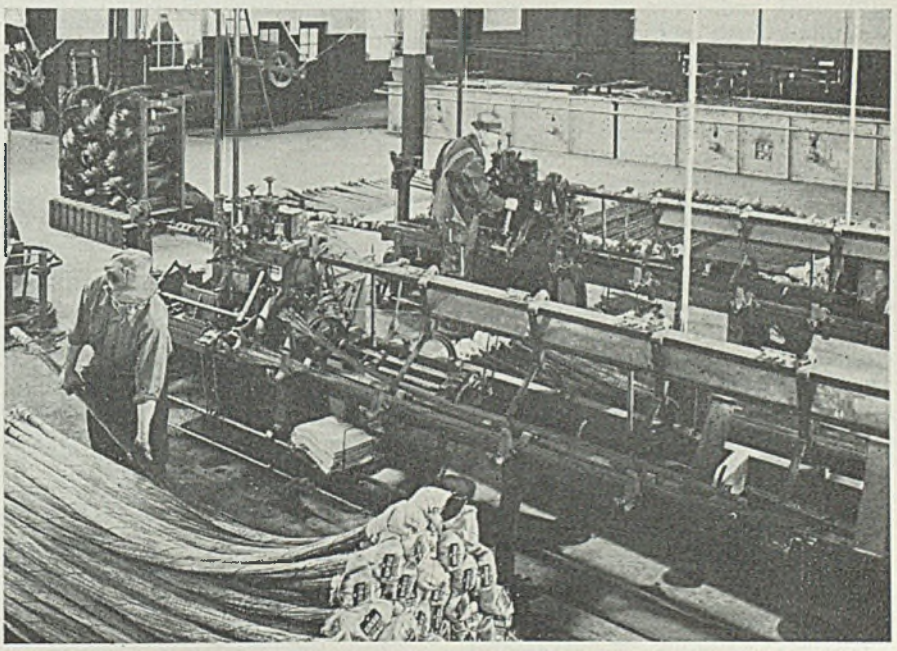
having automatic voltage control by means of electrically energized grids. This 1000-kilowatt rectifier is connected to the direct-current bus through a high-speed breaker. The bus is a 9-inch copper channel ½-inch thick, mounted on special insulators and steel beams in the upper part of the connecting tunnels below the mill floors. This bus is at present the largest section of this type ever rolled. It was selected for strength and ease of installation. It is provided with expansion joints at proper intervals and carries direct-current power through the important distribution centers instead of bringing each feeder back to a centralized board. Circuit breakers for remote centers are tapped to this bus in the tunnel. The wire drawing machine control panels are mounted in the tunnel under the machines and adjacent to the bus. Voltage is maintained at load center of this bus by bringing two pressure wires from load center back to the rectifier voltage regulator, located in the power substation.

In the substation are located the mercury arc rectifier for direct-current conversion, transformers for 3-phase power, and the steel clad cubicle switchgear for high-tension distribution.

The transformers are of a recently developed type in which inflammable

(*Please turn to Page* 94)

Lead annealed wire being converted into bale ties by two machines for midwest distribution



BY C. R. MAXON

Die Castings in Automotive Applications

Part II

USE of die castings in windshields for open and convertible models is far from new. Some complete windshield frames have been die cast in one piece, one Cadillac job weighing 33 pounds and measuring 50 x 22 inches over all being among the largest die castings produced. Only 400 to 500 a year were required, yet the saving in finishing as compared to a sand casting warranted the constructing of the very large die. This was used some years ago and we understand is not now in production. With the introduction of improved methods of body construction, including improved welding practice, windshield design has changed radically.

Parts Are Heavy

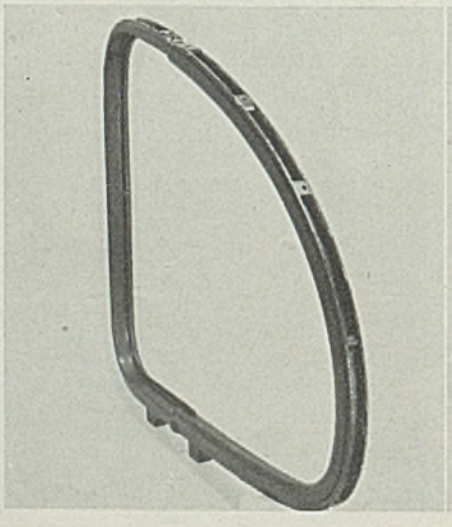
Many windshield stanchions and separate windshield frame parts are still used and serve their purpose well, but such stanchions are exceedingly heavy in most designs with which the author is familiar. Die castings are used for these parts primarily because they supply the required sectional contours and yield a non-rusting support which is readily plated or otherwise finished. It is the author's opinion that weight might be greatly decreased and strength increased by using a properly designed steel insert running from end to end and thinner sections, although this might not decrease cost. As present designs, in general, are used only on models in which production is relatively small, studies of weight saving appear not to have gone so far as they might. Certainly, if stanchions which are more slender were provided, the blind spot which they create could be reduced with some gain in safety.

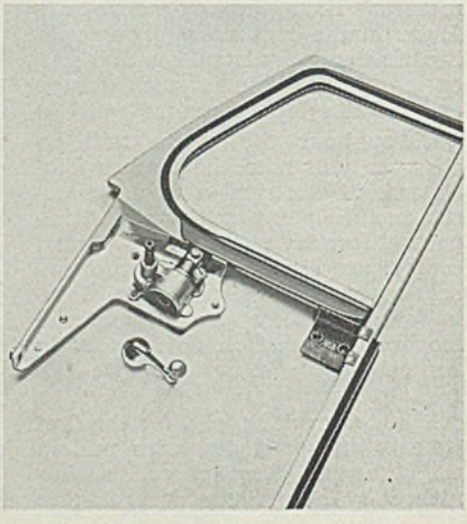
Another example of structural use of die castings is in the frames for D-shaped ventilating wings and quarter windows. A good example of the latter is the Packard frame shown with its rubber cover in accompanying illustration. Such parts have the required supporting bosses for pivots and limit stops and can be made quite light, though perhaps a little heavier than formed steel frames. Important advantages are the closer dimensions which can be held and the freedom from rusting which the use of a zinc alloy secures. When a rubber cover for sealing purposes is desired, the die casting can be brass plated and used as an insert in the mold forming the rubber cover which is vulcanized to it.

In some General Motors applications of this nature, the outer frame for a front window has been die cast, roughly in F-shape. The lower projection extends into the door and the center section is adapted for mounting a die-cast regulator having a vertical pivot about which the inner frame, carrying the glass, turns. This makes a substantial superstructure as well as a firm fastening for screwing or riveting to the frame of the door itself. The assembly takes the place of one which, if not die cast, would have to be built up from several stampings which would probably cost more and be much more difficult to hold within the desired dimensional tolerances.

Though not properly classified under the heading of frames, mention may be made here of some closely associated parts of doors, including window regulators, lock parts and dovetail assemblies. Many dovetail bumpers have been die cast, and the striker plate for holding these is now being die cast also, and is understood to be standing up

VENTILATORS are largely die cast for the draftless ventilation systems. Below are shown at left the Packard rear window vent and at right the assembly used in front windows of Oldsmobiles





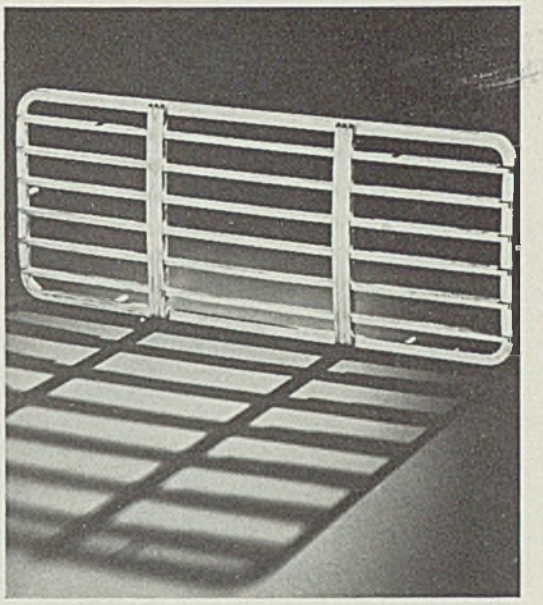
well in service despite the shocks to which it is subjected. Such castings are simple to make and easier to hold within close dimensions than stamped or sand cast parts. One large maker of door locks who heretofore has always stamped the lock frame, is now experimenting with a die cast shell, again because of difficulty in holding the desired tolerances in the corresponding stamped part. His only question concerning the die casting is whether it has enough resistance to shock in extremely cold weather, and there is sufficient expectancy of success to warrant his building a die and putting out some experimental locks for trial. Lock cylinders and other small lock parts have been die cast by the million and are in use wherever a lock is required in the modern car. Intricate parts of this kind are more or less ideal for die casting and cannot be duplicated with accuracy and faithfulness to detail, at comparable cost, by any other means.

As already noted, window regulator parts, which may include gears and sprockets as well as housing parts, are readily die cast and give good service in that form, frequently being lower in cost than equivalent stamped or machined parts. Hardware for regulators and doors is treated under another heading.

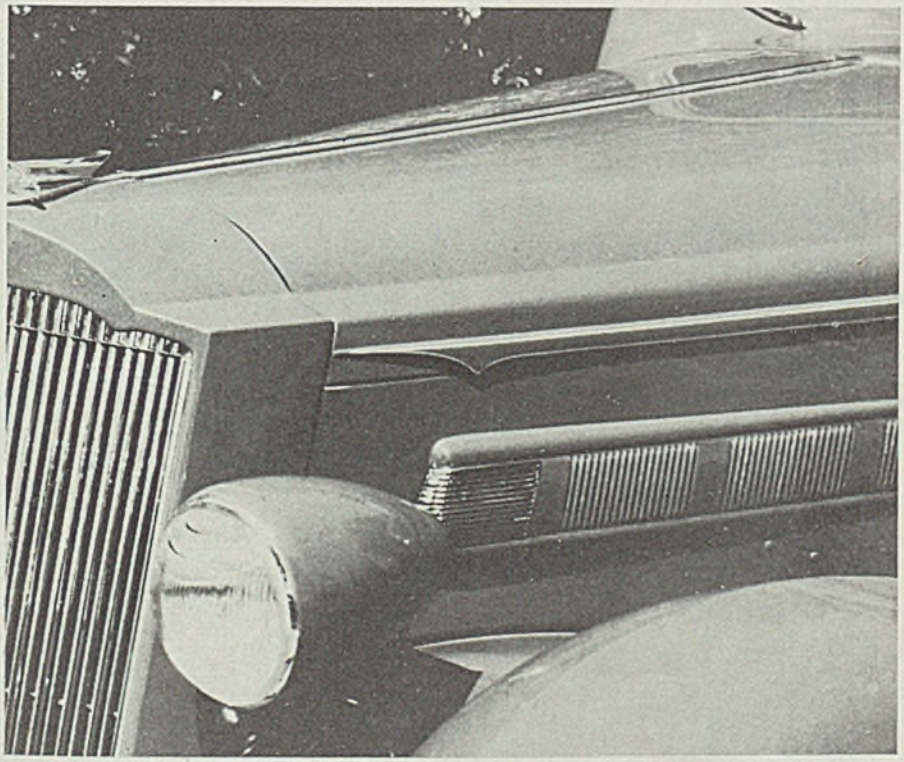
Louvers and Exterior Body Parts

Extensive application of die castings as louvers and decorative applications on hoods is a further tribute to their fine appearance and low comparative cost. Again it must be admitted that the die casting in such applications adds weight which is justified chiefly on the basis of improved appearance, and appearance which cannot be attained at all with stamped parts in some cases, and in other instances only with a much larger expenditure in tooling. Those interested in weight saving can undoubtedly gain it and still take advantage of the die casting, however, if they will set this objective, cooperate closely with the die caster and give him an opportunity to work out die construction such as to yield the lightest feasible sections. Packard has accomplished much along this line in the louver casting used on the new six. This was made so light, in fact, that some breakage was encountered in the polishing operation, but a slight thickening of the section in one area quickly overcame this fault.

Incidentally, the casting in this case is used in close association with stamped louvers which carry through a somewhat similar motif, and the two die castings used are so light as to make at most only a few ounces difference in weight as compared to an all-stamped product. Variations of designs along this general line, in which die castings and stamped parts are used in close association, may well give many of the advantages of both types of parts and serve to decrease weight materially. Studies in this direction will pay both stylists and engineers.



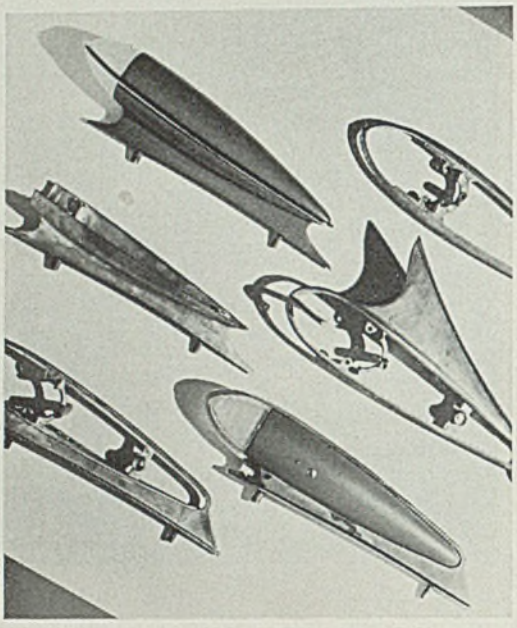
GRILLE covering the loudspeaker for Buick radios is a die casting, mounted in the center of the instrument panel



APPEARANCE of the assembled louvers in a Packard hood. The die cast trim is shown separately in the photograph on the opposite page

Large Moldings Cast

It must be remembered in connection with this that it is entirely feasible today to die cast either straight or curved moldings of almost any length up to 50 inches or more in a great variety of sectional shapes and surprisingly thin, but with convenient fastening bosses such as are not readily provided in stamped or rolled moldings. In some cases, these moldings can even be made flexible enough to conform to variations in stamped parts. An example of this is the D-shaped moldings, a pair of which are used to outline the grille on current Dodge models. These moldings have a section thickness of about 1/32-inch and are about 9/16-inch wide. Over-all dimensions of the D-shaped casting are approximately 30 x 8 inches and represent about 60 linear inches of molding with bosses spaced about 5 inches apart. Casting is done at the rate of about



DIE castings form the main part of Buick fender light assemblies, as illustrated here

three shots a minute and with so little flash that cleaning is a very simple and rapid process. The molding is quite flexible and conforms readily to inequalities of mating stamped parts.

As to irregularly shaped parts such as are used for decoration on and about the radiator shell and sometimes on fenders and headlamps, the die casting is so well suited as to have little or no competition. Such parts are usually designed largely by the stylist, who presumably leaves to the engineer the matter of fastening the casting to mating parts. Fastening is usually done by hidden screws or studs, some of the latter being cast in place in certain instances, but other methods of fastening are deserving of mention, as they may reduce the cost of the finished piece and of the assembly operation.

Locating Studs and Screws

It is common practice to place studs or the axes of screw holes normal to the surface to which the casting is to be attached and, if this surface is curved as is usually the case, the axes of the studs or screw holes come at several odd angles. This often precludes the coring of more than one or two holes which may happen to come with axes normal to the die parting, unless the die is provided with separate slides which increase its cost and often are not feasible at all. The alternative for the die caster is to spot the holes, when the design permits, and to drill and usually tap them subsequently. This, of course, is a simple and not very expensive operation, but it usually involves shifting the casting through odd angles on the drill press. If the hole location and the angle of its axis are at all important, the use of a special rocking fixture is required which must be added to tooling cost. If all the holes were parallel, the fixture would cost less and all holes might be drilled simultaneously.

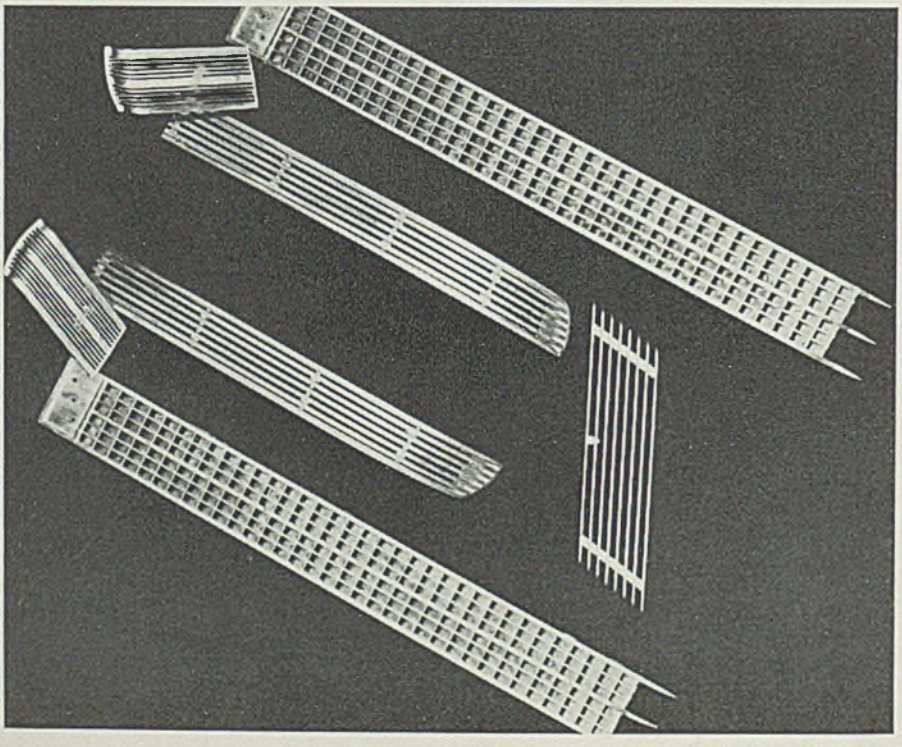
All this points to possible advantages in certain cases of making some or all the holes parallel, and recessing or otherwise altering the sheet metal at attachment points so that parallel faces at bosses are presented to parallel boss faces in the die casting. Naturally, the cost of doing this would be set off against the extra cost of the operations on the die casting if it is not done, and the cheaper alternative selected. As the holes in the sheet metal are usually pierced in a separate operation anyway, it seems logical to suppose that some deformation in the sheet metal surface might be made at the same time, in certain cases with little or no increase in the cost of that part. At present, it appears to be common practice to give the "breaks" to the stamping shop and let the die caster worry as to fitting his product to the sheet metal. This may be the easiest way out, though not necessarily the least expensive, as the die caster must, in the long run at least, be compensated for the extra operations he must perform and for such extra tooling as may be required.

Fastening Methods

In fastening die castings to sheet metal parts, several alternative types of fastenings deserve consideration. They include: tapped holes in die-cast bosses; cored or drilled holes in die-cast bosses for self-threading studs or screws; studs die cast in place; riveting with separate tubular or solid rivets, or fastening with through screws or bolts; riveting or spinning over of projections forming a part of the casting; use of so-called "speed nuts" on integral projections of the casting provided for the purpose; and use of hooked projections on the casting with a spring clip or other fastening for engaging one or more hooks; and various combinations of these types.

Naturally, the least expensive fastening which is satisfactory should be chosen and this suggests check-

SAMPLES of die cast louvers as used by Cadillac, Packard, Chrysler and Lincoln Zephyr. The large pieces match the Cadillac die cast grille while the others are for cars with stamped grille



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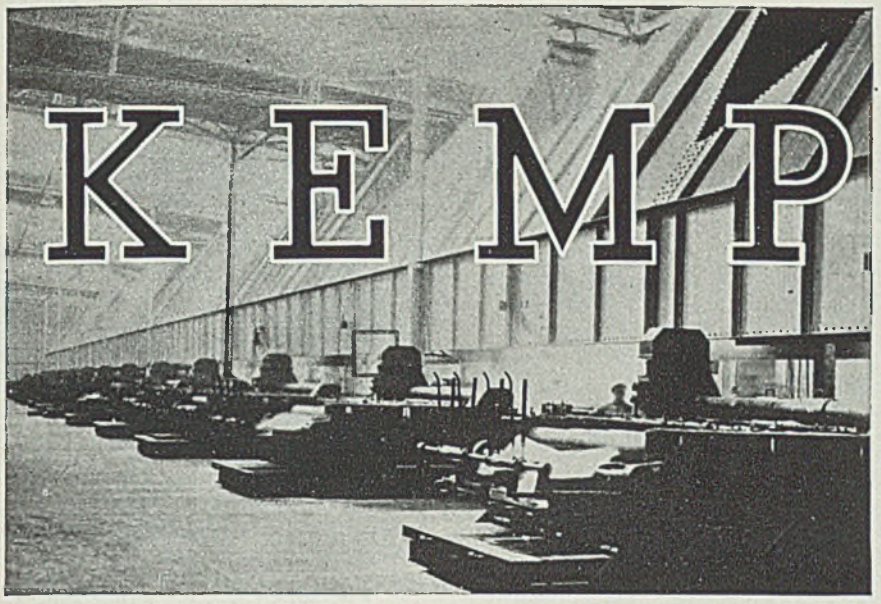

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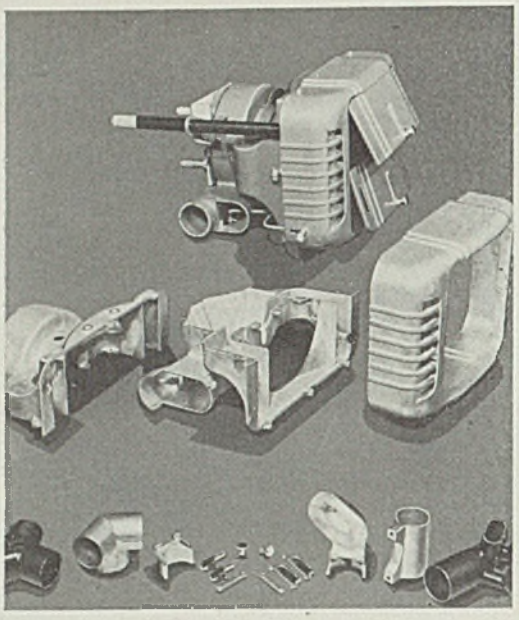

DIE cast parts are largely used in the assembly of a popular hot water heater as shown by this layout

ing against the foregoing list when there is a question as to this or some other fastening. In this connection, the following observations should be borne in mind:

With proper tools, correctly ground, tapping is very simply and rapidly done. But any self-tapping screws and studs are used with satisfaction, some of them being drive screws and others having standard threads, not necessarily hardened. They can be applied with a screw or stud driver, sometimes in a drill press or its equivalent. Use of studs die cast in place, though often an excellent construction, has the disadvantage of lengthening the casting cycle by a time equal to that for placing the studs in the hot die.

Although the use of separate tubular rivets (as in assembling the Olds six grille, for example) is entirely feasible and may be the best practice, as may be the alternative use of solid or split rivets in certain cases, these methods involve supplying and applying the extra rivets. It is often feasible and sometimes represents a saving, besides avoiding the use of exposed rivet heads, to cast the rivets as a part of the die casting, making the ends hollow or solid, as preferred. Thereafter, on assembly, the integral rivets may be struck or spun over (the metal being quite malleable) to afford a quick and secure fastening without any separate supply or handling of rivets. Often, the projecting integral rivet on a die casting is formed by merely drilling a hole in the die. Projections for speed nuts are similarly formed. Naturally, the location, of the projecting parts must be such that the casting will clear the die. It is often a simple matter to form a small lip on a boss or other projecting part of a die casting—perhaps a part required for some other purpose—and afterward spin over this lip to assemble the casting to any mating part.

The radio grille on Buick cars is an example of die casting which is fastened to another part—the instrument panel in this instance—by integral projections over which speed nuts are pressed. An example of the use of integral rivets is found in the small moldings on Ford glove-compartment doors. Such parts would be marred, of course, by through fastenings, but the integral ones are quite simple and effective.

Use of hooked projections is well illustrated in the headlamp molding employed on some Packard models. This curved molding is provided with five flat integral projections arranged to slip through corresponding holes pierced in the shell of the lamp. Each projection is undercut or hooked, an operation quickly performed by broaching, as it is not feasible to cast the undercut. The hook passes under the sheet metal at the end of each slot or hole and since its face is sloped it forces the die casting close against the lamp shell. There it is locked by a spring clip and is thus secure against loosening or rattles. If desired, one or more of the bosses could be arranged for a screw fastening, in which case a spring clip would not be required. This method of fastening might be adapted to almost any molding curved or straight instead of using a series of separate studs, and would save considerable time in assembly, especially where some screws, if used throughout the length, would come at inaccessible points. Fastenings of this type require that the casting be moved longitudinally a small amount when put in place and in general would need elongated holes, a part of which would not be filled by the projecting lug after insertion, but lugs would naturally be placed so that the hole is completely covered by the casting when the latter is forced home. Although a broaching or some equivalent operation is required for undercutting the lugs, this should not be more expensive than drilling and tapping and may

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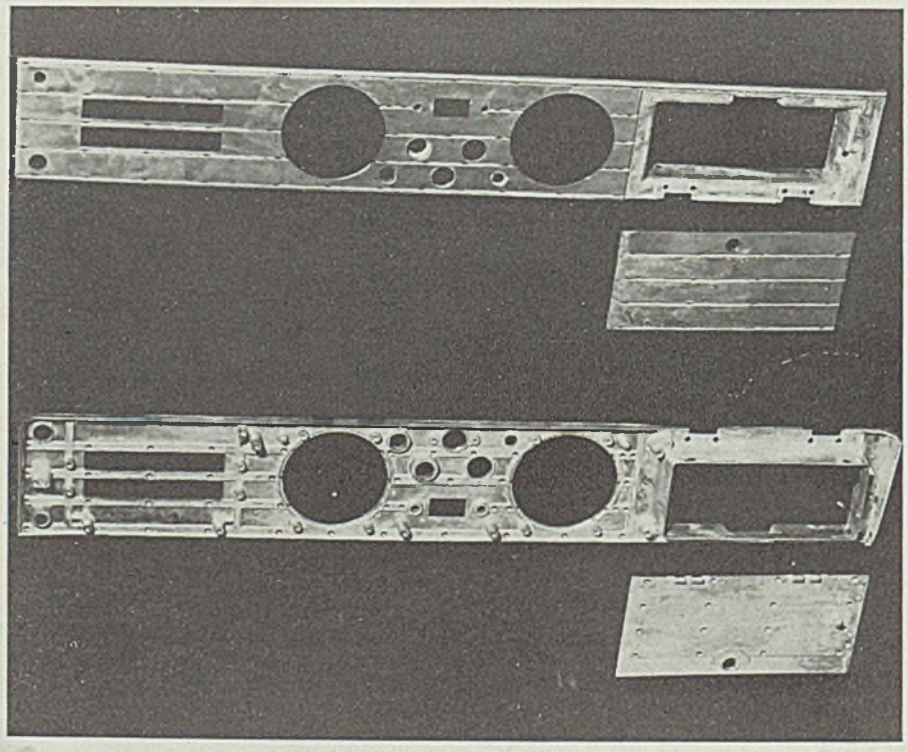
EXAMPLE of the size of thin-section die castings now available is shown in this instrument panel and glove compartment door supplied for Cadillac cars



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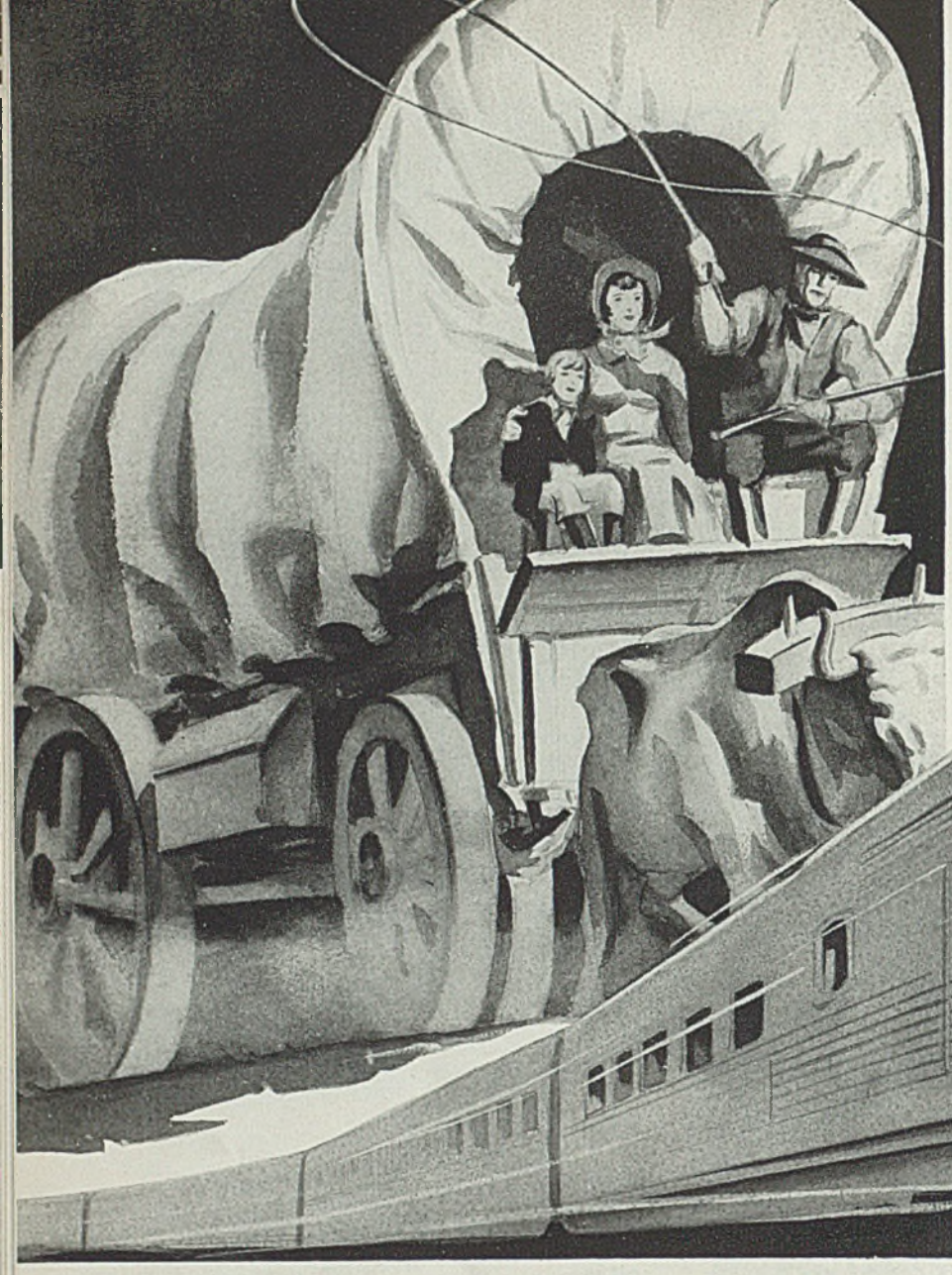

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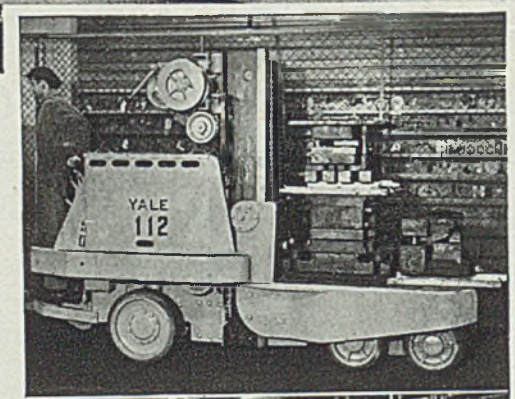

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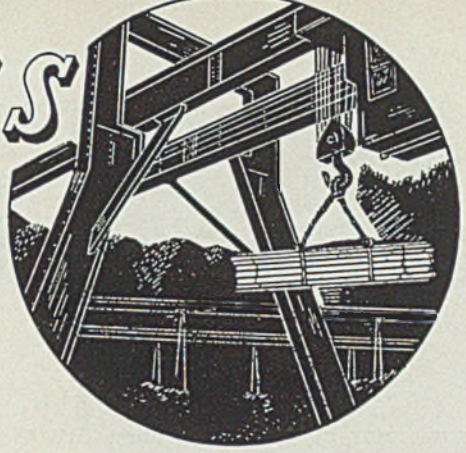
MATERIALS HANDLING



Planning Handling Procedure To Protect Delicate Parts in Process

BY E. W. JOCHIM
Plant Engineer, Mills Novelty Co., Chicago

DEVISING a materials handling procedure for economical handling of miscellaneous products in varying quantities is more complicated and a more common problem than handling continuous production with fewer items. Where the different parts travel on no set path, any transportation method and equipment must be extremely flexible and at the same time as positive as possible to plan, considering the human element. The problem in this plant is further complicated by the number of delicate parts which must be handled from incoming steel through process without bending.

This plant is among the leaders in the development and manufacture of coin-operated equipment. From the original line of slot machines have been added pin games and vending machines for gums, candy bars, cigarettes and soft drinks.

The many miscellaneous requirements demand a very large number of grades, sizes and shapes of steel stock, including stainless. Some of these are used in small quantities and only a few items in fairly large quantities. The materials handling problem for this discussion may be divided into three parts:

First—Handling incoming materials.

Second—Handling work in process.

Third—Handling delicate and finished parts from operations and finishing to assembly.

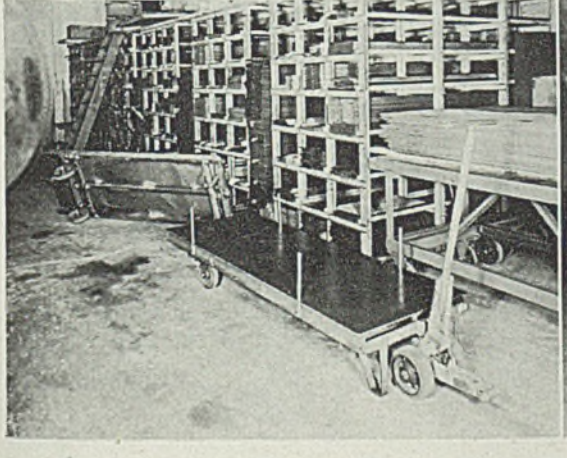
Handling Incoming Materials

Practically all steel is received by truck from local steel supply houses, the largest packages of sheets weighing 2 tons each. These are unloaded by a Yale & Towne chain hoist on an I-beam, placed on a truck, passed over a Fairbanks-Morse platform dial scale to check weight and on to storage. Steels received in small quantities are stored horizontally in steel racks by hand, with the larger quantities and heavier items in the lower sections.

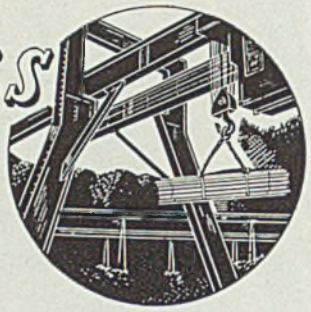
The 2-ton packages of sheets are lifted from the floor trucks after weighing by a Cullen-Friested grab mounted on an I-beam and piled in open floor storage. This grab also removes from floor storage. Building construction in the main plant prevents continuous handling from truck to storage. However, continuous handling is possible and practiced in one of the branch plants. Before this grab was installed many of the sheets were bent when handled by hand, resulting in continual trouble in production and assembly.

Materials have been handled largely on wooden warehouse trucks with two wheels at the center and single swivel casters at each end. This is supplemented by hand lift trucks and skids. Warehouse trucks have the advantage of easy handling, because of the large diameter wheels, and the ease with which the

TOP and bottom views of the all welded platform truck with ball bearing casters and skid legs are shown at left. These trucks are moved by detachable skid jacks. Center photo shows incoming steel being transferred from motor truck to a high top shop truck by a 2-ton Yale chain hoist. Right view shows a part of the temporary floor storage of finished parts in tote boxes. This condition is being eliminated by the installation of adjustable shelving



MATERIALS HANDLING



machine operator may move or adjust his work. Also, they are at a convenient height for the work at the machine. However, with the heavy loads the wood splits making repair work on these trucks take more than the full time of one carpenter.

Special Welded Steel Trucks

As rapidly as possible these trucks are being supplanted by a special truck of our own design. This truck consists of three 1½ x 3-inch channels welded lengthwise to similar channels at the ends. A pair of Colson ball-bearing solid wheels are welded to a cross 1½ x 6-inch inverted channel bolster welded near the back end of the truck. Two bent bar steel skid legs are welded on at the front which also carries on the front end channel an attachment for the detachable Colson skid jack used to move the truck. The platform consists of a sheet of ⅛-inch steel welded to the channels. Standards are mounted in holes drilled vertically through the upper flange of the side channels with a section of pipe welded in for reinforcement and to strengthen the entire structure.

The standard platform is 30 x 60 inches although some platforms are 36 inches wide and a few for handling longer sheets or strips, 84 inches long. The truck is fabricated by the maintenance department, except for the wheels which are purchased. The cost of these trucks is considerably less than warehouse trucks. No maintenance expense is expected.

To move the truck the portable jack is slipped under the front end, the handle pulled down to raise the skids from the floor and the truck pulled to its destination. Elevating the handle deposits the load. One skid jack will serve a number of trucks, the comparative low cost permitting a unit to be placed in each department and on elevators for rehandling.

The advantages of these trucks are: Cost is less than warehouse trucks, maintenance is minimized, accident hazard is eliminated, trucks are able to "stay put" without wiggling about when the load lightens as stocks is removed, and handling is easy with heavy loads. One man handles up to 3000 pounds over the short distances from steel storage to blanking presses. All new equipment and replacements are of the special platforms.

Handling Through Processing

Most important problem is handling work through operations and processes. The parts vary so much in size, shape, quantity and delicacy and in routing that it is impossible to fit into a standard practice. Many of the parts must be kept flat as bending causes serious trouble in assembly and operation of the delicate coin receiving and paying elements. Other parts need not be kept separate before the finishing or sub-assembly operations.

Under our former methods of handling a variety of steel and wooden packing or tote boxes were used at machine operations. The steel boxes were too small for much of the work. Wooden boxes wear out soon and frequently burst in handling.

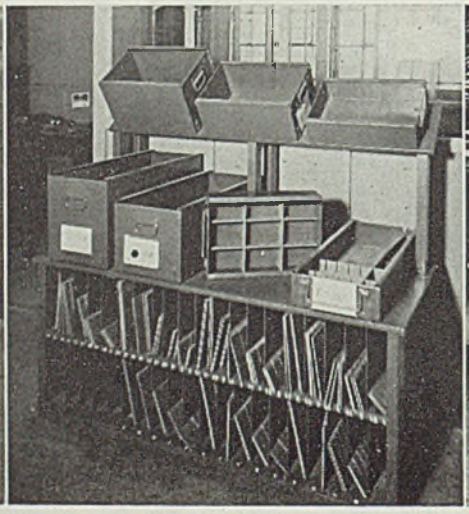
Standardized Tote Box Sizes

The plant has now standardized on seven sizes of Lyon steel shelf boxes with drop handles at both ends to serve as a stacking tote box for handling material through work and storage and two sizes of small steel boxes. These tote boxes are of 16 gage steel, with card holder on the front and reinforced at edges and ends. Two ⅛-inch steel runners, spot welded to the bottom, reinforce and take slidin g wear. The boxes are finished with one coat of green paint baked on to match the steel shelving. These boxes cost about the same as our wooden packing cases for outgoing products but last indefinitely longer.

All seven shelf tote boxes are 11¾ inches wide so that three will fit side by side on a 3-foot shelf and in two lengths, 17¼ and 29¼ inches, for 18- or 30-inch shelves. Heights fit standard 6-, 9-, 12-, or 15-inch shelf spacing. The two smaller boxes are 4 x 4 and 4 or 8 inches long and serve for items produced in small quantities. The large tote boxes set and stack nicely on the 30 x 60-inch platform truck.

The methods engineering department specifies the type and size of box to use, endeavoring to keep the weight of the filled box within the lifting capacity of a man. Filled boxes move from blanking operations to the presses where the parts

(*Please turn to Page* 93)



BELOW left to right are shown shelf storage of combined shelf and tote boxes of parts; make-up bench for the Masonite egg-case inserts used for separating and handling delicate parts through the entire operation of manufacture and assembly; savings of approximately 35 per cent of floor space resulted from installation of adjustable shelving for die storage

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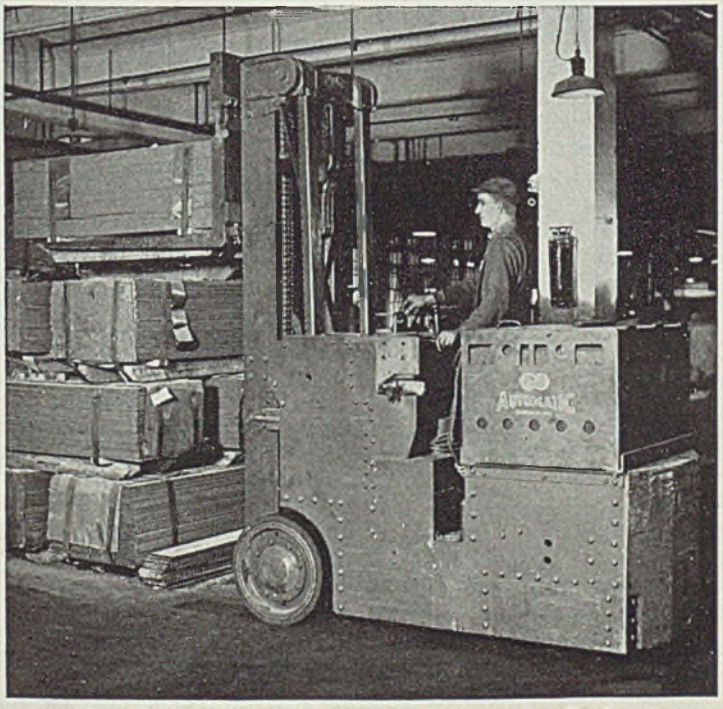

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SURFACE TREATMENT AND FINISHING OF METALS

Tinning of Steel Strip By Electrodeposition

DEVELOPMENT of continuous strip mills has brought about the natural desire to tin steel strip continuously. Considerable discussion has been aroused on this subject during the past year but little or no technical facts or data have been revealed.

Investigations have followed three courses, hot tinning, electrotinning, and a combination of the two. It has already been found practicable to continuously hot tin strip up to 10 inches in width and this is being carried out in Germany at the present time. The possibilities of extending this process successfully to wider strip is being investigated thoroughly.

Cleaning Presents No Problem

It has been found relatively easy to apply electrolytic cleaning methods to long strips of thin gage metal and this has aroused interest in the possibility of utilizing electrolytic methods for the production of various plated coatings on strip.

The technical and economic advantages of electro-tin applied to steel strip is not clearly defined, especially in view of the facts which will be revealed later in this discussion. However, it must be borne in mind that at one time it was assumed all nickel plate must necessarily be brittle or at least not ductile in the true sense of the word. Research has solved that problem as it will undoubtedly solve the present problems in electro-tinning.

In reviewing the technical possibilities here no consideration is given to the economic aspects of any particular process as it is clear that satisfactory results will depend largely on the degree to which the tin plating process can be controlled to produce a uniformly satisfactory product under conditions of large scale production.

Tin may be deposited from either an acid or alkaline bath. It is the acid bath that is being considered at present for practical application to the coating of steel strip. Alkaline bath conditions will also be described for purposes of comparison.

Macnaughtan[1] and his associates in their comprehensive work on the tin plating of steel strip devised an experimental apparatus which would handle strip 1¾ to 2 inches wide and 0.005-inch thick. This strip was available in the form of coils of considerable length and was sufficiently flexible to be readily guided through a series of tanks by means of ebonite rollers.

As received, the steel was bright and free from rust but covered with a thin layer of oil. This was removed by a cathodic cleaning in an alkaline solution in the first tank, followed by a water rinse in the next. From the rinse it passed into the plating tank. When an alkaline tin solution was used, this tank was welded steel (20 x 4 x 4 inches) provided with gas heating. For the acid process, a rubber lined steel tank with no provision for heat was used.

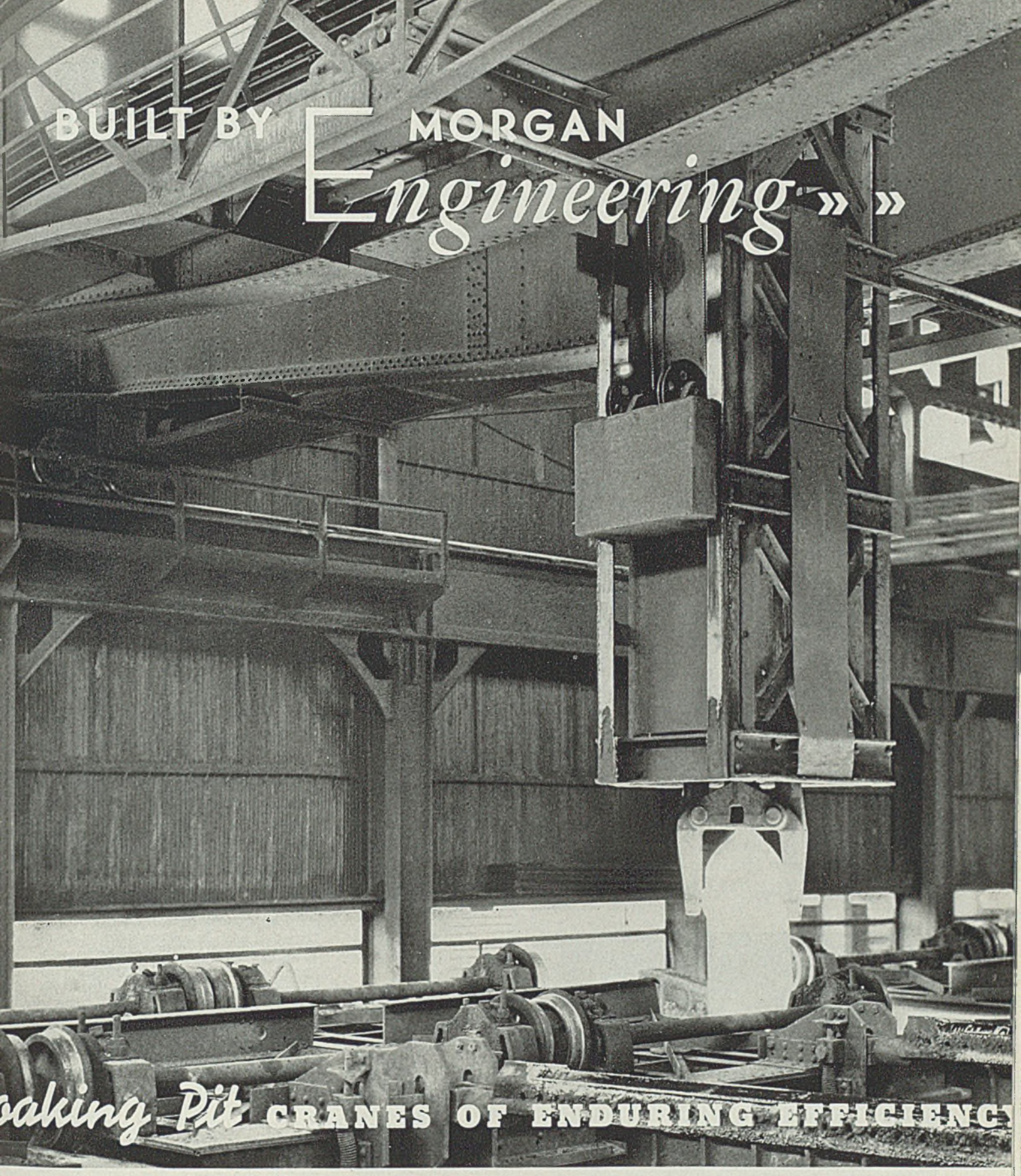
The anodes in all cases were placed horizontally below the strip, 19½ inches of which was immersed in the plating solution. On its exit from the plating tank the strip passed between rubber scrapers which squeezed out most of the plating solution and returned it to the bath. The plated strip was passed through a rinse tank and wound by a coiler which furnished the motive power to pull the strip through the system. Current was led to the strip by contacts at the coiler at the outlet end and the coil support at the inlet end.

Two Alkaline Methods Used

The alkaline plating solution contained 11.3 ounces per gallon tin (as sodium stannate) and 2 ounces per gallon free sodium hydroxide. Two alkaline plating methods were used; the first using insoluble anodes and the second, soluble tin anodes. The use of insoluble anodes necessitated the use of a separate tank in which to regenerate the solution as the tin was depleted. This was done continuously. In the case of soluble tin anodes, success of operation depended on the maintenance of a critical anode current density which insured the

[1]"The Tinning of Steel Strip by Electrodeposition", by D. J. Macnaughtan, W. H. Tait, S. Baier and J. C. Prytherich, *Journal* of the Electrodepositors' society, 1937.

THIS is Part I of an article discussing progress made in the continuous tinning of steel strip. Part II will appear in an early issue of STEEL



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dissolving of tin in the quadrivalent form. Cathode efficiencies were about the same in both cases. Full operating conditions are shown in the accompanying table comparing the alkaline and acid processes. It should be noted here that the alkaline solutions were maintained at a temperature of approximately 167 degrees Fahr.

The acid tin bath was as follows: 4 ounces per gallon tin (as stannous sulphate), 9.3 ounces per gallon sulphuric acid, 6.7 ounces per gallon cresol sulphonic acid, 0.007 to 0.04 ounces per gallon glue, plus various other organic additions as the conditions of the experiment were varied. Soluble tin anodes were used and the bath was operated at room temperature. It was found the acid solution required less than half the time required by the alkaline bath to deposit a tin coating of a given thickness. The speed of the strip through the solution was increased accordingly with entirely satisfactory results.

Three Types of Deposit Produced

The general character of the deposit was greatly influenced by the amount of addition agents present. Three types of deposit were produced; (1) rough matte deposits when the amount of organic addition agent was deficient; (2) smooth matte deposits when the amount of addition agents was sufficient to prevent preferential growth of any particular crystals; (3) semibright deposits when the solution contained a relatively high proportion of the addition agents. In all cases the anode and cathode efficiencies were approximately 100 per cent.

It is evident from the table that the acid tin bath presents a number of advantages over the alkaline bath for the plating of steel strip. Among these are: (1) No heating of the solution, (2) lower bath voltage, (3) higher cathode efficiency, which together with the fact tin is deposited from bivalent ions, results in more than double the rate of deposition for the same cathode current density.

Comparison of Alkaline and Acid Tin Baths

	Alkaline Bath	Acid Bath
Temperature (degrees Fahr.)	165	68–70
Current density (amperes per square foot)	35	35
Bath voltage (volts)	4.5	1.1
Cathode efficiency :		
As quadrivalent tin (per cent)	81	....
As bivalent tin (per cent)	40.5	99.7
Time in bath for deposition of tin 0.0001-inch thick (minutes)	3.3	1.34
Plating speed in 20-inch tank (inches per minute)	6	14.6

Hot tinning of steel is frequently conducted at speeds up to 25 feet per minute. On this basis of comparison the rates used in the experiments are low. Since, for a given cathode current density, weight of coating depends on the speed of travel and length of tank, speeds comparable to those obtained in hot dipping should be attainable by increasing the length of the tank. Thus, using the figures in the table as a basis, it should be possible to attain speeds of 25 feet per minute at a current density of 35 amperes per square foot for the production of a coating 0.0001-inch in thickness by providing a tank length of 82 feet for the alkaline solution or 33½ feet for the acid solution.

Higher rates of deposition are possible. This is particularly true when there is increased agitation of the solution at the cathode surface. Fortunately this increased agitation is provided by increasing the speed of the strip through the bath. In the case of the alkaline bath, supplementary tests indicated a current density of 80 amperes per square foot could be used at a speed of 25 feet per minute. Beyond this value, however, the cathode efficiency fell off too rapidly to permit economical operation. This drop in efficiency was not evidenced in the case of the acid solution and rates of 150 amperes per square foot and even higher are indicated. On the basis of 150 amperes per square foot and a rate of feed of 25 feet per minute, the length of plating tank for the acid solution would be about 8 feet for the production of coatings 0.0001-inch in thickness.

Whether tin coatings produced at this high rate of deposition are satisfactory, however, remains to be investigated.

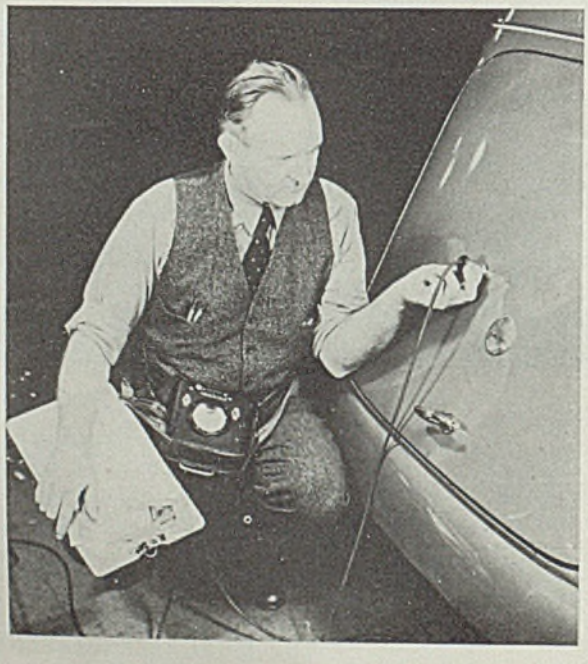
Polishing Is Necessary

The appearance of the tin deposits about 0.0001-inch thick produced by these methods varied, according to the conditions of deposition, from a rough to a fine matte surface, and in the case of the acid bath the surface had a semibright luster. In no case did the surface appearance of the electrotinned steel approach the brightness of hot-tinned steel. In all cases some form of polishing was necessary to produce a surface with a satisfactory appearance. The effect this will have on costs is evident.

Preliminary tests indicated precipitated chalk and Vienna lime were the most promising materials for polishing the soft, thin tin coatings. It was found, however, that effective polishing involved a loss of from 10 to 13 per cent of the weight of coating in the case of the smooth matte deposits; 18 to 20 per cent in the case of the rough matte deposits; and about 7 per cent in the case of the semibright deposits. Scratch brush treatment was also tried with varying degrees of success. Brass wire was found to be most satisfactory involving a weight loss in the order of 0.5 per cent while producing a fairly uniform semilustrous surface.

(To be concluded)

Measures Thickness of Automobile Finishes



RECENTLY invented electrical lacquer thickness gage shown here is used to test paint thickness on new cars as they come off the line at the plant of Studebaker Corp., South Bend, Ind. The dial registers the difference in resistance between an established thickness of paint and that of the surface under test

Industrial Management Group Sees Need For More Human Engineering

(*Continued from Page* 37)

uction, and is premised on a thorough job analysis. The ease in application is indicated by the fact that the audience rated an engine-lathe operator within 2 per cent of the rating established by the group after careful study.

Management, of course, sets the maximum and minimum wage rates and the rating plan determines the classification of the various grades of employes within these points, according to the requirements of the job, rather than the individual abilities of the operators. Such work is best performed by a group or committee, Mr. Rogers contended. These ratings are used as an index value which remains constant even though the wage scale is changed. It is the job of the industrial relations department to sell the idea to the workers.

Experience in rating salaried employes in offices and shops in a group of public utilities was covered by A. M. Hammond, staff engineer, industrial relations division, Business Research Corp., Chicago. In this case all positions were studied by duties performed with each position rated by a committee of three, an industrial engineer and representatives of the management and of the industrial relations department. The rating was based on a job analysis of each position according to duties allocated or services performed.

Problems Now Are Changed

At another session, William E. Odom, vice president, Industrial Reserves Corp., Milwaukee, presided and spoke on "Strong Companies Need Strong Personnel Policies," emphasizing that problems of personnel are entirely different under the national labor relations act. Also, this is further complicated by the increasing tendency toward state acts which are still more drastic.

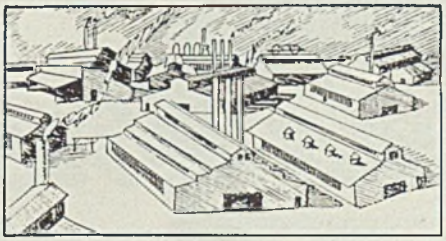
He raised the question as to whether the federal government would provide police protection, if necessary, in case of unsettled labor disputes. Furthermore, due to the anti-injunction act the courts can not interfere in labor disputes; therefore is the employer without recourse? It is no longer a question of what management wants to do but what legislative bodies and labor will permit doing. Mr. Odom emphasized the error in companies not having placed their side of the Wagner act more strongly before the Supreme Court.

Mr. Odom pointed out that the new problem of management should be not to direct action against employes or the government, but rather to direct its attention toward improving the minor supervisory force which, through its actions and attitudes, had destroyed the effect of the good intentions of management and brought on the present critical conditions. His quotation from an investment counselor that, "No investor has the right or should be advised to invest money in an industrial enterprise without investigation of the company personnel policies and its recognizance of the new ideas of employes and government," indicates that personnel policies of the present must be based on the best thought and broad vision.

"Industrial relations must be honest and promises kept," emphasized John A. Stephens, manager of industrial relations, Carnegie-Illinois Steel Corp., Chicago. "There is great need for breadth of understanding in employe relationship, which necessitates trained men who appreciate the social elements in which we live. Today, with the radio and other outside attractions it is the exceptional individual who will continue his developments. "The problem of industry is to train this man and stimulate his ambition, growth and thought, which does not mean propaganda but truth."

Mr. Stephens explained the method adopted in his organization for training apprentices, shop workers and college men, as well as the supervisory force from the superintendents, who must be sold on the idea first, down to the foremen. Men are paid for the time spent in school. He pointed out the possibility of co-operation of city, state and federal agencies, due to the Smith-Hughes act, in training of apprentices particularly.

"This training is done because we feel more and more that industry will have to regain human touch of 50 to 60 years ago," stated Mr. Stephens in closing. "Such training will improve industry, production, the point of view of the individual, and industry as a whole."



"One of the important results of training and a good personnel policy is an upward flow of thought from the supervisory force to management," Merritt Lum, in charge of industrial relations, Johns-Manville Corp., New York, pointed out in the discussion. "Training must start at the top and work down but it has not accomplished its full purpose until it draws out the immensely valuable contributory ideas of the men. Too many businesses are run by orders, which are sometimes resented or not fully applicable to the conditions. If the idea is placed before those subordinates, and in some cases workers, for their viewpoints before installations a better plan and whole-hearted acceptance is assured."

"Basically, motion study is a tool by which we apply common sense," stated W. C. Snell, wage incentives engineer, Western Electric Co., Chicago, who presided at a session on standardization and measurement of labor tasks. "It is a method of determining how a workman can do a better job, more efficiently and without useless, extra effort," he said.

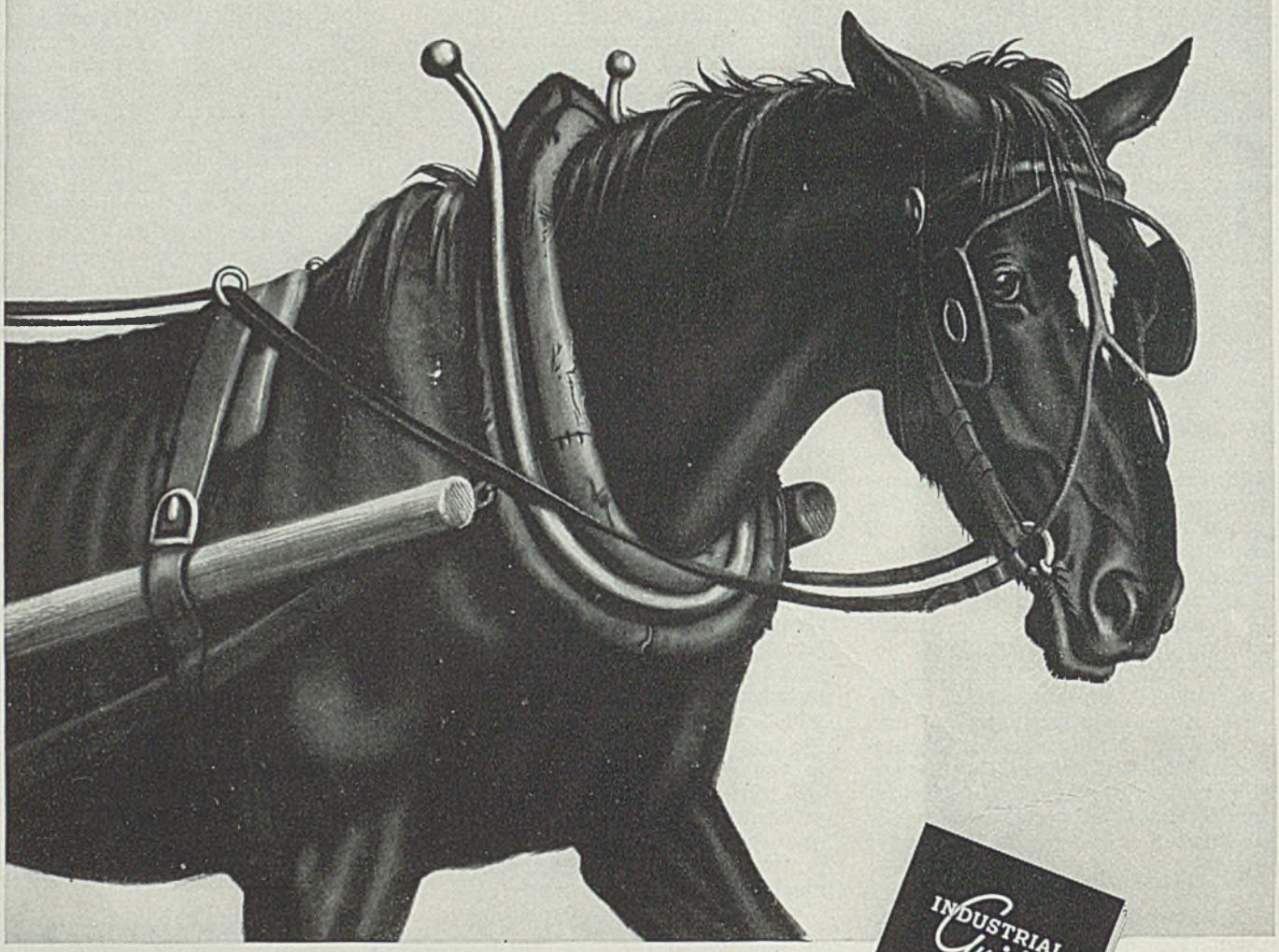
"Motion study has four objectives," according to Ralph M. Barnes, professor of industrial engineering, State University of Iowa, Iowa City, Iowa. These are: 1. Finding the most economical way of doing work; 2. standardization; 3. setting time standards; and 4. training operators in method determined. Motion study is not a speed-up but the determination of an easier method.

Motion Study Saves Money

Some examples of results of motion study given by Prof. Barnes showed increase in production of 50 per cent on the assembly of a bolt, three washers and a nut and a saving of $3000 per year in direct labor; and a $5000 saving in paint on a spraying job by determining by motion picture analysis that 23 per cent of the operator's time was spent in spraying into the air.

"Progressive labor leaders realize that unless they permit industrial organizations to perform a better service they will fail and legislation will be directed against them." This was the viewpoint of A. B. Segur, president, A. B. Segur & Co., Oak Park, Ill. "As a result of contacts with concerns engaged in motion analysis these leaders are considering such use in determining proper working conditions although they

OVERWORKED!



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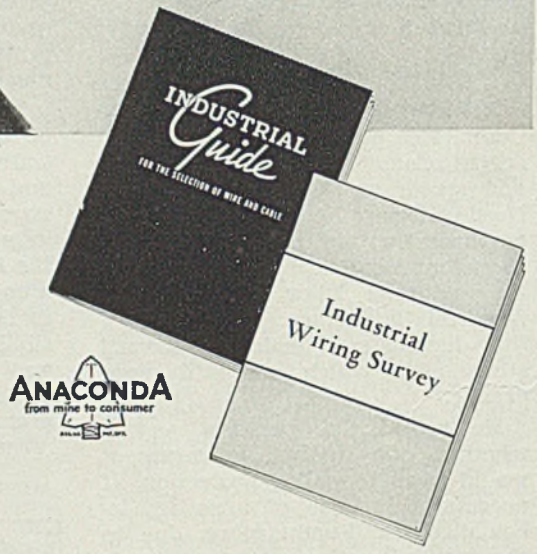

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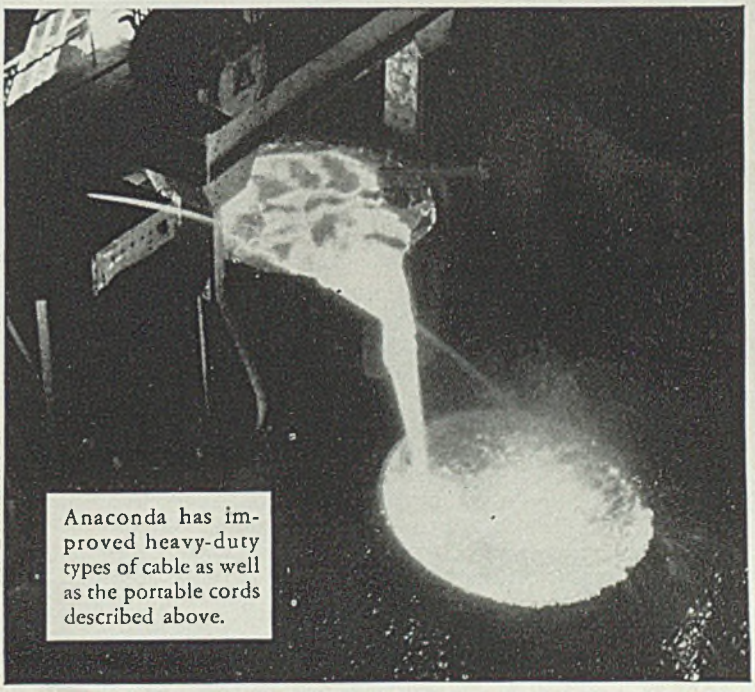


Anaconda has improved heavy-duty types of cable as well as the portable cords described above.

have strenuously objected to time studies."

Mr. Segur bases his motion studies on an analysis of the work according to the 17 fundamental motions in every act or combination of acts in a cycle of hand operations. These motions follow definite laws of time and by determining the proper motions the standard time for the task is obtained. The procedure then is to train the worker in these motions.

In working with unions and works councils, their representatives, as well as company supervisory executives, are trained in motion study so that they can analyze a job and determine for themselves if properly standardized and even set payment rates. Management, however, must be willing to work with labor.

By the use of motion study and new fixtures, determined by such study, output in some cases has been increased 200 per cent and the operator trained in a day to attain standard speed. In other cases entirely new methods have been developed which gave even greater production.

In discussing motion picture photographic technique, Joseph H. Dubray, technician and special representative, Bell & Howell Co., Chicago, recommended the use of modified amateur cameras using 16-millimeter film because of the lower cost and the projection facilities which permit inspection at taking speeds or by a frame at a time without damage to the film.

Must Provide Standards

Standards are necessary for the direction, co-ordination and control of duties and achievements of management and personnel, according to Frederick R. Shanley, partner, J. L. Jacobs & Co., consulting engineers, Chicago, in a paper on "Both Management and Men Need Standards and Incentives." However, management has the greater need for standards and men for incentives.

"The present need is for wider and more intensive use of standards for recording performance and using for improvement. Men need incentives, such as will stimulate their pride in skill and recognition of ability, which can be given only on the basis of standards and adequate and just records of performance, as well as needing monetary rewards," he said.

"The keynote of the industrial engineer's position in industry today is unselfish service, sound educational principles and diligent training so that men and management can appreciate the viewpoints of each other and work together in harmony." This viewpoint was expressed by James R. P. Kettle, industrial engineer, Gary plant, American Bridge Co., Gary, Ind., while discussing "The Industrial Engineer's Status in Industry Today." "He must not look too much toward the past but have an open mind for the future with fair dealing and the welfare of society as a whole in mind.

"The mutual respect and confidence of employer and employe depends upon his ability to choose and install a plan and to inspire the confidence of both in it. He is a coordinator of ideas and suggestions and should give credit to others where due," asserted Mr. Kettle.

So that the audience might understand the use of a recently developed method of handling discussions on subjects of importance to management and men, Russell J. Greenly, associate professor of industrial education, Purdue university, Lafayette, Ind., selected eight men from the audience and led a "panel discussion." These men sat at a table facing the audience, and, led by questions from the chairman, discussed the high points of the meetings. At the end of the conference those in the audience were invited to express their views.

It was suggested by Prof. Greenly that new programs or policies affecting the employes be discussed in this way before all employes with representatives of both men and management at the table and the industrial relations director as impartial chairman. The plan gives the employes an opportunity to hear all sides of a question affecting themselves thoroughly discussed and also to bring out any desirable modifications. Much depends upon the chairman, the speaker stated.

Machinability Lively Topic For Ohio A.S.M. Chapters

MACHINABILITY, a subject which always attracts attention and considerable diversity of opinion, occupied a day's time of 130 members of the American Society for Metals gathered at Battelle Memorial institute, Columbus, O., April 28, for the annual trichapter meeting of the Columbus, Dayton and Cincinnati chapters of the society.

Unlike former meetings, which included afternoon and evening sessions and a dinner, the Columbus meeting consisted of morning and afternoon sessions and a luncheon. Overwhelming preference for the latter program was recorded in a vote. Several national officers attending and participating in the program were: President, E. C. Bain, assistant to vice president, United States Steel Corp., New York; Secretary W. H. Eisenman, Cleveland; Treasurer, W. P. Woodside, vice president, Climax Molybdenum Co., Detroit; and Trustee R. L. Kenyon, supervising research engineer, American Rolling Mill Co., Middletown, O.

Discusses Tool Steels

In consideration of machinability, attention turns first to cutting materials. Logically, therefore, the morning session was devoted to presentation and discussion of an outstanding paper on high speed steel by J. P. Gill, metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa. The speaker traced the development of tool steels from their beginning in 1868 to the present, then focused his remarks on the steels in use.

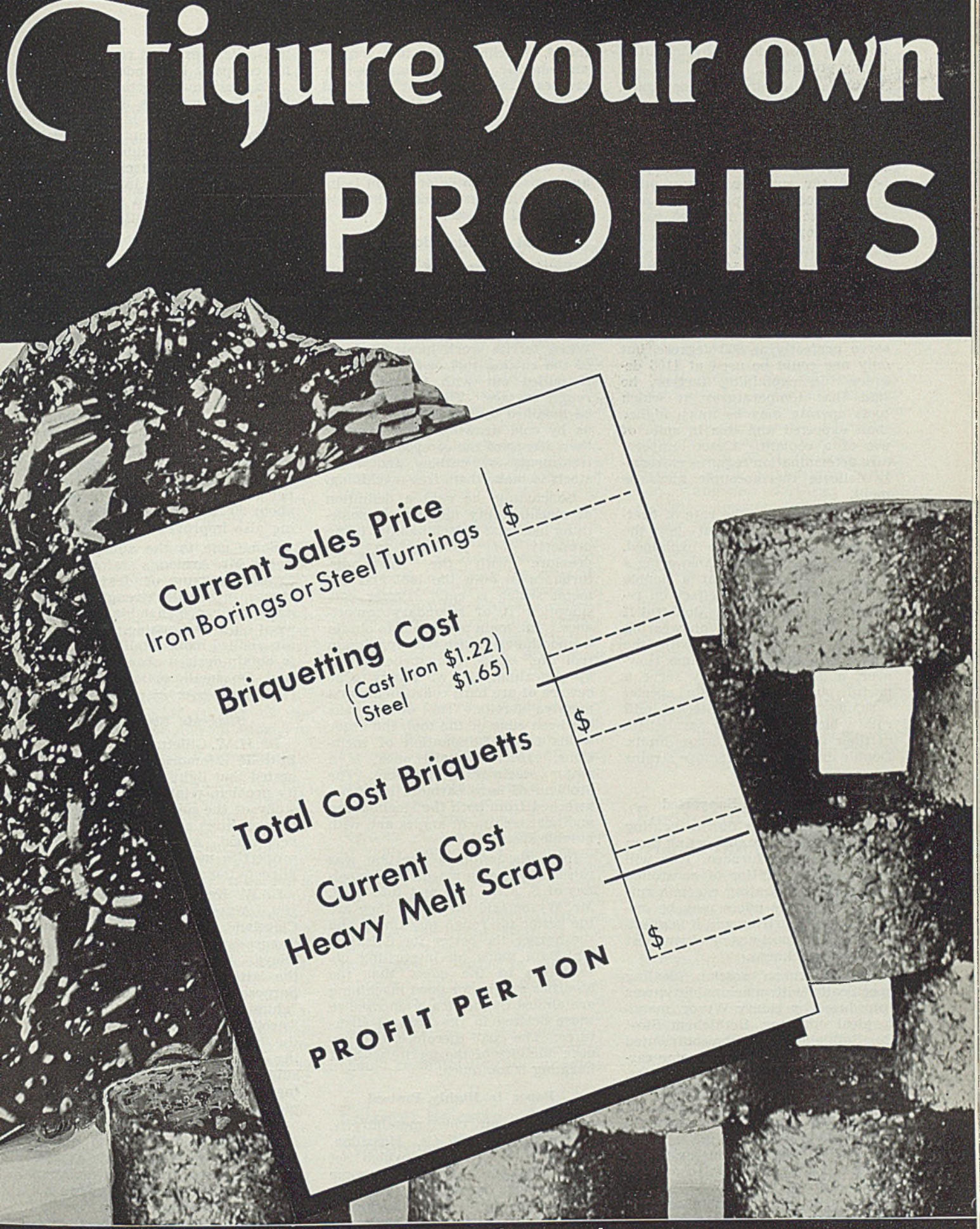
Mr. Gill presented a table listing ten type compositions which are commercial today and explained the outstanding characteristics which certain chemical elements impart to each type. He pointed out that although ten types are available, last year between 80 and 85 per cent of all the high speed steel made was of the 18-4-1 type.

Segregates Affect Steel

All high speed steels are of a segregated nature, consequently, distribution of the segregates has considerable effect upon characteristics of the steel. This segregate, actually a eutectic, has a lower melting point than the remainder of the steel and will fuse while the steel appears to be in a solid state. This fusing takes place at temperatures which are only slightly above those used in heat treating.

Cutting ability is considered the most necessary requisite of a high speed steel, said Mr. Gill, therefore, it is desirable to enumerate factors or characteristics which collectively determine cutting ability. These he gave without rank in importance as: 1. Ability to resist softening at elevated temperatures; 2. strength and plasticity or toughness; 3. resistance to wear or abrasion at temperature operated; and 4. hardness. All of these physical properties are influences by the hardening procedure

Figure your own PROFITS



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and to a lesser degree by manufacturing procedure.

At this point, Mr. Gill undertook a complete discussion of hardening practice and this precipitated much of the discussion which followed. One speaker cited a case where a molybdenum-tungsten steel appeared far superior to any other type of steel for a particular application. The former required grinding only once every 24 hours, the others about every 4 hours.

Answering this, Mr. Gill stated that of two steels, one might be suitable for operation at 1000 degrees Fahr. and the other for 1100 degrees. Obviously, both would serve perfectly at 900 degrees, but only one could be used at 1100 degrees. In explaining further, he said that temperatures at which tools operate may be much higher than expected and this in spite of use of a coolant. Exact temperature determination requires extremely delicate thermocouple measurement.

In drawing, it is the rate of heating which is important—not the manner of heating, he explained. The rate must be slow. Answering a question, he stated that a double draw may have some effect on removing strains, but it is doubtful if it has had much effect on wearing qualities, as compared with the single draw at double the time. However, a double draw may serve a useful purpose in certain special case, as for example Steckel mill rolls which must retain parallelism of their sides within narrow limits. Double drawing may remove strains more completely.

Tools Must Be Supported

Warping of tools during heating can be overcome by supporting them properly in the furnace. This will prevent sagging. Use of controlled atmosphere in heating exerts a surface effect. This effect may be oxidizing or carburizing and it is greatest on small specimens and smallest on large specimens.

The afternoon session, dealing specifically with machinability, was introduced by Henry Wysor, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa., who contributed notes on machinability of some carbon and alloy steels. At the outset, he compared the action of a planer or lathe tool to that of a plow. An outstanding difference, however, is that in machining steel, we are dealing with a crystalline material and advantage is taken of intra as well as intercrystal flow.

Ordinarily steel yields under pressure of the tool with distortion of the grains, and, if there is sufficient ductility, the chip is spiral of long length. On heavy cuts, the chip breaks into sections. With hard metal, the chip breaks into shorter and shorter pieces as hardness increases. Mass movement incidental to machining may be largely made up of intra-grain slippage, however, a secondary phenomenon occurs and profoundly affects machining and cold working. The ferrite hardens and resistance to deformation is increased with corresponding increase of internal stresses.

Cold Drawing Beneficial

Tensile strength of hot worked pure iron or ferrite is approximately 38,000 to 40,000 pounds; cold working may increase this to more than 100,000 pounds, Mr. Wysor said. When ferrite work hardens ahead of the cutting tool, softer material is pulled out with it, leaving a rough surface. This behavior can be modified by hardening the steel, as by cold drawing. The speaker then discussed the compositions and treatments of carbon and alloy steels to make them free machining.

Concluding, he said a definition of machinability might read something like this: "Machinability is the property of yielding to tool pressure with the least disturbance to both the tool and the metal which is cut." Power consumption is of secondary importance. The main purpose is to obtain a smooth even finish with maximum tool life. Aside from beneficiation by annealing, the two things to be beware of are hard constituents and massive ferrite. The one breaks the keen edge of the tool, the other welds fast. Elimination of inclusions, especially hard ones, is a major steelmaking problem. The problem of hard carbides has been attacked from both the steelmaking and heat treatment angles and with notable success.

In a discussion, a question was raised concerning machining properties of S. A. E. 1015 and 1020 steel. Mr. Wysor said the softer they are the better for rough machining and the harder the better for finishing. Dr. Bain made an interesting observation to the effect that the qualities sought for good machining are almost diametrically opposed to those desired in the finished structures. The goal, therefore, is to reduce ductility of the ferrite without harming it too much.

Paper Is Highly Praised

J. D. Armour, chief metallurgist, Union Drawn Steel Co., Massillon, O., presented a paper which set forth what are believed to be some of the more underlying principles explaining why free machining steels machine freely. This paper was given wide acclaim. The speaker enumerated some of the variables which are encountered in attempting to make comparative machining tests, then described research which his company had undertaken.

To overcome objections to certain laboratory methods and to actual shop production, a laboratory production test was adopted. An up-to-date four-spindle automatic screw machine was purchased and a screw machine part which involved a wide form, a large drill, a small accelerated drill, and a cutting-off operation, was designed. Running all tests on this machine, it is believed many variables were eliminated.

At this point, Mr. Armour compared test figures, then discussed free machining steels from the standpoints of their chemical composition and their metallurgical and physical characteristics. Aside from chemistry, cold working is the most important factor in obtaining free machining, he said. Cold working increases the strength and decreases ductility. With the normal amount of draft used in cold working, tensile strength is increased about 30 per cent while ductility is reduced about 50 to 60 per cent. Cold working also improves surface finish.

Some one in the audience questioned Mr. Armour's statement concerning amount of draft and increase in tensile strength, but he gave assurance that his statements were quite reasonable. Draft is being applied more intelligently today to obtain desired characteristics, he said. On small sections draft often runs much over 25 per cent.

Suggests Study Topic

Dr. H. W. Gillett, editorial director, Battelle Memorial institute, suggested that light on the machinability problem might be afforded by a study of the properties of metal at temperatures at which machining is performed. At present, the physical properties used are those obtained at room temperature.

L. W. Kempf, research metallurgist, Aluminum Co. of America, Cleveland, followed Mr. Armour to discuss free-machining aluminum alloys. At the outset, he stated that the latter's paper would serve his purpose rather well, providing "aluminum" were substituted for "steel" throughout the text, and if the hardening elements and alloying elements used in aluminum were substituted for the hardening elements and alloying elements employed in steel.

One exception, however, which Mr. Kempf said should be pointed out, is that whereas power requirements and tool wear are important factors in cutting steel they are not major considerations in cutting aluminum. Aluminum alloys machine rather well, particularly the cast alloys; the problems which do arise are those concerning large production work and the material

usually is free cutting screw stock. The problem here usually is one of breaking up the continuous solid solution masses, the same as occurs in steel.

Slides were used by Mr. Kempf giving comparative figures for the 11S and 17S alloys. The former has somewhat better machining properties and frequently can be used at a saving for many applications despite the fact that the 17S alloy has superior physical properties. The speaker stated, in answer to a question, that some form of cemented carbide tool is used on 90 per cent of production with aluminum alloys. Wrist pin holes in aluminum pistons, however, are diamond bored.

The subject of cutting compounds is so closely related to the problem of machinability that it deserves proper attention in any discussion of the latter topic. Therefore, the assignment to review the progress in cutting oils and compounds was handled by D. J. Richards, district manager, E. F. Houghton & Co., Pittsburgh.

At present, said Mr. Richards, intensive investigational work is being carried on in cutting oils because so many new cutting materials and high speed steel alloys have been introduced within the last few years. When a new material is placed on the market, manufacturers of cutting compounds must at once undertake research to determine the type of cutting oil required and to be able to supply it.

Must Meet New Requirements

No longer is the matter so simple as to choose between lard, tallow or sperm oils, for many of the new materials have set up new requirements which cannot be met by these oils. Among the factors which must be considered in selecting a cutting oil are: Cooling capacity, film strength, cleanliness, lubricity, antisceptic properties, etc. Usually it is necessary to blend several types of oils to meet required specifications.

Among the new oils being utilized, according to Mr. Richards, are high sulphur oils, extreme pressure treatment oils, and oils containing synthetic fats. For some time to come, he said, it will be impossible to get away from saponifiables in oils.

An interesting point about the heating of tools was brought out in the discussion. Mr. Richards intimated that there is a possibility that heat may radiate from a point in a tool back of the tip forward to the tip. In other words, heat may build up at this point, and, unless it is removed by a cutting fluid, will radiate back. It must be the function of the cutting oil to prevent this heat build up.

Correct Metal Spray Procedure

BY A. H. YOCH,
Air Reduction Sales Co.,
New York

WORN shafts, pistons and plungers to an increasing extent are being restored to original diameters by the metal coating process, in which wire is melted and sprayed on the worn surface by means of a gun of the Metalayer type. In view of the fact that procedures now being practiced vary considerably, all users will be interested in a description of the procedure which proves the best.

By this preferred procedure, based on broad experience over a number of years, the diameter of the shaft is reduced to 0.060 to 0.080-inch or more by rough turning and then blasting the resulting surface with sharp angular steel grit to roughen it. An acceptable alternate method is to reduce the diameter by turning, setting the lathe tool low and turning in such a manner as to leave a jagged, torn surface rather than chatter marks. The feed in this case may be 18, 20, or even 28 threads per inch, the exact spacing being immaterial.

Never in any case should a heavy spray coating be made in one application. The reason is that metal coatings lack tensile strength and the overheating practically inseparable from heavy 1-pass applications is likely to set up stresses in cooling that crack and loosen the coatings. The correct procedure is to apply the metal in continuous, overlapping bands, adjusting the lathe feed so as to secure this result. The spray application at all times should be continued only as long as the temperature is low enough to cause no discomfort when the surface is touched by the hand.

For coating worn shafts the best metals are 0.80 carbon steel and a special, hard, stainless steel. As a rule 0.80 carbon steel serves every requirement. The sprayed coating should be finished by wet grinding.

Enlarges Refractory Line; Establishes Warehouse

Midwest Refractories Co., Union Trust building, Cleveland, has been appointed agent in the district from Pittsburgh to Detroit for M. W. Kellogg Co., New York, manufacturer of a complete line of high temperature cements and insulating refractories. It also has been appointed agent in the same territory for Walsh Refractories Corp., St. Louis, maker of a complete line of Missouri refractories, and for the Apollo Clay Product Co., Apollo, Pa., producer of fire clay. Midwest Refractories Co. has established a warehouse in Cleveland; as before, this company handles the refractory products of Union Mining Co., Pittsburgh; Columbia Fire Brick Co., Strasburg, O.; Keagler Brick Co., Steubenville, O., and Interstate Fire Clay Co., Lisbon, O.

Will Market Complete Line of Refractories

M. W. Kellogg Co., 225 Broadway, New York, for 17 years a manufacturer of refractories in connection with its business in the oil refinery field, has organized a refractories division with W. H. Gaylord Jr. in charge. It is establishing service and warehouse facilities in all strategic centers in the United States and in at least 33 foreign countries. The company is in a position to give complete service in meeting all refractories requirements. Products include a complete line of high temperature cements, both alumina and chrome base, a complete line of castables and plastics and a complete line of refractory insulation including refractory insulating firebrick for temperatures ranging from 1600 to 3000 degrees Fahr. In line with this program, the company now is doubling its refractories manufacturing capacity at Jersey City, N. J.

Prepare To Dedicate New Mellon Institute Building

An imposing list of internationally-known scientists will participate in dedication of the new building of Mellon institute in Pittsburgh, May 5-9. The program will include the formal dedication on the afternoon of May 6, a trustees dinner in the evening and a symposium on recent progress in science on the morning of May 7.

Speakers will include Dr. Irving Langmuir, General Electric Co., Schenectady, N. Y.; Dr. Karl T. Compton, president, Massachusetts Institute of Technology, Cambridge, Mass.; A. V. Davis, chairman of board, Aluminum Co. of America, Pittsburgh; Dr. G. O. Curme Jr., vice president, Carbide & Carbon Chemicals Corp., New York; Dr. F. B. Jewett, president, Bell Telephone Laboratories Inc., New York; Andrew W. Mellon and Richard K. Mellon, founders of the institute in 1911; and Dr. Edward R. Weidlein, director of the institute.

WELDING, ETC.

BY ROBERT E. KINKEAD

Cash for New Ideas

DEPOSIT of $200,000 cash in the bank to be awarded as prizes for the best results in saving money by use of arc welding reflects credit on the donor, James F. Lincoln, and on the welding industry. Wise administration of wealth is, perhaps, the most difficult of all human achievements. The giving of alms is as old as the human race but it is a practice which has no attraction as a means of attaining spiritual grace for the industrialist who has to deal with the realities of industrial life.

There is a growing group of industrialists in the middle western states who subscribe to a philosophy which is unique in the history of human social relations. It must be said that the philosophy is far from universal in the district. Reduced to its simplest possible terms it may be stated as follows:

1.—By efficient management produce what people want at the lowest possible cost.

2—Pay the highest wages in the neighborhood.

IN this column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL

3—Use surplus wealth created by efficient management to produce more jobs and more wealth.

4—Don't give anyone anything for nothing.

Most of the industrialists who practice this creed are men, like Mr. Lincoln, who knew poverty first hand in their youth. This is their answer to the question of how to abolish poverty. The great Ford institution is a monument to that idea, built by a man who was poor until he was nearly 40 years old.

Which Method Is Best?

It is perhaps too soon to reach a conclusion as to the merits of this method of abolishing poverty as compared with the equally sincere methods Mr. Roosevelt is trying to carry out. On one hand is the highly efficient and autocratic management which pays high rewards for achievement; on the other, vast hordes of non-productive government employes trying to manage industry, finance, and agriculture so that no one will go hungry.

Mr. Lincoln will get his money back in advertising, in prestige, in good will, in increased sale of his products. Several hundred people will earn substantial cash awards for applying their minds to the problem of how to save more money with arc welding. This appears as wise administration of wealth and far better than the giving of alms.

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Cold Rolling Welded Joints

RECENT studies of the behavior of welds during the cold rolling operation in a modern strip mill have confirmed many facts and theories on the subject. Cold reduction from 0.070-inch to 0.010-inch of a weld in strip steel is severe treatment as compared with any service to which welds are ever put.

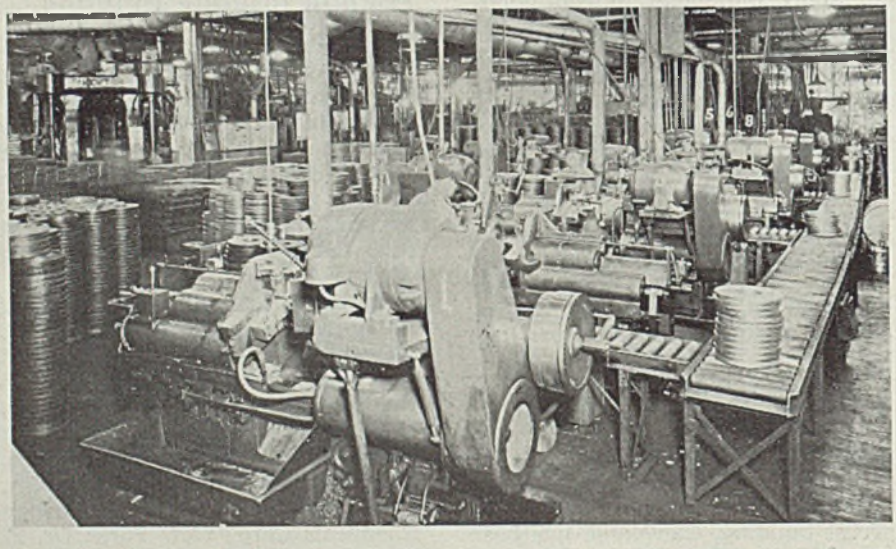
The fact that the metal in and adjacent to the weld has been through the welding heat cycle and is different from the metal of the adjacent strip needs consideration but is not so important as the degree of stress concentration set up by abrupt changes of contour or discontinuities in the weld itself. If the weld is cooled too rapidly it will be harder than the unwelded strip even in such material as automobile body stock. The upper limit is reached in hardness when the welds, during cold reduction, either break or mark the rolls. There is a further effect of excessive hardness which is not so apparent. Stress concentrations are not so easily "ironed out" in hard metal as in metal which has a relatively low yield point.

No Theories Apply

All of the theories built up to explain how metal flows in the plastic state are built on the assumption that the metal is absolutely uniform and that no stress concentrations are present. Neither condition exists in the cold reduction of welds in strip steel. The best answer at present seems to be to make the weld slightly harder than the strip and by selection of the process make the defects come where they will cause the least trouble by resulting in stress concentrations.

The problem is not one of making one weld which will stand cold reduction in a strip mill; it is a job of making 999 out of 10,000 which will go through the mills without failure and without marking the rolls.

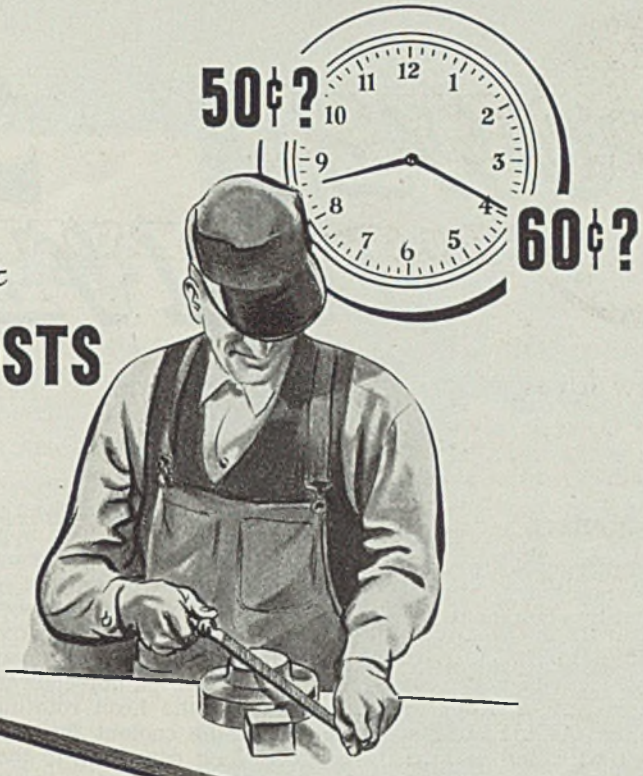
Modern Machines Pay Dividends

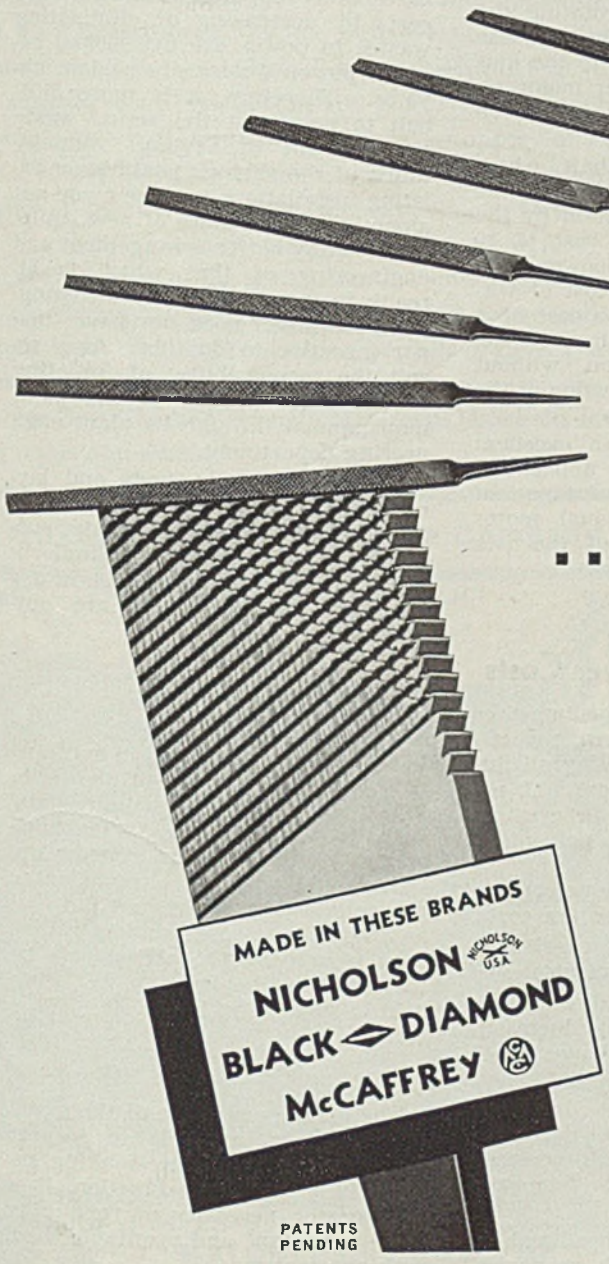


IN the flywheel department of a large automotive manufacturer these eight new radial type Simplimatics, built by Gisholt Machine Co., Madison, Wis., do the work of 24 older machines, permitting elimination of 16 machines and reclamation of two-thirds of the floor space. By combining in one operation, on one machine, the work that formerly required three operations on three machines, these eight new units produce more than 1000 flywheels in 7½ hours. The machining cycle is entirely automatic. In addition to savings in production costs the modern machines produce flywheels of greater accuracy

The Skilled Filer

YOU KNOW HIS COSTS





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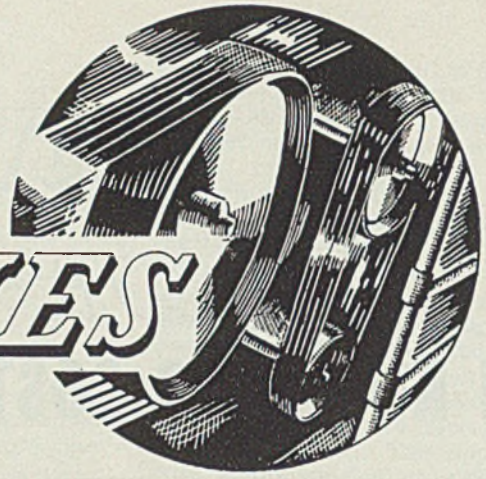
A FILE FOR EVERY PURPOSE

POWER DRIVES



Emergency Starters

SOMETIMES emergencies or failures make necessary special homemade starting equipment for motors. In such cases efficiency, which requires careful consideration during operation, must give away to expediency. Any device used, however, must protect the operator and be so designed as to prevent fires, shorts and exceptionally severe shocks or overloads to the motor.

Although most alternating-current motors may be started across-the-line with full voltage, in case starting equipment fails (and many units are so connected for starting at all times), direct-current motors, except those below ¼-horsepower rating, are likely to be damaged by such starting.

In case starting equipment for direct-current motors fails, and no suitable spare equipment is available, a water rheostat may be used. A metal can or oil barrel of water and a movable plate or casting suspended from a pulley to vary the amount of immersion in the water, will serve in an emergency.

Emergency starting devices for alternating-current motors requires more careful designing and a more thorough understanding of the proper resistance to apply in each case. Only those plant electricians familiar with the practical and theoretical applications of electricity and testing practices should attempt such emergency installations.

In no case should homemade emergency starting devices be used any longer than necessary to obtain new units. Switches are recommended for establishing a final running circuit instead of operating through the emergency starting circuits.

♦ ♦ ♦

Combining Drives

INGENUITY in designing or modernizing a drive often results in material economies in installation and operating costs. For example, difficulty had been experienced with a group of 10 lineshaft-driven grinders on cylindrical work in applying sufficient power evenly enough to obtain good smooth output. As a result 2-horsepower motors were attached to each machine to drive the grinding wheels. Instead of attaching a separate ¾-horsepower motor to drive the head rotating the work and the coolant pump, these remained belt connected to the lineshaft and a 5-horsepower motor replaced the former larger motor on the group.

This use of the lineshaft, which was already installed, reduced the cost of the new installation by the difference between the cost of 10 motors, each of ¾ horsepower, with starting units plus the cost of wiring individually, and the cost of a 5-horsepower motor, control and the single wiring connection, without counting in the salvage value of the large motor formerly used.

This installation is an excellent illustration of a drive application which obtains the advantages of both group and individual motor drive by combination of the two on a number of machines.

♦ ♦ ♦

Importance of Power Costs

THE president of a medium-sized manufacturing concern recently raised this question: "Why all this fuss about power drives? If my power bill was twice as great it would only be a small percentage of my total costs." True, but his power costs are a larger percentage of his overhead or operation costs.

This executive had overlooked three factors in management:

1. Overpowering is a direct waste since it needlessly increases costs for power and fixed charges.
2. Underpowering or improper powering results in decreased output together with increased maintenance and stoppage losses.
3. Reductions in overhead and operating costs, such as power, are equivalent to profits, with benefits recurring year after year.

Machine tool salesmen are constantly emphasizing developments in their equipment which will reduce costs by increasing output. In many cases other opportunities to reduce costs by decreasing or eliminating wastes in power are overlooked because power wastes are seldom obvious. Therefore, it is more difficult to point out the actual waste and amount of saving. Actually much of the savings possible on existing installations may be made not alone by the purchase of new equipment but by better arrangement and engineering of that which is already in use. Ordinarily an equipment salesman does not have time nor incentive to do this. As a result the responsibility of initiating improvements is up to the plant management through its plant engineering department.

Manufacturing methods and layouts which have been in operation for 10 years or more are under suspicion as out of date. Similarly many drives which have been in use 10 years or more also are outmoded.

♦ ♦ ♦

Where surfaces on reciprocating mechanisms are exposed in extremely dusty locations a good plan is to grease exposed surfaces immediately when shut down and then wipe off and regrease before starting up. Often under such circumstances grease is a better lubricant than oil as it holds dust on its surface rather than permitting the abrasive to be carried into the bearing by being held in suspension in the oil.

♦ ♦ ♦

The primary purpose of the maintenance department is to inspect and service equipment; making repairs is a secondary function. Preventing the necessity of repairs is more important and profitable than making repairs.

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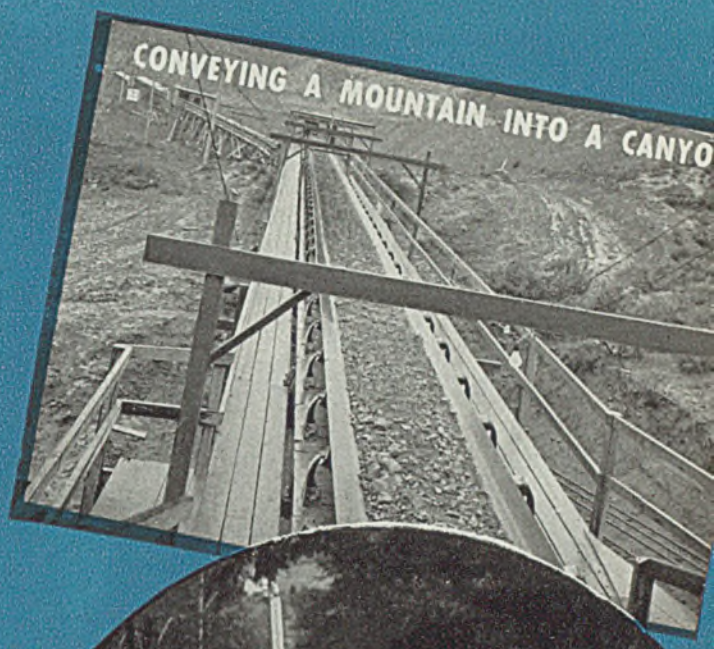
● Go down into a mine . . . or a big excavation job . . . or walk through almost any great plant! There you'll find U. S. Rubber Conveyor Belts doing their jobs and doing them well . . . because U. S. Rubber Conveyor Belts are tailored to fit their loads.

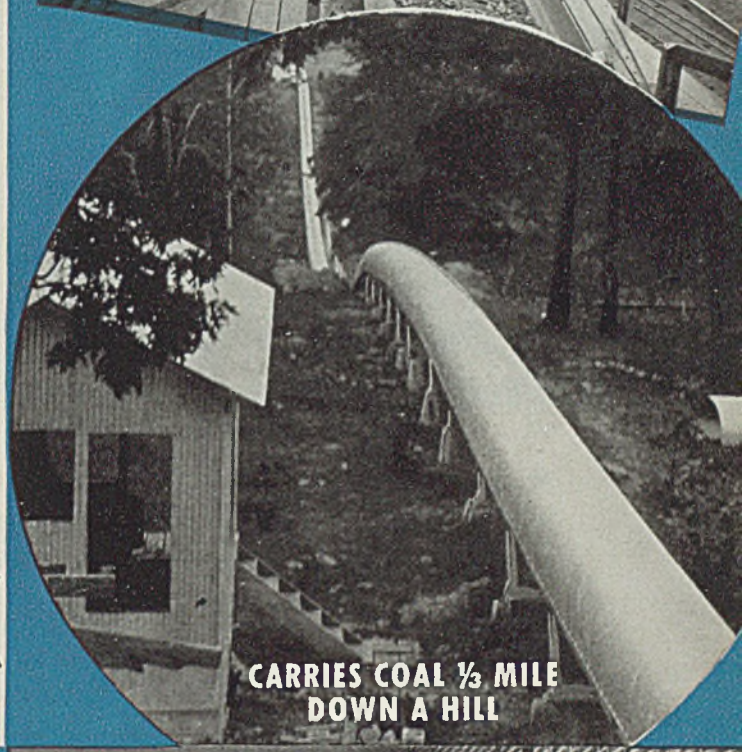
At Grand Coulee Dam 60" U. S. Matchless Conveyor Belts have carried nearly 12,000,000 cubic yards of excavation from dam site over the mountain to dump . . . nearly a mile away. On a Pennsylvania hilltop a U. S. Giant Conveyor Belt 3,600 feet long lowers run-of-the-mine coal from mouth of the mine to tipple. Many other U. S. Conveyor Belts underground in this mine take coal from mine face to surface. In a huge limestone plant, U. S. Matchless Conveyor Belts—especially tailored of 42-ounce duck for exceptional strength—lift 2,800 tons an hour a height of 147 feet, using 500 H.P. Fitted to do a bigger job for a western mining company is a "whopper" of a belt—a 60" x 10 ply U. S. Matchless Conveyor 1,355 feet long. On the wind-up this belt stands 11 feet high; weighs 15 tons. Now in service carrying 20,000 tons of copper ore a day.

These are typical of many installations where U. S. Conveyor Belts are effecting large savings in conveying costs—and carrying their loads efficiently over long periods of time. Use them on *your* job. We will gladly send you, on request, the U. S. Conveyor Belt Album, filled with pictures of U. S. belts at work; being tested and made.

United States Rubber Company

United States Rubber Products, Inc., New York, N. Y





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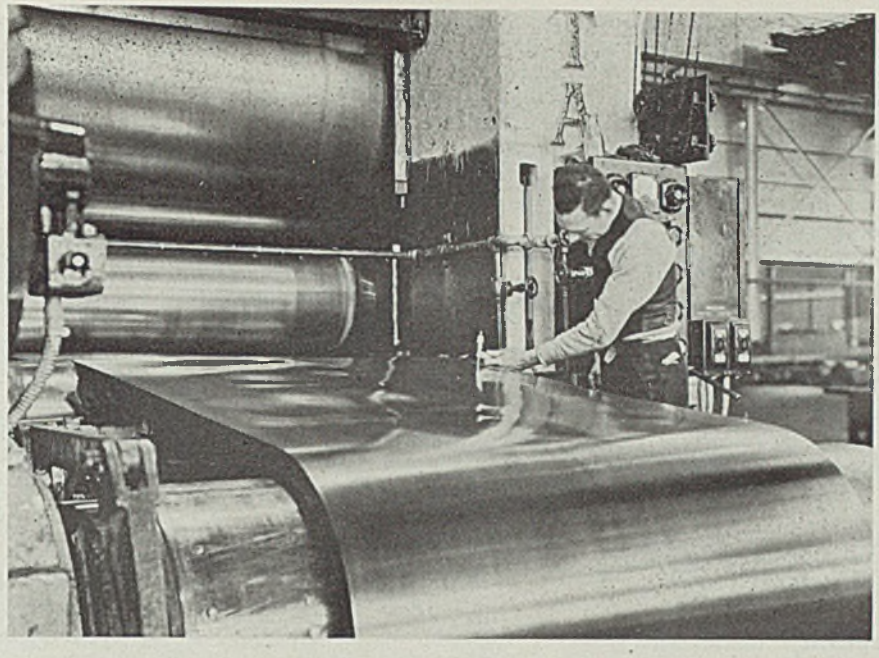


As strip is rewound into coils under tension following reduction in tandem cold mills it emerges with a glossy shining surface

Developments in Modern Broad Strip Mills Presented at Engineering Conference

CONTINUED interest in the manufacture of flat rolled products on broad stripsheet mills was manifested at the spring engineering conference of the Association of Iron annd Steel Engineers at Hotel Statler, Buffalo, April 28-29.

At the Wednesday evening session annealing of sheets and strip in radiant-fired boxes was explained and new developments in cold rolling announced.

Thursday morning's session was devoted to the discussion of problems dealing with heating furnaces, diesel locomotives and arc welding.

Abstracts of various papers presented at the conference follow:

Radiant Tube Annealing Covers

By R. J. Cowan, Surface Combustion Corp. Toledo, O.

SUCCESSFUL operation of large continuous strip mills, such as the one recently completed by the Bethlehem Steel Co., Lackawanna, N. Y., has been attended by many problems, not the least of which was an economical method of annealing large tonnages of cold reduced sheets to meet the varied exacting specifications of discriminating customers.

A rather complicated relationship exists between the degree of cold work, the annealing temperature, the time at temperature, and the resulting grain size in the recrystallized structure. Up to a limit, more severe cold work will increase the ease of annealing. The annealed sheet must pass close surface inspection and perform properly when stamped, drawn, welded and finished in the customers' shops. This in turn largely depends on grain size, uniformity in microstructure irrespective of direction of rolling, and freedom from internal strains and from age hardening.

Radiant tube type annealing boxes provide accurate control of heating cycle

Brief consideration of all these factors will indicate that the modern annealing department must not only be equipped to handle large tonnages of steel, but must be able to adjust the operations so that individual requirements may be met with certainty. This means plenty of *capacity, accuracy* in the heating and cooling cycle, and *flexibility* in being able to adjust this time-temperature program for each pile of sheets, if necessary.

Finally annealing must be done

in such a way that the surface is completely and positively protected from scaling.

The up-to-date method of annealing attains the old objective much more economically and surely by reason of three major improvements (a) in handling methods, (b) in heating methods and (c) in atmosphere control. In the old practice the sheets were piled on a movable base, a rather massive cover lowered and sealed around the base, the base and its load slid into suitable furnace and heated by direct impingement of flame. A nonoxidizing gas was used to prevent scaling.

In the new practice the sheets are piled on a permanent base, a light steel "inner cover" placed over the pile, sealed at bottom and filled with a prepared gas, neutral toward steel or even deoxidizing in nature, and then a heating unit in the form of a portable furnace covers the entire assembly.

Advantages of Inner Cover

This arrangement facilitates the introduction of a constant supply of protective gas to the pile of sheets inside the inner cover, reduces the amount of extra material to be heated to a small proportion of the useful load, economizes greatly in cost and maintenance of protective covers, and gives a fixed source of heat placed in the most efficient position and under accurate control. There appears to be no limitation to the horizontal dimensions of the pile of sheets; vertically the pile cannot be much higher than 50 inches, else the load will cause sheets at the bottom of the pile to weld one to another.

Electrical Developments of Modern Cold Strip Mills

By A. F. Kenyon, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

THE single stand reversible cold reduction strip mill is a comparatively recent development, the first installations having been made at Gary in 1933, for the production of light gage strip for tin plate.

There have been installed several 42-inch reversible tin plate mills, geared for maximum rolling speeds ranging from 1000 to 1350 feet per minute, and with mill motor of 1250 to 1750 horsepower, and two reel motors of 300 to 600 horsepower. Rolling strip from 24 to 36 inches wide, and 0.065 to 0.080-inch thick, to usual tin plate gages, in from three to five passes, monthly outputs of 3000 to 3500 net tons have been attained, with gross energy input to the supply motor-generator set of about 100 to 115 kilowatt hours per net ton. Test data from several different mills indicate that after first pass, tensions of about 20,000 to 22,000 pounds per square inch are maintained on the delivery side, and usually somewhat higher tension is maintained on the entry side.

Back Tension Is Desirable

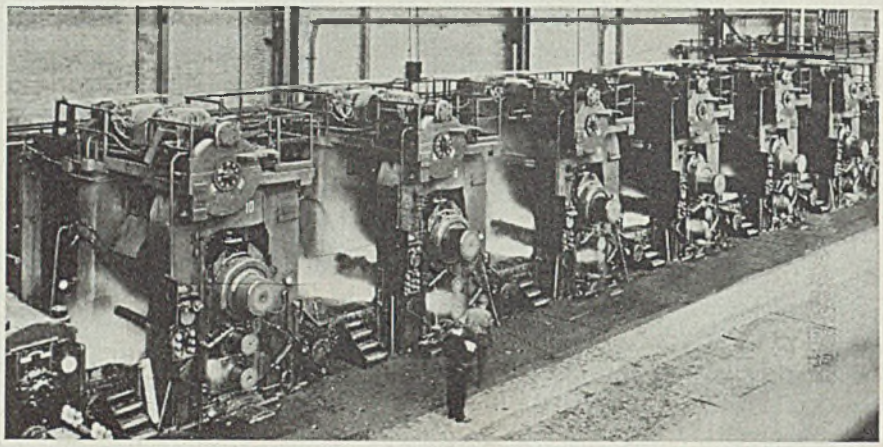
Fairly high entry side back tension is essential to properly guide the strip into the mill, permit making heavier reductions, and enable operating at higher speeds. Various methods of obtaining back tension during the first pass are in use in different plants. In some plants the strip is wound on a reel drum preparatory to the rolling, thus enabling the same operation as during the later passes. One plant has installed a separate cone type feed reel with regenerative braking drag generator. Another plant has equipped each of two 42-inch mills with a roller leveler through which the strip is pulled during the first pass.

Within the last year and a half there have been installed several four and five-stand 42-inch tandem mills, for the production of light-gage strip for tinning. The mills now in operation are geared for rated maximum rolling speed of about 1200 to 1350 feet per minute, two mills now under construction are geared for 1500 feet per minute, and speeds up to 2000 feet per minute are contemplated for new mills.

Increased rolling speeds can be utilized to the best advantage only when rolling long coils. The new Republic mills are being laid out with 30-inch diameter reels capable of handling coils up to 60 inches outside diameter, corresponding to about 600 pounds per inch of width and thus in the maximum widths making coils over 50,000 pounds.

The installation of cold reduction strip mills was not at first paralleled by the installation of "skin pass" or "temper pass" strip mills, as the cold reduced strip was cut into short sheets which were skin passed in existing cold sheet and tin mills. However, there are many advantages in handling and processing coils rather than cut sheets, and at the present time practically all of the narrow strip for tin plate, and much of the wider sheet gage material, is temper rolled in coil form, requiring special single stand, or in some cases, two stand mills, with unwinding and winding reels, and other tensioning machines.

Tin plate strip temper rolling is usually a much more critical process than the cold reduction, and proper equipment and careful operation are necessary to secure satisfactory results. The best mill performance is obtained with relatively high entering and leaving tension, while the unwinding and winding reels perform better with only moderate strip tension.



Light-gage strip leaving the last finishing stand of this 79-inch hot mill travels up to 1350 feet a minute

Mechanical Developments of Modern Cold Strip Mills

By John L. Young, United Engineering & Foundry Co., Pittsburgh Pa.

SINCE that beginning, the successive mills, both hot and cold have been made wider and wider, bigger and bigger, faster and faster and more mechanically and electrically controlled until we now see the building of the largest mill of them all at the Corrigan-McKinney division of Republic Steel Corp., Cleveland.

This mill will be 98 inches wide to roll a normal maximum product width of 92 inches. The hot mill will have a top delivery speed of 2120 feet per minute or about 25

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miles per hour from the last finishing stand.

The cold mills will be of similar size with interchangeable housings, backup rolls, bearings, screwdowns and the like as nearly as possible.

The tandem cold mill will operate at a speed up to 800 feet per minute and will be equipped with a mechanical uncoiling and feeding device and with a high-tension reel capable of handling coils up to 700 pounds per inch of width. This mill also will be equipped with pressure meters for indicating the rolling loads and with a flying micrometer on the delivery side of the last stand to indicate the finished gage, with visual indicators on each of the three stands so that the operators may watch the indicator at any position in the mill.

As the hot mill will deliver coils up to approximately 350 pounds per inch of width into the hot coilers, in order to utilize the full capacity of the cold mill, it will be necessary eventually to go to the welding of the strip in larger coil form.

The welding of strip into longer coils is here. Just what form will be the final answer is not to be stated at this moment. Will it be butt, carbon arc, or the gas method of welding? We must wait for a little further development to be sure.

All three types now are being used with various degrees of success. Whether the welder should be in the pickle line or elsewhere is yet to be settled, and if the time element can be licked, it seems as if the pickle line is the logical place based upon the present arrangement of continuous pickling, although the new rotary pickler may change this program.

Various Welders Now Used

Several types of strip welders now are in service, including the gas and carbon arc welders in the Detroit district, the gas and butt welding units in the Chicago district, the butt welding method at two plants of another large steel producer and the installation at the present time of the gas method in the St. Louis district.

In connection with the carbon arc unit in the Detroit district, a basic development is the possibility of clamping the strip for the shearing operation, and without removing the clamps, perform the welding operation following the matching of the ends by the shearing operation.

The use of the latch type chock clamping method, both in the windows for the backup chocks and for the work roll chocks in the backup chocks has again tended toward the cutting down of roll changing time and has simplified the operation.

Feeders and uncoilers for cold mills now seem to be a major development from a standpoint of the wider, heavier and longer coils now used or contemplated, either based upon existing mill requirements, or upon the potential use of the welded coils.

The rotary pickler now in service at the Granite City Steel Co., Granite City, Ill., has proven an entire success, and in fact the arrangement has been even simplified over the original design. The tendency to reduced original installation cost and in that way also reduce pickling cost per ton seems of vital importance.

Another interesting development, especially for hot mills that also may be applied to cold mills is the slide rule for the settling of the mill rolls and adjusting the corresponding motor speeds, has been developed by H. C. Goodrich, Carnegie-Illinois Steel Corp., McDonald, O.

Diesel Electric Locomotives In Steel Mill Service

By F. H. Craton, General Electric Co., Erie, Pa.

SWITCHING work, whether it be railroad or industrial, inherently seldom can utilize much horsepower. The maximum speed attained in freight switching infrequently exceeds 8 miles per hour for ordinary loaded moves and 10 miles per hour in kicking moves. Moreover, the average number of cars handled per load move is small and the average distance per move, short.

In considering the comparative performance of a 110-ton, 750-horsepower diesel electric and a modern 90-ton, 1500-horsepower six-wheel steam switcher in these various moves.

For the light moves, either locomotive can get from place to place as fast as yard limitations will permit. Likewise for a spotting move and a pushing or bunching move, where the requirement is tractive effort and not speed, the diesel-electric will perform the operation as fast as the steam. Also, for an average loaded move or a kicking move involving only a few cars, the diesel-electric and the steam both possess horsepower in excess of what is necessary to make the move as required.

This leaves only heavy loaded and kicking moves in question. Due to its swivel truck construction the 110-ton diesel-electric will negotiate sharper curves than and meet the same weight limitations as the steamer with its 90-ton rigid wheel base and therefore, can replace it. The steamer, although nominally rating 1500 cylinder horsepower does not develop this until it reaches about 20 miles per hour, whereas the diesel-electric develops its full horsepower from about 2 miles per hour on up through the entire switching range of speed. From standstill up to 10 miles per hour the average driver horsepower of the steamer does not exceed that of the diesel-electric.

The result is that up to 5 miles per hour the faster acceleration of the diesel-electric due to its greater driver weight and higher adhesion due to the smooth electric drive, balances off what advantage the steam may have from 5 to 10 miles per hour. Due to the maximum speed being limited to 8 or 10 miles per hour, the steamer never can get up to speeds where its greater horsepower would allow it to attain greater speed than the diesel.

Principal reasons for the economy of the diesel-electric as compared to steam are:

1—One man operation, saving about 45 per cent of crew expense on the majority of industrial applications.

2—High overall efficiency saving from 70 to 50 per cent of cost of fuel.

3—Lower maintenance saving approximately 50 per cent of repair cost.

4—Negligible amount of water required, saving practically 100 per cent of water costs.

5—Because of absence of boiler and firebox, relatively little enginehouse expense, saving 50 per cent or more on this item depending on extent of diesel application.

Stress Distribution in Arc Welded Joints

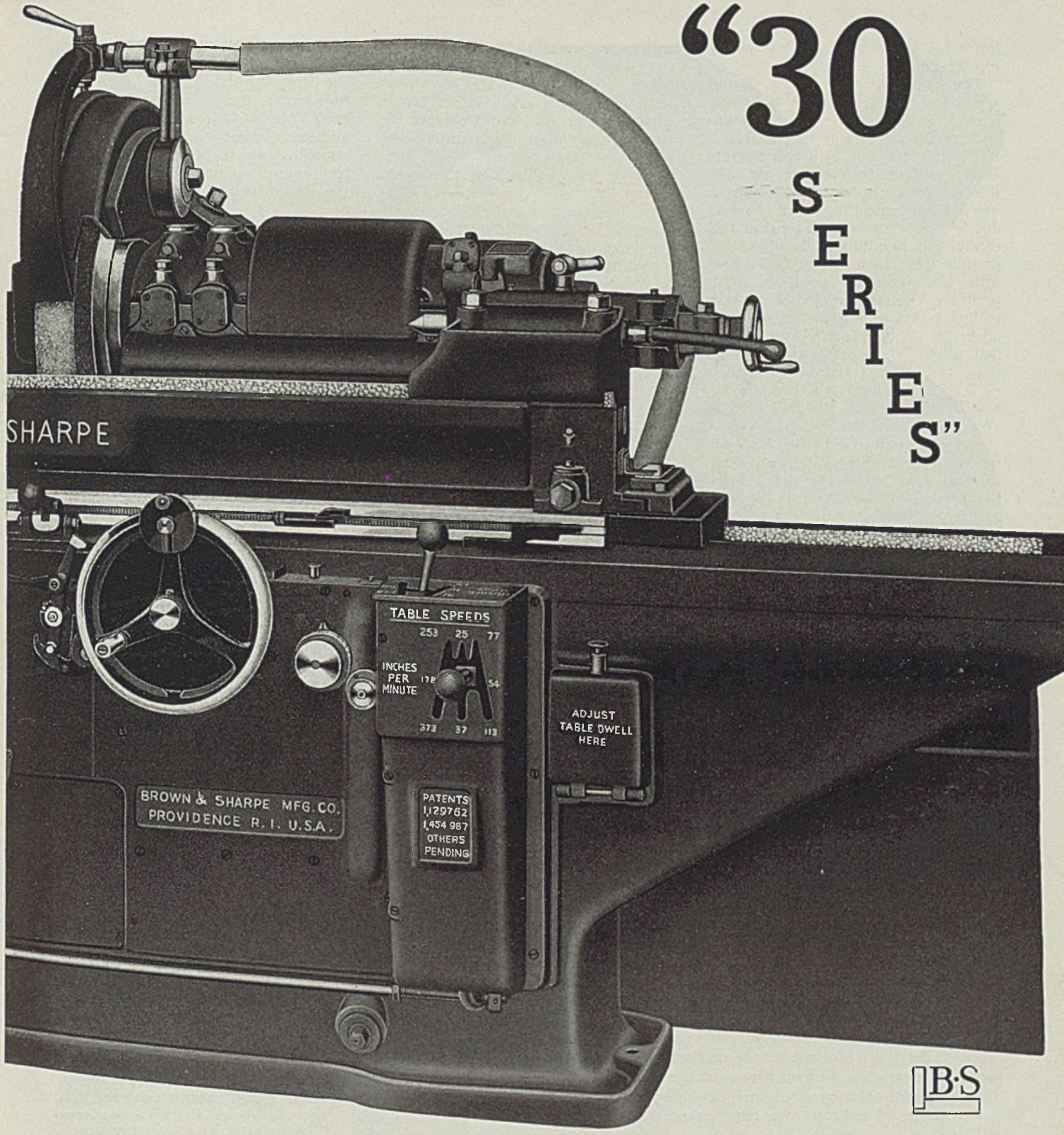
By E. W. P. Smith, Lincoln Electric Co., Cleveland

SERVICE failures of cast or rolled steel machinery parts invariably occur by tearing. The characteristic "necking in" observed in tension failure on a testing machine never is encountered in service failures.

This simple fact focuses attention on the stress distribution in a machinery part subjected to service loading of a dynamic characteristic. If the stress were uniformly distributed, the normal "necking in" would be observed. Since the stress distribution never is uniform, we are confronted with the necessity of finding out equalitatively, at least, the nature of the stress distribution in each particular piece.

Use of rubber offers an inexpensive method of making stress distribution analysis. Rubber, at relatively small deformations behaves

(*Please turn to Page* 95)



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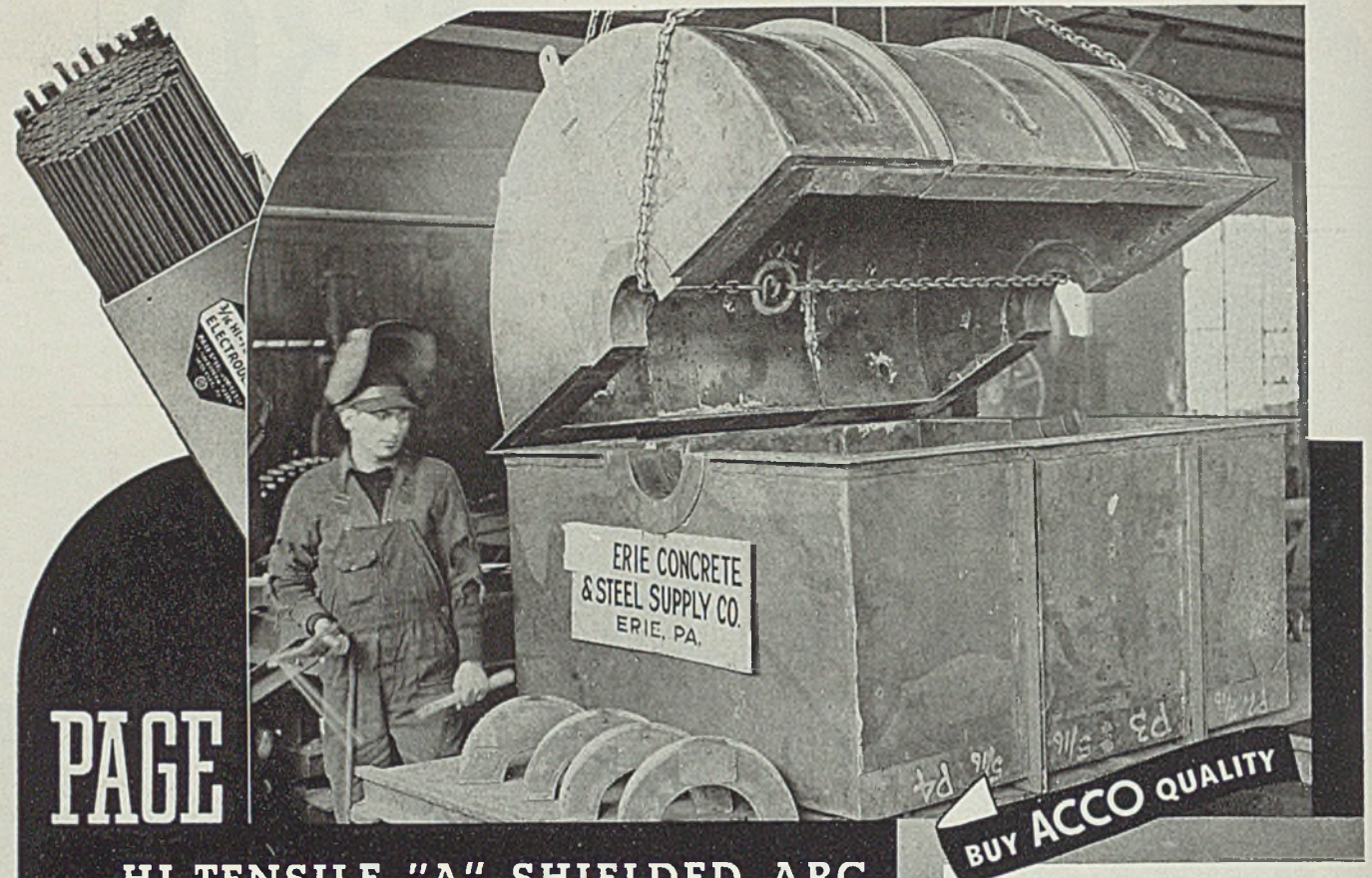

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Domestic Tungsten Ore Supply Becomes Increasingly Important

BY GEORGE H. SNYDER

LESS than 40 years ago, tungsten was a mere scientific curiosity, comparatively rare—and of little practical value. Today this metal is responsible directly for innumerable improved manufacturing practices and for important products. Its application has made possible the building of efficient high speed machines for heavy production jobs and has placed in countless homes dozens of household conveniences whose price otherwise would be prohibitive.

During the world war, tungsten became so important that prices obtained for it skyrocketed to about 13 times the normal level. Yet even today, as far as quantity is concerned, an entire year's production could be loaded into a single freight train.

Two General Uses

Two important metallurgical discoveries gave to tungsten prominence and value. Makers of tool steel found that the use of tungsten as an alloy enabled cutting tools to keep sharp edges far longer at high cutting temperatures than any previously known material. High speed tools were born. Then the rapidly growing electric power industry discovered that hair-thin wires of tungsten in an electric light bulb gave more light with less power consumption than the old carbon filaments. The modern incandescent bulb was born.

Industry suddenly became interested in this strange, brittle, and exceptionally hard metal, tungsten. A dribble of production was obtained in various parts of the world. It was not until 1904 that commercially workable deposits in this country were found in Boulder county, Colorado. Firth-Sterling Steel Co., McKeesport, Pa., pioneered the mining of this ore in the United States. When development work was started, even the name of the metal was not subject to general agreement. Some called it tungsten. Some called it wolframite. The name of the subsidiary organized to undertake tungsten mining represented a compromise between the two words. It was called the Wolf Tongue Mining Co. and this interest started operations in the Boulder county deposits near Nederland, Colo.

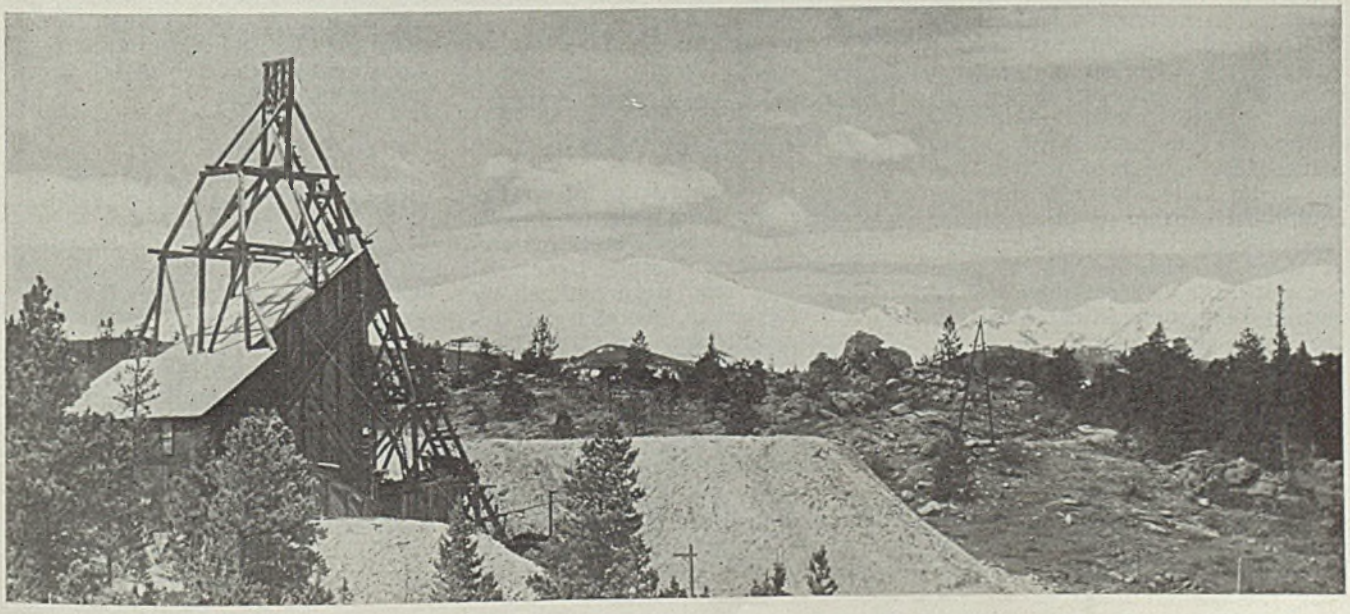
The industry started production and concentration of ferberite, a mineral which contains an average of about 7 per cent tungsten trioxide. After concentration, the ore was shipped to Pittsburgh for smelting. The new company found that the price of tungsten was highly erratic. Concentrated tungsten ore after wide fluctuations reached its highest pre-war price of $11 to $12 a unit in 1907. Shortly after hostilities began the price jumped to $90 to $100 a unit. A unit is 1 per cent WO_3 per ton of 2000 pounds, that is, 20 pounds of tungsten trioxide.

The war resulted in a rush to find more tungsten and to develop its production. Some deposits had been found in California, Colorado, Idaho, Montana, Nevada, and Washington. Then came the discovery of great deposits in China. The industry, then scattered over many parts of the world, began to concentrate on the task of supplying the greatly increased demands. After the war the need for tungsten dropped sharply. Industries using it had piled up large reserve stocks to assure themselves of a supply. The price dropped and the tungsten industry found itself with practically nothing to do for a year.

Production Fluctuates Markedly

Since that time both domestic and foreign production of tungsten has been going on with wide price fluctuations and marked ups and downs in output. At present, the manufacture of high speed tool steels necessary for modern machining is providing a growing market. In 1935, this country produced only 2935 short tons of tungsten concentrates. While the United States is the only steel producing country that has its own supply of tungsten, it does not provide its entire requirements, although it probably could if the price should go higher as a result of abnormal conditions, such as an interruption of our foreign commerce by war.

China is the biggest competitor for the American tungsten market. In that country, tungsten is found at the surface and is picked up by cheap labor. In this country, most of the tungsten ore must be mined below the surface. The Wolf



One of several tungsten ore mines operated by Wolf Tongue Mining Co. in Colorado. This mine is worked at a 500-foot level through a perpendicular shaft

Tongue Mining Co., a typical American producer, obtains its ore at depths down to 500 feet, so that production costs are necessarily high. In maintaining its competitive position, the domestic industry has several factors in its favor and several which offer distinct disadvantages. China, where production is controlled by a military government, has cheap labor but must climb over a tariff wall of 50 cents per pound of metallic content of ore or concentrates. On the other hand, Chinese concentrates are of a lower grade than those shipped from American mines. Producers here must pay high rates for rail shipment, while the Chinese metal comes in on extremely low water rates. It costs $14.50 to ship a ton of concentrates by rail from the Wolf Tongue mines to Pittsburgh, while the Chinese at times get water rates as low as $4 a ton to the Atlantic coast.

Producers Need Tariff

American producers say that a continuance of adequate tariff protection is vitally necessary in order that the industry may continue development work of its deposits in order to assure a sufficient ore supply for the future. The ore in Colorado occurs in pockets and a large amount of development work is needed in order to locate and lay out reserves to assure adequate workings. Lack of certainty on the tariff has resulted in much hesitancy on the part of most producers in spending money for development work. Producers also point out that any spurt in demand, such as might occur in the event of a war or any interruption in foreign commerce, would make this country dependent solely on its domestic resources and that such production could not be developed rapidly enough to meet our defense needs.

An important recent domestic development has been the use of tungsten in sintered carbide tools which are molded and fused at high temperatures. The result has been somewhat revolutionary in the machine tool field, making many machines obsolete and opening new markets for machinery makers who are being called upon to produce equipment capable of using higher speed tools and of taking advantage of their increased ability to turn out work. Aside from their use as cutting tools, sintered carbides now are being employed by many industries for wearing surfaces and, in some instances, they have been found to have as much as 100 times the life of ordinary steel. Chemistry also is turning to tungsten for unique qualities valuable in dyes and mordants, which have wide commercial applications in many branches of industry.

Preventing Seizing Of Bolt Threads

BY BERNARD H. PORTER

Technical Department, Acheson Colloids Corp., Port Huron, Mich.

RECENT investigations indicate vibration, temperature and a possible electrical effect are as largely responsible for the binding of bolt threads as is their customary rusting. In fact, simultaneous conditions of high temperature and rapid vibration cause appreciable pick-up of opposite metal threads in such places as studs of turbine cylinders and pipe flanges, threads of lead-cable presses and stop valves in steam engines. In some instances the binding of threads has required an oxyacetylene flame to remove certain bolts.

Colloidal graphite in aqueous dispersion, painted with a brush upon the previously cleansed metal portions, is reported to overcome these difficulties. Two such applications, followed by convenient drying methods, are advisable. Frequently, however, best results are obtained by hot-dipping the bolts or studs in dilute graphite solutions. Where flanges employ gaskets, the later elimination of sticking is accomplished by impregnating the gasket with a dispersion of colloidal graphite in water, or by coating the gasket surface. Penetrating oils containing colloidal graphite often are effective for loosening bolts and threads.

The particular advantages of colloidal graphite dispersions for this type of application include its efficient dry lubricating properties, resistance to heat and oxidation, chemical inertness, ease of application, lasting qualities, fineness and corrosion retarding characteristics.

Reviews Useful Properties Of Nonferrous Metals

Special characteristics of nonferrous metals, which make them more suitable than iron or steel for certain applications despite their relatively high cost, were outlined by D. E. Ackerman, metallurgist, International Nickel Co. Inc., New York, in addressing members of the New York chapter of the American Society for Metals, March 29, in one of a series of educational lectures on nonferrous metallurgy.

Mr. Ackerman pointed out that iron and steel are the standard materials for most large construction and for many applications in which special qualities are not required. The nonferrous metals zinc, copper and its alloys, nickel and aluminum, he explained, have characteristics not possessed by iron and steel. At the same time, they can be produced with strength and other physical properties approximately equal to those of the ferrous materials.

Among the special useful properties for which nonferrous metals are used, he listed corrosion resistance as perhaps the most important, then magnetic properties, appearance, freedom from contamination of food and other products, and special electrical characteristics. Hence, the speaker asserted, they are used where corrosive conditions would weaken iron or steel rapidly, for ornamental purposes, coinage, magnets, electrical wiring and contacts, thermostatic elements, and for numerous other special applications.

Lathe Manual Reveals Methods of Production

Lathe Operation and Machinists' Tables; paper, looseleaf, 234 pages, 5½ x 8½ inches, spiral binding; published by Atlas Press Co., Kalamazoo, Mich.; supplied by STEEL, Cleveland, for $1 plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminister, London.

This manual has been prepared to provide operating information for owners and operators of metal-cutting lathes. It includes fundamental and concrete theory and operating procedure, making the volume suitable for students, apprentices and vocational schools. More experienced machinists and lathe operators will find the data of much value.

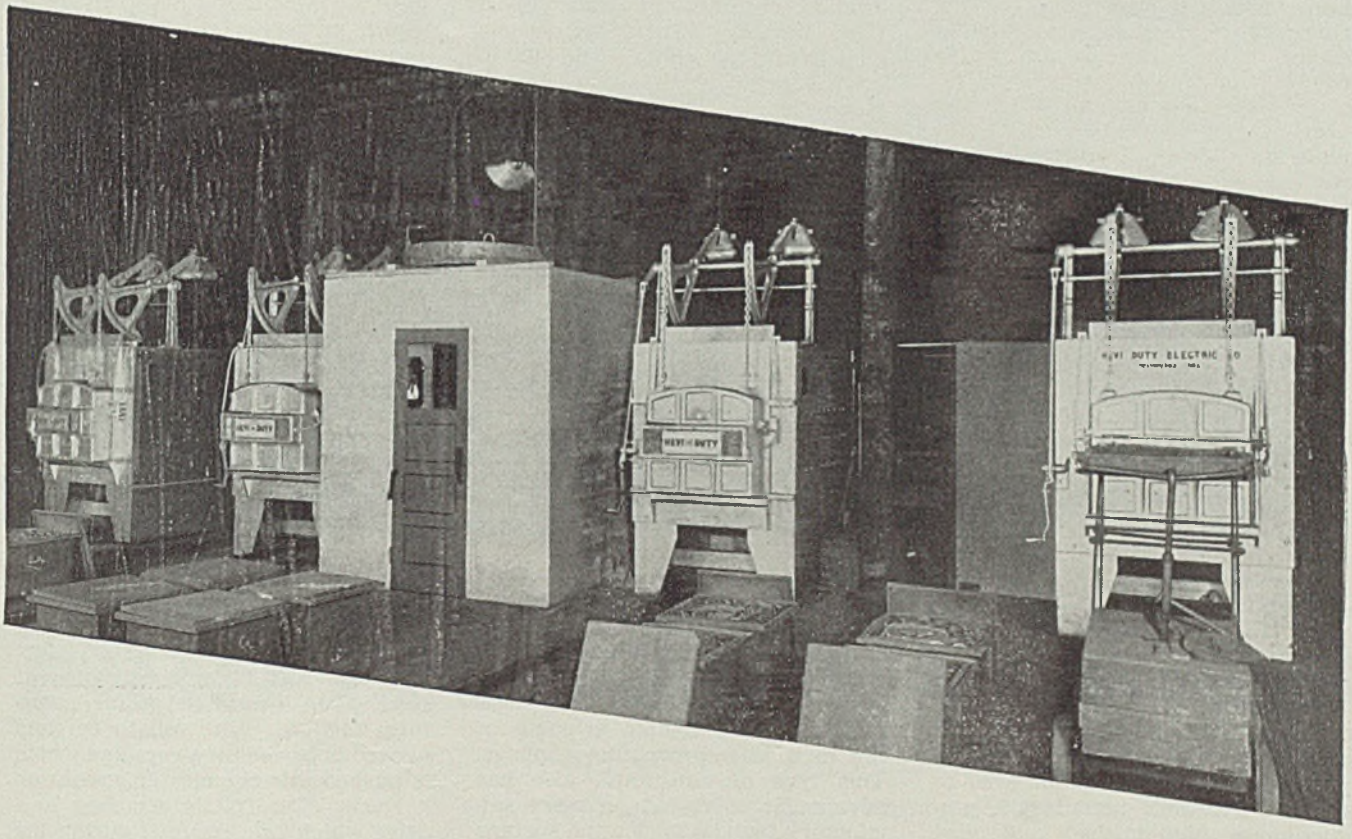
The subjects treated include care and construction of lathes, theory of metal cutting, cutting tools, machining of various materials, holding the work, drilling and boring, thread cutting, lathe attachments and uses, woodturning on the metal lathe, machinists' tables.

Signal Systems Save Time

A recent survey in an industrial city showed that of 130 companies operating private branch telephone exchanges 53 per cent had no modern method for calling individuals, according to Schwarze Electric Co., Adrian, Mich., manufacturer of office signalling devices. The company estimates that a minimum of 10 minutes per day is lost by top executives in attempting to locate key men. This amounts to 3000 minutes or 50 hours during 300 working days.

Two more electric

ANNEALING FURNACES for OLYMPIC FOUNDRY



Because of the quality malleable anneal obtained in their Hevi Duty Annealing Furnaces, Olympic Foundry, Seattle, recently increased their annealing equipment to a battery of four. They have found that these furnaces are exceptionally efficient for use in their quick anneal system of malleableizing.

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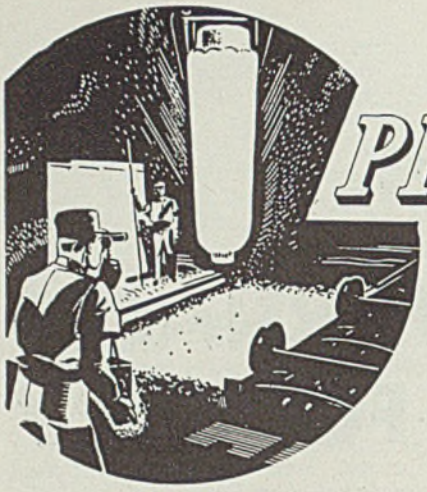
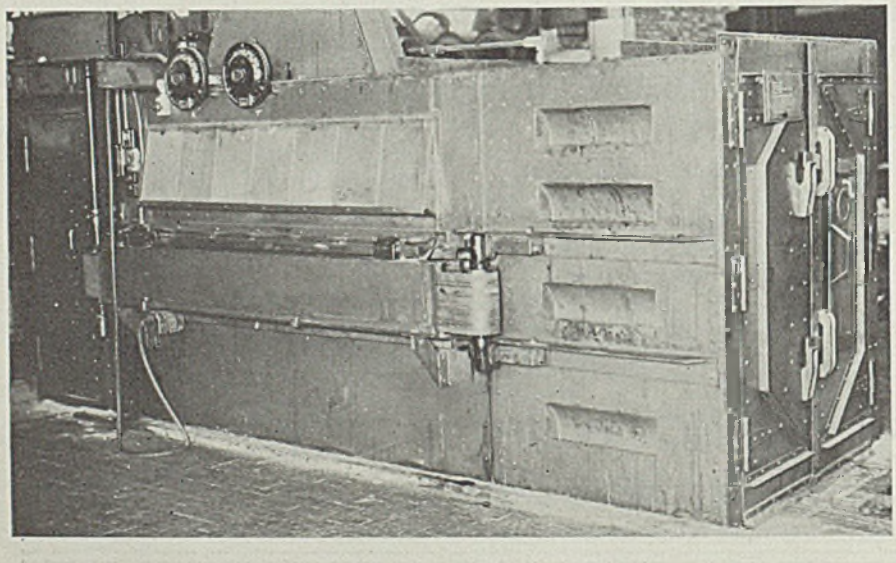


PROGRESS IN STEELMAKING

Shot Blasted Cold Rolls Impart Dull Finish to Sheets

IN THE early part of 1936 equipment was installed at the 48-inch strip steel department of the Weirton Steel Co., Weirton, W. Va., for shot blasting rolls used for cold reduction and skin passing. The purpose of this installation was to roughen the rolls used in the production of high-finished cold-rolled sheets in order to make a product that would better meet the demands of the trade. Roughening the roll surface produces a dull type finish on the sheet which is an advantage in the drawing operations, by making possible a tighter gripping of the dies, thus preventing slippage. This type of dull finish also has advantages in making a more satisfactory foundation for the surface finish.

Equipment for shot blasting the rolls consists of a blast cleaning room 5 feet 4 inches wide x 14 feet long x 6 feet high, constructed of steel plate reinforced with structural sections. The roll to be sand blasted is placed on a carriage which is pushed into the cleaning room on a track. The roll is attached to a drive which can rotate it during the blasting operation. This room is equipped with a vision window so that the operator can observe the roll during the blasting operation and also is equipped with fresh air louvres and access doors.

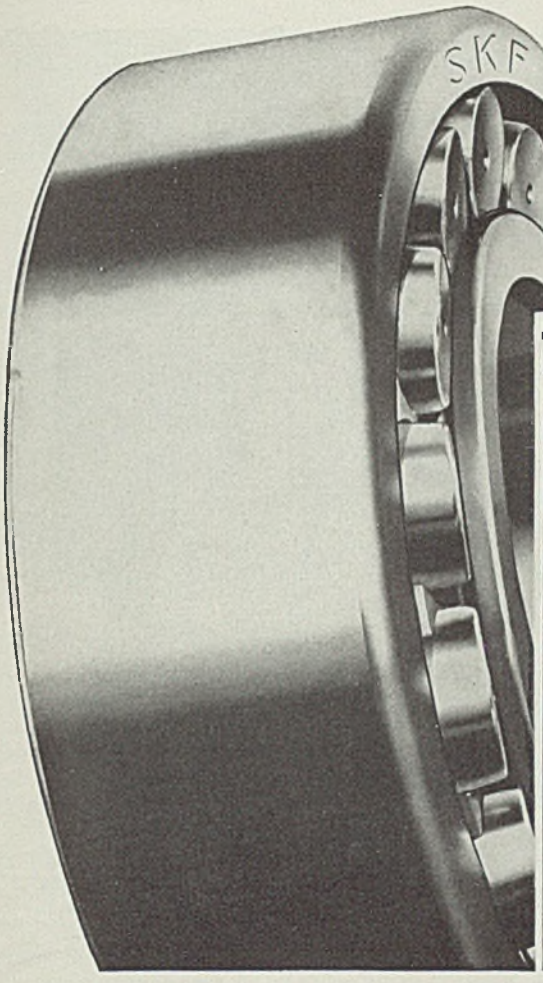


Exterior of shot blasting room with dust handling elevator at left

Nozzle Covers Entire Roll

Shot is delivered under air pressure to a single ⅜-inch diameter nozzle which can travel the length of the roll in a horizontal direction by means of a belt and pulley traverse arrangement. The nozzle is connected by means of a flexible hose to the shot blast supply and the speed of the traveling nozzle as well as the rotating speed of the roll is set to give the proper finish. These speeds must be adjusted to take care of the varying diameters of rolls. The nozzle traverse is arranged so that when the nozzle reaches the end of the roll body, it automatically reverses its stroke and travels in the opposite direction.

Steel shot used for sand blasting



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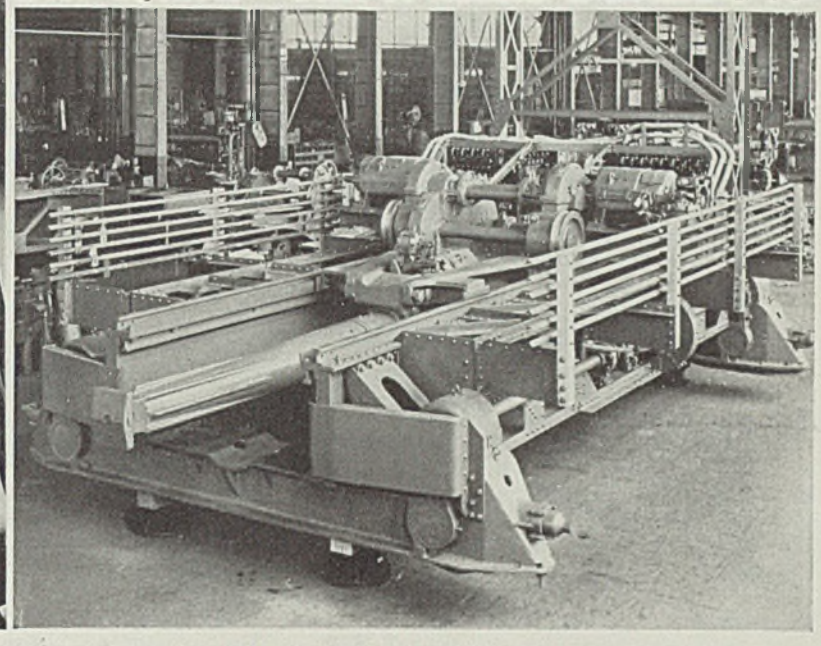

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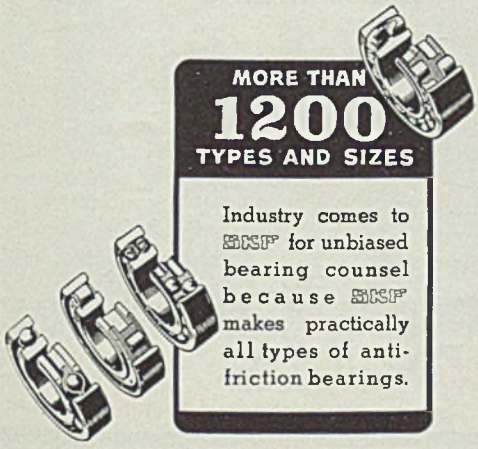

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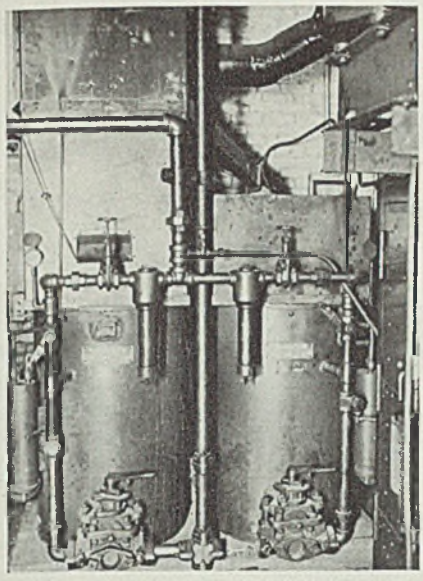


Shot separating equipment with reservoir tanks for Nos. 50 and 90 shot

drops down through a grating floor to a spiral conveyor which carries it to a belt bucket elevator. This hoists it to an overhead chute which delivers to a separator. This separator consists of a series of screens arranged so that the shot cascades downward; the heavier shot passing directly below into a reservoir tank and the lighter shot by-passing to a second reservoir tank. When blasting the rolls the heavier shot is used to produce a coarse finish and the lighter shot for a fine finish.

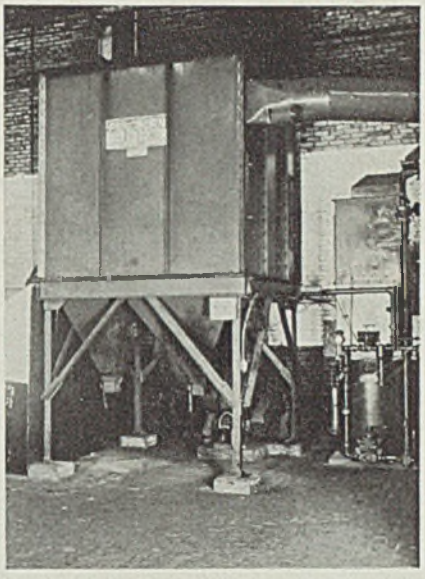
Shot is returned to the blast nozzle by compressed air used at pressures between 40 and 80 pounds per square inch. The compressed air is piped to each of the reservoir tanks. A feeder valve at the bottom of one of the reservoir tanks supplies sufficient air to pick up the shot and convey it in the air stream to the blast nozzle. Each reservoir tank has a rotating agitator in the center to keep the shot moving toward the feed valve at the bottom.

A ventilating and dust collecting system is installed for the blast room. An exhauster is attached to the blast room and draws air through the fixed louvres, carrying the light dust out of the blast room and delivering it to a cloth screen dust collector which separates the dust from the air stream so that the dust collects in the bottom of the hoppers and the clean air discharges into the building atmosphere. This ventilating system has performed satisfactorily.

Finish Can Be Varied

Type of finish produced on the rolls can be varied both with the amount of air pressure and the size of shot. For a coarse finish approximately No. 50 shot is used while for a finer finish No. 90 shot is satisfactory. With a higher air pressure a greater degree of blasting is accomplished so that for a rough finish No. 50 shot with 80 pounds air pressure is used and for a fine finish No. 90 shot with air pressures down to 40 pounds and under are utilized. As an example of this, rolls with a scleroscope hardness of 100 to 105 require 75 pounds air pressure, while other rolls with a scleroscope hardness of 80 to 85 require only 40 to 45 pounds air pressure. In general it is necessary to use higher air pressures on the hard surface rolls and lower pressures on the soft rolls.

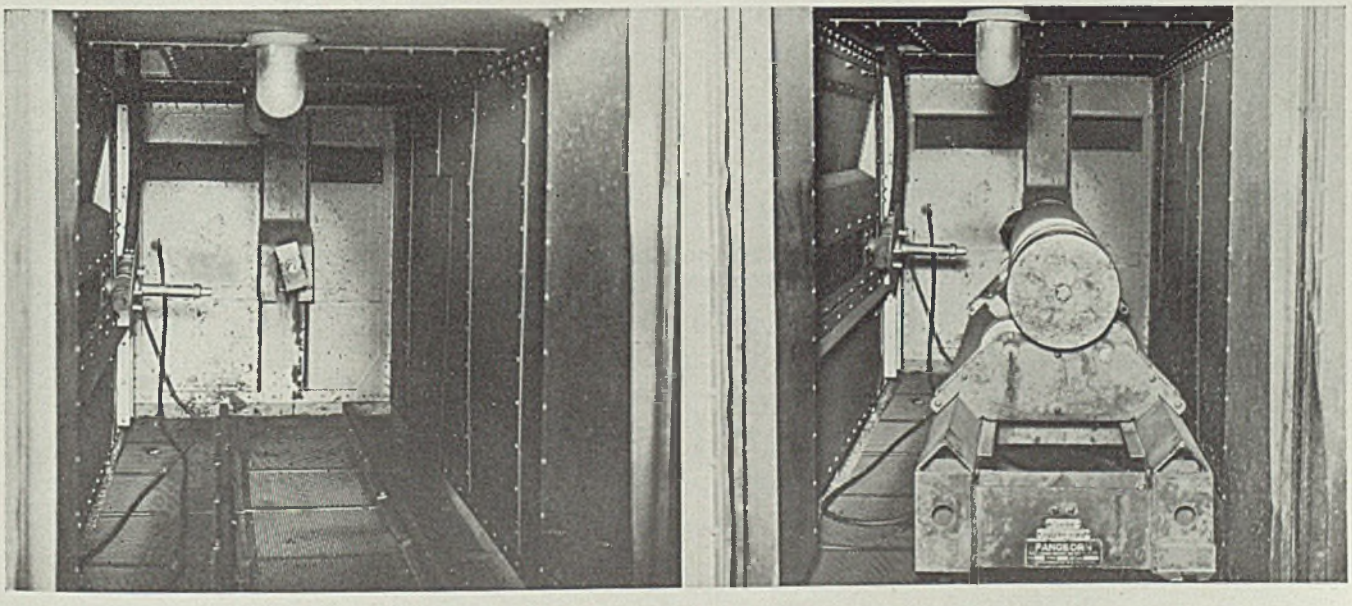
This equipment is capable of sand



Double cloth screen-type dust collector which serves the blasting room

blasting approximately six 18-inch diameter rolls with a 48-inch face in an eight-hour turn. Heavy shot is replaced and normally 300 to 400 pounds are required to complete the operation. The lighter shot does not have to be added as it is formed by the breaking up of the larger shot.

This shot blasting equipment in addition to making it possible to supply a product satisfactory to the trade, also has developed advantages in rolling mill practice. It prevents slippage of rolls during reduction, reduces roll breakage, and by removing firecracks on the roll face allows the rolls to be placed back in service instead of requiring them to be scrapped.

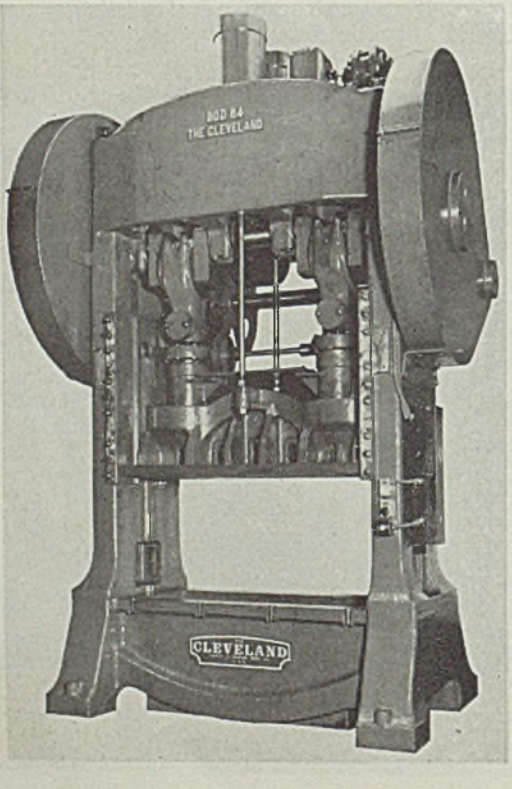


Interior of blasting compartment (left) showing steel plate construction and position of blasting nozzle. Blasting room (right) showing roll carriage with roll in position ready for surface treatment

NEW EQUIPMENT

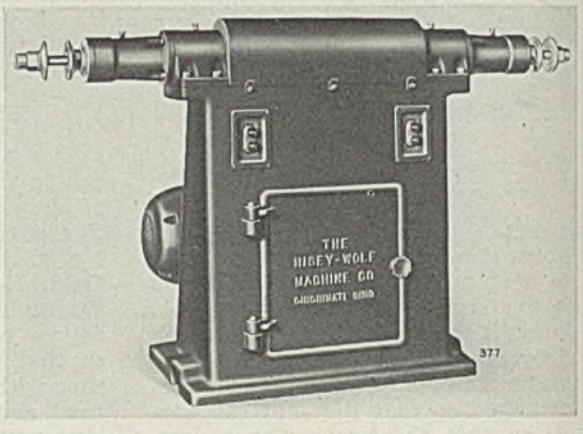
Power Press—

Cleveland Punch & Shear Works Co., Cleveland, has recently built a straight sided double crank press arranged with twin drive to the crankshaft through herringbone gears which run in oil. Air counterbalance is provided for the slide which is power adjusted by individual motor. The press is equipped with an electrically controlled hydraulic clutch with a four-station selector for momentary, long, continuous and inching operations. The hydraulic clutch is so designed that when released the oil is not exhausted or drawn out of the line but is merely backed up sufficiently to release the clutch. As a safety precaution, the brake is spring loaded so that in the event of failure in any part of the line, the clutch is immediately disengaged and the brake applied, bringing the press to an immediate stop. This style press can be furnished in a wide variety of sizes and equipped with a clutch designed for individual requirements.



Cleveland Punch & Shear Works straight sided double crank press

Hisey-Wolf has recently announced a new line of buffing and polishing machines with motors mounted externally



Buffing and Polishing Machine—

Hisey-Wolf Machine Co., Cincinnati, has recently announced a new line of buffing and polishing machines made in several sizes from 3 to 25 horsepower. Motors are mounted externally on these machines and drive through V-belts. Spindles are of one-piece construction and made in special steel, heat treated when necessary. Bearings in all machines are oversize ball bearings mounted with the inner race securely locked on the shaft without the use of sleeves or bushings and are provided with seals to exclude dust and grit. Bearing housings have full length keyway on the top of the column, and spindles and bearing housings are removable as an integral unit without disturbing the bearings.

Multi-Spindle Lathe—

Sundstrand Machine Tool Co., 2531 eleventh street, Rockford, Ill., has recently completed work on an 8-spindle vertical lathe designed for rough turning and crowning cast iron pistons. The machine has a heavy cylindrical base on which an octagonal column is mounted. An electric motor mounted horizontally on the base, provides power for rotating the column through a speed reducer and gear box. On each face of the octagonal column is securely bolted a sub-base having ways on which a Sundstrand hydraulic unit travels vertically in an automatic cycle of rapid approach, feed, and quick return which is governed by

CB TOWER BENTS

Reduce Fabrication and Maintenance Costs

THIS *single track, plate-girder viaduct was erected at Moravia, Iowa, by the Chicago, Milwaukee, St. Paul and Pacific Railroad Company. It was designed and constructed under the direction of their engineering department. Structural steel was fabricated by American Bridge Company.*

THIS clean-cut, sturdy railroad viaduct has tower bents constructed throughout of Carnegie-Illinois Steel Corporation CB Sections. This makes for greater economy in fabrication as every pound of steel in the towers is an integral part of the stress-carrying members.

Maintenance costs are lower, too, for the large plain surfaces are easily inspected and painted, while offering no inaccessible surfaces or pockets to collect dirt.

The fabrication and erection of steel structures for railroads—such as bridges, buildings, viaducts, subways, towers and turntables—have been important in the work of American Bridge Company for over half a century.

AMERICAN BRIDGE COMPANY

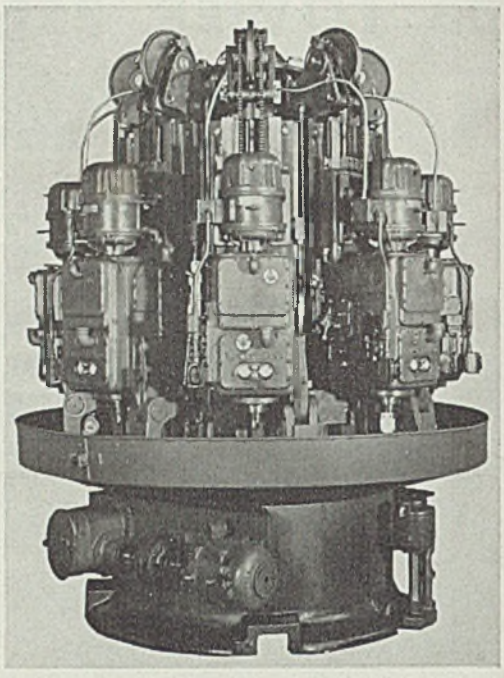
General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

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

UNITED STATES STEEL

easily adjusted dogs. On the spindle of each unit is a push button-controlled hydraulic operated expanding chuck for holding the work piece. Pivoted on the side of each hydraulic unit is a heavy bell crank having its inner end connected to a stationary adjustable rod. This arrangement causes the bell crank to swing about its pivot as the unit moves downward. At the right time in the cycle the tool which is carried on an arm of the bell crank, turns the curved head of the piston to the correct radius. Tungsten carbide cutting tools are used throughout and provision is made for a supply of coolant to carry away dust and chips as well as to keep the tool and work pieces cool. Units are self-contained and each is independent of the others, one or more being removable from the machine at any time without interfering with the operation of the remainder.

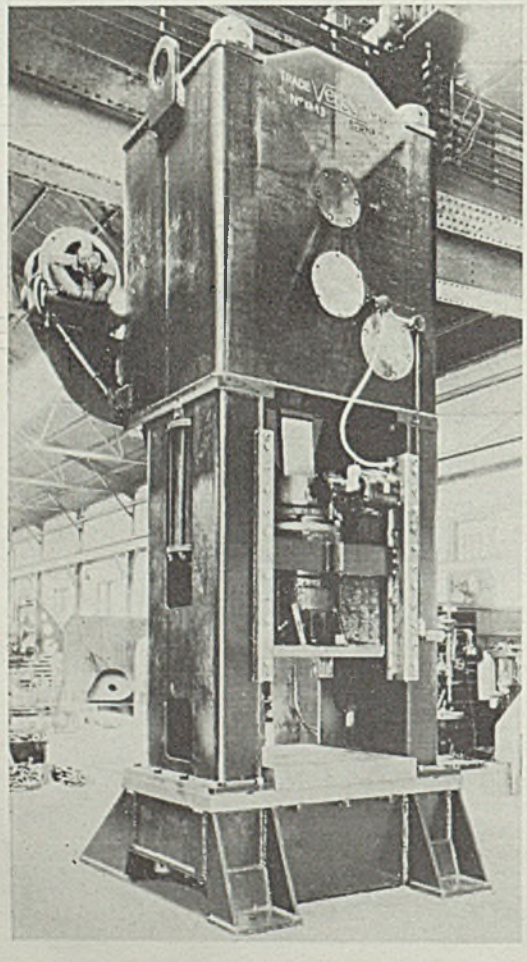


Sundstrand Machine Tool Co. has recently completed work on this 8-spindle vertical lathe designed for rough turning and crowning cast iron pistons

♦ ♦ ♦

Eccentric Type Press—

Allsteel Press Co., Chicago, has recently announced a new line of single crank, full eccentric, front to back presses. Design and construction is unusual in that it eliminates a crankshaft, the motion being obtained by means of an integral eccentric and gear which rotate on the main shaft. This construction is said to eliminate all torque in the main shaft with the result that the capacity of the press is increased. All high speed gears on the new press operate in an oil bath. Large bull gears are lubricated from sumps or from spray pump as the case may be. The new press is equipped with an air or hydraulic operated clutch and brake insuring instantaneous holding pressure. Pitman connection is of the barrel type design, keeping the large adjustment screw in a vertical position. The ram is adjustable by a hoist type motor, and is counterbalanced by air cylinders located in the columns. The main drive is through V-belts, or any other drive requested by the consumer.

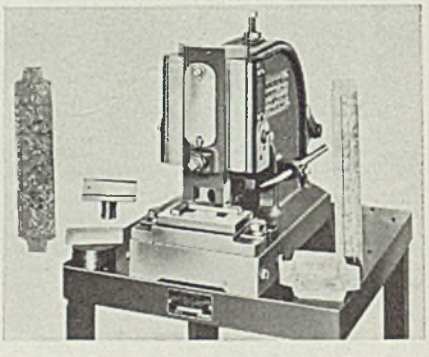


Single crank full eccentric front-to-back press recently announced by the Allsteel Press Co.

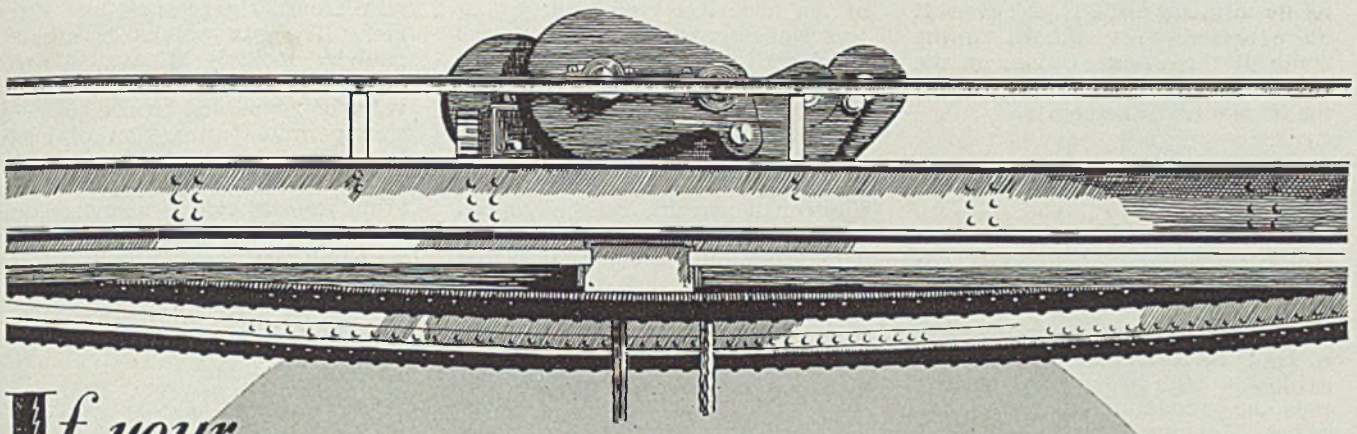
♦ ♦ ♦

Notcher—

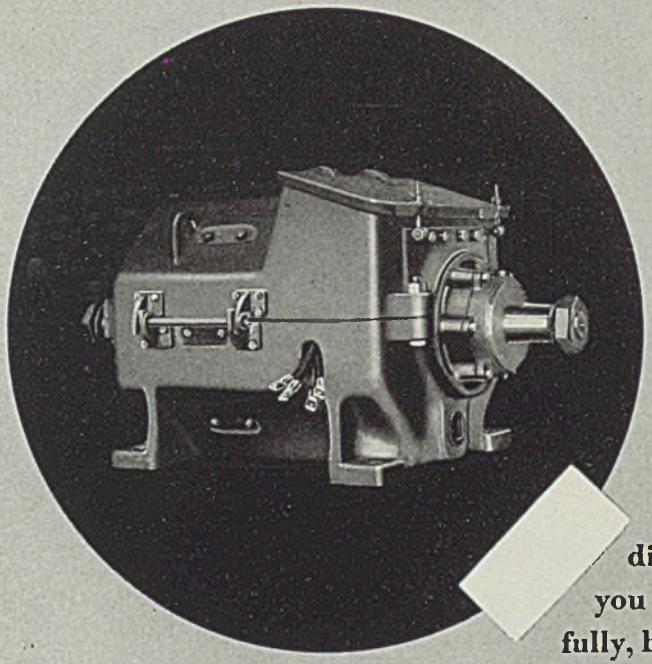
Whitney Metal Tool Co., Rockford, Ill., announces the development of a special notching punch and die to be used on their standard No. 28 Kick Press for reducing the cost of producing drive cleats which are used in fastening duct sections together. The punch cuts two special tapered notches at the end of the galvanized cleat stock in one operation, after which the sides are folded in to form the finishing cleat. The right-hand punch has extra width



Special notching punch designed for use on Whitney kick presses



If your PRODUCTION demands a Crane



That crane is important . . . if it fails, your shipping schedules are disrupted. For this reason you select your crane carefully, but do you pay equal attention to the choice of the driving motor? Crocker-Wheeler "SW" motors have been designed for heavy duty crane service . . . they will withstand high temperatures, heavy overloads and corrosive fumes. Motors that can be installed and then forgotten.

CROCKER-WHEELER ELEC. MFG. CO.

Main Office and Works: AMPERE, N. J.

SALES OFFICES IN PRINCIPAL CITIES

CROCKER-WHEELER

TRADE MARK REG. U.S. PAT. OFF.

EXCELLENT ENGINEERING

to assure a finished job even if there are slight variations in the width of the blanks. Guides on the shoe assure proper positioning of the blanks for punching.

♦ ♦ ♦

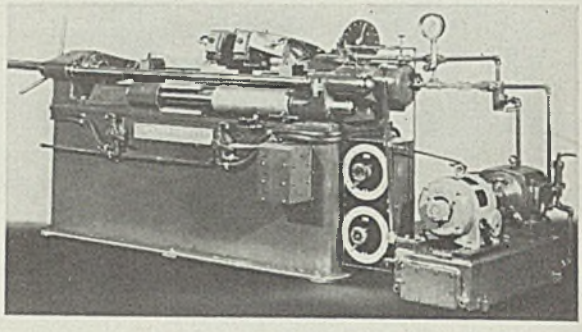
Flash Welder—

Thomson-Gibb Electric Welding Co., Lynn, Mass., has recently announced a new 300 kilovolt-ampere flash welder to be known as Model F29. Capacity of the new machine is high carbon steel drill shanks welded to high speed steel cutting ends at maximum diameter 3⅛ inches. Maximum area to be welded is 7.7 square inches. The stock may be of lengths up to 56 inches, extending 18 inches on the right and 38 inches on the left hand side. Production rate of this machine is 25 to 80 small size drills per hour or 10 to 25 larger size drills per hour. Standard push-up is by means of a hydraulic pressure cylinder powered by a 5 horsepower motor. The transformer is of 300 kilovolt-ampere type, standardly wound for either 220, 440 or 550 volts, 60 cycle current; however, other styles of transformers can be furnished, if desired. The transformer, platens, upper jaws and dies are water cooled.

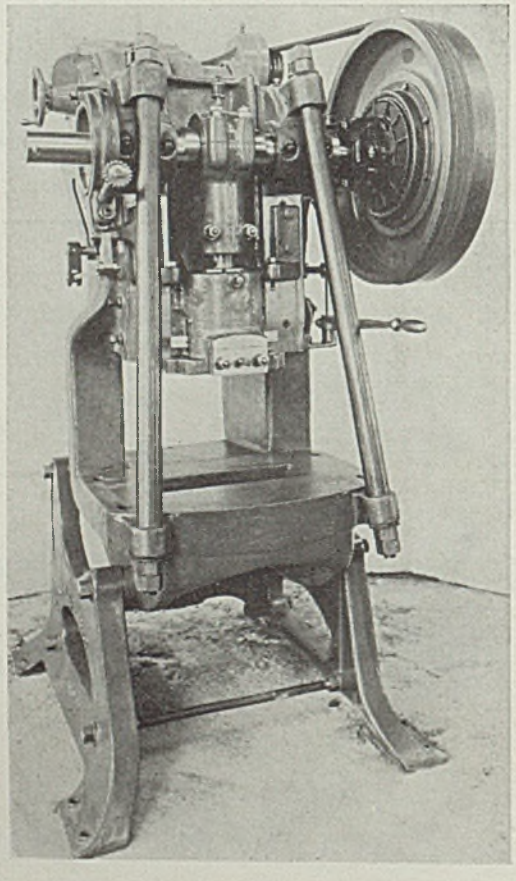
♦ ♦ ♦

Inclinable Press—

V & O Press Co., Hudson, N. Y., announces a new high speed press of the inclinable type having a capacity of approximately 55 tons and capable of operating at a speed of 300 strokes per minute. The machine is fitted with a hand operated multiple disk friction clutch and a fully releasable brake that works in conjunction with the clutch. With this clutch machine can be stopped at any point of the stroke. The machine has a built-in bed and spacing tubes fitted between the tie rod lugs for maximum rigidity, and is equipped with a variable speed transmission. If desired, a feed mechanism may be built into the press.



Thomson-Gibb 300 kilovolt - ampere model F-29 flash welder

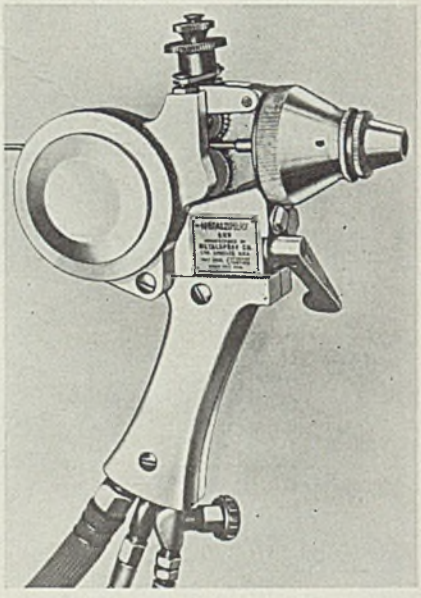


V & O inclinable press of 55 tons capacity which operates at a speed of 300 strokes per minute

♦ ♦ ♦

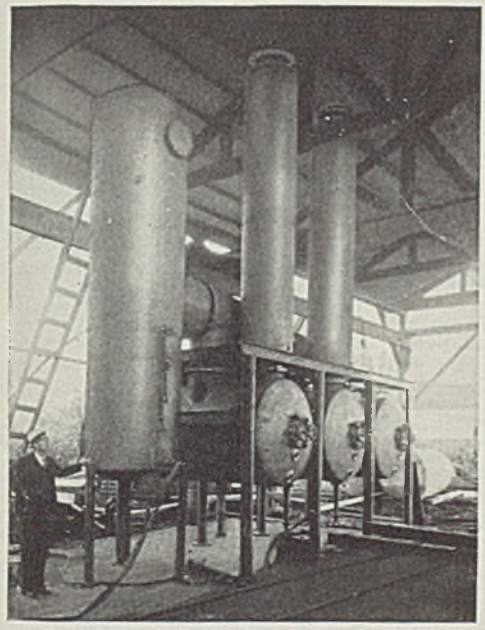
Metal Spray Gun—

Metalspray Co., Inc., 113 Llewellyn street, Los Angeles, Calif., has recently announced a universal metal spray gun designed for spraying all metals in any size of wire from 20 gage to ⅛-inch diameter. The gun weighs less than 4 pounds, making it available for lathe or hand operation. A single valve of monel and bronze construction permits turning on of acetylene, oxygen and air simultaneously. Independent valves permit separate adjustment of acetylene and oxygen, while an air ventilated nozzle eliminates backfire, it is claimed. All ball bearings, gears and worms are lubricated from one point, and new type worm and gear change for varying wire speeds are made without removal of bearings or shafts. Amount of metal deposited per hour is in direct ratio to the wire size used. Maximum gas pressures are acetylene 15 pounds, oxygen 17 pounds and air 60 pounds. The process is used for building up machine elements such as shafts, sleeves, pistons and reciprocating parts, using metals similar to the base, hard abrasive resisting metals, or corrosive resisting metals. Deposits may be made ranging from 1/1000-inch to 1 inch in thickness. Any metal may be bonded



Universal model metal spray gun designed for spraying any metal in sizes up to ⅛-inch diameter

Knocks the "T" OUT OF CAN'T



...ON MANY A JOB WHERE STAINLESS SHOULD BE USED

Where hitherto many plant executives frequently said, "We would like to use Stainless Steel, but we CAN'T afford to do it", today they are saying, "Quote us on IngAclad. That will give us real Stainless Steel service on the side that is used."

Trade Mark Reg. **INGACLAD**

STAINLESS-CLAD STEEL

has knocked the "T" out of "CAN'T" for the buyer of equipment and for the fabricator who would otherwise lose the job or be compelled to quote on corroding material.

If you are not fully acquainted with the wide adaptability of IngAclad, and the economies in its use, write for special IngAclad folder. Fabricators are invited to ask also for the "Manual of Welding Procedures."

A Partial List of IngAclad Users includes:

Armour & Co.
C. O. Bartlett & Snow Co.
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Hobart Mfg. Co.
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Kraft-Phenix Cheese Co.
S. S. Kresge Co.
Lever Bros.
Libby, McNeill & Libby
Link-Belt Co.
Otis Elevator Co.
Postum Cereal Co.
Procter & Gamble Co.
Standard Brands Inc.
Stevens Metal Products Co.
Southern Bleachery & Print Works
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Stainless on the side that is used. Bonded to Steel Backing.

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BORG-WARNER CORPORATION

Specialists in High Carbon, Alloy and High Speed Steel and Stainless-Clad Sheets and Plates

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Plants: CHICAGO, ILLINOIS, *and* NEW CASTLE, INDIANA

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GIVES STAINLESS PROTECTION AT LOWER COST

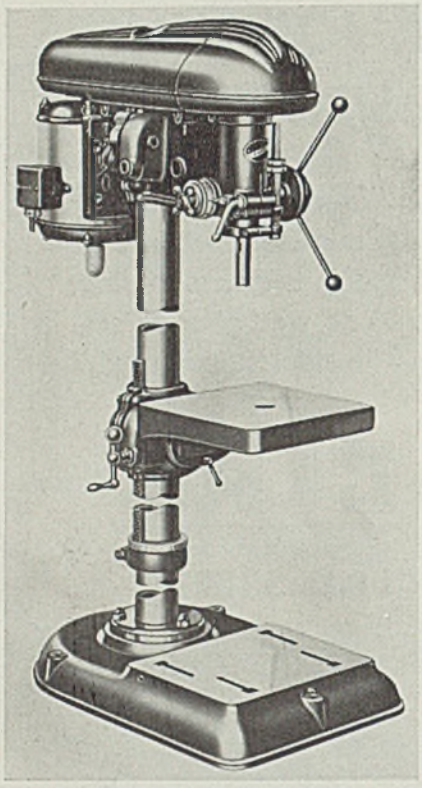
REPRESENTATIVES: H. Boker & Co., Inc., 101-103 Duane St., New York, N. Y.
Clark P. Schumacher, 240 S. Boyle Ave., St. Louis, Mo.
J R. Kindig, Red Rock Bldg., Atlanta, Ga.

to any metal, glass, wood, plaster, concrete, or other stable base.

♦ ♦ ♦

Drill Press—

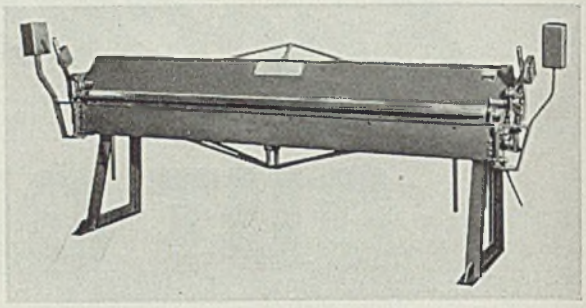
Delta Mfg. Co., 600 East Vienna avenue, Milwaukee, has recently introduced a new line of 17-inch drill presses. The machines are designed to serve the needs of the general machine shop, toolroom and production shop. Maximum capacity of the new drills is ¾-inch in cast iron. An extra large spindle pulley provides five speeds ranging from 385 to 2240 revolutions per minute, and is carried in two self-sealed ball bearings lubricated for life. The pulley is of the floating type in which belt pull or stress is not transmitted to the spindle. The spindle does not project through the pulley, but is keyed to it as the lower end of the spindle is machined to form a 16-tooth spline which slides in a floating sleeve. Spindle is furnished either with a socket for No. 2 Morse taper or with ½-inch capacity Jacobs chuck.



Delta 17-inch drill press designed to serve the needs of the general machine shop, tool room and production shop

Bending Brake—

Whitney Metal Tool Co., Rockford, Ill., announces the addition of a new 18-gage combination bending brake to their line of Whitney-Jensen brakes. These brakes are available in 5, 6, 8, and 10-foot sizes and will handle any thickness of sheet metal up to 18 gage. A novel device feature enables the brake to be used for box and pan bending as well as all types of straight bending. Upper jaw is clamped in four guide slots, two at each end, having locating offsets. By loosening the clamp nuts, the jaw can be cammed up in these slots, the correct position for box and pan bending. Lower jaw is fixed and the upper jaw is moved down to it by means of two counterweighted clamping handles working through toggle connections which are adjustable for different metal thicknesses. Supporting legs are of welded steel sections, correctly planned to support the weight of the mechanism against tipping. Nose of the upper jaw is properly polished to enable the brake to do good work on stainless steel and similar materials.

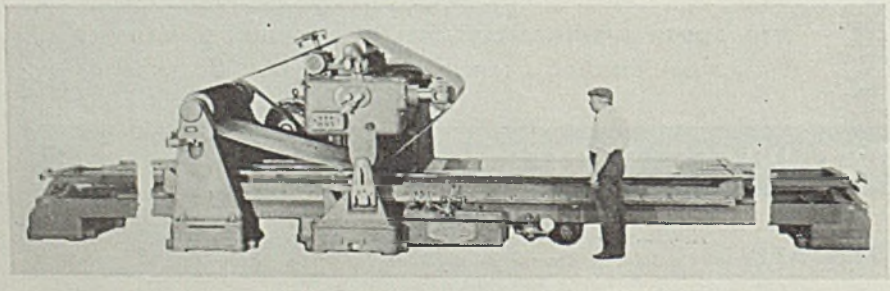


Combination bending brake designed for 18-gage stock by Whitney Metal Tool Co.

♦ ♦ ♦

Sheet Grinder—

Mattison Machine Works, Rockford, Ill., has recently placed on the market a new wide belt sheet grinder specially designed for the proper application of factory coated abrasive belts to the grinding of stainless steel and other alloy sheets. It is built with precision and care, and has the necessary weight to assure the stability necessary for smooth finishing, according to company claims. Construction adapts itself for quick application of belts. Push button station and controls for the table are located at the front of the machine for easy access by operator. Contact rolls are removable and rolls of any degree of cushion may be easily substituted according to the nature of the work. The machine, known as No. 453, can be furnished in various widths and lengths.



Mattison wide belt sheet grinder designed for grinding stainless and other alloy sheets

♦ ♦ ♦

Flexible Shaft Grinder—

Mall Tool Co., Chicago, announces the new type flexible shaft grinder known as the 1½-horsepower Universal model. This grinder operates at 9,000 revolutions per minute on either 110 or 220 volt alternating or direct current. It delivers high speeds and high horsepower to the working tool and, according to company claims, it will accomplish the same results with a 4-inch wheel as an 8-inch wheel used on a slow speed unit. The grinder is recommended for grinding weld seams, flat surfaces, surfacing and snagging castings, grinding stainless steel and numerous other grinding jobs in all industrial plants.

Universal 1½-horsepower flexible shaft grinder recently announced by Mall Tool Co.

Special Handling Methods Used for Delicate Parts

(*Continued from Page* 54)

are removed, worked on and then set in another box for additional operations or for storage. Operations are speeded as the boxes can be set at a convenient height. Also, they do not tie up a truck as would be necessary with larger heavy wooden box loads which cannot be moved from the truck or piled.

Movement Between Departments

Because of the wide variation of travel of parts in process the control of movement between operations and departments must be simple. Therefore each department has convenient "in" and "out" stations for incoming and outgoing materials. Similar "up" and "down" stations are placed in front of the elevators.

The operator gets his material from the "in" station in his department, processes and places in the "out" station. Truckers make regular trips about the plant with incoming and outgoing loads and move to the next department or elevator. The elevator man moves the load to the proper floor and sets it in the "out" station in front of his elevator where it is moved to destination by the trucker on the floor.

Destination is controlled by the routing ticket which is inserted in a celluloid-faced metal-backed holder. A spring clip, riveted to the back of this holder, attaches it to a sheet of steel on a truck or part in a tote box so that it does not slip off in travel.

The comparative low cost of the skid jacks makes it possible to leave a unit in each department and at elevators resulting in no waste time waiting or hunting for a truck. The methods engineering department indicates the number of tote boxes and the size necessary for the work. These are ordered by the foreman a few hours before he needs them. Empty tote boxes are taken to the "out" station at the elevator.

Handling Delicate Parts

Sub-assemblies and about 20 per cent of the work are delicate parts and require special care to prevent bending or damage in handling. The former practice had been to design special boxes for each. Frequently with changes in design these became obsolete or often they had to be stored for long periods between use.

The new practice adopted is to build special egg-crate fillers in the steel tote boxes from mill-end Masonite. The notched strips are assembled to provide vertical openings or pigeon-holes for various lengths, widths and depths for the different box heights. For example, these strips will provide top openings 1½, 1¾, 2¾ or 3¾ inches wide by approximately 1½, 2, 2½, 3 or 4 inches long. (The spacing varies slightly for the two lengths of boxes, 17¼ and 29¼ inches.) These strips are 3, 4, 6, 8 or 10 inches wide to give corresponding depths of openings for the various heights of boxes.

Altogether there are 20 different strips 17¼ inches long and 23 strips 29¼ inches long designated by numbers from 1 to 43. These fit 18 strips 11¾ inches long to go crosswise and are marked by letters.

Thus, insert No. 10E in box No. 3 gives an opening 1½ x 1 15/16 by 10 inches deep, fitting into the No. 3 box, which is 10¾ inches deep by 17¼ inches long. These inserts are made up in a special department, by number, to order, and delivered to the foreman as required.

Some large parts or partial and

final assemblies still are handled on special shelf or compartment trucks. These are mounted on warehouse trucks for ease in movement, as in some cases the compartments are filled from both sides. These parts are stored flat or on edge as demanded.

Miscellaneous Items

Dies are handled to and from storage, on Lewis-Shepard tiering machines or stackers. New standard Lyon steel shelving reinforced on the lower shelves for heavy dies permit saving about 35 per cent in floor space in this department by higher storage and adjustable shelving in place of the former lower solid welded racks.

All lumber is handled through the millroom on warehouse trucks to the last operation. Cut and finished sticks are then placed on a skid platform and handled to temporary storage and the cabinet shop on hand lift trucks. This prevents tying up the more expensive warehouse trucks for long periods.

With such a complex and varied handling problem we have found it impracticable to attempt to establish more definite procedures, relying rather on this general method with the practice worked out in each case by the methods engineering department when routing and scheduling operations. As these procedures are worked out they are recorded and become the standard practice on repeat orders. The installation is not completed as it is being installed gradually with first attention to handling delicate parts.

New Republic Wire Mill Discloses Advancements in Many Practices

(*Concluded from Page* 45)

and explosive oil used for cooling is replaced by a noninflammable, nonexplosive material. Losses are slightly lower in this transformer than in conventional types.

Power and lighting transformers in the new wire mill represent the first installations of this type in the Chicago area. The steel clad cubicle switchgear distribution center located in the substation represents the latest in this type of equipment, the oil circuit breakers being of 250,000 KVA interrupting capacity, push button operated, battery trip. Ample provision for growth of the wire mill is included in the switchgear installation. At present it consists of six important circuits as follows: one incoming line with 2000-ampere circuit breakers, two 1200-ampere, and three 600-ampere feeder circuits leaving the cubicle.

The electrogalvanizing setup includes six motor-generators, the two flash cleaners being small sets with 20-horsepower driving motors and the four plating motor-generator sets having 220-horsepower, 2300-volt 3-phase synchronous motors, and 20,000-ampere 7-volt generators. Special 20,000-ampere shunts were built to furnish the necessary voltage drop for operating, recording, and indicating ammeters at the control station.

The control station in the galvanizing department consists of control push button stations for starting and stopping all motor-generator sets, circulating pumps and takeup frame motors. Rheostats are located here for control of current output for the motor-generator sets and speed of the takeup frames. Feet per minute of wire drawn through the plating bath is recorded on electrical tachometers mounted on the control station board. Indicating voltmeters and ammeters are mounted on the individual motor-generator control panels. Recording ammeters are mounted adjacent to the tachometer recorders. These recording instruments give the wire mill superintendent a constant check upon the entire galvanizing operation.

High Level of Illumination

Lighting throughout the mill is supplied from a bank of transformers located centrally to load in a vault connecting with the main tunnel under the mill floor. Three phase, 4-wire distribution to the various lighting panels leaves this vault. The latest type of high-power voltage fuses protect these feeders and are mounted adjacent to the transformers. Intensities in the drawing room are approximately 12-foot candles, cleaning room 10-foot candles, warehouses 5-foot candles, galvanizing 8 and 14-foot candles, and nail mill 12 to 15-foot candles.

The wire mill occupies a total area of 177,000 square feet, including the outside crane runway yard, which is used for rod storage. This is 100 x 200 feet.

The mill occupies a site just north of the corporation's steel plant and rod mill, a short distance east of the Calumet river. It is flanked on the north and south by railroad sidings; one on the south for delivery of rods to the rod storage yard where the track passes directly beneath the transfer conveyor for unloading, and one on the north to serve a 325-foot loading dock. Both connect with the Pennsylvania railroad and the Indiana Harbor Belt railroad. Truck loading facilities are provided at the east end of the warehouse area, which is situated adjacent to the nail, fence and barbed wire departments.

A clear span of 100 feet has been provided in the wire drawing, process storage, electrogalvanizing, fence, barbed wire and nail departments and the warehouse. Due to the presence of high-speed cranes, monorails and tramrail hoists throughout the plant, 100-foot roof trusses of special strength were provided.

Approximately 1200 lineal feet of subfloor tunnels have been provided to accommodate electrical controls and driving equipment for the wire drawing and nail machines. Removal of these facilities from the production floor further facilitates free-flowing operations provided by the clear aisles.

Concrete floors have been provided throughout the mill and are supported on a 9-foot fill of slag, which was required by the previous swampy condition of the site. A metal roof deck, 1¾-inch deep, covered by ½-inch of special insulation, has been employed throughout most of the plant.

In the cleaning house, where glass block was installed due to the presence of corrosive acids, the roof is of book tile, supported on structural T's. Structural steel throughout the cleaning house is ⅜-inch minimum thickness. Protected metal ventilators and blowers have been installed here and above the electrogalvanizing tanks to insure adequate ventilation.

New Liner Equipped with 300-Ton Cooling System

The new transatlantic liner NIEUW AMSTERDAM, Holland's recently launched "ship of peace," is equipped with the largest air conditioning system afloat according to L. R. Boulware, vice president and general manager, the Carrier Corp., Newark, N. J.

The 300-ton cooling system was designed especially for the 33,000-ton liner by Carrier Corp. which also installed air conditioning systems on the QUEEN MARY and NORMANDIE. The NIEUW AMSTERDAM system is 75 tons larger than that of the QUEEN MARY and 114 tons larger than the NORMANDIE equipment.

Its centrifugal refrigerating machines are of special construction to assure efficient operation despite roll of the ship in any type of weather.

Developments in Broad Strip Mills Are Discussed

(*Concluded from Page* 76)

like steel insofar as stress *distribution* is concerned. If we make a 3-dimension scale model of a machinery part in rubber, the *relative* deformation in various areas will be the same as the relative deformation in the full size metal piece. If we can establish the stress quantitatively in one locality of the steel piece, we can find the stress at any other part by symmetry from the information obtained from the rubber scale model.

But to make 3-dimension scale models of machinery parts is expensive due to the necessity of making a rubber mold. It would be generally less expensive to make a full scale model of the machinery part and get the information by static loading and strain gages.

As in the case of the photoelastic method we resort to reproduction of scale of a *cross section* of the part being studied. For this purpose, we use a sheet of rubber having a uniform thickness of about 0.12-inch. On this sheet rubber is printed from an electro-type cross lines which are 0.10-inch apart. The contour of the section is cut from the cross-lined rubber sheet. Tensile stress may be applied and *relative* deformation of the various 0.10-inch squares read directly with an eight power magnifying glass. Using relatively small deformations, and close readings, the degree of stress concentration at any point may be determined within an accuracy of about plus or minus 10 per cent. By making a series of reading at several values of the tension, and plotting the results, greater accuracy may be obtained.

The use of a stress distribution analysis system may properly be looked on as merely an educational process in most cases of welded steel design. It is unnecessary to analyze every piece or any considerable number of pieces. Once the basic principles of stress distribution are understood by actual study they may be applied successfully to any assembly of welded parts.

The commercial use of the knowledge gained from stress distribution analysis lies in the design of structures which have adequate service life. A machine or machine part has no economic value unless its service life may be predicated. Making machinery parts heavier without regard to stress concentrations may actually increase stress concentrations and shorten the service life. The net result of proper use of the knowledge gained from stress distribution analysis or reduction in weight and cost of machinery parts, the service life being the same.

New Molding Materials Are Resistant to Impact

To permit production molded plastic parts which will have greater resistance to shock or impact, Bakelite Corp., 247 Park avenue, New York, has developed a new line of molding materials. On an American Society for Testing Materials standard test specimen the energy required for breakage ranges from 0.22 to 2 foot pounds, or 2.75 to 25 foot pounds per square inch. Generally speaking, they are classified as improved impact, medium impact, medium-high impact and high impact. In each classification there now are two or more molding materials. Thus this range provides for molded parts which, in addition to impact resistance, have chemical, water resisting and dielectric properties. These new molding materials are said to be suitable for producing handset telephones, golf club heads, football shoe cleats, instrument cases, junction boxes, oil well equipment, rayon spinning buckets and other parts.

Die Castings Used in Automotive Applications

(*Concluded from Page* 50)

for supporting the license plate. The fact that the die casting lends itself to production in complex forms cored out for light weight and in pleasing contours, often of streamline section is, of course, much in its favor. Fastening means are readily provided and can be concealed, and shapes which it would be difficult or impossible to stamp can be used. Much the same may be said of headlamp brackets, which are die cast on several cars, and it is considered likely that head-lamp bodies may yet be die cast either separately or integral with their supporting brackets. Availability of new finishes suitable for die castings finishes that are highly enduring and possess excellent adherence, and which can be had in colors matching the body, have tended to promote the use of die castings requiring an organic finish, such as the brackets in question.

Frames for die-cast fender lamps are produced in numerous patterns and with attractive decorative effects. Recesses for lenses and other glass parts are readily cored out and very little if any machining is needed. Either plated or organic finishes are readily applied with little or no preparation of the surface.

Castings for Body Interiors

Aside from steering wheel parts already dealt with, there are numerous other die cast parts for body interiors which are deserving of mention. Brackets for attaching steering columns to the body are nearly all die cast and constitute a good example of an important structural use. Cadillac is the only car which has yet employed an instrument panel which is completely die cast, including the glove-compartment door, but this application is now in its second year and is a good example of a casting unusually long and thin in section. It is cast, of course, with the openings for the glove compartment and instruments and is provided with required fastening lugs. Many other cars have die-cast instrument frames and decorative parts for instrument panels. These include the radio grilles on Olds and Buick models. Several cars in the Chrysler lines have die cast instrument panel frames in which the slides for choke, throttle and switch parts are guided and held flush with the panel.

In applications such as these, in which the die casting often takes the place of stamped parts, it is usually the better appearance, the closer dimensional limits held and sometimes the lower die cost which dictate the use of die castings. Much the same may be said of the housings and fittings for interior car heaters. Although some of these are provided with stamped shells, the latter are nearly always inferior in appearance to the die cast shell and lack, of course, the convenience of integral bosses for mounting purposes. In addition, the die casting gives as with most parts, a greater freedom in design, as it is possible to dispose the metal in ways which would not be feasible, if possible at all in stamped units. Heater fittings for attachment of tubing to defroster outlets are also die cast to good advantage as is the housing for the fan.

When it comes to hardware, exterior as well as interior, die cast parts are practically without competition and give universal satisfaction. Again the matter of appearance and freedom in design, as well as the remarkably smooth finish which is attained today are all in favor of the die casting. Recently it has been possible to produce acceptable hardware parts cast so smooth that even buffing the surface before plating is dispensed with. Now that a satisfactory bright nickel finish has been developed, it is also possible today, nearly if not entirely, to do away with polishing, buffing and coloring operations for most grades of hardware. Ford is continuing the use of some Macoid finish on interior hardware, and this process also does away with polishing and buffing.

Much experimental work has been done, both here and abroad, in the coating of hardware parts produced by die casting with cellulose acetate applied by the injection molding process. This has attained a commercial application in the electric refrigeration field but is not yet used for automobile hardware to the author's knowledge. It permits of extremely attractive finishes, which give promise of good enduring qualities, but it remains to be seen whether it can compete with plating in cost.

RECENT PUBLICATIONS OF MANUFACTURERS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland

Brazing Alloy—Handy & Harman, 82 Fulton street, New York. Bulletin No. 10, describing its liquid brazing alloy, for ferrous and nonferrous metals, and fills an important need in joining dissimilar metals at low temperatures.

Refractory Block Insulation — Quigley Co. Inc., 56 West Forty-fifth street, New York. Bulletin No. 326, describing its light weight low heat storage refractory block insulation, with service temperature 2200 degrees Fahr.

Furnaces — Surface Combustion Corp., Toledo, O. Bulletin containing five reprints of its advertisements which have appeared thus far in 1937 in various trade publications; additional information is available on any of the installations shown.

Metal Cutting Tools—Haynes Stellite Co., 205 East Forty-second street, New York. Booklet with over 60 illustrations of tools and machining operations; contains complete information how to obtain maximum results in machining cast iron, malleable iron and most steels.

Strip-chart Recording — General Electric Co., Schenectady, N. Y. Folder No. 1061F, describing its portable and switchboard type CD strip-chart recording instruments for alternating and direct current. Folder No. 2428, illustrating the value of proper tension control in cold strip rolling.

Controller — Foxboro Co., Foxboro, Mass. Booklet No. DMF 716, entitled "Air Weight Control", explains advantage of this device, such as flow record, automatic full floating control and compensating mechanism which resets the controller to take care of variations in atmospheric temperature and barometric pressure.

Materials Handling — Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O. Bulletin analyzing fundamental principles to make lifting and carrying operations complete, and illustrating the wide variety of applications of tramrail systems in industry.

Heavy Consumer Needs Hold Output Steady

Autos Near Record; Scrap Again Lower; Ferro Marked Up

MARKET IN TABLOID

DEMAND . . . *Steadier conditions rule; general volume less; some heavy projects bring tonnage.*

PRICES . . . . *Strong; ferromanganese and spiegeleisen advance sharply.*

PRODUCTION . . *Operations decline half a point to 91 per cent, on flood interruption.*

SHIPMENTS . . . *Better deliveries as pressure is somewhat relaxed.*

VARIOUS developments have brought a better condition in the steel market, following announcement of price policy for third quarter. Buyers have accepted this as assurance that they can proceed witn certainty and need not press mills for position on rolling schedules.

Steelmakers, in general, have sufficient tonnage on books to keep production at the present high rate for many weeks, in some instances well into fourth quarter. As a result of less insistence on deliveries they are able to operate more economically and serve all customers to better advantage.

While uncertainties affecting general business and the stock market have caused some unsettlement, the steel market for most part has reacted to only a slight degree and most lines of production using steel have large bookings, sufficient to run on momentum alone for a considerable period. In addition to this a constant flow of new business is being encountered, seemingly little affected by outside factors.

April pig iron production totaled 3,404,060 gross tons, compared with 3,470,470 in March, a loss of 66,410 tons, because of the shorter month. The per cent of loss is 1.9. The daily rate in April was 113,469 tons, a gain of 1518 tons over the daily rate of 111,951 tons in March, 1.3 per cent. For four months total production is 13,114,277 tons, compared with 8,323,831 tons in the same period of 1936, a gain of 4,790,446 tons, or 57 per cent.

Earnings of $5.24 per ton of steel produced in first quarter, compared with $1.39 per ton for first quarter last year and $4.23 per ton for fourth quarter, are indicated by STEEL'S compilation of earnings. For 15 integrated companies representing 87.4 per cent of steel ingot production first quarter earnings were $66,248,036, indicating on the same basis $75,462,000 for the entire industry.

Indications of sustained demand for heavier products are found in award of 28,000 tons of line pipe, nearly 600 miles, to National Tube Co., and inquiry for two Sinclair oil tankers requiring 7500 tons of plates. Brazil has also aided the plate market by three destroyers, to the extent of 2700 tons. A bridge crossing the Mississippi river at Baton Rouge, La., brings 31,157 tons of shapes into the market for bids.

Brief interruption of production at Pittsburgh and Wheeling by flood, which passed in a few hours, has brought the national operating rate down half a point to 91 per cent of capacity. Pittsburgh operations declined 5 points to 90 and Wheeling eight points to 88 per cent. New England also dropped seven points to 93 per cent. Cleveland at 79½ per cent, and Buffalo at 93 per cent showed no change. Gains were made at all other points. Chicago added one point to 85½ per cent, Eastern Pennsylvania 11 points to 70½, Youngstown one point to 87, Birmingham three points to 83, Detroit five points to 100, Cincinnati four points to 90 and St. Louis 12 points to 94 per cent.

Scrap presents the only soft spot, prices continuing to decline in the face of restricted mill buying and large offerings brought out by unusually high prices. Recession of prices has brought the market for steelmaking grades to about the same level as prevailed at the end of February. Some observers believe the readjustment has been practically completed and that little further decline will be seen.

Production of automobiles is close to record levels for all time. Last week production was 139,475 units, compared with 140,822 in the alltime high week in 1929. General Motors turned out 55,455, Ford 35,875 and Chrysler 31,000. April output was 558,320, the highest month since June, 1929. For the first four months of 1937 total cars were 1,860,000, compared with 1,644,898 in the same period of 1936.

World conditions causing higher prices for manganese ore and continued heavy consumption of ferromanganese in this country have resulted in an advance of $7.50 per ton on the latter, bringing the price to $102.50 tidewater. Silicomanganese has been advanced $6.50 per ton for the same reasons.

Further declines in scrap have brought the composite for that commodity to $19.60, a loss of 82 cents from last week. The same influence caused the iron and steel composite to decline 11 cents to $40.25. The finished steel composite is unchanged at $61.70.

COMPOSITE MARKET AVERAGES

	May 1	Apr. 24	Apr. 17	One Month Ago Apr., 1937	Three Months Ago Feb., 1937	One Year Ago May, 1936	Five Years Ago May, 1932
Iron and Steel	$40.25	$40.36	$40.47	$40.39	$36.74	$32.92	$29.34
Finished Steel	61.70	61.70	61.70	61.45	55.92	52.20	47.62
Steelworks Scrap ..	19.60	20.42	21.00	21.27	19.19	13.40	7.03

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.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	May 1, 1937	April 1937	Feb. 1937	May 1936
Steel bars, Pittsburgh	2.45c	2.45c	2.20c	1.85c
Steel bars, Chicago	2.50	2.50	2.25	1.90
Steel bars, Philadelphia	2.74	2.74	2.49	2.16
Iron bars, Terre Haute, Ind.	2.35	2.35	2.10	1.75
Shapes, Pittsburgh	2.25	2.25	2.05	1.80
Shapes, Philadelphia	2.45½	2.45½	2.25½	2.01½
Shapes, Chicago	2.30	2.30	2.10	1.85
Tank plates, Pittsburgh	2.25	2.25	2.05	1.80
Tank plates, Philadelphia	2.43½	2.43½	2.23½	1.99
Tank plates, Chicago	2.30	2.30	2.10	1.85
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.15	1.85
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	2.80	2.40
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.40	3.10
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.25	1.95
Sheets, No. 24, hot anneal., Gary	3.25	3.25	2.90	2.50
Sheets, No. 24, galvan., Gary	3.90	3.90	3.50	3.20
Plain wire, Pittsburgh	2.90	2.90	2.60	2.40
Tin plate, per base box, Pitts.	$5.35	5.25	4.85	5.25
Wire nails, Pittsburgh	2.75	2.75	2.25	2.10
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$34.00	$28.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	34.00	28.00
Billets, open-hearth, Pittsburgh	37.00	37.00	34.00	28.00
Wire rods, No. 5 to ⅝-inch, Pitts.	47.00	47.00	43.00	40.00

Pig Iron	May 1, 1937	April 1937	Feb. 1937	May 1936
Bessemer, del. Pittsburgh	$25.26	$25.26	$22.30	$20.81
Basic, Valley	23.50	23.50	20.50	19.00
Basic, eastern del. East Pa.	25.26	25.26	22.51	20.81
No. 2 fdy., del. Pittsburgh	25.21	25.21	22.21	20.31
No. 2 fdy., Chicago	24.00	24.00	21.00	19.50
Southern No. 2, Birmingham	20.38	20.38	17.63	15.50
Southern No. 2, del. Cincinnati	23.69	23.69	20.94	20.20
No. 2X eastern, del. Phila.	26.135	26.135	23.385	21.68
Malleable, Valley	24.00	24.00	21.00	19.50
Malleable, Chicago	24.00	24.00	21.00	19.50
Lake Sup., charcoal, del. Chicago	30.04	30.04	26.54	25.25
Gray forge, del. Pittsburgh	24.17	24.17	21.17	19.67
Ferromanganese, del. Pittsburgh	107.29	99.79	84.79	80.13
Scrap				
Heavy melting steel, Pittsburgh	$20.75	$22.75	$19.65	$14.75
Heavy melt. steel, No. 2, East Pa.	17.75	19.06	17.75	10.81
Heavy melting steel, Chicago	19.00	20.75	19.50	13.05
Rail for rolling, Chicago	22.00	23.35	20.75	14.65
Railroad steel specialties, Chicago	22.25	23.75	21.00	14.65
Coke				
Connellsville, furnace, ovens	$4.85	$4.50	$4.00	$3.50
Connellsville, foundry, ovens	5.30	5.05	4.25	4.25
Chicago, by-product foundry, del.	11.00	11.00	10.25	9.75

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Prices Subject to Quantity Extras and Deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pacific ports, f.o.b. dock	2.95c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, del.	3.48c
Philadelphia, del.	3.44c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pacific ports, f.o.b. dock	3.80c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.09c
New York, delivered	4.13c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pacific ports, f.o.b. dock	4.40c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.10c
Gary	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.39c
New York, del.	3.43c
St. Louis, del.	3.33c
Granite City, Ill.	3.30c
Pacific ports, f.o.b. dock	3.70c

Cold Rolled No. 20

Pittsburgh	3.55c
Gary	3.65c
Detroit, delivered	3.75c
Philadelphia, del.	3.84c
New York, del.	3.88c
St. Louis	3.78c
Granite City, Ill.	3.75c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke, (base box), Pittsburgh	$5.35
Waste-waste, 2.75c; strip	2.50c
Long ternes, No. 24, unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.53c
Philadelphia, del.	2.43½c
Boston, delivered	2.65c
Buffalo, delivered	2.50c
Chicago or Gary	2.30c
Cleveland, del.	2.44½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, delivered	2.52c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.45½c
New York, del.	2.50¼c
Boston, delivered	2.63½c
Bethlehem	2.35c
Chicago Chicago	2.30c
Cleveland, del.	2.45c
Buffalo	2.35c
Gulf Ports	2.65c
Birmingham	2.40c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, del.	2.52c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific ports, f.o.b. cars, dock	3.00c
Philadelphia, del.	2.74c
Boston, delivered	2,85c
New York, del.	2.78c
Pitts., forg. qual.	2.80c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Moline, Ill.	2.35c
Cleveland	2.35c
Buffalo	2.40c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.64c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.55c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.60c
Gulf ports	2.65c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.84c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.40c
Chicago, Buffalo, Cleveland, Birm., Young.	2.45c
Gulf ports	2.80c

Wire Products

Prices apply to straight or mixed carloads; less carloads $5 higher; less carloads fencing $5 over base column.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.20c
Galv. fence wire	3.60c
Woven wire fencing (base column, c. l.)	$74.00
Single loop bale ties, (base column, c. l.)	63.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.	
Spring wire, Pitts. or Cleveland	3.50c
Do., Chicago up $1, Worc. $2.	

Cold-Finished Carbon Bars and Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	3.00c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
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			0.15
6100 bars			1.20
6100 spring			0.85
Cr. N., Van			1.50
Carbon Van.			0.85
9200 spring flats			0.15
9200 spring rounds, squares			0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c

Strip and Hoops

(Base, hot rolled, 25-1ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.60c
Philadelphia, del.	2.69c
New York, del.	2.73c
Cooperage hoop,	
Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.40c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	3.40c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh, 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	3.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Tie plates, base	$46.00

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 tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger	60-10 off
Tire bolts	50 off

Plow Bolts

All sizes	65-5 off

Stove Bolts

In packages with nuts attached 72½ off; in packages with nuts separate 72½-5 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	60 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.:	
½ to 7/16-inch	60-20 off
Do., ½ to 1-inch	60-15 off
Do., over 1-inch	60-12½ off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
7/16-inch and smaller, Pitts., Chi., Cleve.	70 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	$5.75 off

Cut Nails

Cut nails, C. L., Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
¼ and ⅜	55	38½
½	59½	49
¾	62½	53
1—3	64½	55½

Iron

½	20	1½
¾	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

⅛, butt weld	51
¼ and ⅜, butt weld	54
½, Butt weld	58½
¾, butt weld	61½
1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Butt Weld

Iron

	Blk.	Galv.
½	19	½
¾	25	7
1 and 1¼	29	13
1½	33	15½
2	32½	15

Lap Weld

1¼	18	½
1½	23½	17
2	25⅜	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Seamless 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 for quantity, length, etc.

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2" OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.85	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.96
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.00-58.00
6 to 24-in., Chicago	54.00-55.00
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-*inch base; gross ton*

Pitts., Chi., Cleve., Buffalo and Young.	$37.00
Philadelphia	42.30
Duluth	39.00

Forging Billets

6 x 6 *to* 9 x 9-*in., base*

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young., Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleve., No. 5 to 9/32-inch incl.	47.00
Do., over 9/32 to 11/64-inch incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.75- 4.90
Connellsville, fdry.	5.25- 5.50
Connell. prem. fdry.	6.00- 6.50
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.85-11.30
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.25
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.00
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.60

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	14.75c
do. (450 lbs.)	14.00c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls. to jobbers	7.25c

Per 100 lbs. Atlantic Seaboard

Sulphate of ammonia	$1.35

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; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$23.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	24.50
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Hamilton, O.	24.00	24.00	23.50	.....
Jackson, O.	24.00	24.00	.....	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrows Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.26	25.26	24.76	25.76
Baltimore from Birmingham	25.58	.....	24.46	.....
Boston from Birmingham	26.37	.....	25.87	.....
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.27	27.77	.....	.....
Brooklyn, N. Y., from Bmghm.	27.05	.....	.....	.....
Canton, O., from Cleveland	25.26	25.26	25.76	25.76
Chicago from Birmingham	24.22	.....	24.10	.....
Cincinnati from Hamilton, O.	24.07	25.01	24.51	.....
Cincinnati from Birmingham	23.69	.....	22.69	.....
Cleveland from Birmingham	24.12	.....	23.62	.....
Mansfield, O., from Toledo, O.	25.76	25.76	25.26	25.26
Milwaukee from Chicago	25.00	25.00	24.50	25.00
Muskegon, Mich., from Chicago, Toledo or Detroit	26.90	26.90	26.40	27.40
Newark, N. J., from Birmingham	26.01	.....	.....	.....
Newark, N. J., from Bethlehem	26.39	26.89	.....	.....
Philadelphia from Birmingham	25.38	.....	25.26	.....
Philadelphia from Swedeland, Pa.	25.76	26.26	25.26	.....
Pittsburgh district from Neville Island	∫ Neville, base plus 63c, 76c, and $1.13 switch'g charges			
Saginaw, Mich., from Detroit	26.25	26.25	25.75	25.75
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	25.94	25.94	.....	26.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phila. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.04
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
Second Quality	
Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80
Ohio	
First quality	43.70
Intermediate	39.90
Second quality	35.15
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30
Ladle Brick	
(Pa., O., W. Va., Mo.)	
Dry press	$30.00
Wire cut	$28.00
Magnesite	
Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	43.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	25.00
Base Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$19.00
Do., for barge	$20.00

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York N. Y.	Lead: East St. L.	Zinc: St. L.	*Aluminum 99%	Antimony: Chinese Spot, N. Y.	Nickel: Cathodes
Apr. 24	14.50	14.62½	14.25	57.00	56.25	6.00	5.85	6.75	20.00	17.00	35.00
Apr. 26	14.50	14.62½	14.25	55.37½	54.75	6.00	5.85	6.75	20.00	17.00	35.00
Apr. 27	14.50	14.62½	14.25	57.37½	56.62½	6.00	5.85	6.75	20.00	17.00	35.00
Apr. 28	14.50	14.62½	14.25	55.87½	55.00	6.00	5.85	6.75	20.00	17.00	35.00
Apr. 29	14.00	14.12½	13.75	55.00	54.25	6.00	5.85	6.75	20.00	17.00	35.00
Apr. 30	14.00	14.12½	13.75	55.25	54.87½	6.00	5.85	6.75	20.00	17.00	35.00

*Carlot prices.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 14.00c Conn. copper

Sheets	
*Yellow brass (high)	19.50
*Copper, hot rolled	21.62½
Lead, cut to jobbers	9.50
Zinc, 100-lb. base	12.50-13.00
Tubes	
*High yellow brass	22.25
*Seamless copper	22.37½
Rods	
*High yellow brass	16.00
*Copper, hot rolled	18.37½
Anodes	
*Copper, untrimmed	18.87½
Wire	
*Yellow brass (high)	19.75

OLD METALS

Nom. Deal. buying prices

No. 1 Composition Red Brass	
New York	9.25
*Cleveland	9.25
*Chicago	8.50-8.75
*St. Louis	8.50-8.75
Heavy Copper and Wire	
*New York, No. 1	11.25
*Cleveland, No. 1	11.00
*Chicago, No. 1	10.75-11.00
*St. Louis, No. 1	10.00-10.50
Composition Brass Borings	
*New York	8.50
Light Copper	
*New York	9.25
*Cleveland	9.00
*Chicago	8.50-8.75
*St. Louis	8.50-8.75
Light Brass	
*Chicago	5.50-5.75
Cleveland	6.00
*St. Louis	5.75-6.00
Lead	
New York	4.25- 4.50
Cleveland	4.50- 4.75
Chicago	4.75- 5.00
*St. Louis	4.75- 5.00
Zinc	
Ne wYork	3.25- 3.50
Cleveland	3.25- 3.50
*St. Louis	3.75- 4.00
Aluminum	
Borings, Cleveland	10.75-11.00
Mixed, cast, Cleve.	14.00-14.25
Clips, soft, Cleve.	15.50-15.75
Mixed, cast, St. L.	13.50-14.00
SECONDARY METALS	
Brass, ingot 85-5-5-5, lcl.	14.75
*Stand. No. 12 alum.	19.00-19.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.29
Spiegeleisen, 19-21% dom. Palmerston, Pa., spot	33.00
Do., New Orleans	33.00
Ferrosilicon, 50% freight allowed, c. l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon, 111.50;1%,	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	1.80-1.85
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton	142.50
Spot, carlots	145.00
Spot, ton lots	150.00
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
*Carloads. Quan. diff. apply	

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore	4.00c
Boston††	4.05c
Buffalo	3.10c
Chattanooga	3.96c
Chicago (j)	3.85c
Cincinnati	4.05c
Cleveland	3.75c
Detroit	3.93½c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.96c-4.11c
New Orleans	4.20c
New York‡ (d)	4.12c
Pitts. (h)	3.80c
Philadelphia	4.00c
Portland	4.45c
San Francisco	4.20c
Seattle	4.45c
St. Louis	4.09c
St. Paul	4.10c-4.25c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.96c
Baltimore*	3.25c
Cincinnati	4.05c
New York‡ (d)	3.65c
Philadelphia	4.00c
St. Louis	4.09c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.96c
Cleveland (c)	2.55c
Cincinnati	3.75c
Houston	3.25c
Los Angeles, c.l.	2.45c
New Orleans*	3.14c
Pitts., plain (h)	2.55c
Pitts., twisted squares (h)	3.95c
San Francisco	2.97½c
Seattle, under 1 ton	4.22½c
St. Louis	3.99c
Tulsa	3.25c
Young	2.30c-2.60c

SHAPES

Baltimore	3.90c
Boston††	3.92c
Buffalo	3.35c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.95c
Cleveland	3.86c
Detroit	3.95c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	3.97c
Philadelphia	3.90c
Pittsburgh (h)	3.70c
Portland (i)	4.45c
San Francisco	4.05c
Seattle (l)	4.45c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

PLATES

Baltimore	3.90c
Boston††	3.93c
Buffalo	3.47c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.95c
Cleveland, ¼-in. and over	3.86c
Detroit	3.95c
Detroit, ⅛-in.	4.15c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	4.00c
Philadelphia	3.90c
Phila. floor	4.95c
Pittsburgh (h)	3.70c
Portland	4.25c
San Francisco	4.05c
Seattle	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

NO. 10 BLUE

Baltimore	3.95c
Boston (g)	4.00c
Buffalo	3.72c
Chattanooga	3.91c
Chicago	3.85c
Cincinnati,	4.00c
Cleveland	3.91c
Det. 8-10 ga.	3.93½c
Houston	3.45c
Los Angeles	4.50c
Milwaukee	3.96c
New Orleans	4.35c
New York‡ (d)	4.07c
Portland	4.50c
Philadelphia	4.00c
Pittsburgh (h)	3.75c
San Francisco	4.30c
Seattle	4.50c
St. Louis	4.39c
St. Paul	4.10c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	4.50c
Boston (g)	4.75c
Buffalo	3.35c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.75c
Cleveland	4.66c
Detroit	4.68½c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York‡ (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	5.35c
Seattle	5.35c
San Francisco	5.15c
St. Louis	4.84c
St. Paul	4.75c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	4.70c
Buffalo	4.10c
Boston (g)	5.30c
Chattanooga*	4.76c
Chicago (h)	5.10c-5.75c
Cincinnati	5.40c
Cleveland	5.31c
Detroit	5.40c
Houston	4.50c
Los Angeles	5.55c
Milwaukee	5.21c-5.86c
New Orleans*	4.49c
New York‡ (d)	5.47c
Philadelphia	5.30c
Pitts.** (h)	5.40c
Portland	5.90c
San Francisco	5.85c
Seattle	5.90c
St. Louis	5.49c
St. Paul	5.40c
Tulsa	5.20c

BANDS

Baltimore	3.85c
Boston††	4.25c
Buffalo	3.52c
Chattanooga	4.16c
Cincinnati	4.25c
Cleveland	4.16c
Chicago	4.10c
Detroit, ⅛-in. and lighter	4.185c
Houston	3.35c
Los Angeles	4.50c
Milwaukee	4.21c
New Orleans	4.75c
New York‡ (d)	4.32c
Philadelphia	4.10c
Pittsburgh (h)	4.00c
Portland	4.95c
San Francisco	4.50c
Seattle	4.95c
St. Louis	4.34c
St. Paul	4.35c
Tulsa	3.55c

HOOPS

Baltimore	4.45c
Boston††	5.25c
Buffalo	3.52c
Chicago	4.10c
Cincinnati	4.25c
Detroit, No. 14 and lighter	4.185c
Los Angeles	6.55c
Milwaukee	4.21c
New York‡ (d)	4.32c
Philadelphia	4.35c
Pittsburgh (h)	4.50c
Portland	6.30c
San Francisco	6.50c
Seattle	6.30c
St. Louis	4.34c
St. Paul	4.35c

COLD FIN. STEEL

Baltimore (c)	4.50c
Boston*	4.65c
Buffalo (h)	3.70c
Chattanooga*	4.86c
Chicago (h)	4.30c
Cincinnati	4.50c
Cleveland (h)	4.30c
Detroit	4.30c
Los Ang. (f) (d)	6.85c
Milwaukee	4.41c
New Orleans	5.10c
New York‡ (d)	4.57c
Philadelphia	4.53c
Pittsburgh	4.15c
Portland (f) (d)	5.85c
San Fran. (f) (d)	6.80c
Seattle (f) (d)	5.85c
St. Louis	4.54c
St. Paul	4.77c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.845c
Buffalo	3.39c
Chicago	3.87c
Cincinnati	3.82c
Cleveland (b)	3.60c
Detroit	3.43c
New York‡ (d)	3.92c
St. Louis	4.54c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)

	Base
High speed	69c
High carbon, Cr.	45c
Oil hardening	26c
Special tool	24c
Extra tool	20c
Regular tool	16c
Water hardening	12½c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	55 to 60
Cleveland	60-5-5
Detroit	70-10
Milwaukee	60 to 65
New Orleans	65
Pittsburgh	65-5

(a) Under 100 lbs., 50 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 0.15c higher.

On plates, shapes, bars, hot strip and blue annealed quantity extras and discounts as follows: Under 100 lbs., add $1.50; 100 to 399 lbs., add 50c; 400 to 3999 lbs., base; 4000 to 9999 lbs., deduct 10c; over 10,000 lbs., deduct 15c. At Cleveland, under 400 lbs., add 50c, with $1 minimum invoice.

‡Domestic steel; *Plus quantity extras; **One to 9 bundles; *† 50 or more bundles; †New extras apply; ††Base 10,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, April 29

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$24.75 5 0 0	$28.92	3 12 0
Basic bessemer	19.43 3 18 6*	14.06	*1 15 0
Hematite, Phos. .03-.05	21.66 4 7 6	.....	.....
SEMIFINISHED STEEL			
Billets	$30.94 6 5 0	$35.16	4 7 6
Wire rods, No. 5 gage	47.64 9 12 6	48.21	6 0 0
FINISHED STEEL			
Standard rails	$44.55 9 0 0	$48.21	6 0 0
Merchant bars	2.43c 11 0 0	1.82c	5 0 0
Structural shapes	2.35c 10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.43c 11 0 0	2.23c	6 2 6
Sheets, black, 24 gage or 0.5 mm	2.87c 13 0 0	2.82c	7 15 0††
Sheets, gal., 24 gage, corr.	3.70c 16 15 0	4.27c	11 15 0
Bands and strips	2.21c 10 0 0	2.36c	6 10 0
Plain wire, base	2.43c 11 0 0	2.72c	7 10 0
Galvanized wire, base	3.20c 14 10 0	2.90c	8 0 0
Wire nails, base	2.65c 12 0 0	3.09c	8 10 0
Tin plate, box 108 lbs.	$ 6.06 1 4 6	.....	.....

British ferromanganese $95 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$20.54 4 3 0(a)	$19.04	425	$27.80	825	$25.34	63
Basic bessemer pig iron	20.42 4 2 6(a)	12.32	275	14.66	435	27.96 (b)	69.50
Furnace coke	6.68 1 7 0	6.14	137	5.73	170	7.64	19
Billets	30.94 6 5 0	29.34	655	28.14	835	38.82	96.50
Standard rails	1.82c 8 5 0	1.56c	780	1.80c	1,200	2.38c	132
Merchant bars	2.10c 9 10 0	1.76c	885	1.46c	975	1.98c	110
Structural shapes	2.02c 9 3 0	1.72c	860	1.46c	975	1.94c	107
Plates, †¼-in. or 5 mm.	2.17c 9 16 9	2.21c	1,105	1.87c	1,245	2.29c	127
Sheets, black	3.09c 14 0 0§	2.70c	1,350‡	2.19c	1,460‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.75c 17 0 0	4.20c	2,100	2.85c	1,900	6.66c	370
Plain wire	2.60c 11 15 0	2.72c	1,360	2.48c	1,650	3.11c	173
Bands and strips	2.27c 10 5 0	2.00c	1,000	2.02c	1,350	1.94c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel, a del. Middlesbrough. h hematite. ††Close annealed.
**Gold pound sterling carries a premium of 65 per cent over paper sterling.

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham†	14.50-15.50
Bos. dock, No. 1, exp.	17.50-18.00
N. Eng. del. No. 1..	17.50
Buffalo, No. 1	19.50-20.00
Buffalo, No. 2	18.00-18.50
Chicago, No. 1	18.75-19.25
Cleveland, No. 1	18.50-19.00
Cleveland, No. 2	17.00-17.50
Detroit, No. 1	16.50-17.00
Eastern Pa., No. 1	19.00-19.50
Eastern Pa., No. 2	17.50-18.00
Federal, Ill.	15.00-15.50
Granite City, R. R.	17.00-17.50
Granite City, No. 2	15.00-15.50
New York, No. 1	16.00-16.50
N. Y. dock, No. 1 exp.	17.00
Pitts., No. 1 (R. R.	22.00-22.50
Pitts., No. 1 (dlr.)	20.50-21.00
Pittsburgh, No. 2	18.00-18.50
St. Louis, R. R.	17.50-18.00
St. Louis, No. 2	15.50-16.00
Toronto, dlrs. No. 1	11.00-12.00
Toronto, No. 2	10.00-11.00
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo, dealers	18.00-18.50
Chicago, factory	17.75-18.25
Chicago, dealer	17.50-18.00
Cleveland	18.00-18.50
Detroit	18.00-18.50
E. Pa., new mat.	19.50-20.00
E. Pa., old mat.	15.50-16.00
Pittsburgh	20.50-21.00
St. Louis	15.00-15.50
Valleys	20.00-20.50

BUNDLED SHEETS

Buffalo	14.50-15.00
Cincinnati, del.	14.00-14.50
Cleveland	14.50-15.00
Pittsburgh	18.50-19.00
St. Louis	12.00-12.50
Toronto, dealers	8.00

SHEET CLIPPINGS, LOOSE

Chicago	12.00-12.50
Cincinnati	13.00-13.50
Detroit	12.50-13.00
St. Louis	11.50-12.00

STEEL RAILS, SHORT

Birmingham	18.00-19.00
Buffalo	22.50-23.50
Chicago (3 ft.)	22.00-22.50
Chicago (2 ft.)	23.50-24.00
Cincinnati, del.	22.00-22.50
Detroit	24.00-24.50
Pitts., 3 ft. and less	25.50-26.00
St. Louis, 2 ft. & less	19.50-20.00

STEEL RAILS, SCRAP

Boston, district	†16.50
Buffalo	20.00-21.00
Chicago	18.75-19.25
Cleveland	23.00-23.50
Pittsburgh	23.00-23.50
St. Louis	19.50-20.00

STOVE PLATE

Birmingham	11.00-11.50
Boston district	†11.50-11.75
Buffalo	14.75-15.25
Chicago	12.00-12.50
Cincinnati, dealers	11.00-11.50
Detroit, net	12.00-12.25
Eastern Pa.	15.50-16.00
New York, fdry.	†12.00-12.50
St. Louis	12.00-12.50
Toronto, deal'rs, net	9.50-10.00

SPRINGS

Buffalo	22.50-23.50
Chicago, leaf	22.50-23.00
Chicago, coil	23.50-24.00
Eastern Pa.	25.50-26.00
Pittsburgh	26.25-26.75
St. Louis	21.50-22.00

ANGLE BARS—STEEL

Chicago	20.50-21.00
St. Louis	19.50-20.00

RAILROAD SPECIALTIES

Chicago	22.00-22.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	22.50-23.50
Cleveland, billet, bloom crops	24.00-24.50
Eastern Pa., crops	26.00-26.50
Pittsburgh, billet, bloom crops	26.25-26.75
Pittsburgh, sheet bar crops	26.50-27.00

FROGS, SWITCHES

Chicago	18.75-19.25
St. Louis, cut	18.00-18.50

SHOVELING STEEL

Chicago	18.75-19.25
Federal, Ill.	15.00-15.50
Granite City, Ill.	15.00-15.50
Toronto, dealers	9.00- 9.50

RAILROAD WROUGHT

Birmingham	13.00-13.50
Boston district	†10.00-10.25
Buffalo, No. 1	18.00-18.50
Buffalo, No. 2	19.50-20.00
Chicago, No. 1, net	16.50-17.00
Chicago, No. 2	18.75-19.25
Cincinnati, No. 2	17.00-17.50
Eastern Pa.	20.00
St. Louis, No. 1	15.00-15.50
St. Louis, No. 2	17.00-17.50
Toronto, No. 1 dlr.	15.00

SPECIFICATION PIPE

Eastern Pa.	17.00-17.50
New York	13.00-13.50

BUSHELING

Buffalo, No. 1	18.00-18.50
Chicago, No. 1	17.00-17.50
Cincin., No. 1, deal.	15.00-15.50
Cincinnati, No. 2	9.50-10.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1 new	15.50-16.00
Valleys, new, No. 1	19.00-19.50
Toronto, dealers	9.00

MACHINE TURNINGS

Birmingham	8.00- 9.00
Buffalo	12.75-13.25
Chicago	10.50-11.00
Cincinnati, dealers	11.00-11.50
Cleveland	12.50-13.00
Detroit	11.75-12.25
Eastern Pa.	13.50
New York	†10.00-10.25
Pittsburgh	15.00-15.50
St. Louis	10.50-11.00
Toronto, dealers	8.00- 8.50
Valleys	13.50-14.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.75- 9.00
Buffalo	13.00-13.50
Cincinnati, dealers	10.25-10.75
Cleveland	12.50-13.00
Detroit	12.00-12.50
Eastern Pa.	12.50-13.00
New York	†8.50- 9.00
Pittsburgh	14.50-15.00
Toronto, dealers	8.00- 8.50

CAST IRON BORINGS

Birmingham	8.00- 9.00
Boston dist. chem.	†10.00-10.25
Boston dist. for mills	†9.25
Buffalo	13.00-13.50
Chicago	11.50-12.00
Cincinnati, dealers	10.25-10.75
Cleveland	12.50-13.00
Detroit	12.00-12.50
E. Pa., chemical	15.50
New York	†8.50- 9.00
St. Louis	10.50-11.00
Toronto, dealers	9.00

PIPE AND FLUES

Cincinnati, dealers	11.50-12.00
Chicago, net	13.00-13.50

RAILROAD GRATE BARS

Buffalo	15.50-16.00
Chicago, net	12.50-13.00
Cincinnati	11.00-11.50
Eastern Pa.	15.50-16.00
New York	†11.00-11.50
St. Louis	12.50-13.00

FORGE FLASHINGS

Boston district	†13.00-13.25
Buffalo	18.00-18.50
Cleveland	18.00-18.50
Detroit	15.00-15.50
Pittsburgh	18.00-18.50

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	23.00-23.50
Eastern Pa.	16.00

ARCH BARS, TRANSOMS

St. Louis	19.00-19.50

AXLE TURNINGS

Boston district	†11.00-11.50
Buffalo	16.00-17.00
Chicago, elec. fur.	19.50-20.00
Eastern Pa.	17.50
St. Louis	12.50-13.00
Toronto	9.50

STEEL CAR AXLES

Birmingham	20.00-22.00
Buffalo	22.00-23.00
Boston district	†20.00-21.00
Chicago, net	24.00-24.50
Eastern Pa.	28.00-28.50
St. Louis	24.00-24.50

SHAFTING

Boston district	†20.00-20.50
New York	†20.00-20.50
Eastern Pa.	25.00
St. Louis	14.00-14.50

CAR WHEELS

Birmingham	17.00-18.50
Boston dist., iron	†15.00-15.25
Buffalo, iron	18.50-19.50
Buffalo, steel	22.50-23.50
Chicago, iron	20.50-21.00
Chicago, rolled steel	22.00-22.50
Cincinnati, iron	19.00-19.50
Eastern Pa., iron	22.00-22.50
Eastern Pa., steel	25.50-26.00
Pittsburgh, iron	19.50-20.00
Pittsburgh, steel	26.25-26.75
St. Louis, iron	18.00-18.50
St. Louis, steel	21.00-21.50

NO. 1 CAST SCRAP

Birmingham	13.00-14.00
Boston, No. 1 mach.	†16.00
N. Eng. del. No. 2	17.50
N. Eng. del. textile	18.50
Buffalo, cupola	18.50-19.00
Buffalo, mach.	19.25-19.75
Chicago, agri. net	13.00-13.50
Chicago, auto	14.50-15.00
Chicago, mach. net	16.00-16.50
Chicago, railr'd net	14.50-15.00
Cinci., mach. cup.	16.50-17.00
Cleveland, mach.	20.00-20.50
Eastern Pa., cupola	21.50-22.00
E. Pa., mixed yard	17.50-18.00
Pittsburgh, cupola	19.00-19.50
San Francisco, del.	13.50-14.00
Seattle	12.00-13.00
St. Louis, No. 1	14.25-14.75
St. L., No. 1, mach.	15.50-16.00
Toronto, No. 1, mach., net	16.00-17.00

HEAVY CAST

Boston dist. break.	†14.00
New England, del.	17.00-17.25
Buffalo, break.	16.00-16.50
Cleveland, break.	15.50-16.00
Detroit, break.	14.50-15.00
Detroit, auto net	15.00-15.50
Eastern Pa.	18.50-19.00
New York, break.	†14.50-15.00
Pittsburgh	16.50-17.00

MALLEABLE

Birmingham, R. R.	16.00-18.00
New England, del.	20.00
Buffalo	22.00-22.50
Chicago, R. R.	21.00-21.50
Cinci., agri. del.	16.00-16.50
Cleveland, rail	22.50-23.00
Detroit, auto, net	17.50-18.00
Eastern Pa., R. R.	21.00-21.50
Pittsburgh, rail	20.50-21.00
St. Louis, R. R.	20.00-20.50

RAILS FOR ROLLING

5 feet and over

Birmingham	18.00-19.00
Boston	†18.00-18.50
Buffalo	21.50-22.00
Chicago	21.75-22.25
Eastern Pa., R. R.	21.00-21.50
New York	†18.00-18.50
St. Louis	20.00-20.50

LOCOMOTIVE TIRES

Chicago (cut)	22.00-22.50
St. Louis, No. 1	20.00-20.50

LOW PHOS. PUNCHINGS

Buffalo	22.00-22.50
Chicago	23.00-23.50
Eastern Pa.	26.00-27.00
Pittsburgh (heavy)	25.00-25.50
Pittsburgh (light)	24.00-24.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic ports

Foreign manganiferous ore, 45.55% iron, 6-10% man.	*17.00
No. Afr. low phos.	17.00
Swedish low phos.	nominal
Spanish No. Africa basic, 50 to 60%	*15.50
Tungsten, spot sh. ton, unit, duty pd.	$22.00-22.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$24.50-25.00

*Nominal asking price for spot.

Manganese Ore

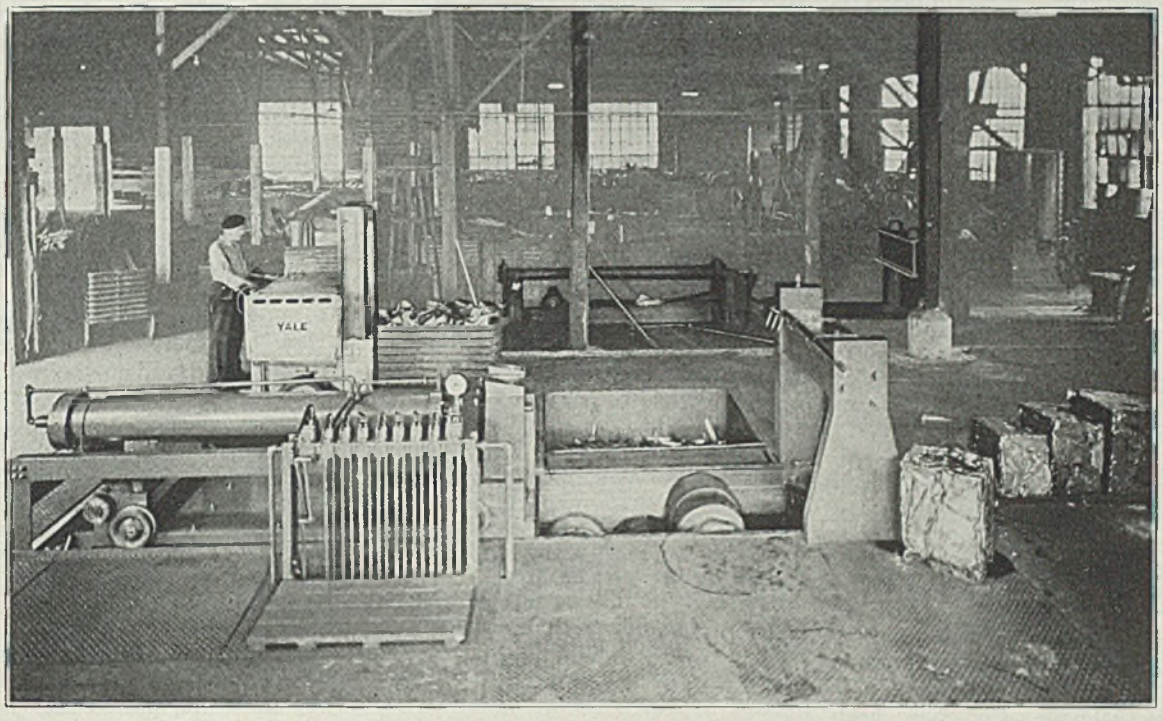
(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	44.00
So. African, 50-52%	Nominal
Indian, 50-52%	Nominal

LOGEMANN

Metal Baling Presses



Steel mills, automobile manufacturers, stamping plants and scrap yards bale their sheet scrap in LOGEMANN scrap metal presses. Baled scrap pays substantial dividends . . . . saves space . . . . can be more economically handled and loaded . . . . is practically free from corrosion and saves much heat in remelting . . . . can be held for favorable price periods.

LOGEMANN scrap metal presses are built in many sizes and several types, to meet specific conditions. The illustration shows two LOGEMANN installations in a prominent automobile plant . . . . in the background a two-ram unit for ordinary scrap . . . . a triple-compression press with special large box in foreground for bulky scrap, drums and large forms.

The LOGEMANN line includes baling presses for all materials . . . . high pressure pumps . . . . hydraulic straighteners . . . . hydraulic presses and fittings. Write for descriptive bulletins.

LOGEMANN BROTHERS COMPANY

3126 W. Burleigh St. Milwaukee, Wis.

Bars

Bar Prices, Page 98

Pittsburgh—Normal promises for delivery range around six weeks on hot-rolled bars. Volume of inquiries and orders has slackened, but operations are expected to hold at high rate because of large backlogs. Reaffirming of the 2.45c, Pittsburgh, price for third quarter has greatly eased tension among consumers. Agricultural implement manufacturers, railroad car shops, machinery builders, and other consumers still are active. Outlook is far from disheartening.

Cleveland—Since prices have been announced unchanged for third quarter on commercial and cold-drawn alloy steel bars and standard carbon bars, specifications have declined to where mills are now able to make some headway against backlogs. However, they continue to operate close to capacity as deliveries are still extended six to eight weeks. Prices remain firm at 2.50c. Cleveland, on soft steel carbon bars.

Chicago—While steel bar specifications continue heavy, new business is quiet, and consumers less insistent on early shipment. Deliveries generally are unimproved and backlogs extend through this quarter. Farm implement and tractor production is expected to hold at better than usual rate during early summer.

Boston—Midvale Co. has been awarded 150 tons nickel steel bars for chainmaking, Boston navy yard, at 4.785c, delivered. All six bids on April 13 quoted same price. Additional 110 tons now being figured.

New York—Buying of steel bars the past week has been increased by orders under protection until May 1 on identified work. New inquiry is easier and deliveries somewhat less delayed.

Philadelphia—Despite leveling off in new orders, no material improvement in deliveries, which continue around six weeks, has resulted. Specifications against orders previously placed for identified work, actually were heavier last week than the week before, protections against these identified jobs expiring April 30. Sellers generally look for a rather quiet demand over remainder of this quarter, now that prices have been reaffirmed for third quarter. The market is 2.45c, Pittsburgh, or 2.74c, delivered, Philadelphia.

Independent Structural Steel Co., structural contractor and engineer, has been formed and is now located at 49 Vandergrift building, Pittsburgh. Samuel Reubene, proprietor, was formerly with Guibert Steel Co. and the Reliance Steel Products Co.

Plates

Plate Prices, Page 98

Philadelphia—Opening of bids May 10 on two tankers for the Sinclair Navigation Co., New York, is being watched closely by plate sellers here, with local shipyards figuring. These boats will require approximately 5000 tons of hull steel each, with the possibility that only one may be awarded at this time.

Atlantic Refining Co. has awarded to Sun Shipbuilding & Dry Dock Co., Chester, Pa., contract for a second all-welded 18,500-ton tanker for delivery in September, 1938. The two are said to be the world's largest welded ships.

A fair tonnage of plates may be required for 700 freight cars to be built by the Reading Co. in its own shops, although 600 of these are to be box cars. Platemakers benefited last week in point of specifications by the release of tonnage under protection at first quarter prices on identified work until April 30. This tonnage has if anything tended to extend delivery schedules, notwithstanding the falling off in miscellaneous new buying. Prices are firm at 2.35c, Coatesville, Pa., or 2.435c, Philadelphia, which levels have generally been extended for third quarter.

Pittsburgh—Heavy backlogs of plate tonnage are on mill books and the volume from railroad equipment manufacturers, shipbuilders, pipe line and tank fabricators is holding up far better than expected. Deliveries have shown little improvement and mills are under great pressure. In tank work, a satisfactory volume of awards and inquiries under 100 tons is maintained.

Cleveland — Plate mills report little gain against backlogs, with deliveries still extended well into July. Much plate tonnage is pending in the three and a half miles of 24-inch steel pipe for the second section of the west side sewage development, here. However, most recent requirements have originated from small structural jobs. Most mills are having difficulty in meeting current requirements, as pressure for deliveries continues unabated.

Chicago—Plate specifications are heavy, principally from railroads, equipment builders and tank and structural fabricators. Less new business for freight car building is in immediate prospect, but mill backlogs will sustain good schedules into next quarter. Tank inquiries are fair, while fabricators have good backlogs. Recent tank orders include 1500 tons for two oil companies.

Boston—Plate specifications and shipments are heavy, with some falling off in new buying. Tonnage now being delivered generally exceeds that currently bought. Bridges account for substantial new inquiry. Large tank work is also heavier, including two 75,000-gallon units for Plymouth county, Massachusetts. In car lots, plates are reaffirmed for third quarter, at 2.65c, Boston.

New York — Specifications for steel plates last week reflected last minute covering on tonnage under protection to May 1 on identified work. New orders are lighter and sellers expect further leveling off over the remainder of the quarter. Bids on the steamer for the United States Lines were allowed to expire April 30 without action. Continued uncertainty as to the type is said to be the principal factor in delays. New bids may be taken, due to a technicality said to make this mandatory in the event no action was taken by May 1.

San Francisco—Demand for plates is exceptionally quiet and no new inquiries of importance have developed during the past few weeks. Bids are expected to be called for soon for the Mad River welded steel pipe line at Eureka, Calif., calling for a fair-sized tonnage. So far this year 21,954 tons have been placed, compared with 50,721 tons for the same period last year.

Seattle — Increasing interest in tank and boiler jobs is reported by plate shops but no large tonnages are up for immediate action. Pulp and paper plants in Washington and Oregon are planning additional extensions. Beall Pipe & Tank Co., Portland, Oreg., was low bidder for furnishing Salem, Oreg., with approximately 800 tons of 20 and 24-inch welded steel water pipe but the award went to cast iron.

Plate Contracts Placed

1300 tons, plates to be galvanized three destroyers for the Brazilian navy, awarded through th Penn Galvanizing Co., Philadelphia, to several Producers; in addition, this company has awarded 500 tons of black plate and 900 tons of other items, including shapes, making for a total of 2700 tons of steel for these boats.

1160 tons, 34 tanks, Pure Oil Co., various locations, Ohio, Pennsylvania, Oklahoma, Illinois and Minnesota, to Graver Tank & Mfg. Co., East Chicago, Ind.

1000 tons, tanks, Pure Oil Co., Toledo, O., to Graver Tank & Mfg. Co., East Chicago, Ind.

775 tons, oil storage tanks, Harbor Springs, Tex., for Humble Pipe Line

Co., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

775 tons, oil storage tanks, Humble Pipe Line Co., Port Aransas, Tex., to Pittsburgh-DesMoines Steel Co., Pittsburgh.

560 tons, four spherical pressure tanks, Humble Oil & Refining Co., Baytown, Tex., to Chicago Bridge & Iron Works, Chicago.

500 tons, tanks, Globe Oil Co., Lemont, Ill., to Graver Tank & Mfg. Co., East Chicago, Ind.

275 tons boiler plate steel for navy, eastern yards and Puget Sound, to Worth Steel Co., Claymont, Del.; 550 tons for navy, Washington, to Bethlehem Steel Co., Bethlehem, Pa., Schedule 251, April 2.

100 tons, large-size bell and whistle buoys, lighthouse bureau, Staten Island, New York; seven to Tippett & Wood, Phillipsburg, N. J., $20,123, delivered; eleven to Union Boiler & Mfg. Co., Lebanon, Pa., $12,350; one to Downingtown Iron Works, Downingtown, Pa., $2800; bids April 14.

100 tons, two 75,000-gallon tanks, county farm, Plymouth, Mass., and county hospital, South Hanson, Mass., to Chicago Bridge & Iron Works, Chicago.

Unstated tonnage, tank, Brewertown water district, Cicero, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Plate Contracts Pending

7500 tons, two oil tankers for the Sinclair Navigation Co., New York, bids postponed from May 3 to May 10; in addition there are approximately 2500 tons of shapes and bars.

780 tons, pipe line, Silver Springs, Idaho.

100 tons or more, 500,000-gallon elevated steel tank, Washington, D. C.; Pittsburgh-Des Moines Steel Co., Pittsburgh, low, tank A type, $41,740; tank B, $31,320; tank C, no bid. Chicago Bridge & Iron Works, Chicago, tank A, $43,850; tank B, $33,500; tank C, $34,750; bids April 26, district commissioners.

Sheets

Sheet Prices, Page 98

Pittsburgh—Sheet mill operations continue at their high rate, with deliveries on hot-rolled continuing around 22 weeks, although new business in cold reduced is off. While automobile specifications are lighter, requirements of refrigerator, farm equipment, railroad freight car fabricators and numerous other consumers are heavy. Good-sized tonnages of galvanized are moving to rural areas and for special jobs. Galvanized mills have been operating at above 70 per cent since early in March and are currently around 76 per cent. Common black and full finished mills are operating around 85 per cent and jobbing mills at close to 60 per cent. Current prices have been reaffirmed for third quarter at 2.40c, Pittsburgh, on hot-rolled No. 10; 3.15c, Pittsburgh, on hot-rolled annealed No. 24; 3.80c, Pittsburgh, on galvanized No. 24; 3.10c, Pittsburgh, on cold rolled No. 10; 3.55c, Pittsburgh, on cold rolled No. 20, and 2.90c,

Pittsburgh, on enameling sheets. Export demand is strong.

Cleveland — The decline in specifications on most steel products since disclosure of third quarter prices has not been so evident in sheets as in heavier hot-rolled material. Except for the absence of the heavy buying from auto manufacturers, there has been little let-up in new business. With mills operating at capacity some progress is being made against backlogs.

Chicago—While sheet shipments still are regulated only by mill capacity, new business is quieter and there are fewer complaints from customers regarding delivery. On most grades, deliveries have not improved but lighter demand from the automotive industry has shortened the time required for shipment on cold-rolled material. Deliveries on galvanized sheets in most instances extend well into third quarter, though some mills occasionally can work in additional tonnages within 30 days.

New York—While there has been some recession, buying of sheets continues actively. Most consumers are operating at capacity and have considerable work ahead. Some rescheduling of deliveries is noted, particularly where buyers had placed tonnage for shipment this quarter to protect against a price increase. With unchanged prices these buyers are willing to have later delivery. As a result some mills now can take some small lots for three to four weeks delivery. Other producers have had little opportunity to reschedule and recently have booked tonnage for fourth quarter at price ruling at delivery. Bids will be opened May 11 on 1000 tons of 3/16-inch sheets for metal stacks for the Archives building at Washington.

Philadelphia—New sheet tonnage continues to shrink but has not reached a point where it is having an appreciable effect on deliveries. Some producers are sold ahead for practically the entire third quarter with others well sold into August and in some cases beyond. It is considered likely that this delivery situation will be rather substantially relieved by the end of this month, judging from the current downward trend in new bookings.

Cincinnati—Buying of sheets for third quarter delivery continues slightly in excess of rated mill capacity despite announcement of reaffirmed prices. Tonnage on which buyers asked shipment be deferred from second to third quarter has been negligible, thus having no effect on the sold-up condition of mills.

St. Louis—The local sheet situation continues tense. Deliveries are still in arrears from two to four weeks, with no relief apparent. Galvanized is reported active.

Pipe

Pipe Prices, Page 99

Pittsburgh—One of the largest pipe line awards of the year, involving 28,000 tons, has been taken by National Tube Co., Pittsburgh. The order consists of 363 miles of 6-inch line and 205 miles of 8-inch for the expansion and improvement program of Great Lakes Pipe Line Co., Kansas City, Mo. The 8-inch line will run from the refinery at Barnsdall, Okla., to Kansas City, paralleling an existing line for gasoline transmission. In other tubular goods the overall volume of new business has fallen off compared to March, but this was expected and conditions are still far better than one year ago.

Cleveland — Jobbers report general requirements for standard steel pipe, comparing favorably with March. Recent demand has centered around industrial sources, as more favorable weather permits carrying out of plans for general repairs and expansion. Cast iron pipe requirements are below those of this time last year, primarily due to curtailment in federal allotments to small municipalities.

Chicago—While cast pipe orders are more numerous, total tonnage involved continues relatively light and sellers are not particularly hopeful regarding a marked upturn in demand. Sellers look for a larger volume of privately financed orders this year than last but this largely will be offset by the reduced amount of federal spending.

Boston — Following a buying flurry, involving several thousand tons, cast pipe demand has receded. Westerly, R. I., is expected to require a large water line tonnage soon. New England cast pipe foundry is operating practically at capacity. French cast iron pipe interests have entered the lists in some recent bidding. Merchant steel pipe demand is well sustained. A fair tonnage of large-diameter steel pipe in short lengths is required for a dam near Hartford, Conn.

New York—Cast pipe buying is light in small lots with inquiry meager, several tonnage projects planned being slow to mature. Volume booked thus far this year has been well below expectations. Eastern pipe foundries are operating slightly above the rate of several weeks ago, but backlogs are not large. Prices are fairly firm on limited current buying, but not seriously tested.

Buffalo — Pipe sales continue heavy and many additional projects are pending. The city of Niagara Falls has purchased more than $58,000 worth of pipe and fittings from the United States Pipe & Foundry Co. for early delivery. Numerous smaller projects are pending in this district.

San Francisco — Cast iron pipe bookings were third largest for any week so far this year, aggregating 1523 tons to bring total to date to 14,615 tons, compared with 11,716 tons for corresponding period in 1936. Largest pending inquiry involves 200 tons for treasury department, Los Angeles, bids opened.

Seattle — The largest cast iron pipe award of the year to date, 1000 tons of 4 to 24 in. for Salem, Oreg., was taken this week by H. G. Purcell, Seattle, for the United States Pipe & Foundry Co., Burlington, N. J. Butte Falls, Ore. has awarded 4000 feet of steel pipe to D. P. Slater, Salem Oreg.

Steel Pipe Placed

28,000 tons, 363 miles of 6-inch and 205 miles of 8-inch, for Great Lakes Pipe Line Co., Kansas City, Mo., to National Tube Co., Pittsburgh.

100 tons, 250 lengths, shore discharge pipe, United States engineer, Philadelphia, to Lancaster Iron Works, Lancaster, Pa., $36 per length delivered, bids April 26, circular 418.

Cast Pipe Placed

275 tons, WPA projects, Buffalo, to United States Pipe & Foundry Co., Burlington, N. J.

192 tons, 4 and 6-inch, South Gate, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

106 tons, 4 to 16-inch, Manhattan Beach, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

2000 tons, Borough yard stocks, New York; bids May 10 to department of purchase.

335 tons, 4 and 8-inch, Chicago; Alabama Pipe Co. low.

180 tons, 4 to 12-inch, Santa Ana, Calif.; bids opened.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 99

Shipments of bolts and nuts are held at an active rate by heavy consumption among railroads, freight car builders and farm implement and tractor manufacturers. Specifications from jobbers still are restricted somewhat by previous shipments but miscellaneous demand is holding well. Prices are fairly steady, particularly as compared with the price situation of recent years.

Transportation

Track Material Prices, Page 99

In spite of official denials that a list involving upwards of 10,000 freight cars is under consideration by the New York Central rumors to that effect persist.

Reading Co. announces that it plans to build 700 cars in its shops at Reading, Pa., and will award contracts for two steel lighters for use in the Delaware river service. Total cost of new equipment will be approximately $2,500,000.

Rail mills are behind on shipments as railroads press for delivery for spring track laying. New business in rails and accessories is light but backlogs will support heavy operations through June. Few inquiries for freight cars are active. Financing problems present an obstacle in purchases of additional equipment by some carriers but others are considering buying additional rolling stock. National Railways of Mexico has divided 750 cars among three builders and has ordered 18 locomotives.

Rail Orders Pending

Louisiana highway commission, Baton Rouge, La., 653 tons of rails and 220 tons fastenings, highway bridge over Mississippi river, Baton Rouge; will be bought by contractors awarded general work.

Car Orders Placed

Atlantic Coast Line, 100 phosphate cars to Bethlehem Steel Co., Bethlehem, Pa., instead of 200 auto cars, as erroneously reported last week.

Canadian National, 50 passenger coaches, to Canadian Car & Foundry Co., Montreal.

Inland Waterways Corp., Birmingham, Ala., twenty 50-ton all-steel box cars to Pullman-Standard Car Mfg. Co., Chicago.

Louisville & Arkansas, 100 box cars to Pullman-Standard Car Mfg. Co., Chicago.

National Railways of Mexico, 250 30-ton narrow gage box cars and 150 50-ton standard gage box cars, to Pullman-Standard Car Mfg. Co., Chicago; 175 standard gage box cars to the American Car & Foundry Co., New York; and 175 standard gage box cars to General American Transportation Corp., Chicago.

Reading Co., 700 freight cars, including 600 50-ton box cars, 50 cement hopper cars and 50 70-ton all-steel flat cars, to own shops.

Car Orders Pending

Koppers Co., Pittsburgh, 700 hopper cars, under consideration.

Locomotives Placed

Bangor & Aroostook, 5 locomotives, to American Locomotive Co., New York

National Railways of Mexico, 18 locomo-

tives to American Locomotive Co., New York.

Buses Booked

General Motors Truck Corp.: Twenty-five 36-passenger, single deck, rear-engined to Chicago Motor Coach Co., Chicago; previous order included 35 coaches of same type.

Tin Plate

Tin Plate Prices, Page 98

Pittsburgh—While the flood last week curtailed operations temporarily and necessitated moving some stock, no serious damage was reported and resumption after the short layoff was speedy. Shipments have been heavy recently, well in excess of production. Most mills are booked until Sept. 30 and are encountering great pressure for speedy deliveries. Meanwhile, export offers are numerous. It is too early for announcement on prices after Sept. 30, but some sellers believe that if pig tin and labor costs remain at their current levels an advance would not be unexpected.

Strip

Strip Prices, Page 99

Pittsburgh—Reaffirmation of hot and cold-rolled strip steel prices for third quarter has not yet resulted in any extensive decline in bookings, but this is expected. Backlogs are still large and operations probably will hold at a high rate for weeks. Automobile manufacturers and partsmakers have not yet completed taking full requirements for 1937 models. Farm equipment builders, household appliance and hardware manufacturers are busy. Export demand is good, with tonnages being booked regularly at advantageous prices. Hot strip is 2.40c, Pittsburgh, and cold strip, 3.20c, Pittsburgh or Cleveland.

Cleveland — Demand for wide and narrow strip from small farm tool and electrical equipment manufacturers has continued better than many expected, since prices are unchanged for third quarter. Most consumers are fairly well stocked, as pressure for deliveries is said to have eased somewhat. Mills continue to operate close to capacity in order to take advantage of the breathing spell, to make some headway against extended backlogs.

Chicago—Occasional gains are shown in new strip business but total volume is substantially smaller than during early March. Consumers are exerting less pressure on mills for early shipment though strip use is well sustained in nearly all directions. Deliveries are improved but slightly and backlogs extend into third quarter.

Boston—Cold strip buying is irregular with incoming volume down slightly. Production and shipments continue heavy. The drop in new demand has been moderate. Most sellers have definitely reaffirmed prices for third quarter. Deliveries are beginning to improve. Hot strip is available in five weeks as a rule, but re-rollers still press for shipments. Cold strip tonnage booked for third quarter at open prices will be billed at current quotations.

New York—Recession in new cold strip buying is gradual. Deliveries show a spotty improvement, mills more frequently being able to roll certain sizes and gages for earlier shipment. Backlogs are heavy, operations high and consumers eased as to sufficient stock for immediate needs. No suspended deliveries are reported. Demand continues well-spread. Until present substantial consumer stocks, already on hand or to be shipped, are partially worked off, a slow tapering in buying is considered likely.

Wire

Wire Prices, Page 99

Pittsburgh—Revision to eliminate differences in southern and northern methods of quoting wire prices likely will be made soon. Last week new specifications declined slightly as result of reaffirmation of current prices for third quarter. Shipments continue heavy and backlogs are comparable to last month. An easier tone to the farm trade is becoming apparent as farmers' spring work starts.

Cleveland — Some mills are still able to make second quarter delivery on rods and some merchant wire products, particularly nails. Spring wire and other grades of manufacturing wire are booked solid, in most instances, through this quarter. Specifications have declined since third quarter prices were announced. Most consumers are apparently fairly well covered for the immediate future, as pressure for delivery has eased considerably.

Chicago—While steel wire consumption is well maintained and shipments hold at recent peak, new business is quiet. This situation largely is a result of extension of current prices into third quarter. Consumers are less anxious to order ahead and now are absorbing part of stocks previously acquired. Movement of merchant products to distributors continues fairly heavy. Prices are steady.

Boston—While new buying declines gradually, wire mills are still pressed for delivery on early second quarter orders. There have been no postponements of deliveries by consumers. While most mills will clear practically all low-priced tonnage this week, some will not be able to ship all this volume before two or three weeks. Mill backlogs are heavy and operations in most finishing departments are at capacity.

New York—Wire buying has leveled off to a steady volume of well-distributed new business. Manufacturers' wire, heavy products, including rope, and electrical goods are well maintained. Shipments are now slightly in excess of incoming orders with mills operating at capacity in numerous finishing departments. High production schedules are assured for remainder of this quarter. Delayed deliveries on nails has resulted in some shortage with secondary sellers who are still pressing for shipment. This situation is gradually improving. Prices are firm and mills generally are making slight inroads on heavy backlogs. Deliveries are improving slowly.

Cold Finished

Cold Finished Prices, Page 99

Pittsburgh—Backlogs of cold-finished bar producers range around six weeks, with earlier deliveries obtainable in a few sizes. Consumers' stocks are ample and it is apparent that they are in less hurry to reorder than a month ago. This easier feeling is generally believed due to reaffirmation of current prices for third quarter. Most buyers expect to return with good-sized specifications a little later this year. Washing machine manufacturers, in particular, have good order backlogs and diversified consumers are busy.

Shapes

Structural Shape Prices, Page 98

New York—An increasing number of structural projects taking under 1000 tons sustains demand,

unplaced pending tonnage is mounting steadily. A court house, Jamaica, New York, closing May 11, is included in new work. Fabricating shops in this district, notably the small units, have substantial volume on the books. Current awards include few large-tonnage contracts.

Bookings of fabricated structural steel during March, according to tabulations of the American Institute of Steel Construction, were the largest since July of last year. March bookings brought the first quarter total approximately 9 per cent above last year. Shipments during March also increased, carrying the total for the quarter above last year.

Boston—Sharp upturn in structural activity, features demand for heavy steel. New bridge work involves 3000 tons, 2020 tons for Massachusetts, closing May 10 and 11. A court house superstructure, Boston, about 6000 tons, already bid, is the largest individual project, with 3300 tons figured for a Hartford, Conn., store. District fabricating shops have backlogs for several weeks of high operation. Plain material is 2.635c, Boston; 2.595c, Springfield, and 2.615c, Worcester.

Philadelphia—While shape mills have been in receipt of substantial specifications for projects on which price protections expired April 30, the volume of new structural contracts reached a low point over the past week. In fact, awards were the lightest in many weeks and there is little business in sight. In Baltimore a 3200-ton bridge is up for bidding May 12, but as for the local district, little is up for early action. Locally, the two school superstructures, scheduled for Sixty-seventh street and Elmwood and North Philadelphia, are outstanding projects. The Market street court house does not appear as imminent as a few weeks ago, in view of the retrenchment program promised in Washington on PWA work. Shape prices are steady at 2.35c, Bethlehem, or 2.455c, delivered, Philadelphia.

Pittsburgh — While volume of awards has dropped considerably from the large number in the early part of April, estimating departments here are busy and projects under 100 tons are active. Awards last week included 1300 tons for a highway bridge at Port Royal, Pa. Inquiries include 1500 tons for a chain bridge, Washington, D. C.

Cleveland — Aggregate structural tonnage placed last week showed marked improvement. American Bridge Co., Pittsburgh, received 890 tons for the mill building at Canton, O., for Timken Roller Bearing Co., Canton, and Burger Iron Co., Akron, O., was awarded 800 tons for the Summit county, Ohio, bridge. Backlogs are further extended so that fabricators are having difficulty in getting definite delivery promises from mills.

Chicago—Shape producers have substantial backlogs, but new inquiries and awards in Chicago district are light. The largest award is 1400 tons here for a steel warehouse. Larger inquiries consist principally of bridges. Railroads

Shape Awards Compared

	Tons
Week ended May 1	19,003
Week ended April 24	17,178
Week ended April 17	28,021
This week, 1936	14,884
Weekly average, 1936	16,332
Weekly average, 1937	27,479
Weekly average, March	28,634
Total to date, 1936	354,945
Total to date, 1937	494,619

Includes awards of 100 tons or more.

are fairly active in purchasing small lots for bridge repairs.

New Orleans—The largest structural steel inquiry of the year closes May 26 with the Louisiana highway commission, Baton Rouge, Mississippi river bridge, that city, taking 31,157 tons of fabricated material, a good part being silicon. Other items include 2743 tons reinforcing bars; 550 tons steel castings; 653 tons rails, and 220 tons fastenings. In the south, public works and bridges account for most structural steel activity, although the number of small private projects is increasing.

San Francisco — While awards were limited to less than 700 tons, over 10,000 tons is pending. The largest letting was 400 tons for the Pine Creek bridge near Victor, Idaho, to an unnamed interest. To date this year 74,643 tons have been placed as compared with 42,087 tons for the corresponding period in 1936.

Seattle—Close figuring featured tenders submitted to Seattle light department, for constructing 560 power transmission towers involving 5500 tons over a 116-mile stretch. A. S. Schulman Electric Co., Chicago, apparently submitted the low figure for fabricating and erecting at $1,124,297. Bethlehem Steel Co., Seattle, was low at $526,368 for materials and Fritz Ziebarth for erecting at $600,539.

Shape Contracts Placed

3200 tons, Fox department store, Hartford, Conn., to Ingalls Iron Works, Birmingham, Ala.; Southern New England Contracting Co., general contractor and H. G. Balcom, Structural engineer.

2200 tons, building, Standard Oil company of Indiana, Whiting, Ind.; divided, Mississippi Valley Structural Steel Co., Decatur, Ill., and Wisconsin Bridge & Iron Co., Milwaukee; M. W. Kellogg Co., New York, engineers and contructors.

1400 tons, warehouse, Central Steel & Wire Co., Chicago, to American Bridge Co., Pittsburgh.

1300 tons, state highway bridge, Route 45, Port Royal, Pa., to American Bridge Co., Pittsburgh.

1010 tons factory building, Owens-Illinois Co., Gas City, Pa., to Indiana Bridge Co., Muncie, Ind.

890 tons, mill building, Timken Roller Bearing Co., Canton, O., to American Bridge Co., Pittsburgh.

710 tons, power house addition, Commonwealth & Southern Power Co., East Peoria, Ill., to Whitehead & Kales Co., Detroit.

600 tons, Summit county, Ohio, bridge, to Burger Iron Co., Akron, O.; through Bates & Rogers, Chicago.

600 tons, bridge approach, Clinton, Iowa, to Clinton Bridge Works.

540 tons, power house addition, Commonwealth & Southern Power Co., Springfield, O., to Whitehead & Kales Co., Detroit.

510 tons, state highway bridge, route No. 17040, Clearfield, Pa., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

480 tons, store, S. S. Kresge Co., Albany. N. Y., to Harris Structural Steel Co., New York.

445 tons, bridge, U. S. engineer, Los Angeles, spec. 280, to Bethlehem Steel Corp., Bethlehem, Pa.

400 tons, building, Swift & Co., Port Newark, N. J., to Joseph T. Ryerson & Son Co. Inc., Chicago; through Lockwood-Greene, New York, engineers.

400 tons, state highway bridge, route No. 379, Avonmore, Pa., to American Bridge Co., Pittsburgh.

400 tons, Pine Creek bridge near Victor, Idaho, to unnamed interest.

335 tons, bridge, project 1-C-1, Vicksburg National Park, to Illinois Steel Bridge Co., Jacksonville, Ill.

300 tons, addition, public school No. 226, New York, to Ingalls Iron Works, New York; through Skolnick Building Corp., New York.

270 tons, state highway bridge No. 156 over route 23, Larry's Creek, Pa., to American Bridge Co., Pittsburgh.

250 tons, building, Fulton Savings Bank, Brooklyn, N. Y.; to Harris Structural Steel Co., New York; DeYoung & Moskowitz, New York, architects.

240 tons, rewaxing plant, Baton Rouge, La., to Decatur Iron & Steel Co., Decatur, Ala.; through M. W. Kellogg Co.

225 tons, building, Virginia Medical college, Richmond, to Dietrich Bros., Baltimore; William Muirhead Construction Co. Inc., Durham, N. C., general contractor.

185 tons, bridge, 1043-R-311-C, Franklin-Lincoln counties, Mississippi, to Vin-

cennes Steel Corp., Vincennes, Ind.
180 tons, bridge, 1043-E-310-C, Wayne highway, Mississippi, to Virginia Bridge Co., Roanoke, Va.
173 tons, state highway bridge, McKean county, Pa., to Bethlehem Steel Corp., Bethlehem, Pa.; through Baldwin Bros. Co., Cleveland.
170 tons, plant addition for the Owens-Illinois Glass Co., Streator, Ill., awarded through Hughes Foulkrod & Co., Philadelphia, to the Indiana Bridge Co., Muncie, Ind.
160 tons, state bridge Snoqualmie river, Wash., to Pacific Car & Foundry Co., Seattle; Cascade Contracting Co., Seattle, general contractor.
150 tons, bridges, World's Fair construction, New York, to American Bridge Co., Pittsburgh; Faircroft Engineering Corp., Brooklyn, general contractor.
140 tons, bridge, route 378 Armstrong county, Pennsylvania, to Reliance Steel Products Co.
135 tons, bridge, 1934-R-176-C, Jefferson, Miss., to Vincennes Steel Corp., Vincennes, Ind.
130 tons, equally divided, shapes and bars, high school, Waynesborro, Va., structurals to Roanoke Iron & Bridge Works, Roanoke, Va., and reinforcing to Roanoke Engineering Sales Co., Roanoke; J. C. Senter, Roanoke, general contractor.
125 tons, bridge, 1043-R-318, Sunflower highway, Mississippi, to Nashville Bridge Co., Nashville, Tenn.
120 tons, subway, section 27SF, Springfield, Ill., to Gage Structural Steel Co., Chicago.
115 tons, filtration plant, Lawrence, Mass., to West End Iron Works, Cambridge, Mass.; James A. Monroe & Sons, North Attleboro, Mass., general contractor.
115 tons, pack house, Lehigh Portland Cement Co., Chapman, Pa., to Lehigh Structural Steel Co., Allentown, Pa.
100 tons, high school, Athol, Mass., to Haarmann Steel Co., Holyoke, Mass.; through H. W. Hanson Co., Boston; bars to Truscon Steel Co., Youngstown, O.
100 tons, power plant, Trona, Calif., awarded by the United Engineers Inc., Philadelphia, to the Ingalls Iron Works, Birmingham, Ala.
100 tons, office building, Block Bros., Wheeling, W. Va., to Fort Pitt Bridge Works, Pittsburgh; through Austin Co., Cleveland.
100 tons, building, Sun Rubber Co., Akron, O., to Burger Iron Co., Akron, O.

Shape Contracts Pending

31,157 tons, superstructures and approaches, bridge, Mississippi river, Baton Rouge, La.; bids May 26 to Louisiana highway commission, Baton Rouge. L. P. Abernathy, chairman; for contracts, also 550 tons steel castings.
6000 tons, 17-story superstructure. Suffolk county courthouse, Boston; John Bowen Co., Inc., Boston, and George A. Fuller Co., Boston, low on various alternates, bids April 27.
5500 tons, 560 transmission towers, Seattle light department; A. S. Schulman Electric Co., low, for fabricating and erecting; Bethlehem Steel Co., Seattle, low, for materials and fabricating.
4000 tons, courthouse, Jamaica, N. Y.; bids May 11.
3700 tons, subway section No. 6, route 101, New York; bids May 11 to Board of Transportation.
3200 tons, Howard street bridge, Baltimore, bids May 12; also 200 tons of forgings and other miscellaneous ferrous items.
2000 tons, 103rd street viaduct, Chicago; Ketler-Elliott & Co., Chicago, low for general contract.
1500 tons, chain bridge, Washington, for District of Columbia commissioners.
1500 tons, public school No. 115, Bronx, N. Y.; bids May 11.
1200 tons, Hollywood Turf club, Hollywood, Calif.
1065 tons, state bridge, Merrimack river, Lowell, Mass.; bids May 10, to department of public works, Boston. G. H. Delano, chief engineer.
1000 tons, courthouse, Brooklyn, N. Y.; bids May 5.
1000 tons, public school No. 113, Manhattan, N. Y.; bids May 11.
860 tons, bridge, Fargo, N. D.
830 tons, Keystone dam, Hastings, Nebr.
800 tons, addition, public school No. 131, Brooklyn, N. Y.; bids May 11.
750 tons, umbrella sheds, Union Pacific railroad passenger station, Cheyenne, Wyo.
750 tons, manufacturing building, for New York & Pennsylvania Co., Lock Haven, Pa.
720 tons, multiple span steel bridge, route No. 20, over Boston & Albany railroad and Westfield river, Huntington, Mass.; bids May 10, state department of public works, Boston, G. H. Delano, chief engineer.
600 tons, Lorain avenue bridge, Cleveland; bids May 18.
600 tons, bridges, Central railroad of New Jersey, Elizabeth, N. J.
554 tons, state bridges, South Dakota.

540 tons, annealing covers, for United Engineering & Foundry Co., Youngstown, O.

500 tons, structural steel; bids by Port manager, Long Beach, Calif., May 5.

500 tons, bridge, Vicksburg, Miss.

430 tons, building, for Moraine Products division of General Motors Co., Dayton, O.

400 tons, grade separation bridge, WPGH-8506, Endicott, N. Y.

350 tons, highway and railway bridge, Ft. Wayne, Ind., for General Electric Co., Schenectady, N. Y.

340 tons, elementary school, Endicott, N. Y.

300 tons, piling, reclamation bureau, Denver; bids May 5.

290 tons, Del Rey bridge for United States Engineer office, Los Angeles; bids opened.

155 tons, piling, bureau of reclamation, invitation A-42,233-A, Knob, Calif.; bids opened.

150 tons, sewer project, contract 17, Hartford, Conn.; F. H. McGraw & Co., Hartford, low.

150 tons, garage and office building, Peoples Gas, Light & Coke Co., Chicago.

134 tons, stringer bridge, Gibbs crossing, Ware river, Ware, Mass.; bids May 11, state department of public works, Boston. G. H. Delano, chief engineer.

100 tons, state bridges, Northfield and Barre, Mass.; bids May 11, state department of public works, Boston. G. H Delano, chief engineer.

Unstated, four state bridges in Montana; bids at Helena, May 5.

Reinforcing

Reinforcing Bar Prices, Page 99

Pittsburgh—Inquiries for concrete reinforcing bars continue steady, including 6000 tons of rail steel for three stores and a warehouse for Goldblatt Bros., Chicago, on which bids will be taken soon. A number of other large projects are on the pending list. Producers report that some contractors' jobs have been held up recently because they showed hesitancy in placing the steel promptly. Prices are fairly steady.

Cleveland—Reinforcing bar awards improved somewhat last week, as Patterson-Leitch Co., Cleveland, received 150 tons, for concrete culvert, at Maple Heights, O., and 200 tons for Euclid creek sewer project, for city of Cleveland. Miscellaneous jobs of well over 100 tons continue active, as deliveries remain three to four weeks. Pending tonnage includes 200 tons for the Hockey Rink, Cleveland. Prices remain firm.

Chicago—Concrete bar demand shows little change. Inquiries are heavier, and there are prospects for larger bookings this month, for public projects and private building. Illinois road work is slow to increase. Prices are fairly steady.

Boston—Unit prices on reinforcing steel in place are slightly firmer. Buying, mostly in small lots, has turned upward with inquiry also heavier, especially for bridges and public buildings. Two industrial addition projects, Beverly, Mass., and Nashua, N. H., took more bars than reported, 700 tons, placed through Morton C. Tuttle Co., Boston.

New York—Reinforcing bar buying is heavier, close to 3000 tons being awarded, including 1000 tons for

Concrete Awards Compared

	Tons
Week ended May 1	4,672
Week ended April 24	4,430
Week ended April 17	6,694
This week, 1936	4,679
Weekly average, 1936	6,005
Weekly average, 1937	4,212
Weekly average, March	5,402
Total to date, 1936	126,805
Total to date, 1937	75,814

Includes awards of 100 tons or more.

two industrial projects, Connecticut Highway mesh is more active, both buying and inquiry. Sewers, on which bids are in, take 4000 tons. P. Tomasetti Contracting Co. is low on the Flatbush avenue, Brooklyn, project, 3500 tons. More tonnage also pends for miscellaneous work in New Jersey, although this state's highway and bridge program lags. Reinforcing bar prices show a stronger trend.

Philadelphia — Reinforcing bar business has slumped sharply. Orders, which have been confined principally to small tonnages, are less numerous and at the moment there is not an outstanding award. Apart from some school work, which still appears a few weeks off, there is little work pending. State road work is getting under way slowly, with prospects along this line not as promising as they were early last month. The tip from Washington that public expenditures were running too heavy appears to have had a depressing influence on state as well as federal work.

San Francisco—Awards are confined to small lots and with few exceptions new inquiries call for similar unimportant tonnages. The largest award went to Carnegie-Illinois Steel Co. and called for 149 tons for the bureau of reclamation at Odair, Wash. This same department has just taken bids on 487 tons for delivery at Phoenix, Ariz., and on three other projects in California and Wyoming, requiring 321 tons. Local mills are booked several months in advance and find it difficult to supply distributors with needed stock material. Awards totaled less than 700 tons, bringing the aggregate for the year to 27,655 tons, compared with 81,675 tons for the same period a year ago.

Seattle—While no awards in excess of 100 tons were placed last week, bids were opened on several sizable jobs. For work at Coulee dam, bureau of reclamation is considering figures on 1600 tons of concrete bars while bids are in for 375 tons involved in footings for Seattle's light department towers. Washington state opened tenders this week for highway projects calling for about 300 tons.

Behind the Scenes with STEEL

Coronation Clatter

INTRODUCTION of STEEL'S august pages to the coronation which now has half the civilized world agog, according to its press agents, occurred on page 15 of the April 19 issue. Since the press of the world has been flooded with propaganda about how many inches each duchess can drag after her and other all-important matters, we have been awaiting the next appearance of the subject in these columns. After a careful search of this record-breaking issue, largest since way back, we fail to find anything traceable to the king-crowning. Not even so much as a series of ads in the coronation colors, which are, we are told, red blue, green and gold. Looks like the orangemen didn't have a powerful enough lobby.

* * *

Canned

PROBABLY you also got a kick out of Youngstown Sheet & Tube's paraphrase of the Earl of Lytton's poetic tribute to cooks in last week's issue, page 59. It went like this:

We might live without pots,
We might live without pans;
But modernized homes cannot
Live without cans.

It is high time someone paid tribute to the lowly can. The world is over-run with them today, and they seem to have evoked but faint praise. As Youngstown so aptly puts it, "The mere thought of a world without cans baffles the imagination."

Uh-uh, there, you reader in Shamokin, Pa., none of that vernacular business!

* * *

Heat Wave

SUDDEN jump in temperature around the Toledo district on April 22 was not due to a sunspot but to the red faces of some 35 sit-downers in the plant of the France Foundry Co. On strike since March 31, they learned some 22 days later the company had quietly folded its tent and quit business on April 1, leaving them holding the bag as well as the plant.

* * *

Minutiae

MANY favorable comments have been received from the advertising gentry on the series of opposite - inside - back - cover institutional messages which STEEL has been presenting the last few weeks under the heading, "It's the Little Things That Count." Feature is the use of a large illustration forcefully drawing the attention to an object of minute proportions, and incidentally to the copy below.

Maybe the little things do count, but ours is now 18 months old and can't even count up to 1 yet. Must be the paternal influence.

* * *

Body Blow

A NORTHERN Michigan manufacturer writes: "Please advise if there is a column in your magazine called 'Motordom'." After reading this thrust, our circulation and promotion departments fell in a dead faint from which they were revived with difficulty. For 10 long years STEEL has carried regularly its "Mirrors of Motordom" pages, being probably the first business magazine to furnish this service.

What we would like to know is this: Is there a state in this country known as Michigan?

* * *

High Water

REPORTS of floods in the Golden Triangle cause speculation behind STEEL'S scenes as to whether the new steel flood gates installed in a Pittsburgh department store will get the acid test, heavily diluted. We have a hunch that if the gates hold tight enough, the whole store will float merrily down the Ohio and resume business in some Kentucky mountaineer's back yard. Hope they have a plentiful stock of jugs and small size wedding rings.

* * *

Fency

FINE fancy ferrous fences for floundering farmers are fabricated in an ultra ultra plant in Chicago by Republic Steel Corp., according to pages 42 et seq., this issue. Well, according to our slant on things political, farmers are in need of defense against some things being dreamed up for them by the bigwigs. Ouch! Wire you throwing those stuff?

—SHRDLU

Reinforcing Steel Awards

700 tons, building, George T. Stagg distillery, Frankfort, Ky., to Pollak Co., Cincinnati.

530 tons, mill building, Bridgeport Brass Co., Bridgeport, Conn., to Concrete Steel Co., New York; Stone & Webster Co., Boston, engineers and contractors.

475 tons, power plant, Connecticut Power & Light Co., Hartford, Conn., to Concrete Steel Co., New York.

375 tons, additional buildings, Williamsburg federal housing project, New York, to Concrete Steel Co., New York; Starrett Bros. & Eken, New York, general contractor.

245 tons, apartment, 1001 Jerome Avenue Corp., New York, to Industrial Engineering Corp., New York.

220 tons, Huntington Park bridge, Cleveland, to Builders Structural Steel Co., Cleveland.

200 tons, filtration plant, Lawrence, Mass., to Northern Steel Co., Everett, Mass.; James A. Monroe & Sons, North Attleboro, Mass., general contractor.

200 tons, Euclid creek sewer, city of Cleveland, to Patterson-Leitch Co., Cleveland.

175 tons, highway and bridge, Jacob Riis Park, Queens, N. Y., to Igoe Bros., Newark, N. J.; through Woodcrest Construction Co., New York.

150 tons, mesh and bars, state highway Interboro Parkway, Queens county, New York, to Truscon Steel Co., Youngstown, O.; through Immick Co Inc., Meriden, Conn.

150 tons, concrete culvert, for county commissioners, Maple Heights, O., to Patterson-Leitch Co., Cleveland.

149 tons, bureau of reclamation, invitation 38,283-A, Odair, Wash., to Carnegie-Illinois Steel Corp.

138 tons, crossing at San Onofre, San Diego county, California, to unnamed interest.

125 tons, bridges, Worlds Fair project, New York, to Joseph T. Ryerson & Son Co. Inc., Chicago; through Faircroft Construction Co., New York.

115 tons, public school 117, Bronx, New York, to Capital Steel Co., Brooklyn; Psaty & Furhman, Inc., New York, general contractor.

110 tons, building, Watt Paper Co., Chicago, to Concrete Engineering Co., Chicago.

100 tons, mesh state highway, Long Island, N. Y., to American Steel & Wire Co., New York; through Good Roads Engineering & Contracting Co. Inc., Wantagh, N. Y.

100 tons, building, Link Belt Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, treasury department, invitation 3686, San Francisco, to Bethlehem Steel Co., San Francisco.

Unstated tonnage, dormitory, Virginia Medical College, Richmond, to Virginia Steel Co., Richmond, Va.; William Muirhead Construction Co. Inc., Durham, N. C., general contractor.

Reinforcing Steel Pending

6000 tons, rail steel, three stores, requiring 1000 tons each, for Goldblatt Bros., Chicago, and one warehouse, 3000 tons; bids soon.

3500 tons, sewer, Flatbush avenue, Brooklyn, P. Tomasetti Contracting Co., Brooklyn, low, April 28.

2743 tons, substructures and approaches, bridge, Mississippi river, Baton Rouge, La.; bids May 26 to Louisiana highway commission, Baton Rouge, La.

1500 tons, rail bars, reservoir, Sioux City, Iowa.

1000 tons, rail bars, Wesley Memorial hospital, Chicago.

750 tons, sewage disposal plant, contracts 10 and 11, Lansing, Mich.

670 tons, Howard street bridge, Baltimore, Md.; bids May 12.

600 tons, new billet bars, Dam No. 25, Cap Au Gris, Mo.

500 tons, rail bars, Moody Bible institute, Chicago.

487 tons, bureau of reclamation, invitation 42,689-A, Phoenix, Ariz.; bids opened.

425 tons, subway section No. 6, route 101, New York; bids May 11 to Board of transportation.

350 tons, sewer, Buffalo; P. Tomatsetti Contracting Co., Brooklyn, low.

200 tons, approaches, Bushkill street bridge crossing, Delaware river, Eastern, Pa.—Phillipsburg, N. J.; Korp & Korp, Phillipsburg, N. J., low.

175 tons, wholesale drug warehouse, Seattle; bids in.

170 tons, sewage regulation chambers, Detroit.

160 tons, mesh, Horace Harding boulevard, Queens county, New York; Johnson Drake & Pipe Inc., Freeport, N. Y., low.

160 tons, high school building, Richmond, Va.

150 tons, mesh highway, Livingston county, New York; Mohawk Paving Co. Inc., Buffalo, low.

150 tons, bridge, St. Ann's avenue, New York City.

140 tons, Ellensburg, Wash., junior high school; Hendrickson-Alstrom Construction Co., Seattle, general contractor.

129 tons, for PWA projects in Oakland, Calif.; bids opened by city.

115 tons, county engineer, Dallas, Tex., bids May 3.

109 tons, bureau of reclamation, invitation A-42,237-A, Potholes, Calif.; bids opened.

101 tons bureau of reclamation, invitation 48,058-A, Cody, Wyo.; bids opened.

Semifinished

Semifinished Prices, Page 99

Demand for semifinished steel is steady and production continues at a high rate, although bookings of sheet bars, blooms, slabs and rerolling billets are not as heavy as in March. Numerous inquiries have been received in the last four or five weeks for sheet bars and other products for export, particularly to England. Wire rod specifications are fairly steady. All current prices will prevail during third quarter.

Metallurgical Coke

Coke Prices, Page 99

Flood conditions in the Connellsville, Pa., region last week resulted in a temporary slowing up in coal production, but no serious damage was done. Loading of barges was hampered and several of the larger mines were idle temporarily. De-

mand for beehive coke has shown little recession recently despite the stocks built up last month.

The bureau of mines announced the March production of by-product and beehive coke amounted to 4,849,363 tons, or 158,127 tons per working day, an increase of 2.2 per cent in the daily rate. For the first quarter production aggregated 13,762,576 tons, a gain of 36.1 per cent over the 10,111,749 tons made in the first quarter of 1936.

Pig Iron

Pig Iron Prices, Page 100

Pittsburgh—Spot business has eased considerably but shipments are comparable to March and still exceed production. Biggest question in sellers' and buyers' minds is the price situation for third quarter, which is being carefully weighed by producers. Many look for reaffirmation of current quotations. A mixed condition exists as to stocks of consumers, some large foundries apparently being well covered. In general, an easier tone is apparent, partly the result of the deep decline in scrap prices.

Cleveland — Pig iron producers report shipments during May compared favorably with March, one of the best months in some time. Most sellers feel this condition will continue through the quarter as many have enough tonnage on books to assure heavy shipments for six to eight weeks. Little spot business is being placed as most foundries have covered requirements. While some are anxious to place tonnage for third quarter, no such tonnage has been accepted among sellers here.

Chicago—April pig iron shipments were relatively heavy despite decrease from heavy March movement. Consumption is holding well and sellers anticipate heavy deliveries during balance of this quarter. With foundries well covered, new business is quiet. While an increase in third quarter prices now appears unlikely, producers may defer opening books for that period until June 1.

Boston — Pig iron buying is limited mostly to numerous small lots with a shortage apparent in some grades. Foreign inquiry continues active with premiums offered. Some gray iron foundries complain of slow deliveries. Sellers have been inclined to limit purchases. Heavier sales, both export and domestic, are curtailed by shortage of iron. Nearly 2400 tons of Dutch iron against old orders has arrived at Boston and Bridgeport, Conn., most at the latter port. Price increase for third quarter is now considered less probable following reaffirming of steel prices. The Everett, Mass., stack is awaiting the arrival of ore to go into blast.

New York—Buying of pig iron is irregular although shipments continue heavy against contracts. The trade expects no price action until late this month when third quarter books may be opened. Some believe there is likelihood of an advance for that delivery.

Buffalo—Pig iron is moving freely. April shipments exceeded the estimates of some merchants by 25 to 50 per cent. Delivery is at a rate leading to the belief there may be considerably more purchasing this month than had been expected, in view of heavy covering in late March. Eleven furnaces are in production and all will run, it is believed, until relining makes it necessary to blow out. Shipments of iron by canal and lake are at the highest point ever reached at this season of the year.

Philadelphia — Pig iron melt continues heavy, although new orders are spotty, as most buyers are under contract. There is less talk about an advance in pig iron prices. Some trade interests, however, think that such an advance may come for third quarter when sellers open books for that delivery, possibly in the latter part of this month.

Cincinnati — Foundries, although operating near capacity, are apparently well stocked with pig iron for second quarter with resultant dull market. There is some spot business and some tardy shipment on old orders against which specifications had to be made by April 1. Price discussion has faded and the market lacks inquiries. Similar conditions apply both in northern and southern iron.

St. Louis — Furnace interests are expected to announce third quarter prices soon. Shipments are being maintained at high levels, and melt is high. Some jobbing foundries have reduced operations, owing to strikes in electrical supply and car plants. However, they report booking of new miscellaneous business, which with backlogs, holds average only slightly below high of late March. Purchasing currently is confined to small lots of special analysis. Stocks are fairly large.

Birmingham, Ala. — Production and shipments are well maintained in this district. Strike of union coal miners, now in its fourth week, has caused no interruption. Spot pur-

chasers of iron are having orders met promptly. Surplus stock of pig iron is still large. April output will equal that of March.

Toronto, Ont. — Merchant pig iron sales are returning to a more normal basis and awards for the week again passed 1500 tons. Melters are entering the market at regular intervals for supplies with current demand for spot delivery. Orders range from a car to 300 tons, with principal movement in foundry iron. Production is holding at the peak level for the year and prices are unchanged.

Scrap

Scrap Prices, Page 102

Philadelphia—Indications are that the current decline in scrap prices is nearing bottom. Not only has the mark-down in many grades been sharp since the decline first set in, indicating that a substantial readjustment has already been made, but revisions now are less numerous and less drastic and certain consumers, who withdrew from the market entirely three weeks or so ago, are now beginning to pick up some tonnage. These consumers apparently regard the market as nearing the bottom, if not actually there, and are consequently covering a little more freely.

Some steel tonnage has been reported purchased at some rather surprisingly low prices, which, in fact, it appears, could not be duplicated today. The leading eastern consumer is understood to have picked up a fair tonnage in northern New Jersey at as low as $18.50, delivered.

This price would be exceedingly difficult to repeat, trade leaders declare. In fact, the eastern Pennsylvania market, judging from prices paid by dealers in covering on old tonnage and in accumulating scrap for export, appears nearer $19 to $19.50, delivered, consuming plant. No. 2 steel, as has been the case for some time, is weaker, relatively, than No. 1 steel, with the current market easy at $17.50 to $18.

Several other reductions have been made recently affecting blast furnace borings and turnings, heavy breakable cast, machine shop turnings and old compressed sheets among other grades.

Pittsburgh—The market here dipped sharply last week on sales of No. 1 heavy melting to several mills at around $21, a decline of $3 in the last month. Weakness became apparent in railroad specialties and other items which had previously withstood the downward trend. More important than the low prices, with many dealers, was the fact that mill buyers had broken their long period of inactivity, which was particularly hard to fathom in view of the high rate of steelworks operations. This week railroad lists again will close.

Cleveland—Prices of scrap have eased in sympathy with other consuming centers, from 50 cents to $1.50 per ton on most grades. Movement is at about normal rate, and some large consumers are asking prompter shipment of some specialties. Supplies of most grades are adequate. Valley quotations are also lower by about the same amount.

Chicago—In the absence of active demand from mills or brokers, scrap prices continue soft. Most grades are off 50 cents to $1 a ton, with heavy melting steel nominal at $18.75 to $19.25. Consumers are expected to re-enter the market in view of the high rate of consumption and the fact that buying has been light for several weeks. While offerings of

scrap are fairly heavy, tonnages are lighter than at the time of the first break in quotations.

Boston—Demand for scrap, notably heavy melting steel for export, continues active, although domestic buying is light. Prices for dock delivery are generally unchanged and quotations on most grades for domestic shipment are nominal. There is fair demand for No. 1 machinery cast for New England delivery, but little is being offered at current prices. Boat loading is active. Permits are still required by railroads for delivery to piers, granted freely when cargo space is immediately available.

New York—No. 1 heavy melting steel for domestic shipment is 50 cents lower, brokers paying a top of $16.50. Export prices are unchanged with most activity centered on dock delivery of previous purchases. Domestic demand is light with prices mostly nominal, although borings and turnings are easier.

Buffalo—Scrap has settled around the $20 level, which dealers are asking for No. 1 heavy melting steel in some instances although others still have higher ideas of value. Consumers are endeavoring to establish $19 to $19.50, and with this small difference of opinion tonnage transactions may come at any time. Lower tendencies show in borings and turnings, following the opening of navigation. The list is 50 cents to as much as $2 lower than at the peak of buying during the boom period which scrap enjoyed in the late winter.

Detroit — Bearish sentiment generally, and in the stock market particularly, has added to the weakness of scrap, prices of most grades being off 50 cents. Dealers are not yet inclined to believe the bottom of the current slump has been touched. The market has now lost much of the ground gained since the first of the year, but buying is still desultory. Reaffirming of steel prices for third quarter apparently has not been reflected in scrap prices.

Cincinnati—Iron and steel scrap receded 50 cents on most grades on prolonged absence of mill buying. Offerings are plentiful and in the weakened market only the rails display any degree of resistance to the trend.

Washington — Purchasing officer, Panama Canal, Washington, will receive bids until May 13 on 6026 net tons of steel scrap, including 2700 tons heavy melting steel, f.a.s. vessel at Balboa or Cristobal, Canal Zone.

St. Louis—The tone of the iron and steel scrap market continues decidedly soft, with further fractional declines in heavy melting steel and other important grades, including rails for rolling. Considerable volume of distress scrap is apparent, caused by requests from users to defer shipments. Arrivals are also large, recent railroad lists having added to available supplies.

Birmingham, Ala.—Little let-down in demand or prices of scrap iron and steel have been noted. Dealers are able to meet all requirements in the home territory and still report nonparticipation in export.

Seattle — Japan is interested in all offers at current c.i.f. prices and considerable new business has been closed. The export space situation has been eased as shippers have chartered a number of vessels for full cargoes. Consequently trans-Pacific scrap rates have dropped about a dollar from the recent peak of $10 and $11. Tidewater prices of No. 1 scrap and rails average $12 and $13 respectively. The Canadian steamer BORNITE has been sold to Japan for breaking up and a scrap cargo of 3500 tons for the vessel is being furnished by Dulien Steel Products Inc., Seattle.

Toronto, Ont. — Demand for iron and steel scrap continues active, with little change in general conditions. Supplies in most lines are limited, but there has been general improvement in offerings of automobile scrap recently. Heavy melting steel, turnings and most other steel lines are in limited supply and consumers are taking all materials offered. Foundries and electric furnace operators show keen interest and some melters state that they are unable to obtain sufficient material to take care of current needs and are using more pig iron.

Iron Ore

Iron Ore Prices, Page 102

Boston—To compete with a water rate of $1.86 per gross ton, exclusive of insurance, the interstate commerce commission has approved a reduction in the railroad rate on iron ore, Buffalo to Boston and Everett, Mass., to $2 per gross ton, effective May 3. This rate also applies to intermediate points, including Worcester, Mass. The former rate from Buffalo to Boston by rail was 30 cents per 100 pounds or $6 a ton and 29 cents per 100 tons to Worcester. This is expected to stimulate movement of lake ore to New England.

—The Market Week—

Warehouse

Warehouse Prices, Page 101

Pittsburgh—While warehouse business is behind last month's volume, it has not declined sharply and is still well ahead of April, 1936. Structurals and sheets are being purchased freely. Operators believe much business lies ahead.

Cleveland—Shipments from warehouse are encouraging after the rather severe reaction the first two weeks of last month. While the aggregate for the month will not compare favorably with March, it has proven better than most expected. The extent to which most consumers are still anxious to get prompt delivery, leaves the general impression that they still are without sufficient stocks. As a general rule more fabrication is done by jobbers this last year than in the comparable period of 1930 or 1929, thus showing the added service which has now become a part of warehouse distribution.

Chicago — While April sales showed moderate decrease from March, letdown was smaller than usual despite heavy volume last month when sales were stimulated by price increases. Consumption is holding well and the seasonal lull during approaching several months is expected to be less than in previous years.

Boston—While comparing favorably with previous month, April warehouse volume declined slightly. Since stabilization of mill prices, reflecting likelihood of few warehouse changes in the immediate future, activity has been less feverish. Prices are firm and unchanged.

New York—Only slightly lower in tonnage, April warehouse sales in dollars about equal March. Buying continues brisk. Deliveries of some heavier hot rolled products have improved, including carbon steel bars, but sheets, alloys and special steel shipments still are slow.

Philadelphia—Records for April are expected to reveal a reduction in warehouse volume from March, an exceptionally good month. Business has been brisk, but with leveling off in steel demand general, jobbing tonnage is being affected. Jobbers look for further good business, however, particularly in view of heavy mill backlogs.

Cincinnati—Warehouse materials sales compare favorably with heavy March business. Delayed mill deliveries are still creating business on sheets and plates. Structural requirements are light.

St. Louis—Warehouse business is well sustained and demand diversified. Sheets, rods and bars especial-

ly are active, with hoops, bands and other cooperage supplies moving in sizable tonnage. Building materials are reported considerably more active than at this season a year and two years ago. Prices are firm, and warehousemen report scarcity of some commodities, notably thin gauge sheets. Wire products are in brisk demand.

Seattle — Business is fair, largely in small tonnages for immediate needs. Prices are firm and well maintained.

Ferroalloys

Ferroalloy Prices, Page 100

New York — Reflecting recent sharp increases in manganese ore prices and continued heavy consumption of ferromanganese, prices on ferromanganese were advanced $7.50 a ton on spot and new contracts for the remainder of second quarter, effective April 27. This increase brought the market to $102.50 for gross ton, duty paid, seaboard, and to $107.29, Pittsburgh in carlots.

Domestic spiegeleisen, 19 to 21 per cent, was increased $3.00 on spot and new contracts over the remainder of this quarter, to $33, Palmerton, Pa., and spiegeleisen, 26 to 28 per cent, to $39.00. Little business over the remainder of this quarter will go at the new prices, it is said, as practically all buyers are protected at the old prices. This, in a somewhat relative degree, also is true of ferromanganese, as contract customers were well protected and some spot buyers, noting the increasing strength of the market had anticipated requirements before the new prices went into effect.

The recent advance reflects also heavy demand in Europe. In the past few days a few hundred tons were offered for shipment here at £20, f.o.b. base port, Europe. This amounts to around $99.80. When freight rate of about $7.50 is added and a duty of $17.92 the f.o.b. duty paid price on this side amounts to approximately $125, as against the domestic market price of $102.50, duty paid, seaboard. This not only explains the increasing strength of prices here, but the fact that the sale of foreign manganese ore in this country is no longer feasible; also that some foreign inquiry has recently appeared in this country. However, the market here is still not favorable for export business.

Silicomanganese has been advanced $6.50 for car lots on new contracts over the remainder of this quarter with 3 per cent carbon now quoted $101.50; 2½ per cent, $106.50; 2 per cent. $111.50; and maximum 1 per cent, $121.50. The usual differentials on smaller quantities applied.

Ferrotungsten has recently been advanced to a spread of $1.80 to $1.85 per pound tungsten contained, freight allowed, in carlots. This reflects the recent sharp advances in tungsten ore, which in turn, is now slightly easier. The market on Chinese wolframite is now holding at $22.00 to $22.50, for short ton unit, on shipments from China in June, July and August.

All other ferroalloys are unchanged at present.

Steel in Europe

Foreign Steel Prices, Page 101

London—(*By Cable*)—Practically all blast furnaces and steelworks in Great Britain are booked several months ahead and are disinclined to accept new contracts until the expected price revision has been made. Shortage of pig iron continues acute. Foreign scrap and domestic coke supplies show some improvement. Output of semifinished steel is increasing, easing the position of rerollers.

The Continent reports export demand continues to exceed available supplies and premiums are offered reaching 40s, gold, on merchant steel.

Nonferrous Metals

Nonferrous Metal Prices, Page 100

New York — Nonferrous metal markets firmed Friday following weakness earlier in the week due to a sharp break in prices on the London Metal Exchange. Tin prices fluctuated widely while copper dropped $10 per ton to 14.00c, Connecticut. Easiness in metals accompanied a similar decline in stock and commodity prices, attributed in trade circles to uncertainty in regard to the future gold buying policy of this country and to the depressing effect of President Roosevelt's statement on price fixing bills.

Copper — Export copper closed around 14.20c, c.i.f. compared with a low earlier in the week of around 13.77½c. Domestic copper firmed at the 14-cent level established Thursday on the substantial recovery abroad. Copper and brass rolled products, copper wire, and red metal scrap prices eased proportionately. Consumer buying support was light.

Lead — Undertone of the lead market held fairly steady in view of easiness in other metals. Demand held up well with sellers generally balancing their ore intakes. Prices were unchanged at 6.00c, New York, and 5.85c, East St. Louis.

Zinc — Prime western zinc held unchanged at 6.75c, East St. Louis, despite the weak undertone during the first few days of the week. The market was supported during that period by its strong statistical position and firmed Friday on the advance in prices in London.

Tin — Prices moved sharply in London daily and occasionally from first to second call. Consumers bought actively at the lower levels of the week's range. Straits spot closed around 55.25c compared with a high of around 57.50c on Tuesday.

Antimony — Chinese antimony prices held unchanged on the basis of 17.00c, duty paid New York, while American spot declined ⅝-cent to 15.25c, New York.

Over Half National Income Received In Seven States

More than half of the national income is received in seven states, New York, Pennsylvania, Illinois, California, Ohio, Massachusetts and Michigan, a National Industrial Conference board survey reveals.

New York and Pennsylvania, which contain 18 per cent of the country's population, receive approximately one-fourth of the total income. Another fourth is distributed in 33 of the smallest income receiving states and the district of Columbia, which have 37 per cent of the population. The remaining half goes to 13 intermediate-sized states containing 45 per cent of the population.

Concentration of population is the most important reason for income concentration. Other reasons are differences in living costs, occupations and industries, productivity due to climatic and racial characteristics, and development stages. The survey covers the seven years from 1929 to 1935.

Use of Tin Increases

World production of tin during first quarter of 1937 was 43,800 tons, compared with 39,065 tons in first quarter of 1936, according to the International Tin Research & Development Council, New York. For the year ending March 31 total world production was 177,400 tons compared with 147,000 tons for the preceding year.

World consumption for the year ending Feb. 28, 1937, was 160,391 tons, a gain of 7½ per cent over the preceding year. Tin consumption in the United States in the year ending in February showed a gain of 16 per cent over the preceding year. Soviet Russia gained 38.2 per cent, taking third place as a consumer of tin. The United Kingdom showed a decline of 2.2 per cent. France increased its tin consumption 23.1 per cent.

Steel Springs Makers Gain In Employment, Production

Manufacturers of steel springs reported gains in 1935 over 1933 in production and employment, according to a census report just released.

These manufacturers employed 3146 wage earners in 1935, an increase of 49 per cent over 2112 reported for 1933. Increase in wages amounted to 80.8 per cent, from $1,971,871 to $3,565,714. Value of products increased 75.1 per cent from $18,233,350 to $10,412,560.

Largest Manganese Cargo

Philadelphia — The largest shipment of manganese ore arriving here in some time involves 8200 tons from the Gold Coast, Africa. This came during the week ended April 24, during which period 107 tons of structural shapes, 49 tons of steel bars, nine tons of steel bands and five tons of diamond plates came in from Belgium; 16 tons of structural shapes from France and one ton of steel forgings from Sweden.

Equipment

Cleveland — Machine tool and equipment inquiries and sales continue on an even keel. Distributors' business is in fair volume, mostly small orders, while manufacturers' products are sold far ahead. Demand is well diversified. Large lists are scarce. Deliveries are unimproved and this is causing many buyers to shop around, often buying where delivery promises are most attractive.

Seattle — Demand for electrical equipment and materials used in water system improvements continues steady. Mining, logging and road machinery is moving in normal spring volume.

Athenia Steel Co. removed its executive and sales offices April 30 to the company's plant at Clifton avenue, Clifton, N. J.

Construction and Enterprise

Michigan

DETROIT — Housing division, PWA, Washington, will open bids May 27 on Brewster and June 8 on Parkside slum clearance projects, here. Allotment for the former is $5,500,000 and for the latter, $4,500,000. Previous tenders were rejected as exceeding appropriations.

DETROIT — Commonwealth Brass Corp., 5781 Commonwealth avenue, has awarded contract for construction of factory building to Austin Co., 429 Curtis building, Detroit.

DETROIT — General Motors Corp., General Motors building, has announced plans for new diesel engine division, to manufacture small Winton diesels. Plant and engineering laboratory will be erected on Outer Drive, this city.

DETROIT — C. E. Jamieson & Co., 1962 Trombly street, manufacturing chemists, suffered plant damage from an explosion April 9.

DETROIT — Detroit Metal Air Duct Corp. has been organized by Harry Schram, 6006 Manistique avenue, to design, manufacture and fabricate air ducts.

DETROIT — National Alloys Co. has been incorporated by W. J. Reardon, 2118 East Woodridge street, to conduct a foundry.

DETROIT — Renu Tool Co. Inc., 317 East Milwaukee avenue, has been formed by P. J. McMullan, Ferndale, Mich., to deal in cutting tools.

DETROIT — Steel Materials Corp., 17260 Gable street, has been organized by Dora Cashdan, 2366 Penobscot building, to deal in iron and steel.

DETROIT — National Mfg. & Engineering Co., care of Industrial Sheet Metal Works Inc., 628 East Forest avenue, has been formed to deal in steel plate furnaces.

HUDSON, MICH. — City is having plans prepared for construction of improvements to waterworks at a cost of about $18,000. Pate & Hirn, Michigan Theatre building, Detroit, are consulting engineers.

KALAMAZOO, MICH. — City has plans prepared for construction of improvements to water and light departments, to cost $482,645.

LANSING, MICH.—City is taking bids, due May 10, for construction of sewage and garbage treatment plant. Shoecraft, Drury & McNamee, Ann Arbor, are consulting engineers.

LANSING, MICH. — Olds Motor Works has awarded contract for construction of motor storage building to Reniger Construction Co., here. Albert Kahn Inc., New Center building, Detroit, is architect.

ROSEVILLE, MICH. — Plans are being completed for alteration to boiler plant at Lincoln school and installation of two stokers at Burton school, here. C. R. Jensen, Detroit, is architect. Bids are due May 10.

YPSILANTI, MICH. — City is having plans prepared for construction of sewage disposal plant. Shoecraft, Drury & McNamee, Ann Arbor, are engineers preparing plans.

Ohio

BEREA, O. — City is taking bids, due May 8, for construction of light and water plant improvements, including natural draft tower, superheaters, and surface condenser. Cost is estimated at $20,000. John Baesel is mayor; William C. Kammerer, 710 Smythe building, Cleveland, is consulting and designing engineer.

BETHEL, O. — Village is taking bids, due May 12, for construction of power plant addition. W. F. Myers is mayor; Carl H. Ruch is city engineer.

CANTON, O. — Detroit Compensating Axle Co. plans immediate construction of two-story office building.

CLEVELAND — Ferro Enamel Corp., 4150 East Fifty-sixth street, plans construction of new building for storage facilities. Preliminary plans have been

prepared and bids will be taken soon. Robert Weaver is president.

CLEVELAND — Shoot Chocolate Co., 419 High avenue, is having plans prepared for alterations to factory building at 1270 Ontario avenue. Cost of work is estimated at $10,000.

CLEVELAND — Spero Electric Corp. has moved to new location and plans alterations and improvements to plant building at 18222 Lanken avenue. Ben E. Spero is president; plans should mature soon.

CLYDE, O. — Village is receiving bids until May 6 for construction of light plant addition estimated to cost $15,000. Cloyd A. Stieff is clerk; Froelich & Emery, Second National Bank building, Toledo, are consulting engineers.

COLUMBUS, O. — Owens-Illinois Glass Co., Toledo, O., has completed plans for construction of $90,000 warehouse building at 711 Southwood avenue. Mr. Snell is in charge at site.

GERMANTOWN, O. — Village plans construction of sanitary sewage system and disposal plant at an estimated cost of $165,000. Frank Gunckel is mayor; M. W. Tatlock, 911 Ferndale street, Dayton, O., is engineer.

JAMESTOWN, O. — Village will issue $30,000 mortgage revenue bonds to finance completion of sewage disposal plant and sanitary sewer project. D. Elden Bailey is mayor; Collins-Wight, Union Trust building, Dayton, is consulting engineer.

KENTON, O. — City plans construction of $40,000 sewage disposal plant. M. A. McMahon is service director; maturity of project depends upon WPA approval.

SIDNEY, O. — City is taking bids, due May 17, for construction of waterworks improvements, including 500,000-gallon elevated steel tank, diesel generator unit and gas stand. Rolla Loughlin is mayor; Floyd E. Browne, Marion building, Marion, O., is consulting engineer. (Noted April 26).

TROY, O. — City will receive bids until May 4 for municipal light plant equipment. George L. Smith is service director; Froelich & Emery Co., 410 Second National Bank building, Toledo, is engineer.

Pennsylvania

CHESTER, PA.—Scott Paper Co. has preliminary plans in progress for construction of paper manufacturing plant. Thomas B. McCabe, foot of Market street, Chester, is president. Stone & Webster Engineering Corp., 49 Federal street, Boston, Mass., is engineer.

CONSHOHOCKEN, PA. — Nichols Engineering Co., 40 Wall street, New York, has contract for construction of sludge incinerator at sewage disposal plant, here, for Conshohocken town council at a cost of $35,980. Edward Williams is chairman of the council. Remington & Goff, 509 Cooper street, Camden, N. J., are engineers.

MODENA, PA.—Modena Paper Co. has preliminary plans in progress for construction of alterations and additions to manufacturing plant. Mr. Oswald, Modena, is prominent in the company. Frederick L. Smith, 21 East Fortieth street, New York, is architect.

PHILADELPHIA — Lawrence-McFadden Co., 4100 Frankford avenue, has preliminary plans in progress for construction of factory building. Robert N. Dippy, 2134 Cherry street, Philadelphia, is engineer.

PHILADELPHIA—City, department of city transit, city hall annex, is taking bids, due May 6, for construction of substation at Juniper and McKean streets. Pre-qualification form to be filed before April 29. Gordon R. Esley is director.

PITTSBURGH—City will receive bids until May 26 for construction of municipal incinerator plants, estimated to cost $300,000 to $600,000. Plans may be secured from department of public health, 620 City-county building, Pittsburgh.

SELLERSVILLE, PA. — U. S. Gauge Co., Clymer avenue, will take sub-bids in about a month for construction of factory addition. F. D. Heyder is prominent in the company.

New York

BROOKLYN, N. Y. — American Safety Razor Corp., 315 Jay street, plans factory addition at 77-89 Myrtle avenue, to cost $550,000.

BUFFALO — Directors of Emergency hospital plan construction of five-story steel and brick addition, estimated to cost $200,000.

BUFFALO — Kenmore Machine Products Inc. has been organized by Ward B. Arbury, Buffalo, to conduct a machine shop.

LOCKPORT, N. Y. — Upson Co., manufacturer of wallboard products, has plans for installation of additional equipment in steam power plant at an estimated cost of about $40,000.

NEW YORK — Glebel Machine Tool Co. Inc. has been formed by Frederick V. Marsi, 50 Broadway, to deal in tools, machinery and machine supplies.

NEW YORK — Standard Fabricators Inc. has been organized by Newman & Bisco, 165 Broadway, with capital of $30,000, to conduct a machine shop.

NEW YORK—Nu-Style Machine Corp., Manhattan, has been organized to conduct a machine shop. Continental Lawyers Albany Service, 305 Broadway, New York, is correspondent.

New Jersey

LINDEN, N. J.—General Aniline Works Inc., 1150 Broadway, New York, plans construction of $130,000 improvements to dye and chemical plant here.

PATERSON, N. J. — Curtis-Wright Aeronautical Corp. is considering plans for $1,350,000 expansion program, including new machine tool equipment, four-story factory wing, assembly department and two testing cells. Guy W. Vaughan is president.

Connecticut

NEW HAVEN, CONN.—Wire Rope Corp. of America, 464 Congress avenue, plans construction of one and two-story factory addition, 150 x 150 feet. Leo F. Caproni, 1221 Chapel street is architect and engineer.

Illinois

ROCK ISLAND, ILL. — Chicago, Burlington & Quincy Railway Co., west Jackson boulevard, Chicago, will soon award contract for construction of roundhouse and other improvements at an estimated total cost of $250,000.

Indiana

ANDERSON, IND.—Delco-Remy Corp., unit of General Motors, plans construction of additional plant building, 240 x 520 feet, to be used for production of starting motors.

FORT WAYNE, IND. — Fort Wayne Wire Die Inc., 232 McKinnie circle, has been formed to manufacture dies for fabrication of wire for insulation, by Paul Bieberich, resident agent, and associates.

LAFAYETTE, IND. — Aluminum Co. of America Inc., Gulf building, Pittsburgh, plans construction of multi-unit mill near here at an estimated cost of $3,000,000. This is part of proposed $26,000,000 expansion program of the company.

SOUTH BEND, IND. — John Beyrer & Sons Roofing Co. Inc., 213 South St. Joseph street, has been organized by James R. Beyrer and associates, to manufacture sheet products, roofing, etc. James R. Beyrer was named resident agent.

WABASH, IND. — National Machine Co. Inc., 166 Stitt street, has been formed by Clifton C. Frame and associates, to design, manufacture and sell machinery. Clifton Frame, above address, is resident agent.

Alabama

FAIRFIELD, ALA. — Tennessee Coal, Iron & Railroad Co., Birmingham, will begin work soon on construction of addition to warehouse and shipping department of merchant mill, here. Structure will be 104 x 210 feet.

SALITPA, ALA.—Clarke-Washington Electric Membership association has REA allotment of $30,000 for construction of generating plant.

Florida

JACKSONVILLE, FLA. — Ralph O. Dulany & Son, Fruitland, is constructing plant for freezing of strawberries U. O. Pennewell is in charge.

MARIANNA, FLA. — Mount Vernon Inc., recently chartered, plans construction of hydroelectric plant on Chipola river, Calhoun county, near here, including dam, 20,000-horsepower generating station and distributing lines. Cost is estimated at $150,000.

Kentucky

BARDSTOWN, KY.—Salt River Rural Electric Co-operative Corp. has been organized by G. S. Geear and M. W. Seay.

CALVERT CITY, KY. — Norman Milling Co. will rebuild steam-electric station recently damaged by fire.

FRANKFORT, KY. — Kentucky public service commission has granted permission to Kentucky Utilities Co. to extend distribution line from Lair sta-

tion in Harrison county to Shawhan in Bourbon county.

HENDERSON, KY.—L. A. Parker, Evansville, Ind., has acquired plant of Consolidated Textile Corp., here, and will equip for manufacture of hosiery.

OWENSBORO, KY. — Davies County Distilling Co. plans construction of $60,000 warehouse and installation of automatic sprinkler system. Will finance improvements by new stock issue.

Georgia

ATLANTA, GA. — Southern Wire & Iron Works, 305 Martin street SE., plans construction of factory building. James C. Wise, 161 Spring street, is architect.

SANDERSVILLE, GA. — City authorized purchase of 380-horsepower diesel engine and generator, to cost $24,500. L. M. Samson is chairman of commission.

VALDOSTA, GA.—Glidden Paint Co., Cleveland, plans to erect $200,000 paint plant.

Louisiana

INDEPENDENCE, LA. — Regional office of WPA, Baton Rouge, La., cancelled invitation for bids on construction of sewerage pumping station; purchase will be made later; complete specifications are being prepared.

Mississippi

COAHOMA, MISS. — Coahoma Electric power association has REA allotment of $65,000 toward construction of 71 miles power lines in surrounding districts.

YAZOO CITY, MISS. — Peoples Warehouse Co. will erect $30,000 warehouse addition to increase present capacity by 4000 bales. Tom Graves is manager; Hull & Drummond, Old Merchants Bank building, Jackson, Miss., are architects.

North Carolina

SPRAY, N. C. — Carolina Cotton & Woolen Mills Inc. has under construction bleachery addition, four-story warehouse, and filter plant. Cost of three projects is estimated at $300,000.

WHITAKERS, N. C. — Town receives bids until May 7 for construction of waterworks and sanitary sewer system. J. B. McCrary Co., 14 Marietta street building, Atlanta, Ga., is engineer.

South Carolina

COLUMBIA, S. C. — South Carolina Gas & Electric Co. plans construction of 13½ miles rural extension lines in Saluda county, to cost about $11,269.

West Virginia

CAMERON, W. VA. — Appalachian Electric Power Co., Roanoke, Va., has authorized construction of rural transmission lines from Cameron to Glen Daniel district, Raleigh county.

Virginia

DANVILLE, VA. — W. Nat Terry and associates plan construction of tobacco warehouse between Wilson and Patton streets. Company will be organized with $100,000 capital.

RICHMOND, VA. — Virginia Electric & Power Co. is considering $4,000,000 construction program in 1938. Jack G. Holtclaw, Richmond, is president.

Missouri

ST. LOUIS — American Car & Foundry Co., 2800 DeKalb street, let contract for construction of factory addition to Austin Co., 1198 Arcade building. Cost is estimated at $30,000.

UNIVERSITY CITY, MO. — Universal Mfg. Co., 3944 Olive street, has leased building on Westgate avenue and will remodel.

Texas

PLEASANTON, TEX. — City voted in favor of bond issue of $15,000 for construction of sewer system.

PORT LAVACA, TEX. — City receives bids until May 6 for construction of waterworks addition. Plans and specifications may be secured from Ray F. Jones, P. O. box 1861, Houston, Tex.; F. M. Dudgeon is mayor.

Tennessee

NASHVILLE, TENN. — Gray & Dudley, 2300 Clifton road, manufacturer of gas, coal, oil and electric stoves, plans expansion program. Work will include erection of sheet metal fabricating plant adjacent to main plant. Total cost is estimated at $400,000.

Wisconsin

AMERY, WIS. — Wisconsin Hydro-electric Co. has announced proposed expen-

diture of $100,000 this summer on construction work and installation of new equipment, including two transmission lines and oil circuit breakers.

BRILLION, WIS. — Brillion Pulverizer Co., manufacturer of soil pulverizers and packers, deep well pumps, etc., has changed its name to Brillion Iron Works Inc.

FORT WASHINGTON, WIS. — John Burger, 3422 North Fifteenth street, Milwaukee, has leased section of Grafton foundry here and is equipping shop for manufacture of special machinery and to do repair work.

MADISON, WIS. — Royal Body Co., maker of automotive bodies, will call for bids soon on construction of fireproof factory, 80 x 100 feet, at 1002 Regent street.

MADISON, WIS. — Oscar Mayer & Co., Chicago, meat packer, has let contract for additional story on main building, 120 x 140 feet, of plant here.

MILWAUKEE — Harnischfeger Corp., 4400 West National avenue, sustained plant damage by flood due to bursting city water main, April 20.

MILWAUKEE—Pittsburgh Plate Glass Co., 235 East Pittsburgh avenue, is considering construction of another addition to its resin and varnish plant here, at an estimated cost of $180,000. E. D. Griffin is general manager.

MILWAUKEE — Sivyer Steel Casting Co., 1675 South Forty-third street, has awarded contract to Klug & Smith Co., 111 East Wisconsin avenue, for construction of building addition, 52 x 64 feet, on West Milwaukee avenue.

TOMAHAWK, WIS. — Wisconsin Public Service Corp., Milwaukee, has plans for construction of dam and hydroelectric generating plant near Tomahawk, at an estimated cost of $500,000. A. G. Carson, Green Bay, Wis., is chief engineer.

Minnesota

HASTINGS, MINN. — C. A. Lund Mfg. Co., ski and toboggan manufacturer, will take bids soon for construction of two-story factory building estimated to cost about $40,000. Additional machinery and equipment will be installed. Toltz, King & Day Inc., Pioneer building, St. Paul, is architect.

MINNEAPOLIS — Dayton Rogers Mfg. Co., maker of metal stampings, 1114 South Third street, has awarded contracts for construction of one-story factory building, 120 x 140 feet, to cost about $50,000. Additional machinery and equipment will be installed. Johnson & Backstrom, 1200 Roanoke building, are architects.

MINNEAPOLIS — Inland Marine Corp., 3117 East Lake street, has been formed by Otto Mueller and associates, to manufacture bolts, locks and fittings for boats.

MINNEAPOLIS — Star Tool Co., 119 North Fourth street, manufacturer of automatic rivet-setting machines, has purchased factory building to treble space of former quarters. Additional machinery and equipment is being installed. A. O. Wisti, 3632 Lyndale avenue South, is president.

MINNEAPOLIS — Whiting Mfg. Co., 1711 Washington avenue North, has been formed by a group of Minneapolis business men to manufacture a new type of automatic chain locks.

Maryland

CUMBERLAND, MD. — Potomac Edison Co. has authorized construction of $3,000,000 addition to electric power plant, a 30,000-kilowatt unit. R. Paul Smith, Hagerstown, Md., is president of the board.

South Dakota

BERESFORD, S. DAK. — City is taking bids, due May 10, for construction of alterations and additions to municipal light and power plant and for furnishing equipment, including four-cycle diesel generating unit of about 450-500-horsepower. J. M. Engberg, Madison, S. Dak., is consulting engineer. (Noted April 12).

Iowa

BELLEVUE, IOWA — War department engineer, Capt. Henry Berbert, Clock Tower building, Rock Island, Ill., will receive bids until May 11 for power, control and lighting system at dam No. 12 on the Mississippi river, here, including lock and power control system, dam power distribution system, lock and dam lighting, gasoline-electric standby power unit, electric tow-haulage units, hand-operated traveling bridge crane, etc.

DAVENPORT, IOWA — Red Jacket Mfg. Co. has awarded contracts for construction of one-story factory addition, 20 x 200 feet.

DAVENPORT, IOWA — Eastern Iowa light and power co-operative has been granted franchise for about 700 miles rural transmission lines in Cedar county, estimated to cost $500,000. H. J. Strong is manager.

FORT MADISON, IOWA — State board of control, Des Moines, is seeking appropriation of $170,000 for purchase and installation of power plant equipment at Fort Madison. E. H. Felton, Des Moines, is chairman of the board.

HOPKINTON, IOWA — City will receive bids until May 25 for construction of power plant and distribution system, including plant building, 40 x 50 feet, machinery and equipment, two diesel generator units, switchboard and power wiring, poles, meters, wire, etc. A. W. McDonald is city clerk; A. S. Harrington, Baum building, Omaha, Nebr., is consulting engineer.

MARSHALLTOWN, IOWA — Cash Universal Regulator Co. has been incorporated at $20,000, by A. W. Cash and F. L. McCammand, to manufacture pressure reducing and regulating valves, relief valves, etc.

MONTEZUMA, IOWA — Poweshiek county association has applied to REA for $315,000 loan to finance construction of 310 miles rural transmission lines.

SPENCER, IOWA — Clay county rural electrification association has applied to REA for $285,000 loan for construction of 258 miles rural electric lines to serve 679 customers. Will Henneberg is president.

Nebraska

AURORA, NEBR. — Hamilton county rural public power district has filed plans with A. C. Tilley, state engineer, State house, Lincoln, Nebr., and applied to REA for loan to finance construction of 319 miles rural transmission lines at a cost of $409,152. H. H. Henningsen Engineering Co., 326 Union State Bank building, Omaha, is consulting engineer.

COLUMBUS, NEBR. — Loup river public power district is taking bids, due May 7, for construction of transmission lines, substation, trolley lines and installation of six 150-kva transformers. C. B. Fricke is president; Harza Engineering Co., 205 West Wacker drive, Chicago, is consulting engineer.

FREMONT, NEBR. — City has applied to PWA for allotment of $133,489 for construction of power plant building, switchboard, underground service and transmission lines. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers. J. Rex Henry is city commissioner; total cost of project is estimated at $296,644.

GRAND ISLAND, NEBR.—Hall county rural public power district has filed plans for approval of A. C. Tilley, state engineer, State House, Lincoln, for construction of 295 miles rural transmission lines to cost $27,296. O. R. Toman, 510 Barkley building, Lincoln, Nebr., is consulting engineer.

YORK, NEBR. — York county rural public power district has submitted plans to state engineer for approval of construction of 255 miles of rural transmission lines in York county. Cost is estimated at $322,575. H. H. Henningsen, 326 Union State Bank building, Omaha, Nebr., is consulting engineer.

Pacific Coast

LOS ANGELES — Pacific Pattern & Mfg. Co., 823 East Vernon avenue, is building corrugated iron pattern shop, 40 x 50 feet, on 3321 Union Pacific avenue, at an estimated cost of $2000.

LOS ANGELES — Pacific Pump Works is having plans prepared for first unit of factory building to be erected at 5615 Bickett street, Huntington Park. The structure will have an area of 60 x 160 feet and will cost about $12,000.

LOS ANGELES — Vultee division of Aviation Mfg. Corp., Downey, Calif., plans extensive program of expansion to increase facilities for the manufacture of aircraft. Don P. Smith is vice president and general manager.

SAN DIEGO, CALIF. — National Iron Works is erecting steel shop building at 715 East Belt avenue, at an estimated cost of $15,000.

STOCKTON, CALIF. — Sierra Mountain Water Co., 410 East Market street, has plans for construction of hydroelectric project on Consumnes river, Amador county, with power dam and plant to rate 13,500-horsepower. Cost of entire project will be about $7,000,000.

BELLINGHAM, WASH. — Puget Sound Pulp & Timber Co. plans extensive improvements to pulp plant, here. Cost will be about $250,000.

PORT ANGELES, WASH. — Fibreboard Products Co. is enlarging plant by construction of digester building and blow pit structure. H. S. Wright Co., Seattle, has general contract.

SEATTLE — Bethlehem Steel Co. is building $8000 addition to locker building, 2802 West Andover street. J. W. Bailey Construction Co. has general contract.

MEDFORD, OREG. — Rosenberg Bros., fruit packers, have plans for construction of two-story packing plant. Clark & Kenney are architects. Two stainless steel towers will be erected.

ONTARIO, OREG. — Van Patten Lumber Co. plans construction of electrically equipped sawmill at Dayton, Wash., in the near future.

Canada

REGINA, SASK. — Ford Motor Co. of Canada Ltd. will build $50,000 warehouse, here, sometime this year.