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STEEL

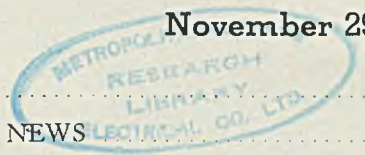
FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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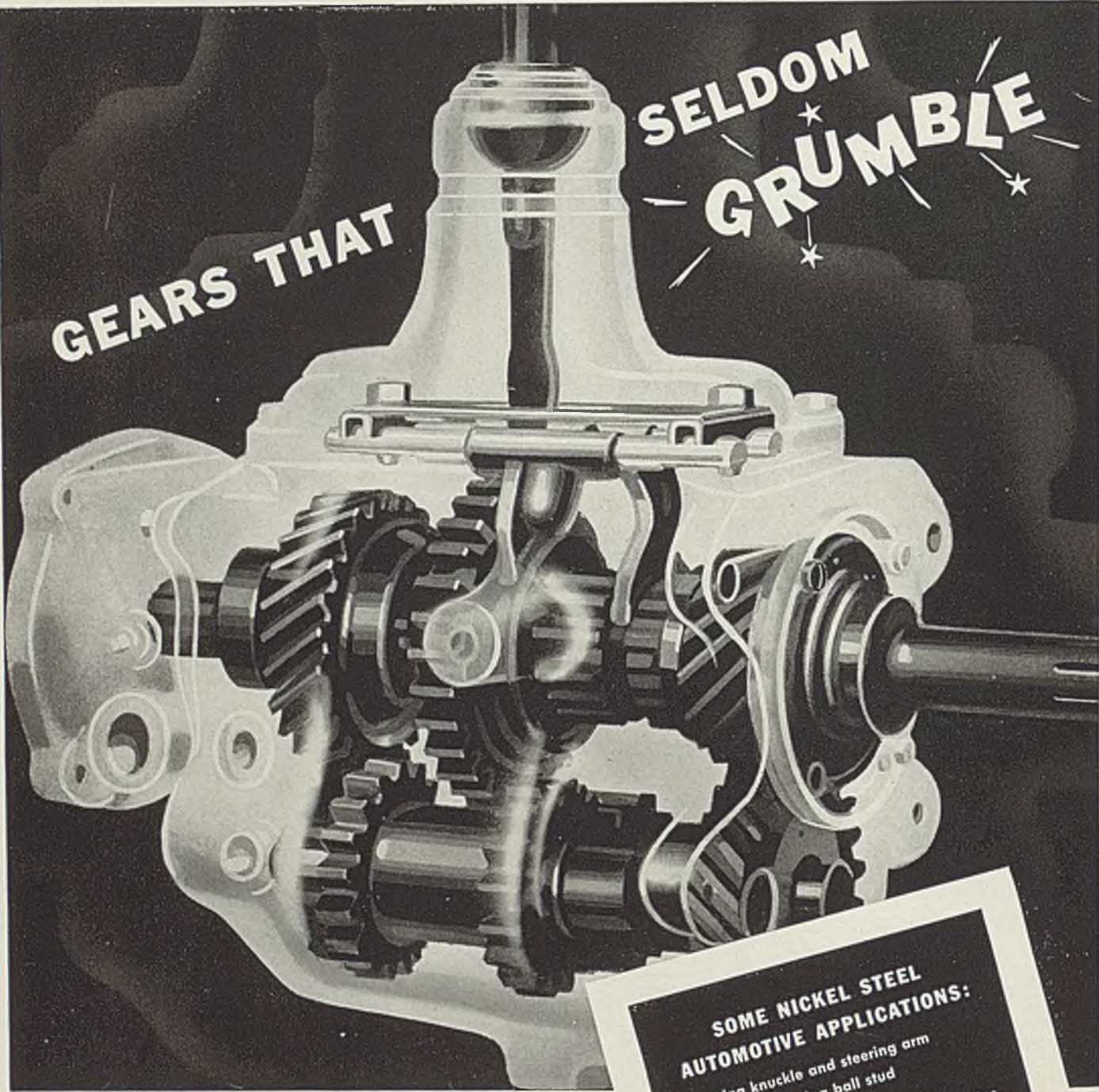


PRODUCTION • PROCESSING • DISTRIBUTION • USE

November 29, 1937

GEARS THAT

**SELDOM
GRUMBLE**



● In addition to superior mechanical properties, such as high resistance to wear, shock and fatigue, the Nickel Alloy Steels offer decided manufacturing advantages. They are easily forged. They respond readily to annealing for easy machining with a high finish. They offer a minimum of distortion when heat treated. All of these resulting in the maximum production of quiet gears. Because of their ability to withstand heating at high temperatures for long periods without excessive grain growth, carburized gears can be successfully quenched from the carburizing box, thus eliminating the extra heat treating operations that are required with other steels. The Nickel Alloy Steels are also used for dozens of other parts subjected to the most punishing conditions. Some of these applications are listed at the right.

**SOME NICKEL STEEL
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- King pin • Steering ball stud
- Steering gear arm
- Steering gear and follower • Spring clips
- Shackle bolts • Transmission gears
- Transmission spline shaft
- Transmission countershaft
- Free wheeling pineapple
- Free wheeling spider • Propeller shaft
- Universal joints • Rear axle drive shaft
- Rear axle drive gear and pinion
- Rear axle differential gears
- Differential cross • Piston struts
- Connecting rods • Connecting rod bolts
- Piston pins • Inlet valves • Exhaust valves
- Engine bolts and studs • Roller bearings

NICKEL ALLOY STEELS

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

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

NEWs from Washington indicates a strong urge in many influential quarters to deal more sympathetically with business, but the obstacles to prompt action are numerous. Congress seems to be overwhelmingly in favor of modification of the tax laws, yet the chances for corrective legislation before the new session convening Jan. 3 are small. The wage and hour bill is in a muddle (p. 29), due to the conflicting views of congressmen and of union labor spokesmen. President Roosevelt's talks with utilities executives had the appearance of a friendly gesture toward private enterprise. All in all, the Washington attitude toward business seems to be improved.

One way in which the federal administration could promote recovery would be to call a halt on activities which incite class antagonism. With industrial operations curtailed, the problem of adjusting employment so as to impose the least possible hardship upon employes is delicate at the best. It will be made

Time for Teamwork

unnecessarily more difficult if the government continues to encourage vindictiveness and to accentuate class distinctions. Every group and faction in the country should be united by the common bond of interest in recovery. This is a time for national teamwork (p. 31), when all should get together to break the stalemate of confusion and misunderstanding.

Attempts to appraise the present business situation must take into account the status of inventories in the hands of consumers of materials and industrial products, as well as the volume of new orders. Seeking light on the extent of stocks in consumers' plants, STEEL's editors unearthed (p. 15) information of

Need Data On Stocks

such diverse implications that it is difficult to generalize from the findings. Apparently inventories

in many lines are somewhat higher than producers realized. However, the condition of stocks is spotty. In some consuming fields and in some districts they are unduly high; in others substantially lower than they were at this time a year ago. The situation suggests that industry should know more about the state of customers' inventories. We have certain data on stocks of a few commodities. We need it on iron and steel.

Management recognizes the importance of adequate lighting for industrial operations, yet many executives in charge of production do not appreciate fully the extent to which the care and maintenance of lighting facilities affect the standard of illumination. Many will be surprised to know that if all industrial lighting installations and their immediate surroundings could be cleaned and reconditioned today (p. 34), then the level of illumination would be well-nigh doubled. The fact that an expert can make this statement with full confidence that it is true constitutes a challenge to management to check up on its "light" housekeeping. One of the essentials is to balance frequency of cleaning against the cost of cleaning. The author presents useful information on this point.

Lighting Industry

Maintenance also is an important factor in the life of conveyor belts. In spite of improvements in the quality of belts in recent years, they are not immune to the results of carelessness or abuse. Proper attention to methods of loading, to careful splicing, maintenance and alignment of idlers, etc. (p. 43) will pay dividends in longer life of the belt. As simple an expedient as a set of bar baffles, to break the fall of lump material upon a belt, saved one operator more than \$1000 in one year. Many plant managers are looking for little economies of this type. In the aggregate, they can mount to a tidy sum each year—providing, of course, the maintenance crew is alert to opportunities for economy.

Save Here, There

E. L. Shaner



Place your
Equipment
Beyond
Competition



WITH INLAND HI-STEEL

● In the construction equipment industry, for example, the machine that's built with Inland Hi-Steel goes farther on its fuel . . . does the work at lower cost because it's lighter, stronger and more mobile.

No matter what product you make of steel—if it moves or must be moved often—you can improve it beyond competition only if useless dead weight is eliminated.

Increased numbers of leading manufacturers now consider Inland Hi-Steel the best material for this purpose. Here are three important reasons:

- (1) Inland Hi-Steel permits a wide margin of weight reduction without loss of structural strength.
- (2) It is easily worked—punches and shears without burr, welds excellently, is uniform and its qualities are not changed by high or low temperatures.
- (3) It is more resistant to atmospheric corrosion than standard copper-bearing steel.



Why not try Inland Hi-Steel for your product? Make a test of its actual advantages. Inland engineers will gladly assist you.

Write for Bulletin No. 10 which gives complete information on Inland Hi-Steel.

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What of Consumers' Steel Inventories?

Surveys Reveal Spotty Conditions

DETROIT

■ CONSIDERABLE loose talk is heard concerning the failure of the automobile industry to release orders for steel in customary volume, and the effect of this policy on the steel operating rate. As a matter of fact automobile steel buying has been more nearly normal than generally believed.

There is also widespread speculation over the size of inventories of steel in automobile plants. Close study of the situation reveals inventories are not excessive, that most of them were worked down by the end of September and that current supplies average two to five weeks' production, which is near normal.

Financial statement of General Motors shows some \$100,000,000 in inventories, but this is chiefly in the form of sub-assemblies such as motors, axles and other fabricated parts, and not in raw materials.

Weekly Schedules Determine Buying

Fluctuation in production schedules, however, is making it difficult for purchasing departments to determine how far ahead to buy steel, and as a consequence they are proceeding with an eye on weekly schedules. In any mass production industry, a sudden downward revision of schedules may make what appeared to be a four-week bank of steel quickly change into an eight-week bank, and buying of materials must be adjusted accordingly. Combination of interruptions to production caused by labor and slow retail sales has made its effect felt on many assembly lines.

While shipments of cars to dealers have been in general moving ahead at a normal rate, the true index of the outlook is in retail deliveries. Here in Wayne county, the following comparisons of new car registrations for the first 20 days of November

for this year and last year may be significant:

	1936	1937
Chevrolet	1271	1177
Pontiac	404	389
Bulck	484	492
Hudson	290	197
Packard	266	170
Plymouth	1309	510
Dodge	729	326
Ford	695	566

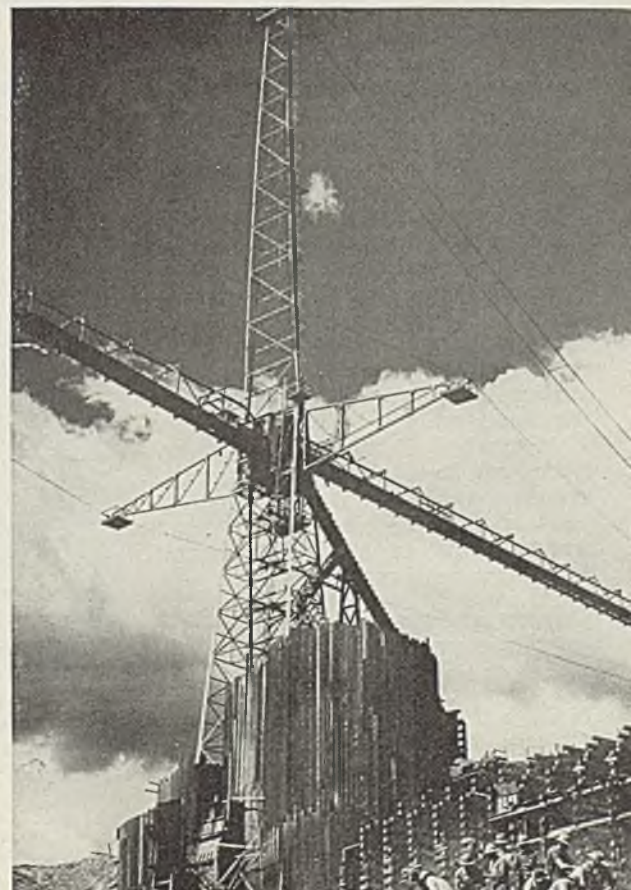
Another depressing influence on steel buying has been the absence of Ford from the market. Ford buys an estimated 12 per cent of the steel consumed by the motor industry. As a result of protracted delay in Ford

assemblies and accumulated stocks of steel produced in Ford's own mills, sharp curtailment of outside purchases has been necessary.

One buyer of automotive steel attributes the decline in the steelworks operating rate to four factors—no railroad buying; virtual collapse in buying of building steel; softness in buying for farm implement and machinery; and weakness in export shipments and small, miscellaneous buying. As far as the proportion of steel used in automobiles is concerned, he sees no important reduc-

Conveyor Tower Higher Than Grand Coulee Dam

■ This central tower of the conveyor system at Grand Coulee dam, Washington, dwarfs even the dam in height. The system carries construction material from storage and mixing stations to points of use, and also moves glacial moraine from a mountain to a canyon a mile away. Millions of cubic yards of material have been moved. Underwood & Underwood photo



tion in the current specifications.

In view of the fact steel can now be obtained without delay as far as shipments are concerned, there is naturally less disposition to buy ahead, and especially in the field of small parts manufacturers purchases are being made cautiously.

DWINDLING STOCKS PRESAGE EARLY RENEWAL OF BUYING

PITTSBURGH

■ Reduction of consumers' inventories to conform with slackened demand has been a major factor in the decline of specifications for steel during the past three months. While small stocks in dull times frequently appear to be bigger obstacles than under ordinary circumstances, it has been found in many cases that consumer inventories were somewhat larger than previously estimated by producers.

Reports from the field indicate that many miscellaneous sheet consumers have ample supplies to run them into January. Due to the fact that few changes were made in 1938 models, automobile manufacturers were able to stock and use considerable material, probably more than expected.

Small jobbers have been perhaps the most ambitious in seeking to liquidate their inventories and convert the material into cash as speedily as possible. Floor taxes in many states have acted as a spur toward the reduction of stocks.

Stock Reduction Widespread

The necessity of waiting until consumers' stocks are reduced has confronted producers in virtually all steel products, although there has been very little working down of consigned stocks to jobbers in tubular goods. Faced by a higher price which went into effect on shipments for fourth quarter, tin plate buyers obtained all the contract material they were entitled to before the deadline.

In some quarters it has been estimated that around one-half of all the potential customers of the steel industry have been recently engaged in inventory reduction. Thus, it would appear that actual consumption of steel products must be proceeding at a level above the production level.

Just when liquidation of inventories will be completed is unknown, but in many quarters it is believed that in the early part of next year improvement in buying from the mills can be expected.

FABRICATORS' STOCKS AT LOW POINT OF YEAR

CHICAGO

■ Steel stocks of consumers in the Chicago district are the smallest so far this year. Inventories, as meas-

ured by the number of days' supply, vary among different industries because the decline in consumption the past few months has been irregular. Stocks also vary according to product.

Practically all consumers have pared their steel supplies the past eight weeks, either because their requirements were declining and the outlook was uncertain or because deliveries were improving and the chances of higher prices were slight. Exact figures are difficult to ascertain, but estimates of the reduction in inventories since spring range from 25 per cent upward.

Stocks also are placed at less than the tonnage on hand a year ago. At that time consumption was heavier than today, the outlook was bright, some steel prices were being advanced and other increases were in prospect. As a result, liberal inventories were desired, notwithstanding the period of the year.

Consumers of heavy steel products, such as shape and plate fabricators, railroad shops and freight car builders, have only small lots on hand. Car builders generally order material for specific jobs. Structural fabricators follow the same plan, though to a lesser degree. On the other hand, manufacturers of products that are disposed of through retail outlets and are made up in anticipation of future sale are relatively the largest holders of steel inventories. Here, too, the situation varies according to the extent to which the manufacturer's business has fallen off the past two months. Stocks of warehouses are smaller than a year ago or in the spring.

STEEL CONSUMPTION RATE EXCEEDS CURRENT BUYING

NEW YORK

■ Despite sharp falling off in business generally, fairly substantial inroads are being made into consumer stocks of steel in the East. Consumption has fallen well below trade expectations of even a few weeks ago, but fabrication has been at a much higher rate than steel output, even finished steel output which has been at a higher rate than ingot production.

Current steel finishing operations cannot be gaged accurately, and this also is true of steel consuming operations; however, there are few eastern sellers of steel who do not agree that consumption has proceeded at a better pace than steel orders would indicate.

In point of business, the heavy lines have been more adversely affected than the light, since the current recession set in, yet stocks are not as large as may be supposed. The railroads generally have sizable

stocks on hand. One large eastern carrier is estimated to have more than 160,000 tons on hand at its principal point.

Stocks at shipyards are low, as their steel is bought mainly to close specifications for work on order. Much the same is true of structural fabricating shops, and car and locomotive plants, for the same reason. In certain miscellaneous lines, where heavy steel is required, consumers have been re-sizing material in stock, to meet given specifications for new jobs, for which new steel orders ordinarily would be issued.

In the lighter consumer lines, which have been more active, certain operations have been seasonal, such as in stoves and radios. Refrigerator production is off more than seasonally and automotive accessory output has proved disappointing. Buying, however, has been cautious for weeks, with a result that stocks are not considered especially heavy.

Trade consensus places operations at eastern metal plants, active in the production of consumer goods, at somewhat under 50 per cent. Eastern jobber stocks are perhaps 20 to 25 per cent higher than normal for this season.

CONSUMERS' INVENTORIES REDUCED 50 PER CENT

CLEVELAND

■ Consumers' stocks now are less than half the average carried during the first six months of this year, some sellers estimate. Inventories have been reduced sharply during the past 60 days, to a point it is said where renewed buying soon will become necessary.

Stocks of shapes, plates and bars are in a much more liquid position than certain grades of sheets, and to a lesser extent, hot and cold-rolled strip. Pipe in this district is distributed largely through jobbers on a consignment basis and consequently their inventories are comparatively small.

Most foundries, particularly those serving the automotive industry, have stocks far out of proportion to current requirements.

Jobbers generally are more heavily stocked than consumers, having built up heavier inventories during the early part of the year.

APPLIANCE MANUFACTURERS STOCKED TO MID-JANUARY

CINCINNATI

■ Heavy inventories in consumers' hands are one cause, according to district sheet mill executives, for the decline in demand now putting mill operations near depression figures.

Some of these consumers will not be in the market for material until the middle of January, and others even longer. Those with especially

heavy stocks include manufacturers of stoves, refrigerators and other household equipment.

The building of consumer inventories was a sequel to difficulty earlier in the year in obtaining material. This tendency was aggravated by the disastrous flood of last January and February. Consumers shut down during the flood tried to catch up with the accumulation of business and ordered heavily.

INVENTORIES REDUCED BUT STILL ARE HEAVY

BUFFALO

■ While inventories are being reduced leading jobbers and consumers of steel products in Western New York still have stocks on hand slightly in excess of last spring, and 30 to 40 per cent greater than at this time last year.

Inventories are distributed fairly well over general steel products, but in some plants sheets seem to be in rather abundant supply. Shapes, plates, bars and structurals appear to be next in volume of supply, while pipe, wire and nail stocks are about normal for current demand.

If consumption continues at the present rate, inventories will suffice until the beginning of March.

Scrap supplies at steel mills are sufficient to maintain present operations until May.

Return at Granite City

■ Approximately 1250 men have been ordered back to work by Granite City Steel Co., following a lay-off of nearly two months. Eight hundred have actually returned to work, and, according to G. Hayward Niedringhaus, president, the others will return as the other mills open.

Return of this number will bring the total employed to about 2800, compared with the peak of 3300 reached in late summer.

Bolt, Nut, Rivet Practice To Eliminate 400 Sizes

■ National Association of Bolt, Nut and Rivet Manufacturers has approved the government's simplified practice recommendation, which eliminates 35 per cent or approximately 400 sizes. Practically all prominent jobber organizations have endorsed the plan. Printed pamphlets covering the simplification will be available in about two weeks.

Simplified practice recommendation for range boilers and expansion tanks has been reaffirmed without change, according to the bureau of standards. Range boilers vary in capacity from 18 to 192 gallons, and expansion tanks from 10 to 42 gallons. The recommendation originally was promulgated in 1924 and has been reaffirmed without change since.

A simplified schedule of sizes for open-web steel joists ranging from 8 to 16 inches in depth and not longer than 24 times their depth, also has been reaffirmed. The simplified practice specifies properties and allowable loads in pounds per linear foot, designations, stresses, resisting moments in inch-pounds, and maximum end reaction in pounds.

Printed copies of the simplified practice recommendation for cans for fruits and vegetables, made effective Sept. 1 and including 21 stock sizes of containers, now may be obtained from the government printing office, Washington.

Roosevelt To Urge Speedier Buying

■ Owing to the fact that the house was not in session last Friday, President Roosevelt deferred sending his message on housing and business to congress until Monday. He will submit a special message on highways Tuesday.

He indicated at a press conference last Friday that the latter message will suggest cutting highway appropriations from some \$200,000,000 annually to \$90,000,000, as spent on highways before 1929.

The President will send a letter to government departments having potential buying power of some \$245,000,000 between now and June 30, 1938, and ask them to help stimulate business by speeding up purchases instead of spreading them over long periods.

Answering press questions, he said he wants tax revision as soon as congress gets ready for it, but he does not want undigested legislation. He also referred to his opening message to congress in which he asked for other legislation first.

Chicago Steel Mills Attract Many Visitors

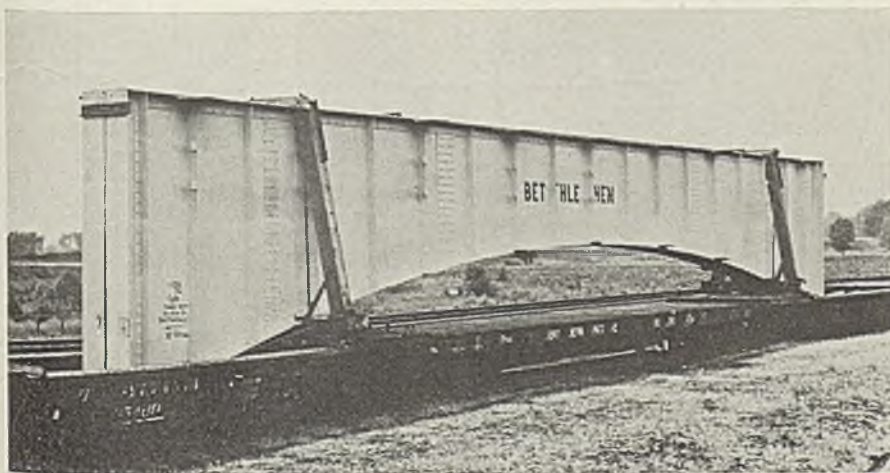
■ Trips through Chicago district steel mills are becoming a standard attraction for Chicagoans and tourists. Carnegie-Illinois Steel Corp. estimates that before the end of the year approximately 20,000 people will have visited its Chicago district operations.

More than 17,000 people have toured the mills so far this year. South works at South Chicago heads the list, having played host to approximately 7800. Largest single group to tour this plant was the Chicago chapter of the American Society for Metals, totaling over 500. Other groups sponsoring tours included the Chicago chapter of the American Institute of Banking, the Chicago Church federation and the Chicago board of education.

At Gary, approximately 5000 visitors have inspected the mills. About 1300 have toured the Gary sheet and tin mills. Largest group to visit this plant was composed of delegates to the Association of Iron and Steel Engineers convention, which totaled 800. Other visitors included high school and college students and a vocational teachers' group.

At Elwood, Ind., the corporation's American works held "open-house" to more than 4000 at the first annual Indiana Tomato Festival, Aug. 11.

105-Foot Girders Moved by Rail



■ Bridge girders 105 feet 5 inches long and weighing 38 tons were shipped recently from the Bethlehem Steel Co.'s Chicago works to Le Claire, Ia., for use in a Mississippi river dam. Three cars were required to move each girder

LABOR

SWOC CONVENTION TO PLAN STEEL CONTRACT RENEWALS

Plans for writing new contracts with iron, steel and metalworking companies will be considered at a convention of the Steel Workers Organizing committee in Pittsburgh, Dec. 14-16. Present contracts expire next Feb. 28. More than 1000 lodges are expected to send delegates.

Speaking of the convention, the first in SWOC history, David J. McDonald, international secretary-treasurer, announced many resolutions are arriving at his office. Elections to pick delegates were held in most SWOC lodges last week.

Reports of a movement among members of the Amalgamated Association of Iron, Steel and Tin Workers to replace many of the United Mine Workers' officials now serving as heads of SWOC were viewed with doubt at SWOC headquarters. Some changes are expected, but these are likely to be enlargements of the staff.

A handbook entitled "Handling Grievances" has been issued by the committee and distributed to its sub-regional officers and lodge heads. The book cautions unions to inquire into both sides of every grievance, and instructs union members not to "coerce or intimidate anybody into joining." Also included are warnings against wildcat and illegal strikes.

METAL TRADES EMPLOYMENT DECLINES FRACTIONALLY

Metal trades employment showed only a fractional decline in October and was larger than any month of the first half of this year, according to the National Metal Trades association's index for 22 leading cities. The October index was 104.3, compared with the 1937 peak of 105.2 in September and 91.9 in October, 1936. This is the highest figure for the corresponding period since 1929. While most cities showed a recession in number of workers last month, the decrease was tempered by a 13 per cent rise in Detroit.

Schedule of Exhibitions Issued in Third Edition

Exhibitors Advisory council, 330 West Forty-second street, New York, has issued its third annual schedule of important industrial, trade, commercial, professional, and other types of shows and exhibitions, to be held in 1938. Copies are available from council headquarters at \$5 each.

For the past 12 years the clearing house for information on exhibits

Joslyn Article

Reprints of the article "Making Laborers Capitalists; How Joslyn Plan Works," which appeared originally in STEEL, Nov. 15, are now available and will be supplied on request to Reader Service department, STEEL, Cleveland. It is a factual presentation of a profit-sharing plan which for 19 years has been in operation in plants of the Joslyn Mfg. & Supply Co., Chicago, with notable results, and has attracted widespread interest.

and fairs, the council is composed of industrial and trade companies and groups interested in exhibiting in shows. The following companies were elected to council membership recently: Diversey Corp., Chicago; L. H. Gilmer Co., Philadelphia; Jeffrey Mfg. Co., Columbus, O.; Mercury Mfg. Co., Chicago; and Wickwire Spencer Steel Corp., New York.

Officers Elected by Galvanizers Committee

F. G. White, Granite City Steel Co., Granite City, Ill., was re-elected

chairman of the governing board of the Galvanizers' committee, sponsored by the American Zinc institute, at the fall meeting of the committee in Cincinnati, Nov. 16-18. Others named to the board are: C. A. Brayton, Newport Rolling Mill Co., Newport, Ky.; N. E. Cook, Wheeling Steel Corp., Wheeling, W. Va.; R. H. Dibble, Carnegie-Illinois Steel Corp., Pittsburgh; B. P. Finkbone, American Rolling Mill Co., Middletown, O.; and J. L. Schueler, Continental Steel Corp., Kokomo, Ind.

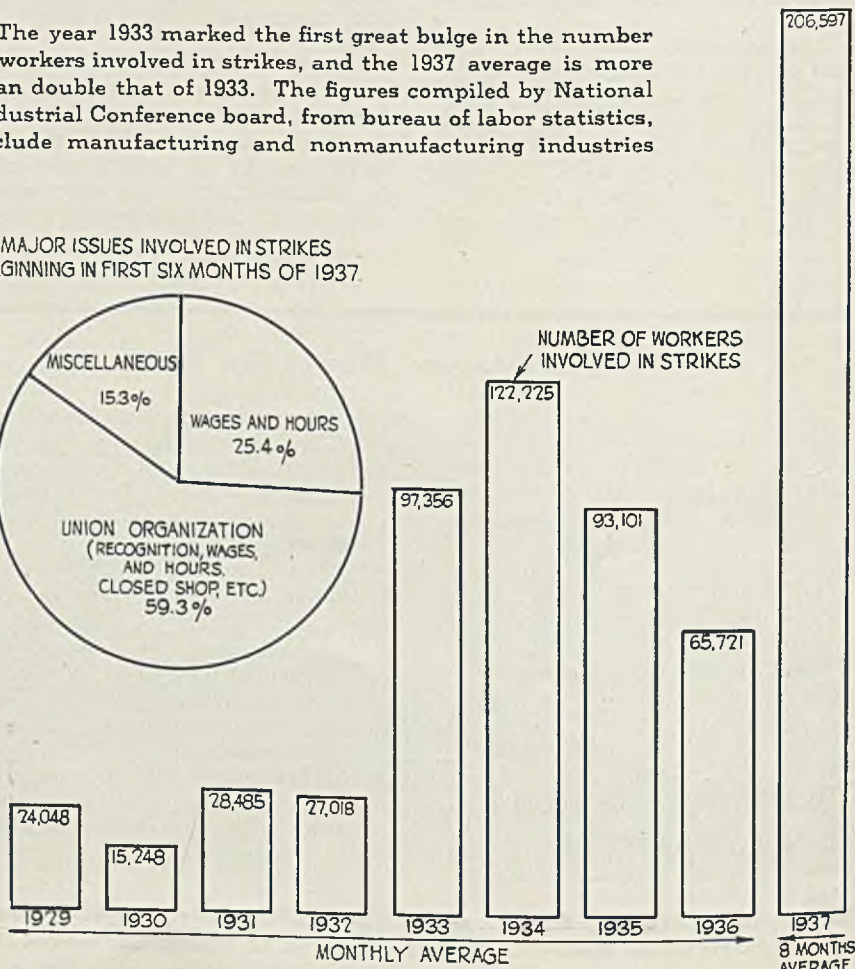
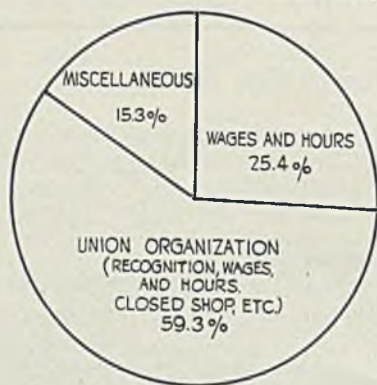
Three general sessions were held during the meeting, each featuring discussions of technical and operating problems relating to the galvanizing industry. Nearly 60 representatives of member companies attended.

Among the speakers were A. K. Andrews, president, Newport Rolling Mill Co., Newport, Ky.; and George M. Verity and L. F. Reinartz, chairman of the board and works manager, respectively, American Rolling Mill Co., Middletown, O. The meeting closed Nov. 18 with inspection of the plant and new research laboratory of the American Rolling Mill Co.

Up Goes Number Involved in Strikes

The year 1933 marked the first great bulge in the number of workers involved in strikes, and the 1937 average is more than double that of 1933. The figures compiled by National Industrial Conference board, from bureau of labor statistics, include manufacturing and nonmanufacturing industries

MAJOR ISSUES INVOLVED IN STRIKES BEGINNING IN FIRST SIX MONTHS OF 1937



FINANCIAL

■ Board of directors of the Budd Wheel Co., Philadelphia, have declared the regular quarterly dividend of \$1.75 per share, plus a participating dividend of 25 cents per share on the preferred stock. The dividend is payable Dec. 31 to holders of record Dec. 17.

A fourth quarterly dividend of \$1 a share was declared by the board of directors of General Electric Co., Schenectady, N. Y. The dividend is payable Dec. 20 to stockholders of record Nov. 26. In accordance with the company's general profit sharing plan, approximately \$3,700,000 will be paid to employees in the semiannual disbursement about Dec. 20.

On account of surtax on undistributed profits, directors of International Business Machines Corp., New York, decided recently that the dividend ordinarily payable Jan. 10, 1938 shall be paid in December, 1937. They declared a dividend of \$1.50 a share, payable Dec. 23 to holders of record Dec. 15. They also declared a stock dividend of 5 per cent, payable April 1, 1938 or as soon thereafter as practicable, to holders of record March 15, 1938.

Holdings of the preferred stock of Pittsburgh Coke & Iron Co. have authorized the issue in 1937 of not exceeding 7500 shares of \$5 preferred stock as a stock dividend on the common, if the directors deemed it advisable. Holders of the 10-year convertible debentures, however, have indicated they did not consider it wise to lift the restrictions on payment of the dividends on the common stock, which are provided for in a trust agreement securing such debentures. Definite action by the holders of these debentures is expected soon, after which directors will definitely determine what, if any dividend on the common stock can be paid at this time.

Directors of Cuban-American Manganese Corp., subsidiary of Freeport Sulphur Co., declared a dividend of 20 cents a share on the 8 per cent class A cumulative preferred stock, payable Dec. 20, to record of Dec. 10, covering arrears on this class of stock for the five quarters following issuance of the stock and ending Oct. 15, 1934.

Chicago Revises Building Code To Permit Welding

■ Revision of Chicago's building code to permit use of welding in structural work has been approved by the city council. New York's

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Nov. 27	Change	Same week	
			1936	1935
Pittsburgh ..	27	- 9	70	45
Chicago	30	+ 2.5	77	62.5
Eastern Pa...	27	- 8	48.5	39
Youngstown..	37	- 5	75	58
Wheeling	35	- 8	89	78
Cleveland ...	28	+13	77	82
Buffalo	21	- 7	84	40
Birmingham..	54	None	74	56
New England	27	- 3	88	90
Cincinnati ...	29	+ 4	96	†
St. Louis.....	20.6	+ 5.6	68	†
Detroit	59	-12	100	94
Average....	31.5	- 3.5	75.5	56

†Not reported.

building code was revised last July to permit welding of buildings (STEEL, July 26, p. 21).

In the Chicago code the allowable stress in weld metal is 16,000 pounds per square inch, which exceeds the allowance for riveting by 2500 pounds per square inch.

Congress of Industry To Be Held Dec. 7-9

■ Industry-labor relations problems and the whole field of the present business and industrial cycle will be discussed at the Congress of American Industry at the Waldorf-Astoria hotel, New York, Dec. 7, 8 and 9. National Association of Manufacturers is the sponsor.

Preceding this will be the annual two-day convention of the National Industrial council, a conference organization of state and local manufacturers' associations and national manufacturing trade associations, Dec. 5 and 6.

Committees of the National Association of Manufacturers have prepared various reports to be presented to the convention. One of these on industrial practices, already approved by the board of directors, has been made public as "a direct answer to those who challenge industry to put its own house in order."

Relations with customers, suppliers, competitors, employees, stockholders, creditors, the local community and government are covered in the report. The committee drafting it recommended private enterprise and private property demonstrate their basic worth to the public and the desirability of their perpetuation.

Charles R. Hook, president, American Rolling Mill Co., is chairman of the resolutions committee.

PRODUCTION

■ With the curtailed production in most districts, partially due to the holiday, and a moderate increase in some other centers where accumulation of orders made rollings possible the national steelworks operating rate last week dropped 3.5 points, to 31.5 per cent.

Pittsburgh—Down 9 points to 27 per cent.

Wheeling—With more open hearths made idle last week, operations declined 8 points to 35 per cent.

Central eastern seaboard—Off 8 points to 27 per cent, largely as a result of partial suspensions over the holiday. Average rate for the district as the week opens is placed at 31 per cent. One mill with a single furnace on may add another shortly since production is insufficient to match rolling requirements.

New England—Down 3 points to 27 per cent of capacity as finishing departments continue to work off accumulated stocks of billets and semi-finished steel.

Detroit—Down 12 points to 59 per cent, with 12 furnaces operating the full week and another the first three days. One producer is reported about to take off 2 more furnaces. The other producer is replacing 2 units this week. Ford hot mill will be started Dec. 6, operating five days a week.

Cincinnati—Up 4 points to 29 per cent. The rate this week is uncertain as mills are staggering work and seeking to avoid further increase in ingot inventories.

St. Louis—Up 5.6 points to 20.6 per cent. The rate in the preceding week was the low mark of the year.

Youngstown—Down 5 points to 37 per cent, with 36 open hearths, three bessemers and 11 blast furnaces active. Uncertainty has caused mills to schedule only from day to day.

Birmingham, Ala.—Unchanged at 54 per cent for the fourth consecutive week.

Buffalo—Down 7 points to 21 per cent.

Chicago—Up 2.5 points to 30 per cent, the first increase in ten weeks.

Cleveland—Up 13 points to 28 per cent as both local producers resumed production on an accumulation of orders.

■ Present investment in industrial lighting is approximately 2 per cent of the capital investment, John B. Smith, lighting engineer, General Electric Co., told the Northeastern Ohio chapter, American Foundrymen's association in Cleveland recently. Cost of lighting is about 0.3 per cent of production cost, he said.

Depicts Growth of Stainless Steel

■ EXPANDING use of stainless steel is reflected in an exhibition which opened last week in the New York Museum of Science and Industry, RCA building, Rockefeller Center. It is sponsored jointly by Electro Metallurgical Co., unit of Union Carbide & Carbon Corp., New York, and the museum, and portrays the history, development, production and fabrication of stainless steel. It includes hundreds of stainless steel products from many different manufacturers.

Fields of application receiving special emphasis are household equipment, food and beverage industries, general industry, transportation, architecture, and the medical and dental professions.

Motion pictures illustrate steps in making stainless steel from mining raw materials to completion of the highly polished and accurately dimensioned sheet.

The usefulness of stainless steel in the food industry, its adaptability for strong light-weight structures and high temperature service, and its importance in architectural applications are shown by practical demonstrations.

Operators give actual demonstrations of oxyacetylene and spot welding with stainless steel. Another demonstration shows the sandblasting method of etching, used extensively in making decorative murals and architectural trim.

Electric furnaces, ladles of molten

metal, ingots, soaking pits and rolling mills are illustrated as steps in production, while fabrication methods depicted include forming, drawing, spinning, machining, and welding.

It is indicated how the qualities of stainless steel are altered by other elements, such as nickel, molybdenum, columbium, tungsten, manganese, silicon, titanium, copper, and selenium. Stainless steel is represented as a new, low cost, "noble metal."

The tensile strength of stainless is shown by a demonstration in which a cantilever beam of the alloy, weighing 22 pounds is used to support a weight of 300 pounds at the extreme end.

Machinery

Exports Up 46%

■ EXPORTS of machinery from the United States show consistent gains, having reached a total of \$182,363,201 for the first nine months this year, 46 per cent more than the \$124,486,427 in the comparable period of 1936.

All groups show an increase over the 1936 period except metal-working machinery other than power-driven, in which the total was about 1 per cent lower. Power-generating machinery gained 64 per cent in the nine months; construction and conveying 96 per cent; mining, well and pumping 81 per cent; power-driven metal-working 34 per cent; textile, sewing and shoe machinery 5 per cent; other industrial machinery 50

per cent; and printing and bookbinding machinery 12 per cent.

A study of distribution of power-generating machinery, except automotive and electric, over the past 11 years shows considerable fluctuation in relative importance of the various areas as markets for this equipment, Canada ranking first in most years, South America first in 1926 and 1927, Europe in 1931 and Central America and the West Indies leading in 1935 and 1936.

For the entire period of 11 years Canada has ranked first, South America second, Central America and the West Indies third, Asia fourth, Europe fifth, Africa and Oceania sixth, and the United Kingdom, one of the most important individual markets, seventh.

Canada has taken an average of 25 per cent of exports of American power-generating equipment over the period and ranking first in six years. In 1926 Canadian purchases were spread in substantial volume over practically all types of this equipment and totalled approximately \$6,481,000.

In 1936 they were confined primarily to locomotive parts and accessories, steam specialties, diesel and semi-diesel engines, other stationary and portable engines and parts, totaling about \$2,325,000 in value. Shipments to Canada in 1936 were 254 per cent of the 1933 low figure, but only 36 per cent of the corresponding exports in 1926.

South American Exports Drop

South American countries dropped from first place in 1926 and 1927, in purchases of power-generating machinery, to fourth place in 1936. In the former years exports to that continent aggregated more than \$8,000,000. Corresponding sales in 1936 totaled only \$1,273,000, 250 per cent of the 1932 low figure, but only 16 per cent of the 1926 total.

During the past two years Central America and the West Indies represented the most important foreign market for American power-generating equipment, taking 26 to 27 per cent of the total exports, compared with 17 to 18 per cent in the early part of the 11-year period. Mexico and Cuba are by far the leading individual markets in this region and take all types of such equipment.

During 1936 40 per cent of the steam locomotives, 28 per cent of the diesel and semi-diesel engines, 40 per cent of the condensers, heaters and accessories, 29 per cent of the steam turbines and 18 per cent of locomotive parts and accessories exported went to Mexico. Guatemala accounted for 23 per cent of the steam locomotives exported.

Asiatic countries have taken a fairly stable share, 13 to 22 per cent, of these exports over the 11-year period.



A section in the exhibition of stainless steel at the Museum of Science and Industry, New York. Each section, similar to this, is devoted to a different phase of the subject. It is designed to appeal to producers, fabricators and ultimate consumers

Activities of Steel Users and Makers

Westinghouse Electric & Mfg. Co. recently completed a month-long air conditioning school at East Springfield, Mass. About 70 representatives of distributors of Westinghouse air conditioning equipment in all parts of the country attended the course. A banquet and presentation of diplomas closed the sessions.

Ferro Enamel Corp. will hold its annual sales meeting Dec. 17-18 in Cleveland. The new raw material storage plant will be viewed by representatives at that time.

Carl Zeiss Inc. is now distributing Zeiss precision gaging tools and instruments direct from its New York office at 485 Fifth avenue. A new department is being organized under direction of F. Loewen.

Economy Pumps Inc., formerly Economy Pumping Machinery Co., has removed its general offices to 2522 West Congress street, Chicago. The factory and engineering department, with enlarged and improved production facilities, are located at Hamilton, O.

Paragon Die Casting Co., Chicago, has moved from 2701 North Crawford avenue into new and larger quarters at 5851 Dickson avenue. The new plant provides about 80,000 square feet of floor space. More casting machines will be built and installed, and additions made to facilities for diemaking.

Carrier Corp., manufacturer of air conditioning equipment, has centralized its operations in the former Franklin automobile plant in Syracuse, N. Y., where it occupies about 30 acres of space. The two plants at Newark, N. J., and one each at New Brunswick, N. J., and Allentown and Bridgeport, Pa., have been placed on the market.

Acheson Colloids Corp., Port Huron, Mich., points out that the words dag, Oildag, Aquadag, Glydag, Castordag, Varnodag and Prodag are trade marks and not generic terms. These names, the company announces, represent its brands of colloidal products in various mediums, and as such are protected by and subject to the usual trade mark laws.

Denham & Co., Book building, Detroit, specialists in market development of industrial and automotive products, announces a new service designed to bridge the gap between inventors of ideas of potential use to

the automotive and allied industries and the men to be reached in the industry itself. The company is prepared to consult with or give advice to inventors as to market possibilities, and on inventions possessing merit, inventors will be put in touch with the particular organizations and men most likely to be interested in the development.

MEETINGS

WILL CONSIDER USE OF STEEL IN FARM STRUCTURES

Sessions dealing with farm structures, power and machinery, rural electrification, and soil and water conservation, will feature the fall meeting of the American Society of Agricultural Engineers, Stevens hotel, Chicago, Nov. 29-Dec. 2.

"Application of Steel in Farm Structures" is the title of a symposium scheduled for the afternoon and evening of Nov. 30.

INDUSTRIAL HEALTH TO BE CONSIDERED IN SEMINAR

A seminar on industrial health will feature the annual fall membership meeting of the Air Hygiene Foundation of America Inc. at Mellon institute, Pittsburgh, Nov. 30. Speakers and subjects are as follows: "Industry and Its Workers," by Col. Willard T. Chevalier, vice president, McGraw-Hill Publishing Co.; "Recent Progress in the Medical

Field Toward Further Improvement of Industrial Health," by Dr. A. J. Lanza, chairman, medical committee; "Mixed Dusts and Protector Dusts," by Dr. LeRoy U. Gardner; "Choice of Roentgenographic Apparatus and Technique in Industry," by Dr. S. Reid Warren Jr.; "Engineering Progress Toward Controlling Occupational Disease," by Prof. Philip Drinker, chairman, preventive engineering committee; "Observations on Air Dustiness in Drilling," by D. Harrington, chief, health and safety branch, United States bureau of mines; "Compensation Legislation—A Critical Review," by T. C. Waters; and "Correlation of American Researches in Industrial Air Hygiene," by the managing director.

MINING CONGRESS ARRANGES ANNUAL MEETING PROGRAM

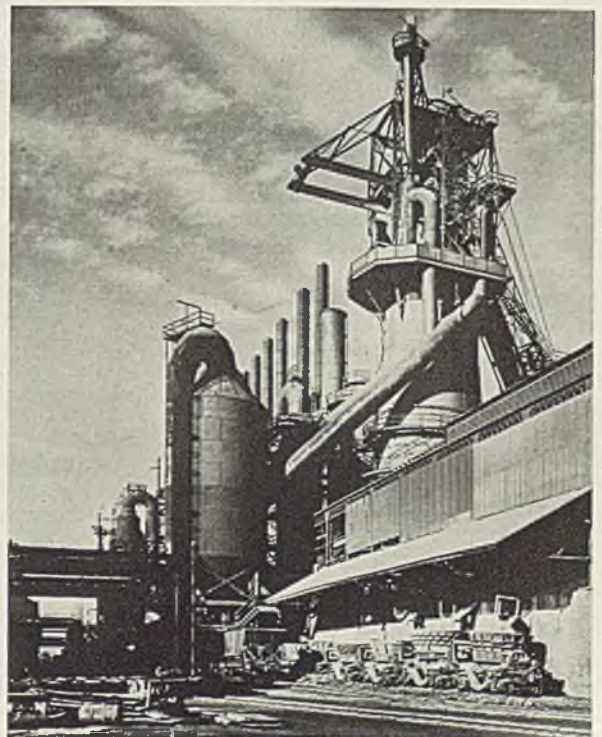
Leaders of the mining industry will convene in Washington, Dec. 1-3, for the fortieth annual meeting of the American Mining congress. The program includes discussions of mineral taxation, coal mine mechanization, relation of mining to federal government, and activities and policies of the organization.

Wesley E. Disney, congressman from Oklahoma, will address a luncheon on the subject of revenue law revision.

Arrangements for the fifteenth annual coal mining convention and exposition in Cincinnati the week of May 2 will be made by the manufacturers division.

Republic Replaces 600-Ton Furnace with 1000-Ton Unit

This 1000-ton blast furnace was completed recently at Republic Steel Corp.'s Corrigan-McKinney plant, Cleveland, adjacent to the open-hearth furnaces which will supply steel to Republic's new 98-inch continuous strip mill. This replaces a 600-ton unit built 20 years ago. It is one of four blast furnaces at the plant



MEN OF INDUSTRY

■ H. M. NAUGLE, formerly president, is now chairman of the board of Rotary Electric Steel Co., Detroit. W. H. Colvin Jr., until recently treasurer, succeeds Mr. Naugle as president.

George A. Blackmore, president, Westinghouse Airbrake Co., John S. Craig, and Leon E. Hickman have been elected directors, Pittsburgh Screw & Bolt Corp., Pittsburgh.

W. C. Flanders has been promoted to sales manager, Worthington-Gamon Meter Co., Harrison, N. J. He succeeds G. H. Gleeson, vice president in charge of sales, recently resigned.

Eugene H. Pfeiffer has been appointed Buffalo district sales manager, stainless division, including stainless tubing, bars and castings, for Brace-Mueller-Huntley Inc., Buffalo.

Charles S. Pope has returned to the Soo Line railroad to fill the newly created post of executive assistant, after an absence of several years. His headquarters will be in Minneapolis.

Robert J. Ritchey has joined the commercial division staff of Carnegie-Illinois Steel Corp., Pittsburgh. He will devote his efforts to the development of company products for use in the metal burial goods industry.

T. F. Myners has been named general superintendent of the Withersbee-Sherman ore properties at Mineville and Port Henry, N. Y. which recently were put under the management of Republic Steel Corp. (See STEEL, Nov. 22, p. 97).

J. A. Schallenberg has been appointed assistant comptroller for Worthington Pump & Machinery Corp., Harrison, N. J. He has served the corporation 20 years in various capacities in the treasury and accounting departments.

Harold E. Long, vice president in charge of purchases for Nash Motors division of Nash-Kelvinator Corp., whose office was transferred to general offices in Detroit early in November, has been appointed director of purchases for all divisions of the parent company.

Warren D. Fuller, for a number of years engaged in engineering in New England, has been appointed New England representative for the Selas Co., Philadelphia, consulting

and manufacturing gas engineers. He will maintain headquarters at 36 Pearl street, Hartford, Conn.

D. T. Downes, chief engineer, Calorizing Co., Wilkinsburg, Pa., has resigned to accept a position as development engineer for Pittsburgh Plate Glass Co., at the recently organized central development laboratory.

Phil Huber, formerly vice president and assistant general manager of the Ex-Cell-O Corp., Detroit, has been elected president and general manager, succeeding N. A. Wood-



Phil Huber

worth who has resigned because of ill health.

H. G. Bixby, assistant secretary since 1929 and controller since 1932, has been named secretary, treasurer and a director.

Robert H. Schuster, for the past five years employed in sales work in the Pittsburgh district with the Ault & Wilborg division of Inter-Chemical Corp., has joined the Pittsburgh sales staff of Lincoln Electric Co., Cleveland.

Edward W. Voss, 2882 West Liberty avenue, Dormont, Pittsburgh, is now representing the Philadelphia Drying Machinery Co., Philadelphia, in western Pennsylvania, eastern Ohio and West Virginia, in the sale of its industrial heating equipment.

Allan P. Stern, vice president and estimating and contact engineer, Colonial Iron Works Co., Cleveland, will receive Dec. 7 in New York the Charles T. Main award of \$150 of the American Society of Mechanical Engineers for his thesis entitled "The Influence of the Introduction

of Labor-Saving Machinery Upon Employment in the United States."

Arthur T. Cox Jr. has been appointed manager by Lincoln Electric Co., Cleveland, of its Tri-Cities welding sales-engineering office located at Moline, Ill. He formerly worked in the company's Chicago office. He succeeds J. B. Flock, who is taking a year's leave of absence.

J. J. Pelley has been re-elected president, Association of American Railroads. Ralph Budd, president, Chicago Burlington & Quincy railroad, and E. M. Durham Jr., chief executive officer, Chicago, Rock Island & Pacific railroad, have been elected directors.

L. W. Wallace, head of engineering research for the Association of American Railroads, will become director of a new engineering and research division of Crane Co., Chicago, effective Dec. 1. The new division will co-ordinate all engineering activities and direct the development of new products.

R. F. Herr, formerly assistant export manager, Harnischfeger Corp., Milwaukee, has been appointed export manager to succeed Frederick Salditt, recently elected vice president in charge of sales. Mr. Herr joined Harnischfeger following his graduation from Purdue university in 1930.

Alden L. Covill, associated with the Northern Equipment Co., Erie, Pa., as representative in Rochester, N. Y., for the Copes system of boiler feed control and allied equipment since 1918, is retiring from business. The Rochester territory will hereafter be covered by Charles A. Randorf, 220 Delaware avenue, Buffalo.

Floyd C. Parman has been named sales manager in the Chicago territory for Hendey Machine Co., Torrington, Conn., with offices at 565 Washington boulevard. Mr. Parman has been succeeded as sales manager of the company's central New York territory with headquarters in Rochester, N. Y., by E. J. Ray.

Dr. G. M. L. Sommerman, of the physical laboratory staff of American Steel & Wire Co., Worcester, Mass., plant, has received the Alfred Noble prize for his paper entitled "Properties of Saturants for Paper-Insulated Cables" presented before the American Institute of Electrical Engineers last June. The prize consists of \$500 in cash and a medal.

Walter H. Bodle, previously in charge of the Indianapolis office of

the Square D Co., Detroit, has become assistant to the sales manager. Concurrent with Mr. Bodle's appointment, the order and billing departments have been merged with the sales department under Mr. Bodle's supervision. Mr. Bodle's position in Indianapolis is being taken by R. W. Thompson, previously branch manager at Pittsburgh, while A. W. Anderson will assume charge of the Pittsburgh territory.

H. B. Harvey, Harvey Metal Corp., Chicago, has been elected president, Brass Forging association. Other officers elected are: Vice presidents, F. L. Riggin, Mueller Brass Co., Port Huron, Mich., and T. W. Kuhn, Bohn Aluminum & Brass Corp., Detroit; secretary, G. F. R. Wheat, Revere Copper & Brass Inc., New York; treasurer, F. S. Hyde, Scovill Mfg. Co., Waterbury, Conn.

Charles N. Mason, president of Electrical Securities Corp. and G. E. Employes Securities Corp., subsidiaries of General Electric Co., Schenectady, N. Y., completed 50 years of service with the General Electric organization Nov. 1. He was born in Plymouth, Mass., in 1869; at the age of 17 he began as an office boy and clerk with Thomson-Houston Electric Co., which consolidated with Edison General Electric Co. in 1892 to become General Electric Co.

B. C. Heacock, president Caterpillar Tractor Co., Peoria, Ill., has been nominated for re-election as president of the Illinois Manufacturers association. Other nominees include: First vice president, J. C. Belden, Belden Mfg. Co., Chicago; second vice president, J. E. Otis Jr., Stewart-Warner Corp., Chicago; treasurer, Paul Schulze, Paul Schulze Biscuit Co., Chicago. Election will be at the annual dinner meeting, Dec. 14, at which Tom M. Girdler, chairman, Republic Steel Corp., will be principal speaker.

Harold L. Hoefman has been appointed manager of Link-Belt Co.'s plant, warehouse and sales office at Atlanta, Ga. He succeeds the late I. H. Barbee. George A. Paige who has been district sales manager at Pittsburgh, has been made manager at Detroit.

Laurance O. Millward, for the past four years district sales manager at Cleveland, has been named district sales manager at Pittsburgh. Paul V. Wheeler, associated with the Cleveland office since 1921, has been appointed district sales manager in that city.

Barney H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J., has been elected president, New Jersey chapter, Institute of Scrap Iron and Steel



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Inc. Other officers elected include: First vice president, Israel Citron, Citron-Byer Co., Trenton, N. J.; second vice president, I. Werblin, Werblin Bros., Somerville, N. J.; third vice president, W. Abramson, A. Abramson & Sons Inc., Newark, N. J.; secretary-treasurer, Murray Kunin, Schiavone-Bonomo Corp., Jersey City, N. J.; honorary president, Abraham Isaac, Abraham Isaac Inc., Elizabeth, N. J.

Hugo Kurowske has become sales manager, Claude B. Schneible Co., Chicago, manufacturer of dust collecting machinery. Other personnel changes follow: L. C. Beers, formerly in the southern territory, has been transferred to the New England district as manager, with headquarters in Springfield, Mass.; Carl Herman, of Philadelphia, will be in charge of sales in the New Jersey and New York metropolitan area, retaining his office at Philadelphia; Noyes C. French, Ohio representative at Cleveland, has taken over additional sales territory, including part of West Virginia and Kentucky; John Lisko has been appointed chief engineer, and Carl Noderer, experimental engineer.



Frank H. Sleeper

DIED:

JOHN G. JENNINGS, 81, chairman of the board, Lamson & Sessions Co., Cleveland, of a heart attack while en route to St. Petersburg, Fla., Nov. 21. Following graduation from Yale university, Mr. Jennings became a bookkeeper for the Peck, Stow & Wilcox Co. He then joined Lamson & Sessions as bookkeeper and rose to the presidency, which position he held many years. Mr. Jennings was also vice president, Johnston & Jennings Co., Cleveland.

Arthur W. Taylor, 64, prominent in Pittsburgh steel circles for many years, Nov. 21 in Pittsburgh.

Arnaud G. Heller, vice president, Heller Brothers Co., Newark, N. J., in Newark, Nov. 16.

Edward N. Boice, 60, treasurer, Hanson-Van Winkle-Munning Co., Matawan, N. J., in that city, Nov. 6.

R. B. Carolin Sr., founder of R. B. Carolin Foundry, maker of brass and aluminum castings, Detroit, in that city, Nov. 20.

Lucius J. Elliott, 82, president, Imperial Bit & Snap Co., Racine, Wis., manufacturing hardware specialties, Nov. 19.

Edward L. Marsh, 57, former secretary-treasurer, United States Gypsum Co., Chicago, and a director for the last nine years, at Old Lyme, Conn., Nov. 21.

Joseph Wimmer, Pittsburgh scrap dealer and former president of Hausman & Wimmer Co., Pittsburgh, scrap iron merchants, at Miami Beach, Fla., Nov. 21.

Benjamin Lissberger, 61, chairman of the board, Federated Metals division, American Smelting & Refining Co., New York, in New York, Nov. 19. A prominent figure in the secondary metals trade for many years, Mr. Lissberger also had a wide acquaintance throughout the steel industry.

Frank H. Sleeper, 74, inventor of spring making machinery, and president, Sleeper & Hartley Inc., Worcester, Mass., in St. Petersburg, Fla., Nov. 4. Mr. Sleeper recently originated a plan to perpetuate the business of Sleeper & Hartley Inc. completing all arrangements for continuing the same management of the business, thus making certain that its large clientele and general industry would continue to receive the same courtesies, efficient and prompt service they have always enjoyed.

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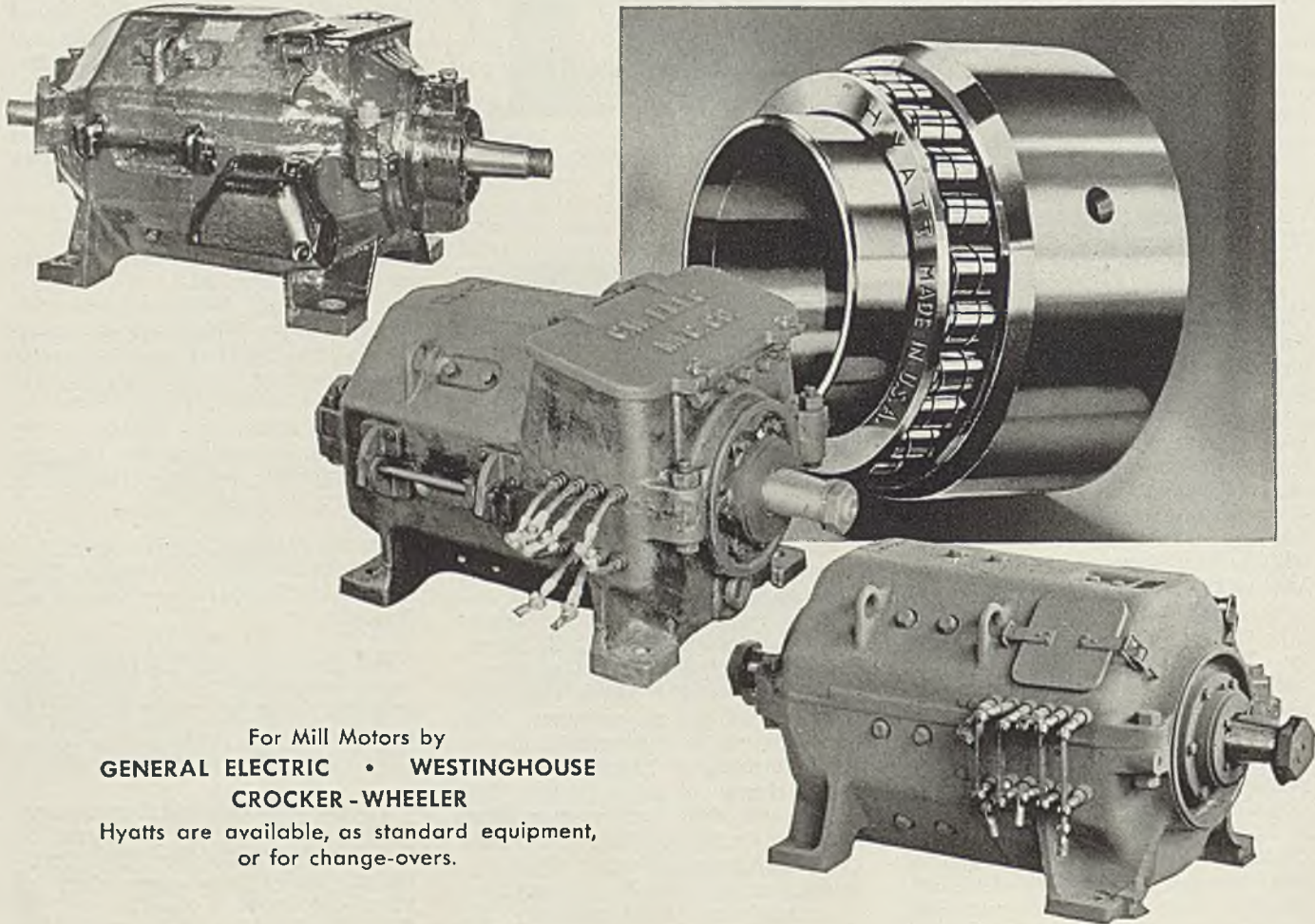
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HYATT protection for your Mill Motors



For Mill Motors by
GENERAL ELECTRIC • WESTINGHOUSE
CROCKER - WHEELER

Hyatts are available, as standard equipment,
or for change-overs.

To assure dry windings and proper armature clearance at all times equip your mill motors with Hyatt Roller Bearings.

Hyatt construction permits the simplest kind of mounting giving you a long-lived installation requiring no maintenance beyond the occasional addition of grease lubricant. Hyatt Bearings Division, General Motors Corporation, Harrison, Detroit, San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.

HYATT *Roller Bearings*



MIRRORS OF MOTORDOM

■ **AUTOMOBILE** production fell sharply last week because of the Thanksgiving holiday, several producers closing Wednesday night for the balance of the week. Labor trouble in Pontiac practically shut off assemblies in that area, and according to no less an authority than Homer Martin, UAW president, Pontiac has a supply of 17,000 cars (about three weeks' production) awaiting buyers, and could close down "for three months" without any serious inconvenience. Mr. Martin made this point in urging sit-down strikers to leave the Fisher Body plants in Pontiac, and no doubt purposely exaggerated the situation slightly.

Martin pleaded for an hour and 25 minutes before the several hundred men holding the plant finally agreed to evacuate. Thousands hoped to return to work Tuesday, but the management announced it would be impossible to resume operations until the plant and equipment was checked thoroughly. Some damage was reported, including the removal of rubber hose from welding machines. Production will be resumed this week, it was announced.

Buick Production High

Production at Buick has not shrunk appreciably as yet, assemblies running well over 6000 per week until last week, and retail deliveries during the first ten days of this month totaled 6776, best volume for this period in Buick history. Employment and payrolls at this Flint, Mich., division of General Motors are at a new seasonal high.

Cheerful news likewise comes from Packard where deliveries for the first ten days of November also exceeded the totals for last year at the same time. Packard has been striving by might and main to reach a production rate of 40 cars per hour but has not been able to make it. Two 8-hour shifts are operated five days a week and assemblies average about 2500 weekly. The

BY A. H. ALLEN

Detroit Editor, STEEL

company is now engaged in attempts to round out dealers' supplies of all models, in view of the fact the bulk of production so far has been sedans and two-door models. Good backlogs of orders for convertibles, coupes and other body styles are reported.

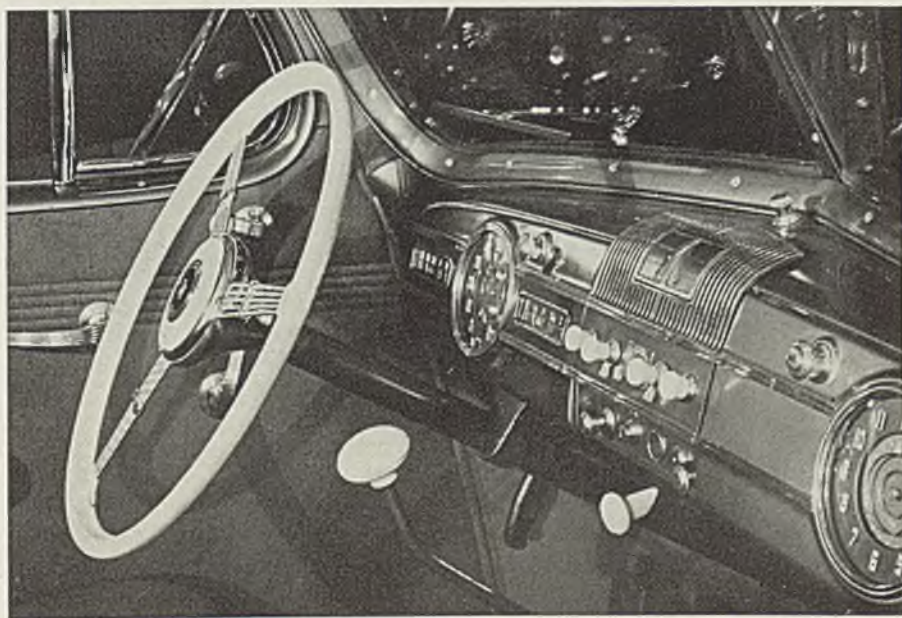
Some divisions at Packard which have been operating at full speed since early this fall, got far ahead of the assembly line and consequently had to be shut down to avoid becoming overbalanced on

stocks. This was true of the forging department.

Packard, in common with all other producers, has been having its share of minor labor disturbances, and it is a rarity when any plant these days gets an honest 8 hours' work from any department. But such interruptions have ceased to be news. The chief question now is how long managements will tolerate this condition in an industry which always has insisted on maximum effort from employes for the maximum in wages.

■ **A TOUR** of the new industrial community springing up in Warren township, Macomb county, north-

Packard Instrument Panel Features Die Cast Segments



■ This distinctive Packard instrument panel is composed of a number of zinc alloy die cast segments. The ash tray decorative plate in center is a single chromium plated casting. Many of the segments, such as the control knob panel, are finished in a combination chrome and enamel to harmonize with other interior fittings. Photo courtesy New Jersey Zinc Co.



MIRRORS OF MOTORDOM

east of the city, shows the Dodge truck plant nearing completion, the boiler being fired up within the last ten days and the glass-windowed sidewalls erected on two sides of the structure. Nearby, inside the city limits, steelwork is going up for the new Briggs plant and the tall brick chimney of the plant is more than half finished. Elsewhere the visitor is besieged with hundreds of real estate signs offering "choice industrial and homesites" for "practically nothing."

Little homebuilding has started in the vicinity, but undoubtedly will get underway shortly, since it is intended to have the new Dodge plant in operation by Jan. 1, and the Briggs plant soon thereafter.

Welding Company To Build

Another new plant in this section will be started any day now, scheduled for completion within 90 days. It is being built for the Progressive Welder Co., suppliers of numerous types of hydromatic and multiple spot welding equipment. The company has enjoyed unusual success for its products in the 2½ years of its existence, and this year will do over \$1,000,000 worth of business. At present the company leases space from Fisher Body on Piquette avenue. The new building, designed modernistically, will provide 40,000 square feet of office and plant space, with adjoining land available for duplicating the plant. It will be located at 3050 East Outer drive, and in appearance will resemble the nearby plant of Herron-Zimmers Molding Co.

Present industrial inhabitants of Warren township are said to be none too enthusiastic over new industries coming into the district. Already there is talk of a tax rate increase to provide new schools, and low tax rates were one of the chief inducements of this area for industrial plants. But with hundreds of new families coming in, schools naturally must go up, and tax rates increased.

Thornton Tandem Co., manufacturer of a gear unit for truck transmissions, is another company which was planning to build in this area, having option on a 25-acre site on Hoover avenue. However, the option has been allowed to lapse, and building plans deferred.

In brief the status of industrial

Automobile Production

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

	1935	1936	1937
Jan.....	300,335	377,244	399,634
Feb.....	350,346	300,810	383,698
March....	447,894	438,943	519,177
April.....	477,059	527,625	553,415
May.....	381,809	480,518	540,357
June.....	372,085	469,368	521,139
July.....	345,297	451,206	456,909
Aug.....	245,075	275,934	405,064
Sept.....	92,728	139,820	175,620
9 mos....	3,012,628	3,461,468	3,955,013
Oct.....	280,316	230,049	*352,565
Nov.....	408,550	405,799	.....
Dec.....	418,317	518,958	.....
Year.....	4,119,811	4,616,274	.....

Estimated by *Ward's Automotive Reports*

Week ended:	
Oct. 30	90,155
Nov. 6	89,770
Nov. 13	85,325
Nov. 20	85,757
Nov. 27	59,405

	Week ending	
	Nov. 27	Nov. 20
General Motors	24,075	40,900
Chrysler	16,020	26,700
Ford	7,960	3,525
All others	11,350	14,632

*Estimated.

development in the district is as follows:

Plants now in operation

Rotary Electric Steel Co.*
Herron-Zimmers Molding Co.

Under construction

Dodge truck assembly and export plant.*
Briggs body parts plant.

Plans drawn up

Carboloy Co.*
Progressive Welder Co.

Rumored

Divco Twin Truck Co.*
Unidentified stamping plant*
Thornton Tandem Co. (abandoned temporarily).*

The asterisk (*) denotes property outside the city limits.

■ CONSIDERABLE mystery surrounds the labor troubles which have developed here in the past three weeks. It is difficult to see why sitdowns and other disturbances have been promulgated in face of declining production and in view

of the approaching holiday season when families are eager for wages.

Two explanations are heard: One is the UAW decided it needed some form of demonstration—a shot in the arm, so to speak—to show managements and the public the union movement was not dying, that even in the face of layoffs and shorter hours its members had plenty of fight left. This opinion cannot be reconciled with the stand taken by union leaders that the Pontiac trouble was unauthorized and unsanctioned, and would not be tolerated by the union executive board.

The second explanation, which sounds more logical, is that the disturbances were engineered by a radical, left-wing group (if indeed there can be a left-wing group in an organization such as the UAW) of malcontents headed by organizers ousted from the Flint local of the UAW some months ago. The latter group has been holding quiet meetings in Flint for some weeks, and its members believe in taking strong steps to assert the union domination of the automobile industry. They are at odds with Homer Martin, UAW president, and other UAW officials and there have been numerous instances of beatings and scuffles between this group and those now in power at Flint.

Sitdowns Break Out Again

The Flint local, by the way, is said to have been \$14,000 in the hole prior to the installation of new leaders by Martin, a deficit which is now reported to have been made up completely, partly as a result of intensive "button checks" of workers.

Another outbreak of sitdownitis occurred last week at Bundy Tubing Co., where 1100 were thrown out of work after 250 workers seized the plant and chained and padlocked the doors. The company had been negotiating with the UAW since Oct. 21 on a contract which was mutually agreeable to the management and the union except for the company's refusal to grant sole bargaining rights to the UAW.

Sheriff's deputies were called to the plant of the New Haven Foundry Co., New Haven, Mich., after UAW workers forcibly ejected 12 non-union men and fist fights developed between union and nonunion employes. The foundry employs 600.

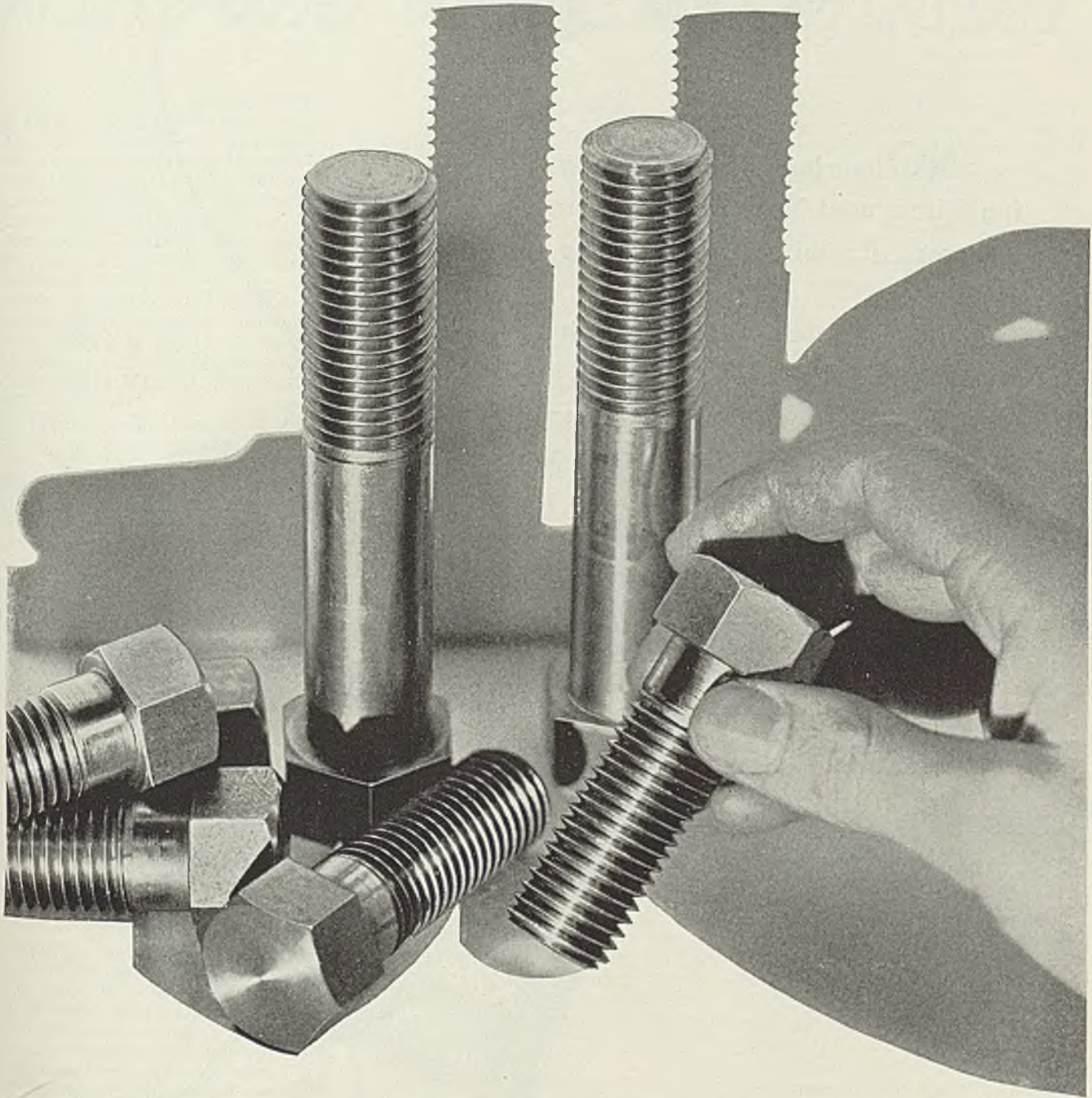
After 500 men on a day shift called a production recess to mull over union difficulties at Wilcox-Rich division of Eaton Mfg. Co. at Saginaw, Mich., last Monday, the management closed the plant and sent the men home, throwing 1000 into idleness.

Alarmed at the new increase in labor trouble over the state, Governor Murphy Wednesday retreated from his early-in-the-year position and urged upon workers respect for

(Please turn to Page 82)

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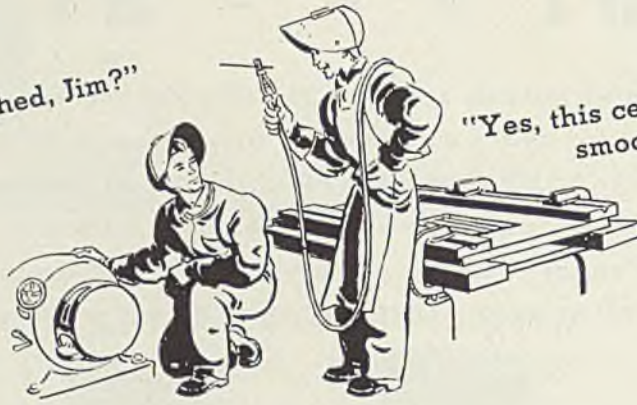


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WINDOWS OF WASHINGTON

WASHINGTON

■ DESPITE all the talk on Capitol Hill since congress convened to help the poor business man, especially in the matter of taxes, Washington observers do not believe there can be any relief during this session, which certainly must end before Jan. 3 when the next session convenes.

General opinion here is there will be no broadening of the income tax base as this is election year. Also unlikely is a new manufacturers' sales tax in spite of much talk to the contrary.

There is talk, however, of an increase in the corporate tax. It is said this does not interfere with management and that as long as a tax has to be imposed this is less disturbing to industry than many others.

Complaint has been heard, especially in the house, that business interests have not presented enough statistical data on taxes to the ways and means committee. The committee has received many complaints from business of all sizes regarding the taxes but specific cases and especially statistics are scarce. Of course, treasury experts are supplying plenty of statistics, but these do not reflect in favor of the business interests.

There is a feeling in some quarters the capital gains tax must be repealed to help get money into circulation.

Substitute Bills Offered

Several substitutes have been offered for the Black-Connelly wage and hour bill with which the house is having so much trouble—and has had since last spring. Two of these are the Lamneck bill and the Berry bill. Incidentally it is no secret that Berry would be glad to be nominated vice president in the next campaign. He would like to please both capital and labor, a job that looks impossible.

As pointed out in this column before, the Lamneck bill deals with what the congressman calls substandard conditions and provides

BY L. M. LAMM

Washington Editor, STEEL

for administration by the federal trade commission. It is the belief of the representatives of industry in Washington, who have made a close study of the Lamneck bill, that it would be preferable to the Black-Connelly bill.

At this writing there are three alternatives, the Berry bill, the Lamneck bill and the Black-Connelly bill. Of the three, industry prefers the Lamneck bill.

In connection with the hours and wages bill, Mrs. Norton, of New Jersey, chairwoman of the house labor committee, called upon Miss Perkins, John Lewis and William Green for their views "because of the great conflict of opinion which seems to exist on this legislation."

Green Assails Bill

Opposition to the pending bill was voiced by Green, who recommended either a substitute bill or amendments to the present measure. This change of front on the part of the American Federation of Labor brought it again into conflict with the Committee for Industrial Organization and probably blasted hopes of the administration for speedy enactment of the wage-hour bill.

Reversal of the AFL's stand was explained by Green in a letter to Mrs. Norton. Experience, he insisted, has demonstrated it is no longer safe to entrust administration of such legislation to a board such as the national labor relations board.

The AFL president also said recession in business since the bill was drafted makes necessary provisions for a shorter work day and week. The present bill provides for a maximum work week of 40 hours.

Lewis replied to Mrs. Norton's request as chairman of the board of Labor's Nonpartisan league. He

said while there are certain shortcomings in the bill before the house nevertheless the establishment of the principle of federal wage and hour legislation is so important that it should be adopted without further delay. He declared the league would do all in its power to help push the bill through. On the other hand southern Democrats in the house are doing everything they can to prevent its passage.

BORAH RESENTS SUGGESTION CONGRESS INFLUENCE ICC

Senator Borah of Idaho recently became wroth in the senate at the suggestion the railroads would ask congress to call upon the interstate commerce commission to increase freight rates by 15 per cent—which application has already been filed with the commission.

He offered a resolution calling to attention "the interstate commerce commission is a quasi-judicial body and any and all attempts to influence its action through outside influence must necessarily result in disparaging the efficiency and worth of such commission."

FTC INVESTIGATES HIGH LIVING COSTS

Federal trade commission has started an investigation of the sharp uptrend in prices of various commodities requested by the President.

The great concern of the Chief Executive in this is interesting because it was not long ago he was telling newsmen the government had to get prices up.

The investigation by the commission is apparently going to take longer than the President thinks.

In the opinion of some Washington observers the President in calling upon the commission for the investigation was simply taking another step to assist in the revival of housing construction. This thought probably originated through the idea the trade commission has cases against some of the building trades commodities, such as cement, win-

dow glass manufacturers and the cast iron pipe folks.

As already pointed out in these columns the case against the cement people probably will be used as a precedent in the steel basing point situation. However, there is no reason to believe the commission will rush its cement case because of this general survey to be made for the President. That case will have to take its regular course.

TRADE PACTS WITH CANADA, UNITED KINGDOM PLANNED

Announcement has been made by the state department it contemplates the negotiation of a trade agreement with the United Kingdom and also that it will reopen negotiations with Canada for an amended trade agreement.

Both of these agreements should be of special interest to the steel trade. Figures available at the department of commerce indicate Canada was the second best customer for iron and steel and their products, ranking next to Japan.

Excluding scrap, in the first nine months the United States shipped 372,312 gross tons of iron and steel and their products to Canada which was 14.8 per cent of our iron and steel exports for that period. During the comparable period last year our exports to Canada were only 197,192 tons. Our imports from Canada for the first nine months this year were 29,860 tons, compared with 39,854 tons last year.

The department's figures show regarding the United Kingdom that during the first nine months of this year we exported 228,428 tons, or 9 per cent of all of our steel exports, compared with 10,548 tons or 1.3 per cent of all exports sent to the United Kingdom during the first nine months of 1936. During the first nine months this year the United Kingdom was the third market in importance.

During the first nine months, this year we shipped 191,547 gross tons of pig iron to the United Kingdom, compared with only 20 tons during the period last year. Also during the same period this year the United States exported 9567 tons of steel bars to the United Kingdom compared with 684 tons last year; 6449 tons of strip steel compared with 1767 tons last year and 5967 tons of ingots against none last year.

In the first nine months of this year the United Kingdom imported our iron and steel products in 52 classifications. The most important products, aside from those enumerated, included wire rods, black steel sheets, railway track material, including rails, and shapes. Leading items exported to the United Kingdom during 1936 included; 7132 tons of sheets (principally black steel); 1821 tons of strip; 2235 tons of wire

rods; 938 tons of steel bars; and 395 tons of skelp.

This trade in 1936 covered 42 separate iron and steel classifications ranging from one ton of seamless boiler tubes to 6840 tons of black steel sheets.

Dates for holding hearings on these trade agreements have not yet been announced but the state department has made known the negotiations so that American industrialists will have time to make suggestions. Later they will be given a chance to be heard concerning their own commodities.

The United Kingdom is the largest foreign market of the United States. Our exports to that country in 1936 were valued at \$440,000,000 and accounted for nearly 18 per cent of our exports to all countries. Value of the trade in 1935 was \$433,000,000. In 1929 it was \$848,000,000.

ASKS EXTRA ALLOWANCE FOR ANTITRUST UNIT

The attorney general may be very hopeful but he has asked the budget bureau for an extra allowance of \$1,000,000 for use by the antitrust unit at the justice department. If this should be granted, it would more than double the present appropriation. With all the government departments trying to curtail expenses it would seem inconsistent to allocate this additional amount for antitrust work—but it may be in view of the evident interest in the subject by the administration.

Mr. Cummings told newsmen last week that if the additional money should be granted to his department, it would be used to increase the antitrust legal staff and defray the cost of other activities in pressing antitrust action.

He said it costs the department nearly \$100,000 a year to carry on antitrust prosecutions now.

"The antitrust problem," said Cummings, "is No. 1 on my list of things to be done. We need more funds and more men, as these cases are most complicated and take an enormous amount of time. I've been preaching until I'm tired of hearing my own voice that the antitrust situation is a very important problem."

The attorney general said he is having data prepared for consideration by congress with a view to showing the urgent need for an overhauling and extension of federal laws against monopolistic practices by great corporations.

ROPER'S ADVISORY COUNCIL WILL MEET IN CHICAGO

The Roper business advisory council will have its next meeting in Chicago on Dec. 1. No agenda has been announced but it is known that Secretary of Commerce Roper will attend. This is the first time a meeting has been held outside of

Washington although there has been considerable demand for it owing to the fact that a number of the members are from the West.

UNDERGROUND CORROSION SUBJECT OF CONFERENCE

Causes and prevention of underground corrosion of cast iron and other pipe lines were discussed here last week at a conference at the bureau of standards.

Delegates from seven countries attended, giving it an international aspect and emphasizing the widespread interest and concern in the problem. Loss from the corrosion of buried pipe lines, it has been estimated, amounts to \$100,000,000 a year in the United States.

More than 80 papers on the subject, including 18 by foreign delegates were discussed. They included such subjects as soil corrosion and electrolysis, soil tests and surveys, measurements of the depth of pitted places on the surface of pipes, determination of the condition of pipe lines, and the protection of pipe line coatings. Copies of the papers were sent several weeks in advance to each of the delegates, and the conference was given over to their discussion.

It was organized by K. H. Logan, chief of the section on underground corrosion of the bureau of standards.

RAILROAD EQUIPMENT INSTALLATIONS INCREASE

According to the car service division of the Association of American Railroads, installation of new equipment so far this year has been greater than in any corresponding period since 1930. Class I railroads, the association says, for the first ten months installed 62,911 new freight cars, compared with 34,113 in the same period of last year. The average capacity of all freight cars also continues to increase, it having been 49.20 tons on Sept. 1, compared with 48.66 tons in 1936 and 43.28 tons in 1923.

The association says the average tractive power for steam locomotives also is greater, amounting to 49,564 pounds on Sept. 1, this year, an increase of 27.5 per cent over 15 years ago.

GERMAN STEELMAKERS OPEN SCRAP PURCHASING OFFICE

Large iron and steel producers of western Germany recently organized a nonprofit scrap purchasing and distributing office with headquarters at Dusseldorf, according to the American consulate, Cologne.

This central agency was established mainly to effect equitable distribution of scrap for local consumption and will supervise distribution to consumers in the Rhineland, Westphalia, and Saar districts.

Why Not Stress Common Bond of Interest and Promote Teamwork!

IN THESE days when criticism, vindictiveness, class hatred, persecution and general cussedness are rampant, it may be profitable to explore the possibilities of a national policy of tolerance and unity.

Millions of column inches of newspaper and periodical space and thousands of hours of radio time have been devoted to the specific purpose of breeding antagonism between various factions of the American economic and social structure.

Everything that could be done through the medium of modern, highpowered propaganda has been directed to the task of intimating that the interests of agriculturists and industrialists are diametrically opposed, that employers are the arch enemies of employes, that consumers should view all sellers with suspicion, that business is conducted in malicious violation of the public interest and that bankers, investors, landlords and all others identified as the "haves" are motivated only by an overpowering passion to grind down the "have nots."

National Policy of Inciting Class Antagonism Has Resulted in Chaos Instead of Benefits

This policy of promoting hatred and suspicion and of inciting class antagonism has been permitted to run riot for several years. The claim of its sponsors that it would result in social benefits for the underprivileged has not been demonstrated by the results. The experiment has not brought prosperity to the nation nor real benefits to the unfortunates. Instead it has wrought havoc generally.

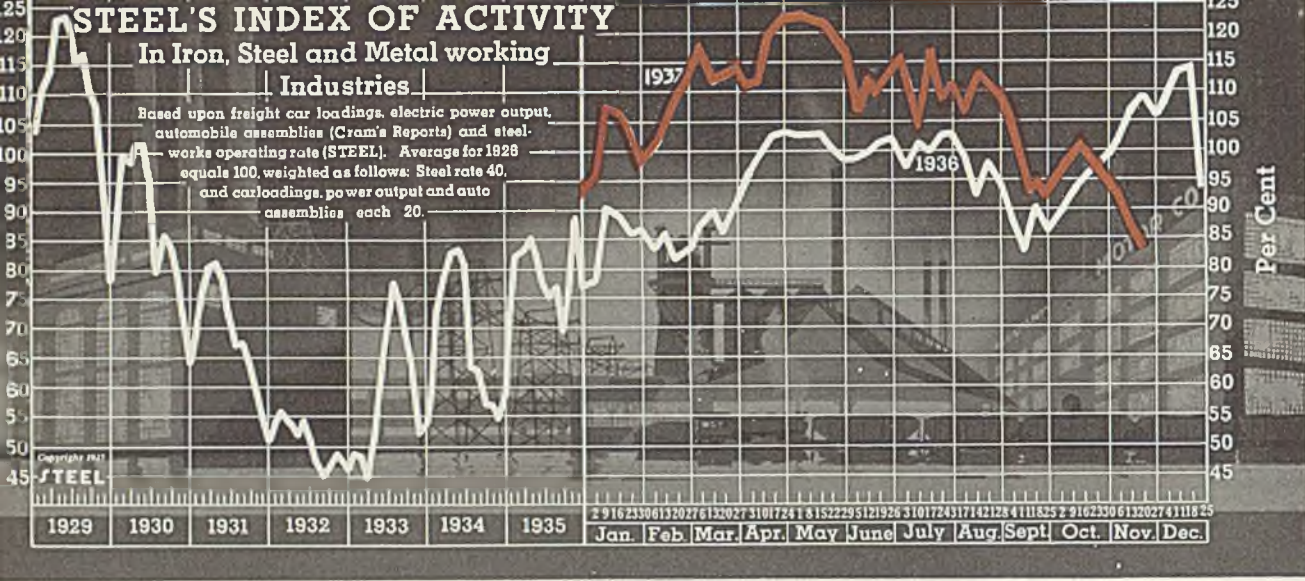
This is not surprising. No worthy enterprise has ever succeeded when the participants were arrayed against each other. On the other hand, history furnishes innumerable examples of success based upon good teamwork.

Leadership in Co-operation Will Succeed Where Leadership in Dissension Has Failed

Right now leadership in co-operation would succeed where leadership in dissension has failed.

Think what might be accomplished by strong, capable leadership in high places directed specifically to urging employer and employe, producer and consumer, investor and spender, agriculturist and industrialist, Southerner and Northerner, Easterner and Westerner, "haves" and "have nots,"—in fact, all groups and all classes—to get together in a concerted drive to break the present stalemate of confusion and misunderstanding.

This nation has done it before. It can do it again.



sh

STEEL'S index of activity declined 2.4 points to 84.1 in the week ending Nov. 20:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
Sept. 11	94.3	83.1	70.1	58.7	69.1	44.9	60.9	85.0
Sept. 18	95.0	90.1	69.4	58.1	68.2	47.8	65.6	86.2
Sept. 25	93.0	86.2	68.5	59.3	66.9	48.0	65.2	83.8
Oct. 2	96.0	89.0	73.3	54.7	67.4	47.7	62.4	81.0
Oct. 9	99.0	83.4	74.9	56.4	66.0	48.4	61.5	79.4
Oct. 16	101.8	95.5	77.4	58.2	60.9	48.7	57.9	77.5
Oct. 23	97.5	97.1	82.4	56.3	58.0	48.7	58.2	78.8
Oct. 30	95.7	99.1	86.4	55.0	52.3	48.4	59.2	72.5
Nov. 6	92.4	102.1	88.4	54.9	50.7	48.5	56.0	71.5
Nov. 13	86.5†	107.9	88.8	55.2	52.6	47.7	55.5	73.0
Nov. 20	84.1*	109.9	90.9	54.4	55.4	49.2	54.8	71.0

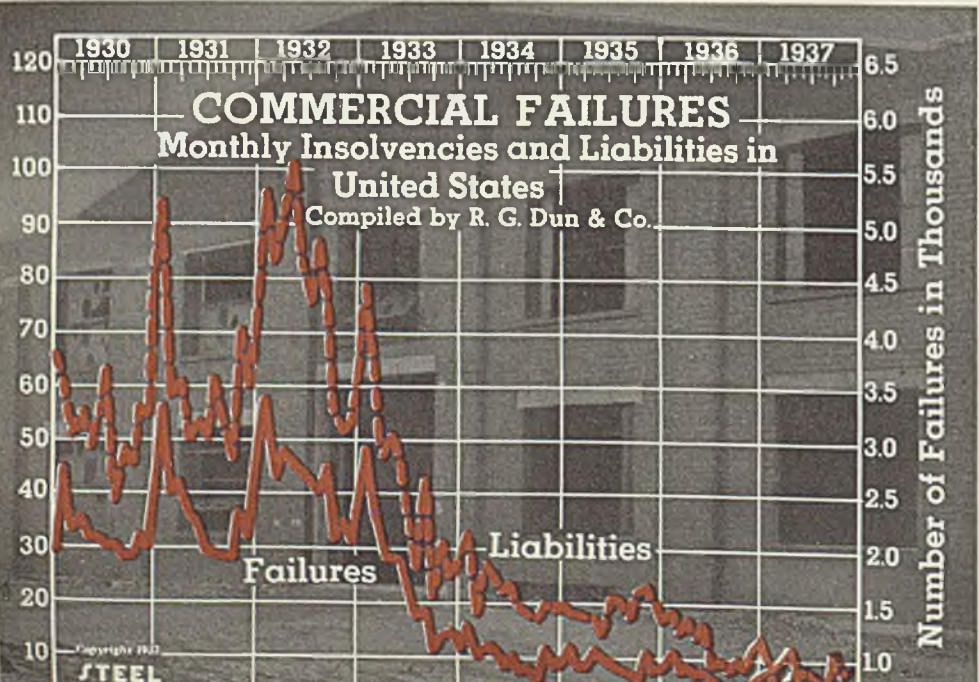
*Preliminary. †Revised.

Late November Signs Are Only Mildly Favorable

UP TO Thanksgiving day, November had displayed few signs of reviving industrial activity. Some encouragement is afforded by the indications that recessions in the latest week have been somewhat less precipitous than they were several weeks ago and also by a few scattered evidences of a halting or reversal of

the downward trend in certain branches of industry. The rate of steelworks operations still is headed downward but in the last two weeks the percentages in several important producing centers have shown slight, but not highly significant, gains. Automobile production also seemed to be on the point of stabilization when in two consecutive weeks output held stationary at the 85,000 car level. The figures on automobile output in the week ending Nov. 27 (p. 26) will show the extent to which the renewed outbreak of unauthorized strikes has disturbed production in motordom.

STEEL'S index of industrial activity in the week ending Nov. 20 stood at 84.1, the lowest figure recorded



	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.	786	830	8,906	14,157
May	834	832	8,364	15,375
June	670	773	8,191	9,177
July	618	639	7,766	9,904
Aug.	707	655	11,916	8,271
Sept.	564	586	8,393	9,819
Oct.	768	611	9,335	8,266
Nov. ....	.....	688	.....	11,532
Dec. ....	.....	692	.....	12,288

BUSINESS TREND

since the week ending Sept. 12, 1936. However, this was an abnormal week in that it included Labor day. Excluding this week, the current figure is the lowest since that of the week ending Feb. 29, 1936.

The recession in the index from 86.5 in the previous week was due to moderate losses in carloadings, electric

Where Business Stands

Monthly Averages, 1936 = 100

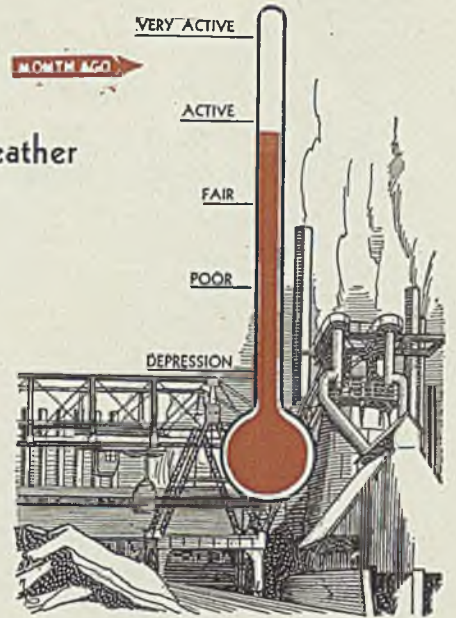
	Oct., 1937	Sept., 1937	Oct., 1936
Steel Ingot Output	86.8	114.4	111.9
Pig Iron Output	111.2	135.9	115.1
Freight Movement	114.3	114.7	118.1
Building Construction	88.6	94.8	107.5
Automobile Production	91.6	50.0	59.8
Wholesale Prices	107.4	108.6	101.2

power output and the rate of steelworks operations. A negligible gain of 422 in automobile production was recorded.

Trends in electric power output and in revenue freight car loadings reflect the sluggishness of industrial activity generally. Car loadings now are below the 700-

Industrial Weather

TREND:
Downward



000-car-per-week level, whereas a year ago loadings were just a few thousand cars below the 800,000 mark. Electric power output, which until two months ago was running ahead of last year's record by a comfortable margin, now is at about 2,170,000,000 kilowatt-hours compared with 2,196,000,000 a year ago.

New orders for machine tools and foundry equipment declined in October, indicating that the trend in forward commitments has been affected by the uncertainty displayed in the current operations of industry.

The general trend of commodity prices continues downward. STEEL's composite of steelworks scrap prices stands at \$13.08, compared with \$16.05 a year ago. Finished steel prices are slightly higher than a year ago.

The Barometer of Business

Industrial Indicators

	Oct., 1937	Sept., 1937	Oct., 1936
Pig iron output (daily average, tons)	93,259	113,937	96,509
Machine tool index	180.8	187.2	127.5
Finished steel shipments ..	792,310	1,047,962	1,007,417
Ingot output (daily average, tons)	130,488	172,075	168,333
Dodge building awards in 37 states (sq. ft.)	30,266,100	32,364,300	36,718,900
Automobile output	*352,565	175,620	229,989
Coal output, tons	40,040,000	39,055,000	43,321,000
Business failures; number ..	768	564	611
Business failures; liabilities ..	\$9,335,000	\$8,393,000	\$8,266,000
Cement production, bbls.	11,223,000	11,223,000	12,470,000
Cotton consumption, bales ..	526,000	602,000	651,000
Car loadings (weekly av.) ..	792,519	795,736	819,125

*Estimated.

Financial Indicators

	Oct., 1937	Sept., 1937	Oct., 1936
25 Industrial stocks	\$172.35	\$197.79	\$231.67
25 Rail stocks	\$26.57	\$33.95	\$45.85
40 Bonds	\$77.33	\$80.84	\$89.63
Bank clearings (000 omitted)		\$24,076,000	\$25,852,000
Commercial paper rate (N. Y., per cent)	1	1	%
*Commercial loans (000 omitted)	\$9,682,000	\$10,004,000	\$8,721,000
Federal Reserve ratio, per cent	80.2	80.2	80.0
Railroad earnings	†\$59,304,948	\$50,307,881	\$70,096,166
Stock sales, New York stock exchange	51,093,381	33,859,818	43,998,322
Bond sales, par value	\$227,291,275	\$181,250,400	\$337,065,500

*Leading member banks Federal Reserve System.
†September, August and September, respectively.

Foreign Trade

	Oct., 1937	Sept., 1937	Oct., 1936
Exports	\$296,729,000	\$264,708,000	
Imports	\$233,361,000	\$212,643,000	
Gold exports	\$129,000	\$117,000	
Gold imports	\$145,623,000	\$218,929,000	

Commodity Prices

	Oct., 1937	Sept., 1937	Oct., 1936
STEEL's composite average of 25 iron and steel prices ..	\$39.59	\$40.16	\$34.65
Bradstreet's index	\$10.85	\$10.96	\$10.22
Wheat, cash (bushel)	\$1.14	\$1.21	\$1.30
Corn, cash (bushel)	\$0.86	\$1.20	\$1.08



Monthly cleaning of light reflectors by a trained maintenance man is a profitable procedure both from the standpoint of lighting cost and working efficiency

■ IF ALL industrial lighting installations and their immediate surroundings could be cleaned and reconditioned today, then the level of illumination would be well-nigh doubled. Where maintenance is poor and lighting systems depreciate, the losses due to neglect may be classified roughly as follows:

1. Dirty lamps and accessories.
2. Darkened or discolored walls and ceilings.
3. Lamp bulbs of poor quality or low efficiency.
4. Empty sockets and unobserved burnouts.
5. Aged lamps past their prime of usefulness.
6. Under-voltage burning of lamps.
7. Improper combination of lamp and reflector.

Consider first the advantages and costs of keeping lighting equipment

clean. Many examples exist to demonstrate the importance of removing films of dust and grease from the lighting units. For example, a glassteel diffuser in a somewhat smoky machine shop when new produced over 12 footcandles of illumination on the workbench beneath. It had gradually become so dirty during weeks of neglect that less than 3 footcandles finally resulted, meaning that the cost of light on the work had quadrupled. It meant that out of every dollar spent for electric power and lamp bulbs, 75 cents was being wasted.

Of course one must expect a continuous depreciation due to the continuing deposits of dust on reflectors and the continual aging of lamps. However, this falling off in efficiency is not a straightline function. Usually the greatest losses occur in the first month or six weeks. (Some 15 per cent in the first month is perhaps a fair average.) Dust deposited upon old dust is not so costly as is the first thin layer. The loss of light from the normal and unavoidable depreciation of the lamp bulb itself from internal blackening seldom brings the final output of

that lamp below 90 per cent of its initial efficiency. However, blackening does continue as almost a straightline slope and hence an aged lamp bulb can be removed economically and replaced by a new one should it be found to live much beyond its rated life.

In any discussion of economics one naturally asks the question, "How should lighting equipment be cleaned and what does it cost?" In general the experience of past years has shown that bulbs and reflectors should be wiped free of dust at least once each month. Except in unusually dirty locations they should be washed at least once every 60 days. It is not a bad plan to alternate dry and wet cleaning.

Stubborn cases of encrusted, greasy dirt require warm water and soap or a mild grease solvent. Extreme cases of hardened sooty deposits, particularly on surfaces outdoors, may require a dilute solution of oxalic acid. After the common washing with soapy water, and to avoid the soap film that will hold the next deposit of dust, wipe and dry the reflector carefully or preferably rinse in ammonia water.

Dividends From "Light" Housekeeping

BY SAMUEL G. HIBBEN

Director of Applied Lighting
Westinghouse Lamp Division
Bloomfield, N. J.

Cleaning costs vary but, taken alone, they seem to average in the neighborhood of 4 per cent of the total operating costs of a lighting installation. If, as seems evident, such cleaning will in itself increase the illumination 20 or 25 per cent, then the results pay for the expenditure four or five times.

The accessibility of the lighting unit (and the lamp) is important. In commercial installations, if the bulb can be removed without taking down the globe, the maintenance is simplified materially. In industrial installations, the "safe-change hanger" or disconnecting plug facilitates removal of both reflector and lamp to the floor for easy washing. Just what this means in economy is illustrated by the following study.

Labor Cost Reduced

To clean 5700 glassteel lighting units, in their regular overhead position, at 8 minutes each, required 45,600 minutes, or 760 hours to clean. (Labor for this operation averaged 62 cents per hour.) Therefore, the cost of each complete plant wash is $760 \times \$0.62 = \471.20 . Considering four washes per year, the yearly cost is $4 \times \$471.20 = \$1,884.80$. With a cleaning time per unit of $2\frac{1}{2}$ minutes, made possible by a removable hanger, it takes 14,250 minutes, or $237\frac{1}{2}$ hours to clean the 5700 fixtures. With labor at 62 cents per hour, the cost for one complete wash is \$147.25. The yearly cost or the cost of four complete washes thus is \$589, a saving of \$1,295.80 per year, or 68 per cent of the yearly cost of keeping lights clean and efficient.

What we have discussed about dirt on the reflector applies in principle to grimy or discolored interior surfaces. Neglecting for a moment the efficiency differences of different colors of painted surfaces, we may consider merely the losses due to neglect thereof. In an enclosed space such as a small room any change in the light reflected by the walls and ceiling will change the light available at work level almost in the same proportion.

Individual studies must be made to ascertain how frequently an interior may be repainted, but it seems common practice to find it economical to wash most painted interiors once annually. How much the reflection coefficient may be increased by washing is impossible to answer definitely but many studies indicate that an increase on the order of 10 per cent is not uncommon.

Our third item of neglected maintenance has to do with lamps of poor quality. The cost of the lamp bulb is merely a small "down payment" on the cost of lighting.

It usually represents less than 10 per cent of the total and a few cents difference in the cost of the bulb is really negligible, whereas a few per cent difference in output efficiency is vitally important. If we evaluate lighting costs properly we find that a deficiency of 6 per cent in the lamp efficiency is about equal to the average first cost of the lamp.

Empty sockets and unobserved burnouts take their toll of lighting efficiency. Fixed charges, as cost of installation and investment, continue whether the socket is empty or full.

Obviously, the unobserved burnout is doubly to be avoided because if the unit appears ready for service and yet fails to function in an emergency or need, it represents a definite loss, sometimes an accident hazard. If an installation of a plurality of sockets can be found satisfactory when a considerable number of the lamps are burned out or removed, then the prima facie evidence is that the lighting plan was at fault. Surplus dead sockets cost something as standby investments and one would conclude that the most economical installation should have been based upon the minimum number of sockets, but each lamped and doing its full share of duty.

Voltage Drop Is Low

Another pocketbook problem in connection with the economics of maintenance is the under-voltage burning of the lamp. The general features of wiring and voltage have been discussed previously but under present consideration comes the matter of voltage as effected strictly by maintenance. To a minor degree, there may be some loss in voltage due to any corroded contacts throughout the system. To a greater degree, there is a voltage loss resulting from haphazardly extending or overloading branch circuits, a temptation that exists through practicing the false economy of saving a little copper at the cost of lumens.

The voltage drop in any system should not exceed 2 per cent. In the main this is counterbalanced by providing a slightly excess voltage at the service entrance or the distribution panel. The cost evaluated in units of light amounts to approximately a 3 per cent diminution of illumination for a 1 per cent drop in voltage. Consequently the highest economy dictates that there must be the closest possible agreement between the designed and rated voltage of the lamp and the actual socket voltage, or that the latter be not less than the former. By over-voltage burning, one gains light at the cost of life, but as lamp bulbs have been and are in general

constantly decreasing in first cost, this feature of operating costs deserves much careful study.

Finally, in an endeavor to strengthen each link, and to secure the most seeing ability per dollar, generated light must be directed to its point of usefulness. If the glass reflector is broken, the light is wasted sidewise since the proper reflector usually increases the usable light from two to three times over that from the bare lamp. If the metal reflector becomes tarnished or bent much the same thing occurs. If—and this is an important point—the wrong size of lamp bulb is inserted in the reflector, then the emitted beam is changed and the combination loses effectiveness.

Inspection Is Necessary

The secret of an efficient lighting installation, once it has been installed properly, lies in *planned periodic attention*. Frequently sight meter surveys are recommended in order to detect depreciation. Above all, the maintenance must be made the regular duty of a reliable employe who appreciates the worth of his job. He should receive credit for doing a good job. Neglect which is common today has been proved to reduce the possible illumination by an estimated amount of easily one-third. Reasonable maintenance seems to cost much less than the value of the light gained thereby. The total lighting bill of the United States last year was perhaps \$690,000,000. Adequate and intelligent maintenance may save one-third on lighting costs or may add a corresponding amount to usable illumination, and may therefore be worth \$230,000,000.

Develop Metal Roofing

■ Sheet metal roofing, as newly developed by Tiffin Art Metal Co., Tiffin, O., is manufactured in three qualities.

Super-Alloy galvanized roofing is coated with pure zinc over an alloyed base metal free from impurities. Presence of copper in the alloy makes the roofing rust-resisting and anticorrosive. Tamco metal, steel with copper bearing base, is a second quality and the third is Super-Steel, practically free from impurities, low in manganese, sulphur, silicon, and phosphorus, and with a pure zinc coating.

The roofing, known as Seal-Tite, has a spring lock seam. The top locking crimp or V has a constant pressure on the bottom sheet and, with the loosening of nails through expansion, the roofing has a constant tension that enables each sheet to be kept tight. Joints are water-tight and neat in appearance.

CARBURIZING—

Its History—Selection of Steels and Type of Case—A New Hardenability Test—Materials and Equipment—Production Practice

PART II

■ FEDERICO GIOLITTI, Italian metallurgist, is credited with being the father of the science of gas carburizing; in a series of reports issued from 1908 to 1912 he presented data which did much to clarify vague generalities and differences of opinion of predecessors, and his book in 1912 gave initial impetus to the development of commercial gas carburizing.

Tribute to Giolitti was paid by L. D. Gable and E. S. Rowland, Timken Roller Bearing Co., Canton, O., who gave a description of early work on gas carburizing work at Timken, begun in 1913. Experimental verification of the possibilities of gas carburizing was obtained, but the complete lack of a material suitable for a retort prevented commercial success of the method, and it was not until 1925 that the retort problem was solved.

Modern gas carburizing furnaces and machines are well designed units in which carburizing of high

quality and uniformity can be done at low cost and in the shortest possible time. Control of the process, therefore, consists of producing, within commercial limits, a constant depth of case, a uniform maximum concentration of carbon at the surface and a satisfactory gradation in carbon from case to core. Gas carburizing is a ticklish operation at best and simplicity in a process is a virtue not to be underrated. Many variables enter in, some controllable and others not, but the fewer the total number of points in the process where variations may possibly occur, the easier will be the problem of control and the better the results obtained.

The most important variables entering into the process are (a) tem-

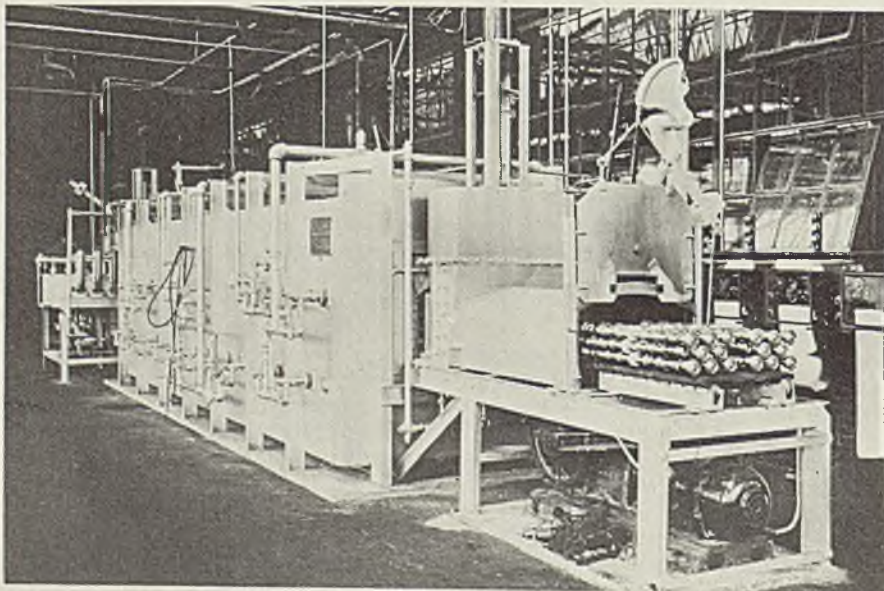
perature, (b) the gas, (c) the time, (d) the steel, and (e) the human element. Of these variables, temperature is the most important because, in commercial operation, the entire process is dependent upon the rate of diffusion of carbon in austenite which, in turn, is dependent on the temperature. The necessity for the most rigid control of the carburizing temperature cannot be too heavily stressed. It is Mr. Gable's opinion that the temperature must be held within a plus or minus 10-degree Fahr. variation if best results are to be obtained. This figure includes variation through the charge as well as from charge to charge in the same furnace and from one furnace to another operating on the same product. This small variation can only be maintained by continual checking and adjustment of the equipment but it is felt that the effort will be repaid in results.

Treatment of Variables

Variables due to the gas include composition and rate of flow. Both should be carefully measured and held constant within as narrow limits as possible. Pressure affects the rate of flow and should be sufficient to prevent infiltration of air. Increasing the pressure beyond this point, however, is of no benefit unless the gas is so dilute that the rate of transfer of carbon to the steel is less than the rate of diffusion. Under these conditions, compressing the gas is necessary to increase the amount of hydrocarbon gas in the retort at any one time. The obvious solution, however, is to increase the hydrocarbon concentration of the gas used and operate at a lower pressure, where operating difficulties are lessened.

The effect of variation of time on the depth of case is much less important than that of temperature variation but it is of sufficient im-

Continuous gas carburizing furnace operating on butane gas. Paper of L. D. Gable and E. S. Rowland. Photo courtesy Surface Combustion Corp.



portance that the time cycle of operations must be adhered to rigidly. The more complex the cycle, the more difficult of attainment is the control of this variable.

Both the analysis of the steel and the size of the austenite grains at the carburizing temperature have an effect on the case obtained. In general, of course, the more highly alloyed the steel the slower the rate of carbon diffusion. Variations within the ordinary limits of analysis, however, produce some differences in the resultant case. Generally speaking, the larger the austenitic grain size, the greater the rate of penetration of carbon. Need for control of these variables is usually greater from standpoint of the finished part than from the carburizing operation, but their effect in this regard should not be overlooked.

Minimizing Human Element

The human element enters into the control of all the above variables. Any operating man is kept painfully aware of the effect that the human element has on the process he is trying to control. This factor cannot be eliminated entirely but proper training and discipline will do much toward minimizing it.

Controversy often arises as to the commercial limits of the case depth within which the product of a properly operated process can be maintained over a long period of time. Messrs. Gable and Rowland suggested that if carburization is carried out by the best commercial practice available, the variation in case depth should not exceed plus or minus 0.010-inch for case depths of 0.030-inch or greater but that it cannot be maintained within much less than this variation over long periods. For example, if a part has a specified case depth of 0.060-inch, a minimum of 0.050-inch and a maximum of 0.070-inch should be acceptable and the case depth of all parts maintained within these limits.

■ Average results obtained with three types of steel, carburized for three lengths of time, at three temperatures, in six types of liquid baths, the latter including cyanide baths and activated cyanide compound baths, indicate the superiority of the activated baths in speed of producing case depth. Data were ceptable and the depth of all parts maintained within these limits.

An accompanying chart shows the results with the two types of baths, three temperatures and three time periods, figures for the three types of steel being averaged. Steels were S. A. E. 1015, 3115 and 4615; temperatures 1500, 1550 and 1600 degrees Fahr., and time 30, 60 and 90 minutes.

Steels selected were the usual

grades of carburized steels used in the automotive industry. They were approximately 9/16-inch round bar stock, cold drawn and centerless ground in the bar. Temperatures selected were those commonly used for liquid baths. The lengths of time selected were to give the effect of time on penetration. A furnace was selected with pot capacity of about 100 pounds of compound. This amount of compound was used to start each bath tested, additions being made during the run to corre-

On the accompanying pages STEEL presents the second part of its review of the comprehensive carburizing symposium conducted during the nineteenth annual convention of the American Society for Metals in Atlantic City, N. J., Oct. 18-22. Part I appeared in the Nov. 15 issue of STEEL, page 48; Part III, the concluding instalment, will be carried in an early issue

spond with production practice. Each individual bath test was continuous. The three steels were all treated at each of the three temperatures listed for each of the three lengths of time.

Six different baths were used in this investigation. Each bath was heated to 1500 degrees Fahr. first, then about 30 pounds of scrap parts were added and all the samples of all steels to be tested at this temperature were suspended in the bath by means of wire. At the end of 30 minutes one-third of the

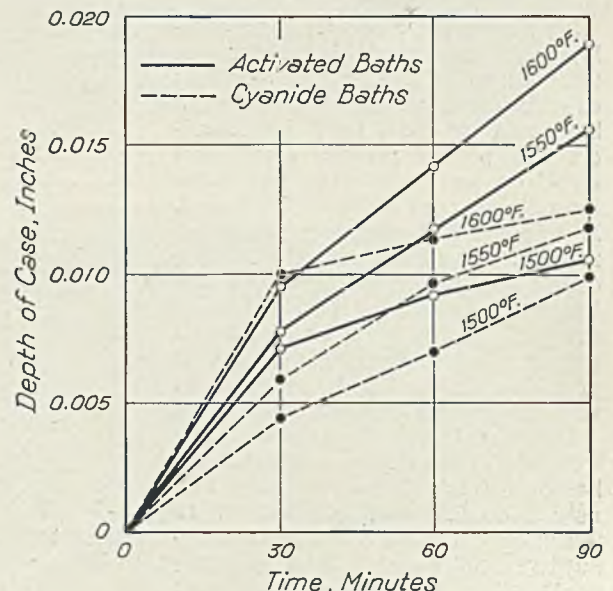
samples were removed and quenched; the carbon steel in water and the alloy steel in oil. Likewise at the end of 60 minutes total time another third was removed and quenched and at 90 minutes the balance were quenched. The load of steel parts was then removed and the temperature of the bath raised to 1550 degrees Fahr., additions were made to maintain level and proper activity and the procedure was repeated. The temperature was then raised to 1600 degrees Fahr. and the foregoing time cycles and quenching repeated. None of the quenched samples was drawn, being tested "as-quenched".

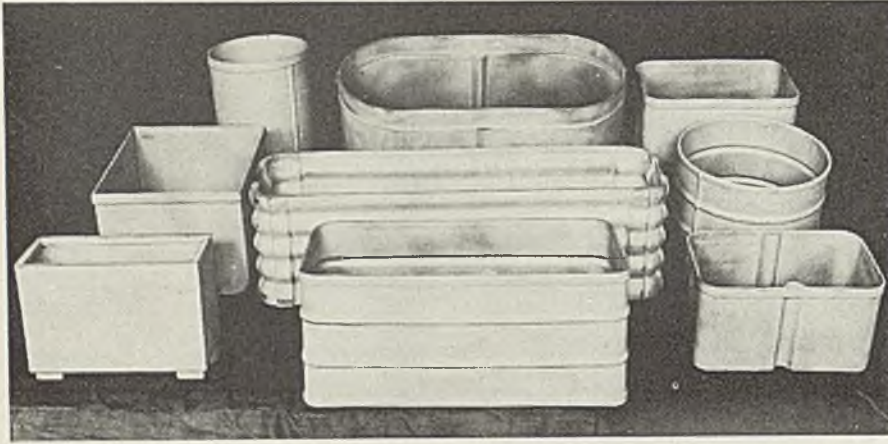
Hardening Thin Sections

Liquid bath carburizing is especially suited for small stampings or parts turned from bars which have thin sections, and must have thin case. Examples of these are speedometer gears and pinions, thrust washers, clutch throwout forks, bushings, throttle control parts and small shafts. It can be used to advantage on parts where the loads are relatively light, and the wear of a few thousandths would make it ineffective.

Parts carburized in a liquid bath usually require a thorough washing or neutralizing dip after removal from the quench tank to insure against rusting. It must be remembered while operating a bath that both the work and the heat are removing the active carburizing agent, therefore, if the "drag-out" is insufficient to require addition of the base compound from time to time, to maintain level, then it is necessary to "bail out" some compound and add new. The amount and frequency must be determined on each individual furnace and part carburized. Each metallurgist must determine for himself, from the characteristics of the bath, which one will fit into his operations and

Average case depths for activated and cyanide baths at three temperatures and at three time periods. Paper of B. B. Beckwith





Several types of carburizing containers in which the sheet sides were cast into the corners. Paper of R. W. Roush and A. C. Dames

equipment to the best advantage, if he desires to use activated liquid bath carburizing.

R. H. Weber, general foreman, heat treating, Cadillac Motor Car division, General Motors Corp., Detroit, described some of the results obtained in that plant with activated liquid baths for carburizing. He observed that it becomes more difficult to obtain a case depth of 0.030-inch with a Rockwell hardness of C 60. Cadillac obtains this in an activated liquid bath with production methods. Using a 24-inch diameter by 18-inch depth pot with about 300 pounds of compound, a constant load of 40 pieces of 2¼-inch diameter shafts of S. A. E. 4620 steel is immersed in the bath. This load makes a total of 200 pounds or 66 per cent of compound weight, which is considerably more than previously attempted. A distortion change of not more than 0.0003-inch also must be maintained. A hour and a half is required to bring the bath "to heat" at 1600 degrees Fahr. and an average of 3½ hours is required at heat. An individual drastic quench in oil results in the previously mentioned Rockwell test of C 60 and a 0.030-inch case depth.

Many Factors Involved

To obtain these results consistently, many factors which enter the cycle to cause disturbances or loss of the chemical balance between base and catalyst, must be considered. A pot of pressed steel, cast steel, or an alloy with not more than 35 per cent nickel is preferred. If the pot is brought to heat too rapidly, there is a tendency for the compound to break down in the lower section of the pot. A proper graphitic cover, coat, or blanket is preferred when desiring case depths of 0.030-inch, and it is essential in the lighter case depths.

It is common practice to have some dragout of compound as it adheres to the parts on quenching and new material must be added to maintain the bath level. This dragout in baths intended for heavy case depths, does not represent sufficient

replacement to maintain the proper chemical equilibrium; but it becomes necessary to bail out enough compound from the bath to allow for proper additions. These additions should preferably be made at the beginning of each load. Due to the adherence of the compound to the stock during quenching operations, it sometimes becomes a problem to remove economically, but a proper compound can be removed readily by hot water and soaking.

■ In discussing theoretically the action of solid carburizing agents, H. W. McQuaid, Republic Steel Corp., Massillon, O., observed in sum that (1) carburizing by means of solid carburizing agents depends on the ability of a charcoal-carbonate mixture to produce carbon monoxide; (2) the removal of carbon dioxide from the surface of the work being carburized is of primary importance in obtaining satisfactory commercial carburizing results; (3) this removal of carbon dioxide in compound carburizing depends on the ability of the charcoal to adsorb preferentially carbon dioxide as compared to carbon monoxide; and (4) the physical form of the carbon which reacts with the carbon dioxide formed is important and is apparently satisfactory only when it has a highly porous or adsorbent surface.

Regarding the preferential adsorptive capacity of charcoal referred to by Mr. McQuaid, some difference of opinion developed. Hugh Rodman, president, Rodman Chemical Co., Verona, Pa., observed the author failed to give due consideration to the ash or alkali content of charcoals. This alkali acts as an energizer to promote carburization.

■ Extensive survey of various gaseous media for carburizing was made by G. T. Williams, metallur-

gist, Cleveland Tractor Co., Cleveland, including three basic types: Oxides of carbon, hydrocarbons, and noncarburizing gases such as hydrogen and water.

Summarizing his findings, Mr. Williams pointed out that by selection of carburizing gas medium and its regulation, cases of desired depth and characteristics are produced readily. Control of soot precipitation offers several problems and in most instances these have been overcome successfully. Satisfactory gas carburizing will depend largely on the gas medium, and the selection thereof is usually by empirical methods.

The following are basic considerations in selection of a medium:

1. All commercially available hydrocarbon gases will supply more than enough carbon to give maximum carburizing. City gas in some cases may give unsatisfactory results due to variable content of carburizing agent, moisture and carbon dioxide.

2. Hydrocarbon gases will deposit soot if an excess, usually required to give circulation, is used. The tendency to soot deposition is greater with increasing molecular weight.

3. Soot formation may be decreased by holding the excess of hydrocarbon low, volume for circulation being obtained by addition of a noncarburizing or carrier diluent.

4. Carburizing to carbon maxima below the austenite solubility limit may be performed by use of hydrocarbons diluted to lower carbon equilibrium.

5. Low-carbon cases also may be produced by permitting the high carbon content previously formed to diffuse during one or more periods when no carburizing agent is supplied.

Agree on Research Results

Enthusiastic reception of Mr. Williams' contribution to the technology of carburizing attested to the importance of his research. A number of discussors cited results of their own work which checked the opinions of the author.

On the matter of soot formation on work being carburized, John F. Wyzalek, Hyatt Bearings division, General Motors Corp., suggested that soot is less objectionable when carburization is accomplished with work in motion, as is the case in revolving horizontal retort furnaces. Some soot also is desirable to insure satisfactory carburization and to protect the surface of the product against oxidation in its removal from the furnace. With regard to high gas pressures, Mr. Wyzalek cited as his experience no practical increase in rate of carburization or

carbon concentration as compared with atmospheric pressures.

■ Evolution of the carburizing container from the original heavy cast iron type to the modern individual unit type using thin sections of heat-resisting alloys designed to reduce the insulating effect of the compound was reviewed by R. W. Roush and A. C. Dames, metallurgist and superintendent of heat treatment, respectively, Timken-Detroit Axle Co., Detroit.

Chemical compositions of some of the most widely used heat-resisting alloys are given in the accompanying table. To say that any one is best for all applications is a matter of opinion. As a general rule the higher the percentages of nickel and chromium, to certain limits, the better the heat-resisting properties. While this statement is true, a comparison of the costs of these alloys shows that the alloy No. 10 in the table, must give 1½ times the service life of the lower priced alloy No. 7, to show equal economy.

It has been stated that nickel in excess of 20 per cent greatly retards the absorption of carbon. While this is true to a certain extent, containers having as much as 65 per cent nickel have been found to be carburized to a depth of ¼-inch after extended service. The nickel and iron contribute strength and toughness to the alloy. Chromium and silicon help to form the hard adhering oxide coating and contribute to the chemical stability of the alloy. Chromium and iron alloys are not stable and carburize rapidly. It is desirable to have the percentage of carbon below a reasonable figure for good ductility.

Carbon Content Specified

The maximum carbon content of the modern heat-resisting alloys is approximately 0.70 per cent for castings and 0.20 per cent for sheet. Carbon usually is increased as the nickel content is increased.

Various alloys of copper and iron have been tried but to no advantage. Aluminum and iron have been tried in various proportions and extensive investigations made on other low-priced alloys in the hope of finding something less expensive than the nickel-chromium.

Cast and sheet steel containers, coated by means of metal spraying, have shown possibilities but require further development. When coated with copper, carburization is stopped, while an aluminum coating improves heat-resisting properties.

Of the alloys listed in the table, Nos. 7, 8, 9 and 10 are used extensively as castings, and Nos. 3, 4, 5, 7, 9 and 10 for sheet.

The life of any container, whether casting, sheet, or combination sheet and casting, depends mainly on de-

sign, composition and soundness of the alloy care used in fabrication and welding in the case of sheet and combination containers, furnace equipment, type of fuel, operating temperatures and the method and rate of heating and cooling. Most any foundryman can enumerate a hundred reasons why carburizing containers fail and can often trace the cause of a premature failure to a particular foundry operation.

Many cast and sheet containers, after they have given good service, are discarded on account of some defect which, although having made them unfit for economical service, has not entirely destroyed their usefulness. A minor repair may recondition them and allow 50 per cent additional useful life. When properly heated, most any container, cover, or tray can be straightened and formed to its original shape.

Cracks and porous sections can be welded, restoring the original strength to the container and rendering it reasonably leakproof. Welding of thin sheet is much more difficult than the welding of a casting. Welding of a sheet to a casting, especially when both have absorbed considerable carbon, demands the best workmanship. Skillful welding technique is a major requirement. The material must be cleaned by chipping, grinding or machining, and all oxide coating removed from the portion to be welded. Acetylene welding usually is employed in such repairing, the welding rod being the same composition as the parent metal. Many good repairs have been made on cast and sheet con-

tainers by welding a sheet alloy patch over the defect.

Many containers after a second repair have shown long service. It is best to make repairs when defects are first noticed, as small cracks or porous sections cause rapid disintegration of the alloy.

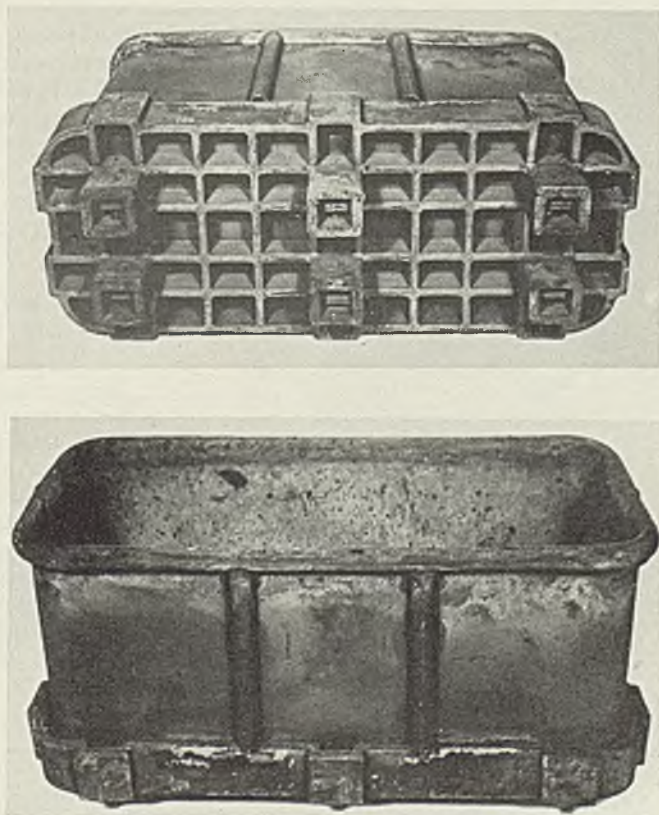
For a satisfactory and permanent solution to any carburizing problem, a careful study must be made of all the essential factors involved—size, shape, weight and composition of the part, the type of container, available furnace equipment, fuel for heating, analysis and amount of compound required, and operating temperature. Perhaps the most important is container design.

Room for Improvements

Although there has been a tremendous advance in the composition and casting of heat-resisting alloys, as well as in welding, rolling and fabricating technique, container design has not taken full advantage of these improvements. At present, the containers in general use do not embody a close furnace-container relationship and work-container relationship; this latter factor in the case of pack carburizing, determining the amount of carburizer used.

Where liquid baths constitute the carburizing medium, and batch loading is the practice, there is a definite work-container relationship. Size of the load is determined by the amount of molten salts contained in the pot. Most salts are of such a nature that whenever mass loading is great enough to lower the bath temperature below certain

Two views of combination sheet and cast container with cast base of ½-inch metal section of alloy No. 7, loosely attached to heat-resisting body of alloy No. 5, ⅜-inch metal section. Length is 29 inches, width 11 inches, depth 13 inches. Paper of R. W. Roush and A. C. Dames



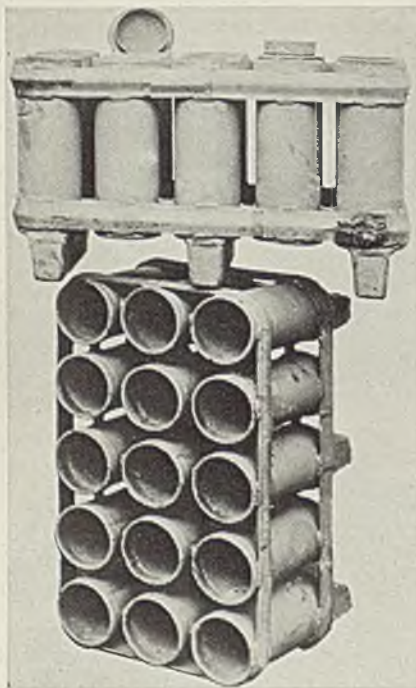
limits, carburizing efficiency of the bath is impaired. Since commercial salts show a considerable variation in composition, information on safe operating temperature limits should be obtained from the manufacturer supplying the material.

Life of the container depends mainly on wall thickness, fuel used, furnace equipment, mechanical strength and soundness due to casting practice, and composition of the alloy.

In batch-type gas carburizing where the retort revolves, container design is to a great extent predetermined by the furnace design. Parts which do not lend themselves to carburizing in this manner can be carburized on racks designed to provide smooth flowing contact between the gas and the parts in the muffle type of batch gas carburizing furnace. Muffles for this type of furnace are designed to meet individual carburizing problems.

In a few of the larger plants where there is steady output of a great number of similar parts requiring similar types and depths of case, carburizing in continuous gas furnaces is replacing pot carburizing in continuous furnaces. Where this condition regarding the parts exists, and direct quenching is the practice, carburizing in continuous gas furnaces will produce more uniform results at a lower price per piece than will pot carburizing in either the batch-type or continuous furnaces.

With the introduction of the con-



A 15-cylinder container made entirely of $\frac{1}{8}$ -inch heat-resisting sheet metal alloy No. 5 and assembled by gas welding. Paper of R. W. Roush and A. C. Dames

tinuous gas carburizing furnace, new problems in container design originated, because designers of alloy equipment had never before been called upon to produce muffles of from 19 feet to 27 feet in length, which were exposed to oxidation and carbon penetration at temperatures ranging from 1650 to 1800 degrees Fahr. After five years of production experience, a few of the important factors governing muffle design have been found to be:

1. Size and weight of the part or parts, and production requirements.
2. Relation between dimensions of the muffle and number of trays to be pushed through per hour.
3. Proper placing and size of cor-

Composition of Heat-Resisting Alloys for Carburizing Containers

No.	Per Cent			
	Carbon	Nickel	Chromium	Silicon
1.....	0.17	8.80	19.0	1.95
2.....	0.20	10.90	24.3	....
3.....	0.15	10.90	24.8	2.26
4.....	0.11	26.25	18.2	2.54
5.....	0.10	20.40	25.4	1.52
6.....	0.23	....	20.7	....
7.....	0.20	35.70	15.8	....
8.....	0.28	40.25	21.7	....
9.....	0.42	60.70	13.2	....
10.....	0.60	65.00	16.5	....

rugations at the top of the muffle to prevent distortion.

4. Method of joining the various cast sections comprising the muffle into a single unit.

5. Relation of cross sectional area of the muffle to cross sectional area of a loaded tray.

Greatly improved carburizing results can be obtained by more scientific container design. Time of carburizing can be reduced, as well as the weight of compound and alloy required, for a given amount of work.

Any advance in carburizing container design must center around the following fundamentals:

1. More definite planning and consideration of all relating factors by container manufacturers, furnace builders and all those responsible for the carburizing operations.
2. Further improvements in foundry practice and the production of sound, clean castings.
3. More widespread use of the X-ray for the inspection of castings.
4. Improved heating and handling conditions.
5. Improvement in the melting and rolling of heat-resisting alloy sheet.
6. Further improvement in weld-

ing as applied to heat-resisting alloys.

7. Intelligent relation of the container design to the shape of the parts to be carburized.

E. F. Davis, Warner Gear Co., Muncie, Ind., questioned the decrease in heating time between a thin-walled and a thick-walled box. Carburizing compound is the poor heat conductor, he said, whereas the metal is a good heat conductor, and although the heat radiation through the metal might be somewhat slower in the thick box, yet the heat must penetrate a mass of carbon grains of high thermal resistance regardless of whether box walls are thick or thin. Chief economy of thin-walled boxes appears to be in their lighter weight; however, chimney boxes or any which increase the surface to heat conduction must aid in reducing the time necessary to bring the boxes to carburizing temperature, stated Mr. Davis.

Experience of the Dodge division of Chrysler Corp., Detroit, showed best results obtained with thin-walled cast alloy cylindrical containers, using separate cast-iron tubes as chimneys, for transmission and axle gears and pinions, and thin-walled cast alloy tubes for shafts, according to E. H. Stilwill of the metallurgical department of that plant. This practice gives uniform heating in the shortest time, with the least amount of compound for the results desired and with satisfactory container life.

(To be concluded)

Addition of Cadmium Improves Tensile

■ Up to 3 per cent addition of cadmium to typical tin-base bearing metals and on alloys causes an improvement in strength and hardness, but above this amount these advantages are offset by loss of ductility.

In technical publication series A, No. 57, of the International Tin Research and Development council, Dr. C. E. Homer and H. Plumer, as a result of a research, have issued data on the "Mechanical Properties of Some White Bearing Metals and Other Tin-Base Alloys at Various Temperatures."

The extra strength due to the cadmium addition is retained by the alloys when heated, although these alloys, like nearly all the others examined, lost a definite proportion of their tensile strength when raised to a given temperature. Alloys of tin, copper and cadmium without antimony do not appear to have any particularly useful properties which cannot be obtained more easily in other alloys.



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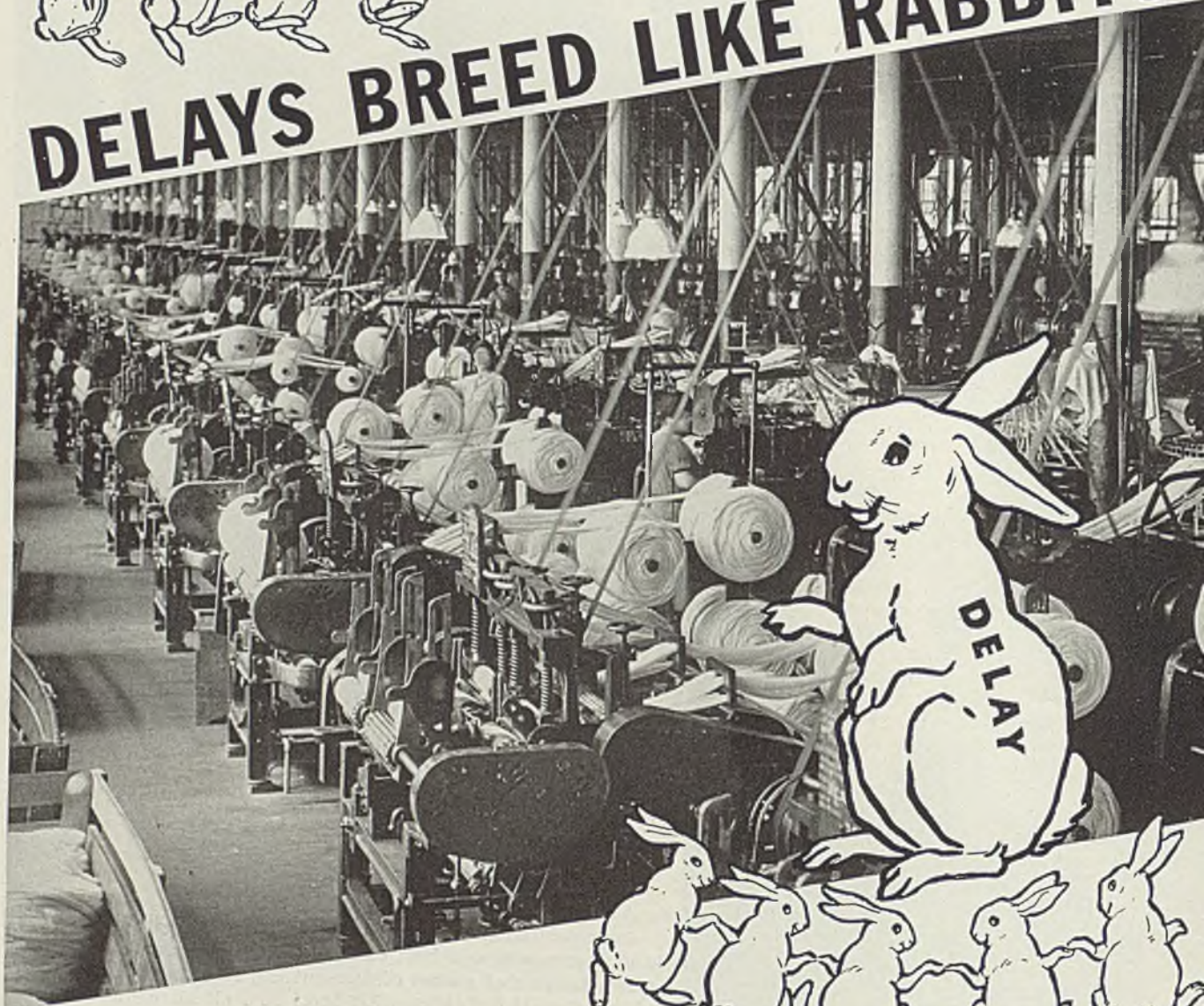
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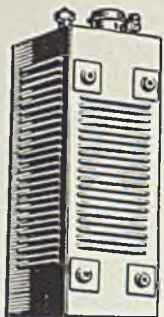
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DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, NEW JERSEY

MATERIALS HANDLING



Careful Maintenance of Conveyor Belts Results in Substantial Economies

BY P. W. VAN ORDER

Manager, Belting Sales Division,
B. F. Goodrich Co., Akron, O.

■ UNQUESTIONABLY the modern conveyor belt is a far superior product to that offered a few years ago. Continuous improvements in cotton fabrics and rubber compounds have made possible a belt construction possessing greatly increased strength and wear resistance. Despite such developments, conveyor belts still are not immune to abuse and neglect. It is the purpose of this article to point out briefly a few of the primary causes of belt wear and how, by avoiding them, users can make substantial savings through increased belt life.

Principal wear on a conveyor belt occurs at the loading points. An ideal loading chute would be so located

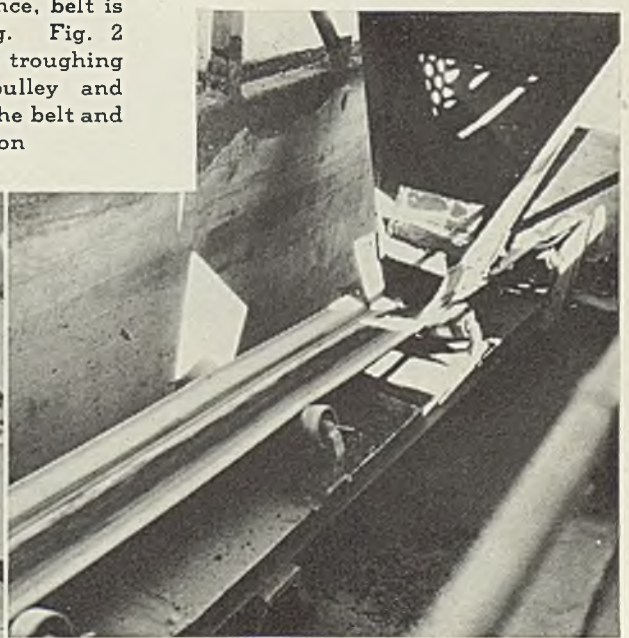
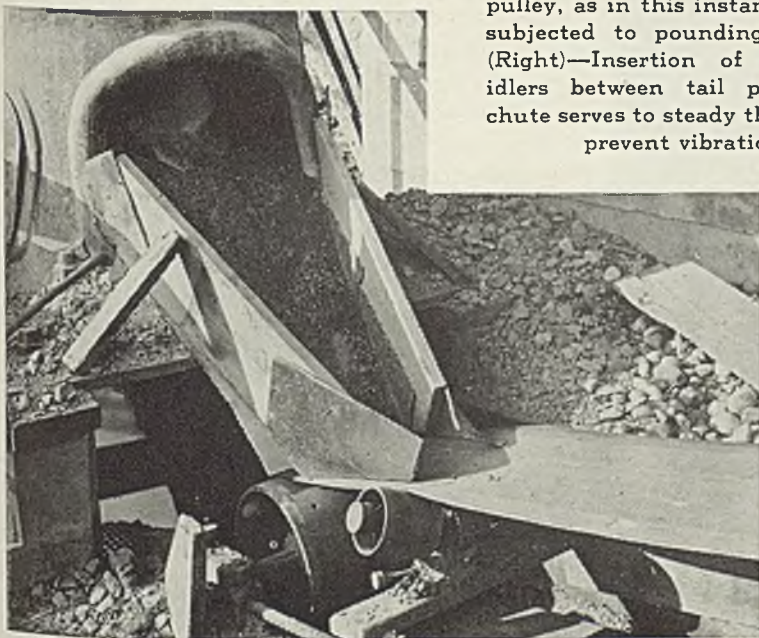
that the material leaves the chute moving in the same direction as the belt and as nearly as possible at the same speed. Loading at an angle with belt travel not only increases abrasive wear on the cover, but also may cause the belt to climb the idlers, resulting in damage to the edge.

When it is necessary to load a belt from the side, the chute should be designed to deflect the fall so that the material discharges in the

direction of belt travel. Lumps falling directly against the rubber surface are responsible not only for a large percentage of wear, but frequently cuts, gouges and fabric breaks. A common device to save this wear is a mechanical arrangement to permit fine material to fall on the belt first, thereby providing a cushion to receive the lumps.

This can be accomplished by a screen or grizzly, but excellent results have been obtained by simply cutting a notch at the mouth of the chute, which permits the finer material to drop on the belt first. It also serves to turn the material, which is always at the bottom, toward the middle of the belt, form-

Fig. 1 (Left)—If heavy material discharges on belt directly over pulley, as in this instance, belt is subjected to pounding. Fig. 2 (Right)—Insertion of troughing idlers between tail pulley and chute serves to steady the belt and prevent vibration



MATERIALS HANDLING



ing a better-shaped load. If the chute should be at a slight angle with the belt, the notch can be cut lop-sided to deflect the load so that it will discharge parallel to belt travel.

If the chute discharges 3 or 4 feet above the belt, or if it is so steep that lumps fall with considerable velocity, it will pay to install sheet steel or bar baffles. For example, it is estimated that a set of bar baffles, or "jingle bars" saved one operator more than \$1000 per year.

These "jingle bars" are suspended from the top to swing free at the bottom. A cable is threaded through all the bars a few inches from the top, serving the dual purpose of increasing the shock resistance and preventing any single bar, which might be torn loose, from dropping on the belt and being carried along it. The material striking the bars loses its velocity and slides easily on to the belt. It is important, however, that the weight

and number of these bars be carefully adjusted to avoid slowing up the feed to an extent where the chute becomes choked.

Location of pulleys at the mouth of chute must also be given careful consideration. If heavy material discharges on the belt directly over a tail or idler pulley, as shown in Fig. 1, the belt is subjected to a pounding as if between a hammer and an anvil. If impossible to avoid such a location, damage to the belt can be minimized by covering the idler pulleys with $\frac{1}{2}$ to $\frac{3}{4}$ -inch thickness of soft cushion rubber. Some operators avoid this pounding by removing the middle roll of the carrier directly under the lip of the chute.

Improper clearance between belt and lip of the chute or the bottom edges of the skirtboards is another common cause of wear. Stationary parts should not be permitted to come in scraping contact with the belt surface, nor should material

be permitted to wedge between the belt and the chute.

This wedging of material is difficult to prevent in some cases due to vibration of the belt caused by impact of the load. Such vibration or "chatter" can be eliminated or reduced, however, by proper location of the chute with relation to the tail pulleys. Distance from the tail pulley to the lip of the chute should be not less than three times the belt width. This permits insertion of troughing idlers between the tail pulley and the chute, as shown in Fig. 2, which serve to steady the belt and prevent objectionable vibration. To insure this steadying effect, idlers should be spaced closer together at loading points, sometimes as close as 12 to 18 inches for heavy material.

Even with careful placing, skirtboards frequently cause excessive wear on the belt cover. They never should come in contact with the belt either loaded or empty, and should be set so that the space between the boards and the belt increases in the direction of belt travel, thus permitting material to work free rather than to become wedged against the belt to gouge the cover. Bottom edges of the skirtboard should be equipped with strips of flexible rubber, but even these will wear the belt cover if allowed to rub against it with constant pressure.

Skirtboards usually are placed in front of the loading chute to insure good formation of load and prevent spillage. Their length should be three or four times the belt width which permits a load to come to rest before passing ends of the skirtboard.

Use of skirtboards along the full length of the belt should be resorted to only when absolutely necessary to prevent excessive spillage. If essential, they should be made of some yielding material such as old pieces of belt. Regardless of what they are made of, they should not rub constantly against the belt because

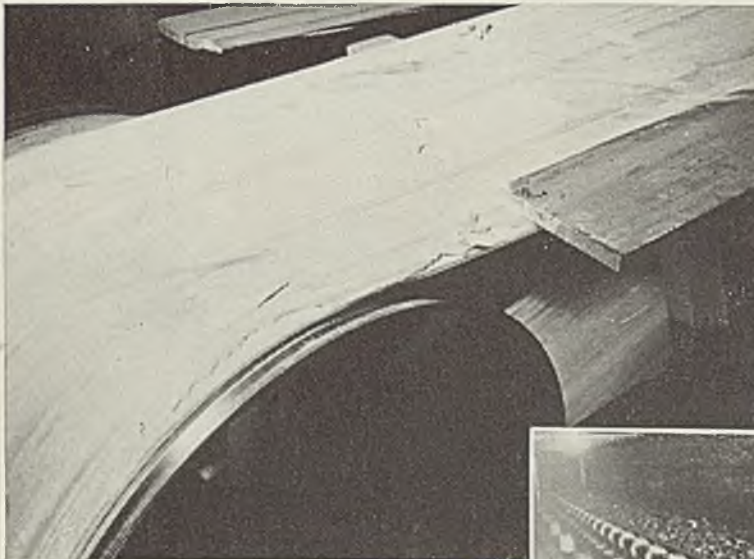
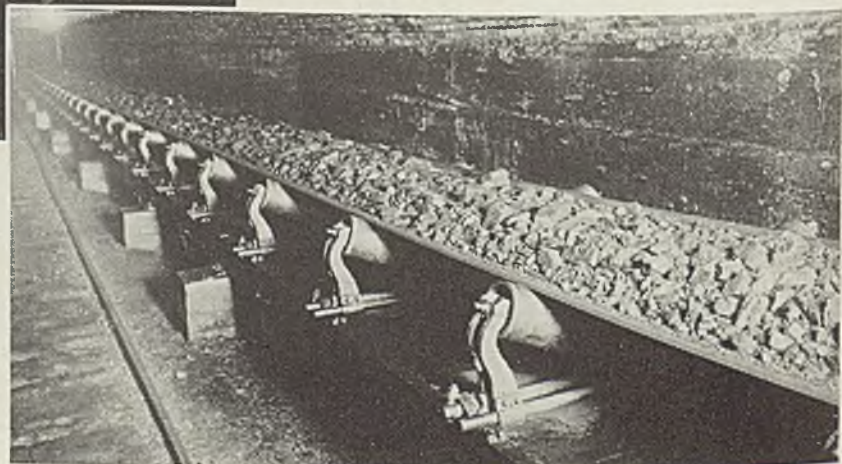


Fig. 3 (Above) — Skirtboards rubbing against the belt cause damage such as may be noted on the edges of this belt. Fig. 4 (Right)—Decking of sheet metal or planks covering entire return side of belt protects it against trapped lumps



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it soon results in a condition such as shown in Fig. 3.

Lumps of material, even as small as 1-inch, can cause serious damage to the fabric carcass of the belt if they become trapped between the belt and the pulley. The same is true of moist material caked on the pulley surface. There are several remedies, such as brushes and scrapers, but by far the best protection against trapped lumps is a decking of planks or sheet metal which covers the entire return side of the belt (Fig. 4). This decking must be kept clean, otherwise, spilled material will accumulate and stop movement of idlers.

Of premature belt failures, a large percentage today can be traced directly to the fact that they are running crooked. The belt shown in Fig. 5 is an example. Crooked running permits it to run against a concrete abutment on the return side. The protecting rubber is completely worn from the edge and for 2 inches in on the pulley side, eventually permitting breakdown of the fabric and the entrance of moisture. Rubbing against an obstruction proved even more disastrous for the crooked-running belt shown in Fig. 6. The steel pin of the lacing was bent back and eventually the belt hooks broke loose, causing the fabric to rip.

Crookedness in the belt itself is indicated when the same part of the belt is always trying to run off, no matter at what point of the conveyor it may be. The most common cause of this condition is failure to cut the belt ends square at the splice. Since the edges are not always perfectly true, the safest plan, particularly with wide belts, is to mark a center line at least 10 or 15 feet back from the belt end. The

cut should be made at right angles with this center line. Even belts which have been running straight will develop crooked running if ends are not properly squared when replacing fasteners.

If a belt keeps climbing sidewise on the same idlers, the fault is due to the alignment of the idlers. In lining up the latter, one should work in the direction of belt travel. Usually the carrier which causes the trouble is the second or third be-

ment of supports in many cases.

Do not attempt to straighten a belt by unequal adjustment of take-up screws. The end pulleys should be set in alignment and kept so. Trying to make a belt run straight by increasing the tension not only strains the driving mechanism, but puts an unnatural stress on the belt, which tends to enlarge any cuts or breaks and weakens the splice.

Other factors which contribute to the crooked running of belts are un-

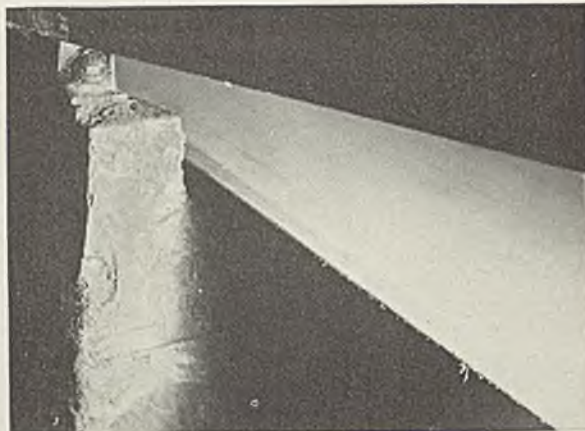
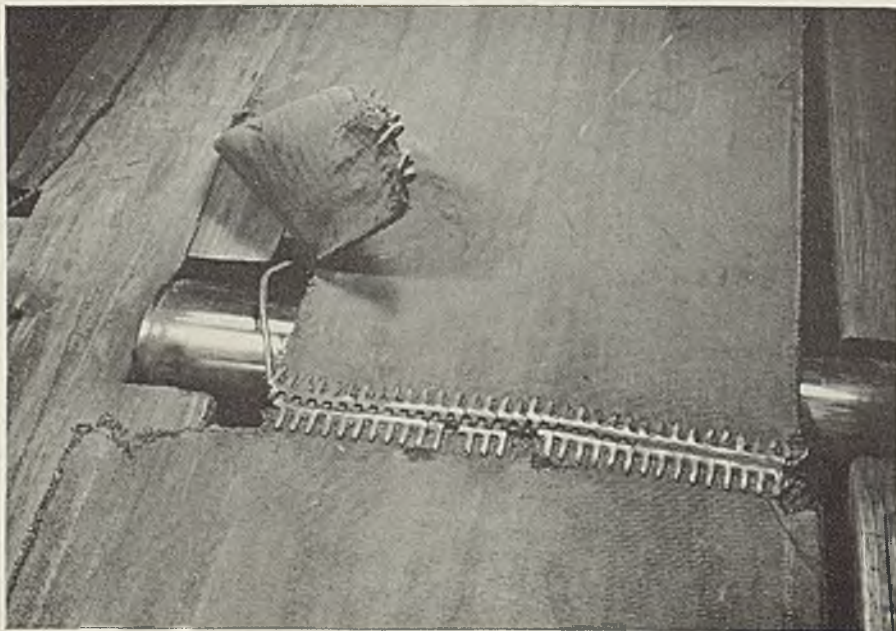


Fig. 5 — Protecting rubber on this belt has been completely worn off by contact with concrete abutment

hind the point where the belt climbs out of line. Adjustment of the second flat idler behind the tail pulley on the return side of the belt often is effective.

Crooked running sometimes results from return idlers becoming loose and sliding to one end of the shaft or, when conveyors are erected on temporary or insecure foundations, may be traced to bad align-

Fig. 6—Another instance of damage to conveyor belt caused primarily by crooked running



equal loading, frozen idlers and insufficient belt contact.

Proper maintenance and spacing of idlers are of vital importance to long belt life. A defective idler, which does not turn, is extremely destructive to both the rubber cover and fabric. Routing inspection and greasing of idlers not only insure belt protection but power savings as well. Excessive lubrication, however, should be avoided as grease or oil on the belt will swell and rot the rubber.

A conveyor is originally designed with the idler carriers spaced closely enough together to afford the belt sufficient support so that it will not sag between carriers. This spacing is determined by the amount of tension in the belt. If there is too much sag, the load shifts as it moves from carrier to carrier and causes wear on the belt surface, besides consuming power.

Such a condition can be improved by graduating the idler spacing from one end of the belt to the other, proportioning the spacing to the tension in the belt. This tension on the carrying side decreases from a maximum at the head pulley to a minimum at the tail pulley. Just what the exact spacing should be at various points depends on the load, the belt tension, the belt width and the inclination of the conveyor. It can be arrived at accurately only by experimental adjustments and power ratings at different settings.

Probably no improvement in con-

(Please turn to Page 63)



PROGRESS IN STEELMAKING

DRIVES and CONTROL FOR A MODERN ROD MILL

■ ONE LARGE steel company has recently placed in operation two duplicate continuous rod mills designed for quantity production of steel rod of high quality. Each mill has a continuous, gas fired heating furnace into which cold billets 2 5/16 inches square and 30 feet long are charged. The heated billets pass completely through 19 sets of rolls in approximately 75 seconds and the finished No. 5 rod leaves the last roll stand at a speed of 3500 feet per minute. In this short time the original 30-foot billet has been elongated to about 4500 feet. Two strands can be rolled simultaneously, so that two rods 4500 feet long, 0.207-inch in diameter and almost white hot are delivered from each mill every 75 seconds.

One of the principal considerations in operating a mill of this type is the disposal of the finished product as it is delivered from the mill. To accomplish this, each mill is equipped with six reels into which the hot finished rod is coiled as it leaves the mill. A system of pipes makes it possible for the operator to direct

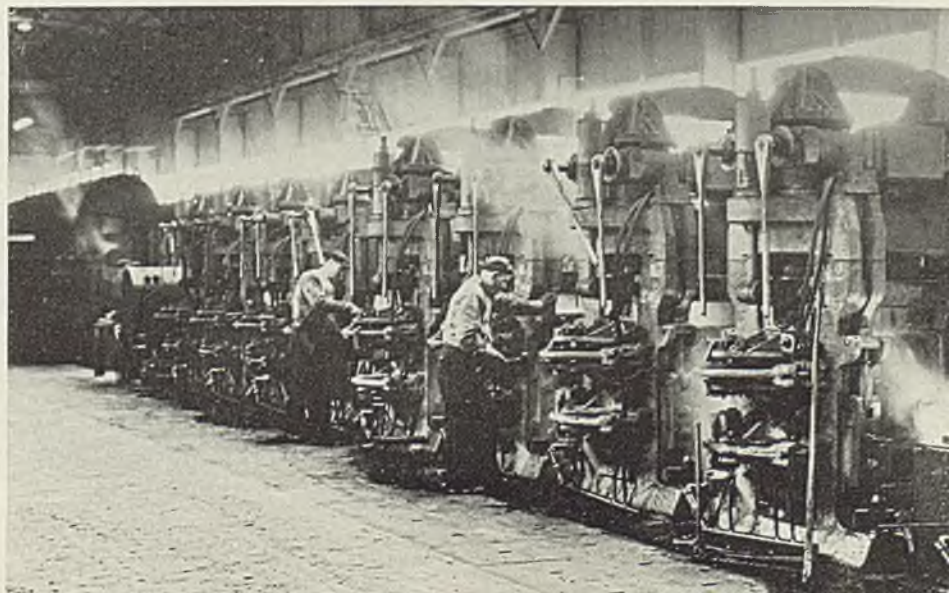
each successive rod into the desired reel. Although only two strands can be delivered simultaneously from each mill, six reels are required for each mill because of the time required for acceleration, stopping, and unloading. All twelve reels are electrically driven and the equipment differs somewhat from that used in previous installations.

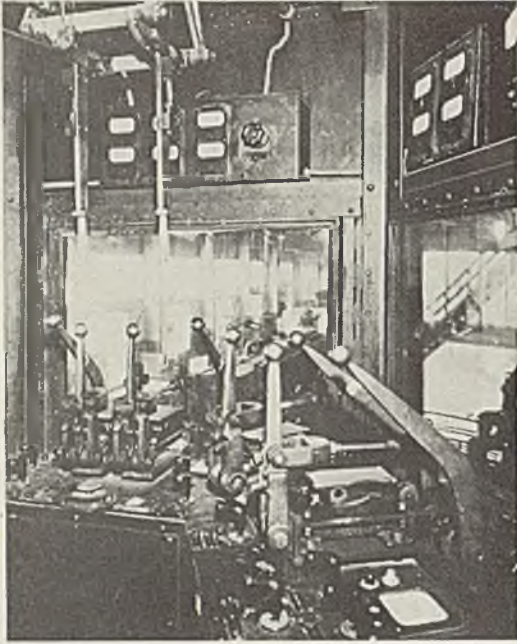
Each reel consists of a vertical spindle that carries at its base a circular steel plate on which are mounted two sets of vertical pins, located concentrically. A second movable plate with holes to clear the pins rests on top of the plate which carries the pins. The upper plate,

on which the coil of rod is formed, can be lifted vertically by a hydraulic mechanism so as to clear the pins.

In making a coil, the reel is accelerated to the correct speed and the oncoming rod is directed between the two concentric rows of pins. The rod fills the annular space between the pin circles and forms a neat coil resting on the movable circular plate. When the coil is completed, the reel is brought to rest as rapidly as possible. The plate with its coil is lifted from the reel to a system of conveyors on which the rod is allowed to cool. The reels are mounted below the mill floor and

General view of new continuous rod mill showing roughing stands, intermediate stands, flying shear and finishing stands. All 19 stands are equipped with antifriction bearings





Operating pulpit for controlling six of the reel motors. A similar pulpit controls the other six

the coils are discharged at the floor level.

Each reel is driven by a 125-horsepower, 230-volt, compound-wound, adjustable-speed motor. It is of the bracket type, has roller bearings, and has openings on the top half of bracket, with semi-enclosing screens on the bottom half. The motors are arranged for horizontal mounting and drive the reels through bevel

gears. A shunt-wound, marine type, magnetic brake mounted on the reel drive shaft assists in bringing the reel to rest after each coil is completed.

The power for each group of six reel motors is delivered by a 300-

These twelve panels, six in each group, control the twelve electrically driven reels

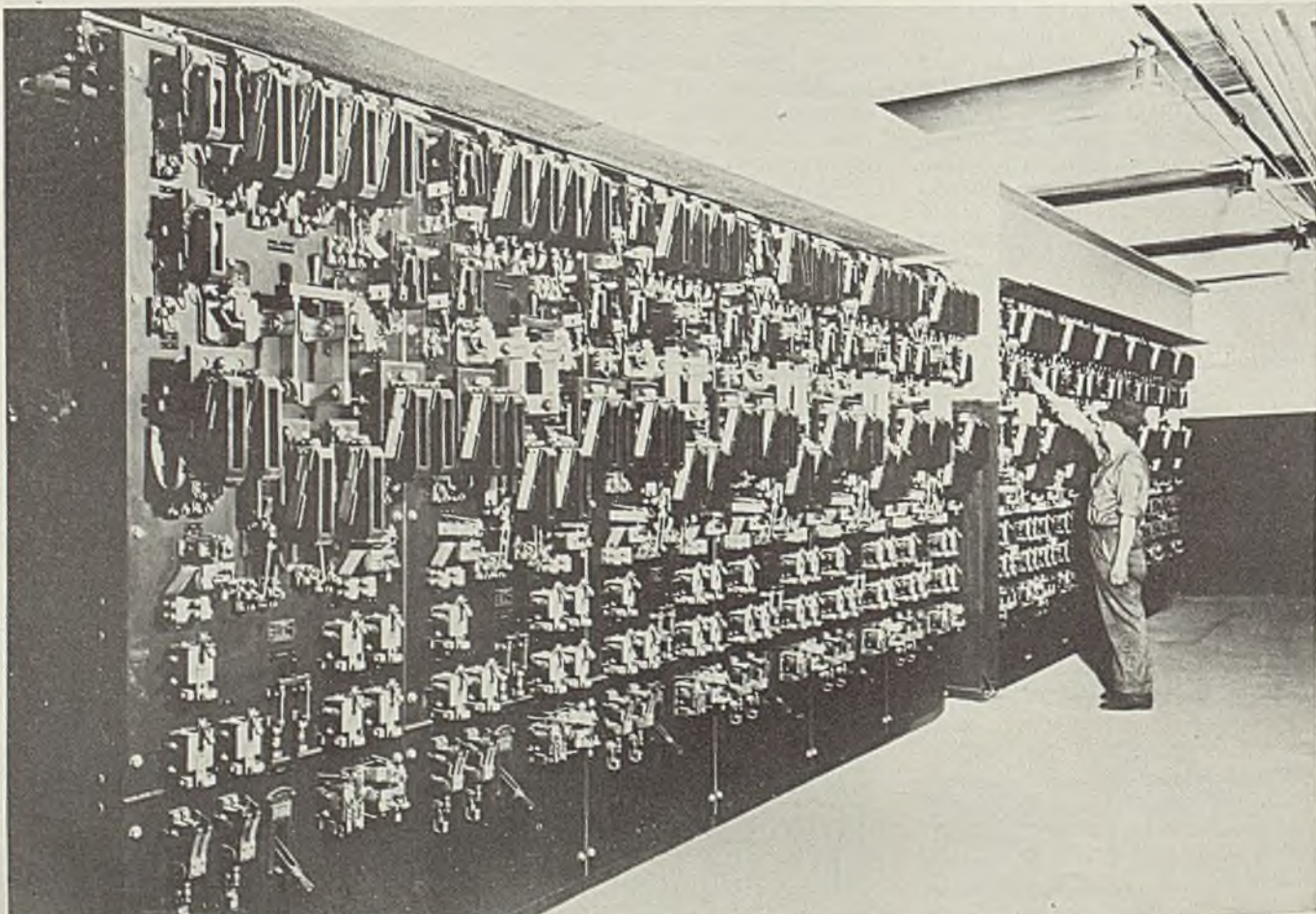
kilowatt, 75/300-volt shunt wound, separately-excited generator.

To withstand the unbalanced weight of 400-pound coils with this mean diameter traveling at a speed of 40 miles an hour, the reels have to be of heavy construction. The flywheel effect, accordingly, is quite high. Furthermore, the time for acceleration and deceleration is limited, thus imposing severe duty on the driving motors and control. The normal time for one complete cycle is about 60 seconds, of which 7 to 8 seconds is for acceleration, 30 seconds running at full speed, 6 seconds for deceleration, and the remainder with the reel at rest for discharge of coil.

A separate control panel is provided for each reel motor, with the following operating features:

1—Time limit acceleration to base speed is obtained with a five-point, four-step starting resistor. The resistor is designed to give 100 per cent full load current inrush on the first point for about 0.3-second and approximately 190 per cent on each successive step including the last step. The first inrush barely starts the reel, without shock, thus reducing the shock effect of the second inrush of 190 per cent.

2—Full-field excitation is maintained during acceleration on resistance by a field relay. As soon as



the last resistance step is cut out this relay functions to bring the motor to full speed or a speed determined by the position of shunt field rheostats. The armature current during acceleration by field fluttering is maintained at 165 per cent current.

3—Deceleration to base speed is brought about by a field-fluttering relay and from base speed to a standstill by timing relays and three steps of dynamic braking. The current is limited to 140 per cent full load to base speed and to 75 per cent on the first point of dynamic braking and 125 per cent on the second and third points. The shunt brake is applied about the time the second dynamic braking point is cut out.

A unique feature of the control is the operator's benchboards, one of which is provided for the reels of each mill. The benchboard shape eliminates all unnecessary moves on the part of the operator. Standing in front of the middle section, the operator has all six controls within his reach. Each of the six sections of the benchboard has both control switches and hydraulic valve control levers. The hydraulic levers by which the movable plate of the reels is raised and lowered are electrically interlocked to control the starting and stopping of the reel motors at the same time. When a finished coil is raised to the discharge position, the reel is stopped. When the movable plate is lowered to the position to receive a new coil, the reel is started automatically.

Load Fluctuates Widely

When a mill is in full production, two reels are receiving rods and the others are either accelerating, decelerating, stopped, or idling. This condition imposes considerable load fluctuation on the reel generators. It is of absolute importance that the voltage of the reel generators remains constant at all times. To secure constant voltage, each generator is provided with a voltage regulator. The regulator is of the broad-range type since voltages from 75 to 300 volts are being employed depending on the product rolled. The regulated voltage assures constant speed of the reel motors and proper matching of their speed to the speed of the last stand of the mill.

A considerable amount of water is used by mills of this type so the mill proper is elevated 14 feet above the ground level to insure good drainage. Space is available, there-

fore, on the ground level for reel drives, control equipment, oil tanks, etc. The control panels, starting resistors, rheostats, etc., are located in the control room almost immediately below the operating pulpits, a design which lends itself readily to a simplicity and economy of the whole installation.

Lowers Power Cost

■ Substitution of spherical roller bearings for ordinary plain bearings on 2-high cold mills used by a maker in the Pittsburgh district, for rolling stainless steel, has effected a reduction in the power consumption in excess of 65 per cent. Rebuilding of the 12 x 18-inch stands afforded rolling at higher speeds, permitted of heavy reductions per pass and effected greater uniformity in gage from one end of the coil to the other. By eliminating water cooling of the roll necks, the surface finish of the rolls was prolonged and a saving in the grinding costs was effected. Under former practice, the acid condition of the cooling water corroded the surface of the rolls, thus shortening their time in service.

Uses Two Batches of Oil

■ Lubricating steam turbines for driving prime movers at steel plants frequently involves care if disturbing elements are to be avoided. Every precaution should be taken to avoid entrapped air and moisture, according to a steelworks engineer, and to prevent sludging which may lead to bearing failure. At a plant in Ohio two batches of oil are used for lubricating large turbines, one being in service while the other is

resting. This is accomplished by having a tank with two compartments. The rested oil is returned to service through a centrifuge separator. Twice a year the lubricating system is cleaned with steam.

Increase Pickling Output

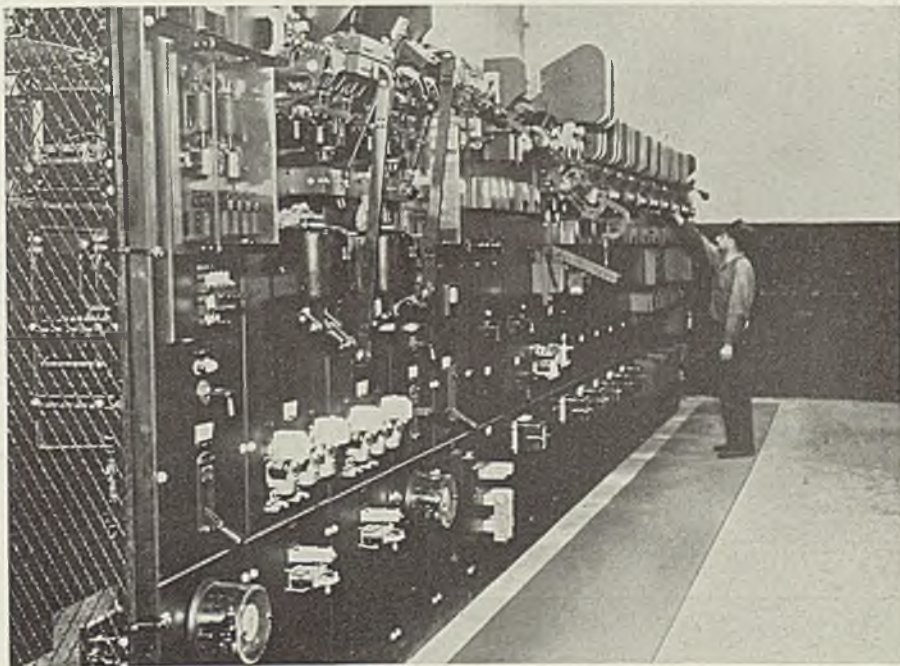
■ A large producer of strip steel has effected an attractive increase in its pickling capacity without installation of any additional pickling tanks. The steel is passed between alternating current low voltage electrodes. The resultant agitation, heating and formation of gas bubbles hastens the loosening of scale from the steel and speeds the pickling action. Transformers of the proper rating and some associated apparatus furnish the low-voltage current required.

Shortens Cooling Cycle

■ The cycle of heating, soaking and cooling coiled steel strip had been shortened considerably by using the cylindrical bell-type electric furnace equipped with center element and with high-pressure circulating fans located in the bases of the furnace. Cycles of five to six days duration have been reduced to about two days.

Extends Life of Guides

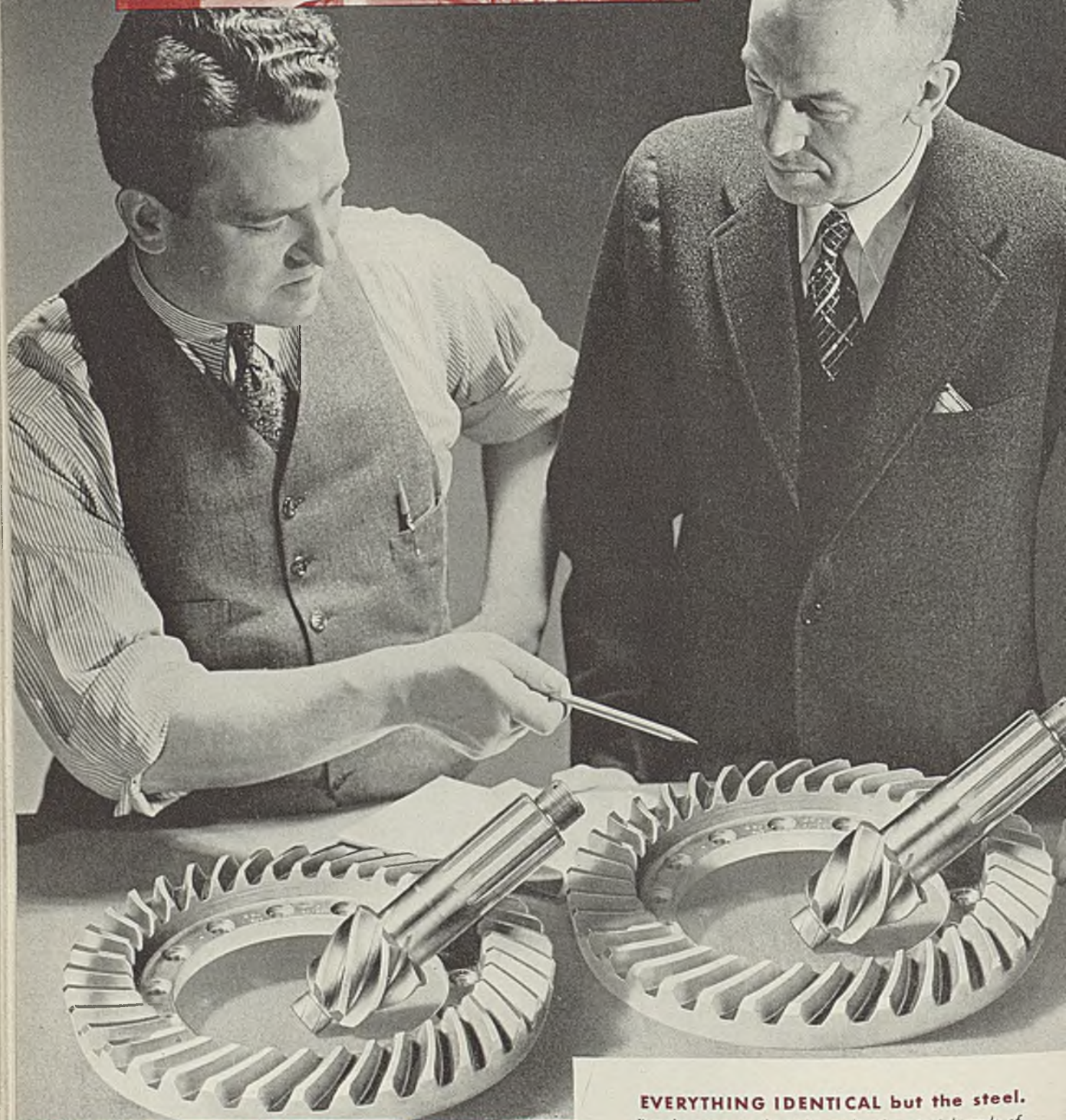
■ Hard-faced rolling mill guides are giving highly satisfactory service on merchant and rail mills. One rail producer now is treating all guides in this manner. Reports are that in many cases hard-faced guides have given a performance ratio of 30:1 over guides previously used. At another plant hard-faced guides show a life of 6:1.



Incoming power control board. One of the broad-range voltage regulators for the reel generators is shown at upper left



HOW TW



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TO MAKE a cheaper set of gears is not difficult . . . if quality can be sacrificed.

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But to make a better *and* cheaper set of gears—gears which will run more quietly, scuff less and save 12½¢ per set in material cost—is an accomplishment of which any two metallurgists can well be proud.

This is the result of a cooperative study, extending over a six weeks period, by a metallurgist from Carnegie-Illinois and a metallurgist of a well-known automobile manufacturer. The first was thoroughly familiar with alloy steels and the limitless combinations of analyses and heat treatments. The second knew the requirements of their 1938 models and the advantages of their plant facilities. Working together, they could coordinate and pool their knowledge. They could achieve a result that neither could achieve alone.

Gears made of the new grade of U·S·S Carilloy Alloy Steel they recommended have been thoroughly tested. All the experiments are now complete. In the words of the laboratory report . . . “We find an exceptional superiority of the—steel over the—steel now being used, especially with respect to wear and scuffing, a feature which must be watched closely on spiral bevel Hypoid gears. Since machining and heat-treating are not materially changed, the 12½¢ saving will be net.”

As a result, this automotive concern has standardized on this new grade of U·S·S Carilloy Alloy Steel for the remainder of their 1937 production, as well as for all 1938 models, at a saving of several thousand dollars.

This is the kind of sincere side-by-side cooperation Carnegie-Illinois offers you. Our man and your man, working together, can achieve results neither can achieve alone.

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UNITED STATES STEEL



WELDING, ETC.

BY ROBERT E. KINKEAD

For Welded Steel Machinery Designers

■ Engineers who design machinery to be built in welded steel construction will find interesting examples of what is being accomplished in November *Machine Design*.

Wallace bending rolls and Colonial hydraulic presses illustrate clean design with pleasing appearance. A timely article by Herbert Rosengren, assisted by E. W. Miller, chief engineer, Fellows Gear Shaper Co., Springfield, Vt., shows before and after views of machines which have had their design modernized.

Whether the design of machinery for saleability is an art or a science will be argued by engineers as long as machines are sold on a competitive basis. The fact that opinion rather than natural law is a dominating factor is well illustrated by the current models of 1938 automobiles.

Some designers have worked on the assumption that the lines and form should be those most pleasing

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.

when the car is traveling at high speed. Others have designed their cars with the knowledge that most cars are inspected by prospective buyers in the showroom, and made the lines most pleasing from the static point of view. Still others have tried to compromise and build a beautiful car either standing at the curb or traveling at 70 miles per hour. Each premise leads to a different solution.

These different premises upon which design of machinery is built extend to all kinds of machinery. Machinery that is mounted permanently on foundations is properly designed with reference to its surroundings, particularly of other machines which may or may not be

Down to the Sea Without Rivets



■ Built entirely of arc welded steel and without rivets, this 39-foot cruiser for deep sea fishing was fabricated by O. A. Aaker, Willows, Calif., using an acetylene cutting torch, electric drill, portable grinder and arc welding machine as the only tools. It weighs approximately 8 tons, is powered with a 44-horsepower diesel engine and has a speed of 10 to 12 knots

linked in function. The freedom with which welded steel design may be carried out permits the designer to deal effectively with the situation once he has established his major premises with reference to the problem.

Testing by Explosion

■ Tests of welded cylinders under explosive internal pressure were shown by United States Steel Corp. at the recent metal show.

L. C. Bibber, welding engineer for Carnegie-Illinois Steel Corp., conducted the tests, which as yet are far from complete.

Considerable significance is being given this method of testing by the welding fraternity in view of the results so far obtained by Mr. Bibber. While the tests were designed primarily to show the behavior of high tensile steel when welded by the electric arc process, additional information of great value has developed. The surprising uniformity of these high tensile steels, as shown by their deformation under explosive force of a velocity of around 4000 feet per second, was noted.

The welds showed that they need not be discounted even under impact of this velocity. Speculation as to whether this test will disclose when it is necessary to stress relieve by heat has focused attention on results which will be published in the near future.

When it is considered that the velocity of impact in these tests is due to use of high explosive, the question of service behavior of welded construction using these high tensile steels is completely answered. They are entirely safe. The fact that there has been somewhat more than a shadow of doubt about the full section impact resistance of a steel having an ultimate tensile strength of 85,000 pounds per square inch after fusion welding was the actuating motive for making the tests.

Develops Iron Swivel Seat

■ By swinging around, the driver of a cab-over-engine truck can now easily get in and out of his cramped cab with a minimum of effort. Developed by Eberhard Mfg. Co., Cleveland, the new type swivel chair is made of malleable iron.

The seat can be automatically locked in the driving position by a swivel latch bolt, and is so arranged that the driver can unlatch it, swing around and make his exit. The pedestal also provides an adjustment for height, as well as for forward or backward movement to accommodate the tall and short drivers.

Offers New Truss Section For Reinforcing Concrete

■ ADDING to its present line of structural steel products, Jones & Laughlin Steel Corp., Pittsburgh, recently placed on the market a new product known as Jaltruss. Jaltruss is a concrete reinforcing section of double Warren truss design, manufactured primarily for installation in the concrete slabs of bridge floors and large structures where the floors are subjected to the severe impact forces and reversed stresses set up by heavy moving loads. The new member is a one-piece lightweight truss section rolled from billet to finished truss in one continuous rolling operation while the steel is well above the critical rolling temperature.

Being a hot rolled section, Jaltruss is constant in dimension and uniform in strength. It is made of structural grade new billet steel which conforms to the standard specifications for reinforcing material of the American Society for Testing Materials.

The rolling of Jaltruss is performed on a mill having nine stands of rolls in continuous arrangement. Billets 30 feet long are heated to rolling temperature and then entered into the mill. The first six stands of rolls shape the billet in an I-beam section having areas of correct proportion in the web and flanges. These areas remain constant in the succeeding operations as no further elongation of the beam section occurs.

Passing into the seventh stand of rolls, the web of the beam section is slit at predetermined intervals to form the web members of the fin-

ished truss section, which at this time remain in their original planes. Only the web member is rolled in the eighth stand where the length is increased sufficiently to permit the separation of the flanges to the desired depth of beam without stretching of the web member. The ninth stand of rolls merely flattens and aligns the finished truss, after which it is delivered to the cooling bed.

Jaltruss can be obtained in any length, because its pattern permits cutting at any point. The range of sizes is such that the section can be incorporated into the plans of practically any structure that requires reinforced concrete floors. In addition to a variety of sizes, Jaltruss is manufactured in two weights.

Investigate Alloys To Harden Pewter

■ Study in improving hardness of pewter is embodied in the contribution of R. E. Leyman, in technical publication series A, No. 53, of the International Tin Research and Development council under the title of "The Effect of Cold-Work and Annealing on the Hardness of Some Tin-Antimony, Tin-Antimony-Copper and Tin-Antimony-Silver Alloys."

Three alloys of tin with antimony in the proportions of 3, 5 and 7 per cent were investigated, both without and with addition of either copper or silver in substitution of parts of tin. The copper additions, approximating $\frac{1}{2}$, 1 and 3 per cent, were

made only to the 5 per cent antimony alloy, while the silver was introduced in the same proportions in the 7 per cent antimony alloy. Ingots of these compositions were reduced in thickness by repeated rolling, the reduction per pass being about 1 per cent. Tests of brinell hardness and examination of micrographic structure were made on specimens with reductions of from 10 to 80 per cent. All alloys were hardened by moderate cold rolling down to 40 to 50 per cent. Further rolling softened them, the softening becoming more pronounced with the higher proportions of copper and silver. Annealing caused further softening in most cases but some of the copper and silver alloys which had been severely worked improved slightly in hardness. Various quenching and aging treatments were tried but were without permanent effect.

Metal Fatigue Covered In New French Volume

■ *La Fatigue des Metaux*, by R. Cazaud and L. Persoz, paper, 190 pages, 6 $\frac{1}{4}$ x 9 $\frac{3}{4}$ inches, published by Dunod, Paris, France, and supplied by STEEL, Cleveland, and in London by the Penton Publishing Co. Ltd., 416-17 Caxton House, Westminster.

This volume, which is written in French, is devoted to fatigue of metals and is intended for engineers, designers and others who are associated with all branches of mechanical construction. It aims to supply first the necessary guidance for choice of metals best suited for the purpose intended, and second, methods for determining the best combination which will give maximum resistance with minimum weight. Fatigue limits of various metals are compared with other physical characteristics and descriptions are given of the various machines employed for determining different fatigue limits.

The book is divided into eight chapters of which the first relates to the historical and general phases. Chapter II deals with the character of ruptures from fatigue, and Chapter III discusses the theories of the mechanism of fatigue. Determination of fatigue limits and machines for its execution are described in Chapter IV, while Chapter V is devoted to fatigue limits of metals and alloys. Chapter VI discusses the influence of various factors on fatigue. Chapter VII deals with the fatigue resistance of riveted, welded and brazed assemblies, and Chapter VIII discusses the practical applications of fatigue limits. At the end of each chapter an extensive bibliography is given to aid the reader in further reference.



The new structural shape known as Jaltruss is shown here on the cooling bed in a Jones & Laughlin mill, where an operator is cutting a test sample during a rolling operation

POWER DRIVES



Lubrication of Roller Bearings Presents New Problems Daily

BY O. L. MAAG*

Lubrication Engineer, Timken Roller Bearing Co., Canton, O.

■ EVERY day brings new problems to the lubrication engineer and to the manufacturer of lubricants.

The speedy increase in the application of antifriction bearings in all branches of industry, the increase in bearing loads, gear loads, higher speeds and greater precision, all play their part in complicating the problem of economical, efficient lubrication.

Lubrication is no longer merely a messy job to be handled by any laborer with an oil can or a grease paddle. Lubricants must be properly applied as well as properly compounded. Intelligent selection of the type and grade of product to be used is important and co-operation between the manufacturer of lubricants, the bearing manufacturer and the user of the equipment is essential. Too much lubricant may prove nearly as disastrous as too little. Poor selection or a poor quality of lubricant may prove expensive.

Much still remains to be done in closure design and, until closures are perfected, a lubricant must be partly a seal as well as a lubricant, which still further complicates the situation.

Every bearing application presents

a potential problem in lubrication. High operating temperatures call for special lubricants. Greases for use under these conditions should be of such a character that they will return to their original consistency with practically no oil separation when the bearing cools. Ordinarily, short fiber, soda-soap greases of smooth texture give satisfaction in applications involving high operating temperatures and high speeds. Cold working is usually required to produce greases of this particular type.

There is still much to be learned in the art of compounding greases. Some soda-soap products have a tendency to become quite stringy when worked, while others become more smooth. In our experience, those with a tendency to become smoother give best results in service.

We recently tested two greases made by a well known manufacturer. One had a tendency to string out on working, while the other became smoother.

It may be that a slight variation in acidity or alkalinity caused this, or a difference in the method of manufacture, such as the use of a steam-heated or open-fired kettle.

Certain manufacturers are now compounding their greases to include fractional percentages of free fats or free fatty acids. Such greases adhere better to the bearings, the surface tensions of the lubricant being increased so that the metal surfaces are more uniformly cov-

ered. This has a tendency to reduce operating friction, and greases of this type are being used with marked success in numerous instances.

The melting point of greases varies over a wide range, due to differences in the type of grease and the manner in which the greases are compounded. Most laboratories have their own method for determining this property and a wide variation exists in the technique followed.

Melting Point Determined

In our laboratory the melting point of any grease is easily and accurately determined with a simple piece of apparatus which anyone can make in a few minutes. In this, a definite quantity of grease is held in a copper scoop which is attached to the bulb of a thermometer. The thermometer is suspended in a test tube which is immersed in an oil bath. The temperature rise of this bath is closely controlled. Consistent results are obtained by holding the temperature rise to 10 degrees Fahr. per minute.

The severe service imposed on rollneck bearings in rolling mills presents an interesting problem in lubrication. Usually loads are quite heavy, and often operating conditions arise that impose many times the normal load. Water complicates the problem and temperatures must likewise be considered. Each mill presents an individual problem and, while general principles may be

*Paper presented at fifth annual convention of the National Lubricating Grease Institute held Oct. 4-5, at the Blackstone hotel, Chicago.

stated, expert individual analysis is essential to best results.

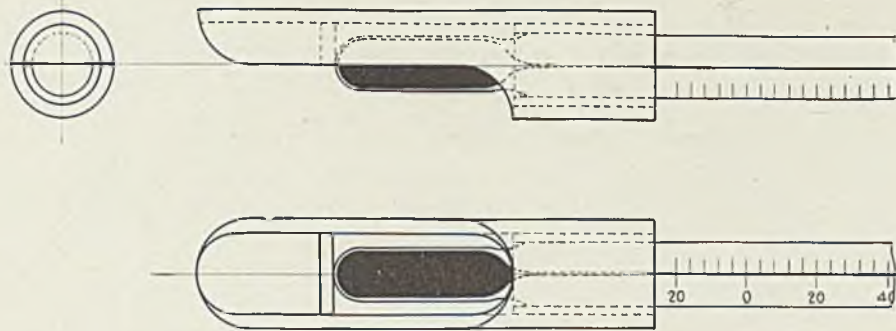
In addition to lubricating the bearings, any rollneck bearing lubricant must supplement the seals and closures and aid in keeping water and scale out of the bearings. Consequently the grease must be as heavy as possible, yet soft enough to properly lubricate the bearing. Some greases have the ability to hold a considerable amount of water as an emulsion before thinning out too much. This is at times a desirable feature, for as long as the water is held in an emulsion it is not likely to etch the bearing surfaces. Once the saturation point is passed, free water in the form of globules appears and etching and corrosion follow.

A majority of the water-repellent grease used in steel mills will carry from 20 to 25 per cent of water in emulsion before giving much trouble. However, the degree of thinning varies over a wide range with different greases, some thinning out to the danger point with an amount of water that apparently has little effect on others. This condition is controlled in some cases by the use of a mixed-base grease, varying percentages of soda-soap grease being added to the water-repellent, lime-soap grease to improve the emulsifying properties and reduce the danger of globules of free water etching or corroding the bearing surfaces.

Consistency Differs

Another factor that gives trouble is the wide difference in consistency that too frequently now exists between worked and unworked greases. Unworked greases that thin out in service allow the entrance of more water and scale than do those greases that maintain a uniform consistency. Consequently, we recommend that lubricant manufacturers bear this item in mind when studying mill conditions and recommending lubricants for use in applications exposed to water.

Fortunately, water, or grease containing water in the form of an emulsion, is thinner than fresh grease. Consequently, careful attention to lubrication will enable an operator to control the danger of water etching by the periodic addition of fresh lubricant. The fresh lubricant forces the water and thin, used grease out of the housing, either through a grease outlet or overflow or past the closures, and recoats the bearing surfaces with fresh, dry lubricant capable of providing the necessary corrosion-proof coating. It is therefore advisable to inspect from time to time the old lubricant forced out of the housings to see that all the emulsified material has been re-



Simple equipment for easily and accurately determining the melt-point of grease lubricants

moved and that only clean lubricant is in the housing.

Extreme pressure lubricants have established themselves in many fields, the outstanding applications being in rolling mills and industrial power transmissions and in hypoid and heavy duty axles. We recommend the use of extreme pressure lubricants for all types of bearings in steel mill, heavy duty service and have noted good results from the lime-lead-soap-sulphur, lime-soap-sulphurized base and the lead-soap-sulphur-chloride base products, as well as those using a chlorinated or phosphorous compound base. Under normal conditions it is not advisable to mix types. In all cases we recommend that any extreme pressure lubricant carry a 33-pound lever load on the Timken lubricant tester.

Where emergency operating conditions develop, necessitating the use of an extreme pressure product in applications normally lubricated with a straight petroleum base lubricant, we found that the addition of approximately 20 per cent of an extreme pressure sulphurized base to the lubricant normally used will raise its load carrying capacity from 33 to 43 pounds on the Timken tester. Adding approximately 5 per cent of hexachlorethane will raise the load carrying capacity of a normal lubricant to approximately 75 pounds.

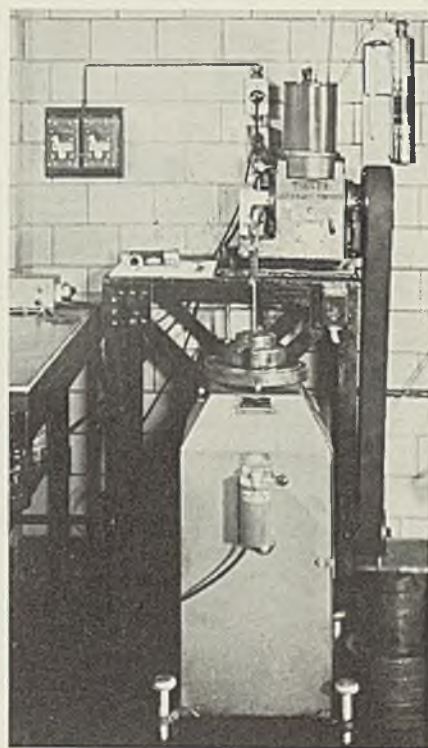
Where a mill accident has caused scoring of the bearing surfaces, we have made good use of the mild abrasive properties of sulphur by adding approximately 2 per cent of flowers of sulphur to the lubricant. This imparts extreme pressure properties to the lubricant and enables it to carry the load during the period while the scoring is being eliminated by the mild abrasive action of the sulphur. This abrasion is not severe, but it is sufficient to smooth up the bearing surfaces unless they are too badly scored, in

which case factory attention is required.

However, as soon as smooth surfaces have been restored, it is essential that the treated lubricant be removed. This is done by adding new lubricant under pressure, thus forcing out the sulphurized material. By doing this we avoid the possibility of further abrasive or corrosive action. In all cases we recommend for normal use only those lubricants which are free from either abrasive or corrosive action.

Ordinarily, we feel that manufacturers of extreme-pressure lubricants should stock about three consistencies, which we have found ample to meet practically all mill operating conditions.

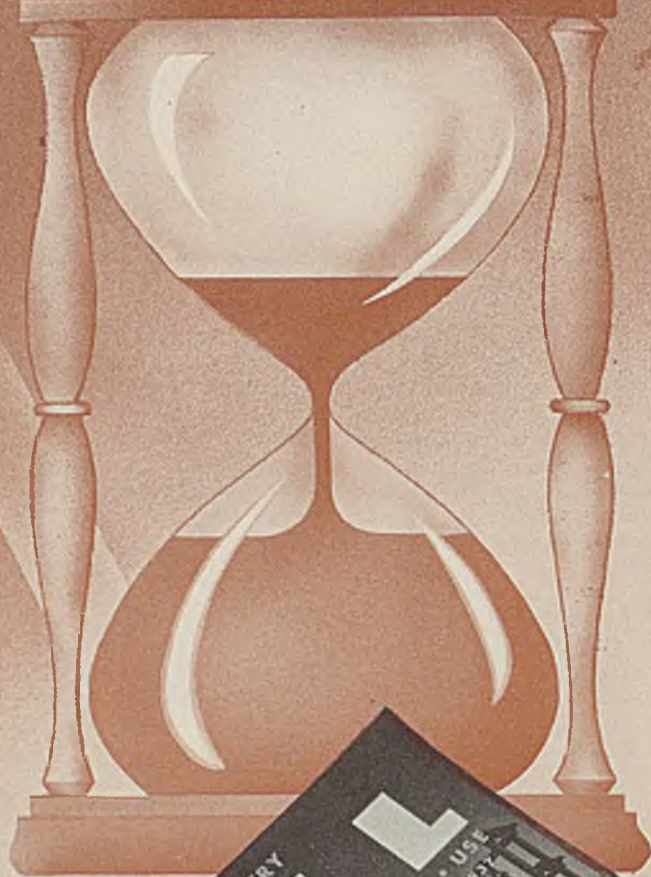
When selecting a lubricant, the



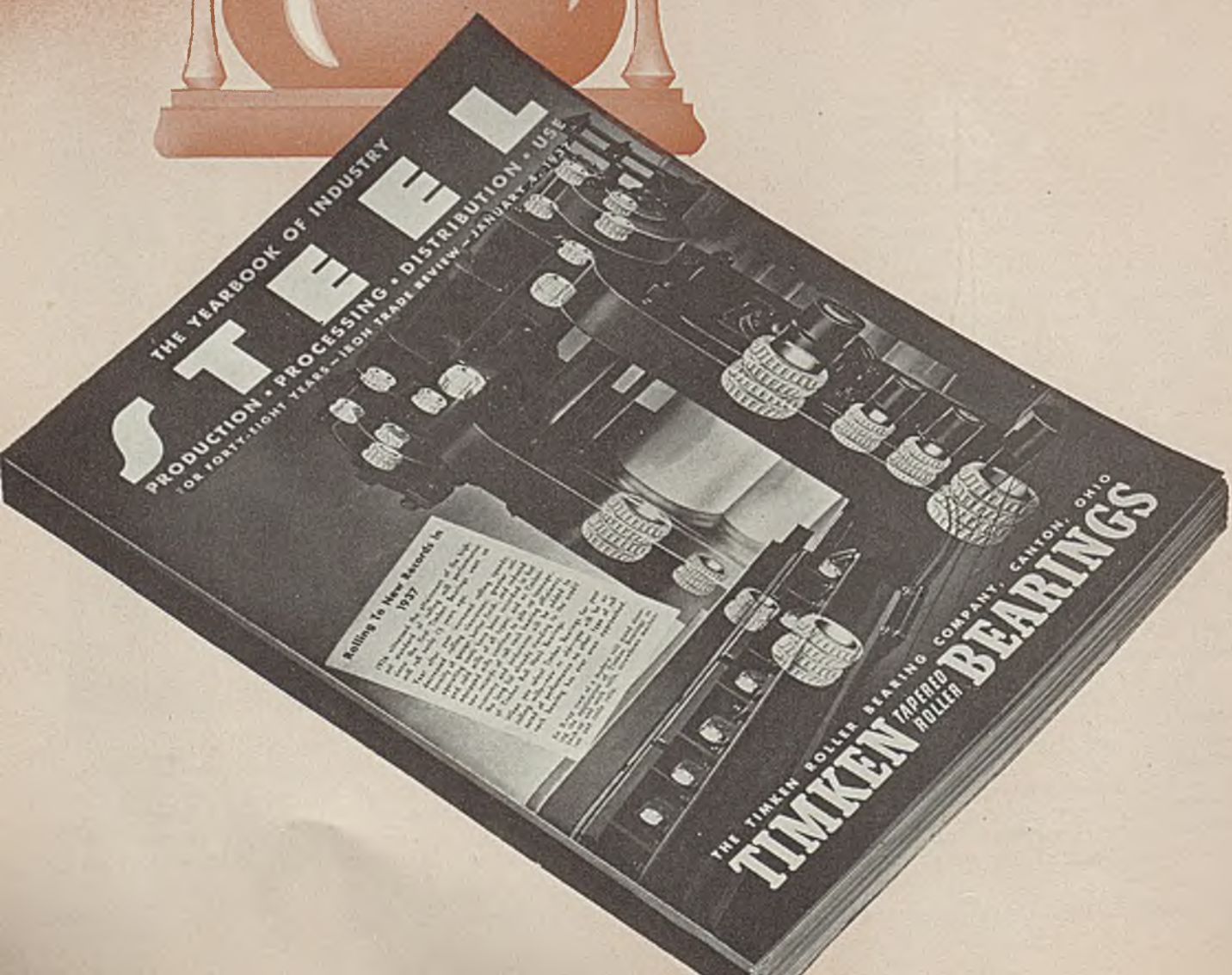
Wear and extreme pressure qualities of lubricants of all types are determined on this Timken lubricant tester which is equipped for mechanical application of loads

THE YEARBOOK OF INDUSTRY
JAN 3 1938

1937



The



Sand Runs Out

THE YEAR is drawing to a close. The 1937 Yearbook of Industry issue, which has served and is continuing to serve well, will soon have lived its life. But . . . there's a new Yearbook issue coming to replace that which has become worn and dog-eared from much use.

» » The January 3, 1938 Yearbook issue will surpass the old as the old surpassed its predecessors. It will contain all of the time proven features of previous Yearbooks, all of the departments of current issues amplified to fit the occasion; plus much valuable information attuned to the times and future needs. All of this material will be presented in the usual easily accessible manner which makes STEEL'S Yearbook issue of such great value as a reference volume.

» » The 1938 Yearbook issue is a proper medium in which to place your "Master Advertisement" of the year. Your advertisement and your name will be seen time after time. Your product or your service will be continually coming to the attention of your customers and prospects. You will definitely profit by advertising in the January 3, 1938 Yearbook of Industry issue of STEEL.

» » Send in your reservation or write for further details on

STEEL'S 1938 YEARBOOK ISSUE

most adverse conditions should govern, giving due consideration to all factors such as bearing size, speed, temperature and load. Ordinarily either a lime or soda-soap grease may be used for bearings not over 6 inches in diameter operating at speeds below 1000 revolutions per minute. However, moisture conditions would ordinarily restrict the selection to the water-repellent greases and high temperatures to the soda-soap base greases. For bearings over 6 inches in diameter, medium or medium-to-soft consistency greases may be used where operating speeds do not exceed 500 revolutions per minute. High speeds and high temperatures usually require oil lubrication.

Inorganic fillers of an abrasive or corrosive nature should be avoided,

case of dry mines with long, high-speed hauls, a soda-soap grease may give better satisfaction than a lime-soap product.

Drives where the bearings are lubricated by the same lubricant as is used for the gears usually require the use of a fluid lubricant which will flow freely at all operating temperatures and speeds. Where extreme pressure lubricants are required, we recommend the use of a stable type and have had entire satisfaction from the nonactive-type material.

To determine the effect that certain active sulphur type lubricants are having on standard equipment, we have analyzed used lubricants for their iron and copper content. Table I shows the metal content of new and used commercial gear lubricants. Increased corrosive and abrasive attack would account for the marked difference in metal content found in the used lubricant. It is apparent from these tests that certain oil companies still have much to learn about the compounding of their products to produce a less corrosive and less abrasive extreme-pressure product.

Specifications for lubricants are being drawn tighter and tighter as users study their problems. Difficulties are inevitable as equipment manufacturers and users become more and more insistent upon having lubricants compounded to meet their special conditions. Many problems have to be solved, among them being improvement of the stability of various types of lubricants both in service and in storage, reduction of the difference in consistency between milled and unworked greases and reduction or elimination of the abrasive and corrosive action of certain types of extreme pressure products.

Compounders can play an important part in solving these problems and can be of valuable assistance to users of equipment in solving their particular problems without the need for too many special products. Our company is at all times willing to co-operate with manufacturers and users of lubricants in their endeavor to improve operation, reduce maintenance and increase bearing life.

♦ ♦ ♦

Grinder Refaces Points While in Distributor

■ An announcement recently made by K-D Mfg. Co., Lancaster, Pa., introduces two new products: A portable abrasive grinder that refaces ignition points without removing them from the distributor, and a piston ring filer.

Ignition point refacer No. 125 is a miniature bonded-in-rubber abrasive wheel which produces a polished

face on the points, and continues to run freely and uniformly until it is completely worn through. Four wheels, two large and two small, are furnished with each refacer. Spares are carried in a magazine in the handle. Wheels made in two sizes accommodate the various sized distributors. A 6-inch cutting stroke is made by means of a two-to-one chain drive which speeds up the process. The handle, fastened to the drive shaft by a spring clip, can be slipped off and used on either side of the drive shaft, depending on conditions encountered on motors, such as position of points, generators, or oil filters.

Piston ring filer No. 870 eliminates much guesswork. Both ends of the ring are filed at one time and in the operation the ends are held firmly against a vertical guide plate to assure a square and parallel job. By means of an adjustable, graduated gage, square-cut, step-cut or angle rings of any size or make can be handled. In addition to file teeth on the sides of the cutter file there are saw teeth on its periphery. By removing the ring gage, the filer is transformed into a rotary hacksaw for such jobs as slotting pistons.

Multiplex Projector Makes Stereoscopic Maps

■ A tract of land 25 miles square can be "picked up" from an airplane and set down on a table top in three dimensions.

The device that makes this possible is an instrument known as the Multiplex Projector now being built for the U. S. Army air corps by Bausch & Lomb Optical Co., Rochester, N. Y.

The method involves no actual model making. A complete representation of a countryside can be obtained in a field station within a few hours after the exploring plane takes off. A plane working in conjunction with the aero-projector begins operations over an area containing three points accurately surveyed by traditional methods.

As it flies out into unmapped territory, the shutter of an automatic camera looking down clicks at regular intervals. The film is then developed and printed on small glass plates which are used as lantern slides in a battery of projectors mounted above a table. The images formed by adjacent projectors on the table overlap just as do the areas covered in successive photographs. Alternate projectors form their images in red and green light. The user wearing spectacles with one green and one red lens, sees the overlapped area stereoscopically and gets the impression of depth.

TABLE I

Metal Content of Sulphur Type Lubricants

Sample	New Oil		Used Oil	
	% Fe	% Cu	% Fe	% Cu
1.....	0.02	0.00	0.19	0.15
2.....	0.01	0.00	0.08	0.13
3.....	0.01	0.00	0.04	0.02

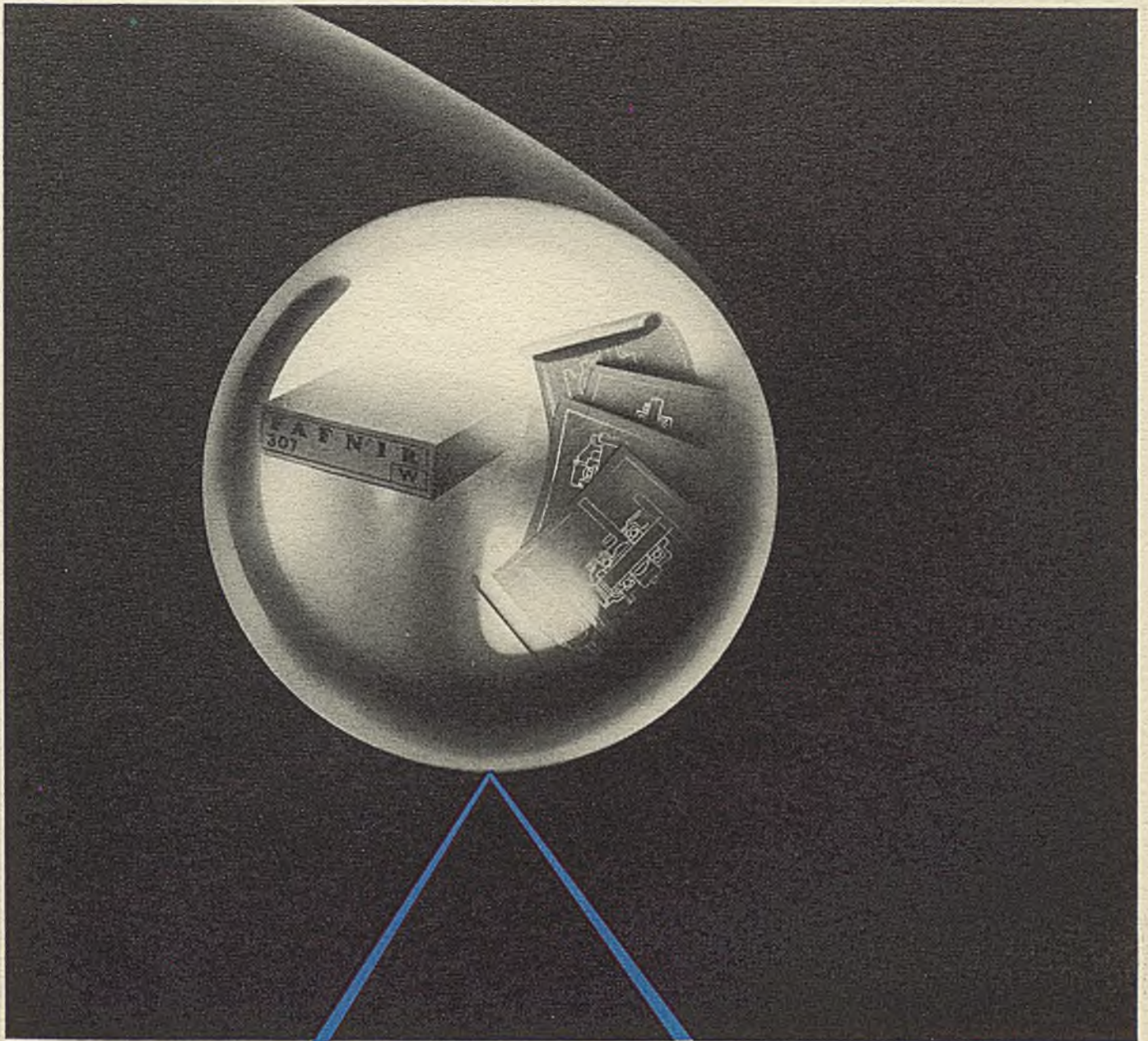
ed, for, while they may be useful in running in a rough bearing or smoothing up a damaged one, they will continue to cause wear and thus defeat the very purpose of a lubricant. Extreme pressure lubricants may frequently be used to good advantage during the running-in period, changing to the regular grease or oil after a single charge of the extreme pressure base. Hexachlor-ethane, as previously mentioned, has been found useful in this connection.

Use Heavy Oils

Heavy cylinder oils are usually satisfactory for lubricating low speed bearings, although at times it has been found advantageous to use extreme pressure products. In some cases, by using a lighter bodied oil, but of the extreme pressure type, it is possible to reduce operating temperatures and also effect a marked saving in power.

Ordinarily the mine-car greases which have proved most successful for use with Timken bearings are lime-soap products free from inorganic fillers, compounded from well-refined mineral oils ranging in viscosity from 200 seconds to 600 seconds at 100 degrees Fahr., the higher viscosity oils generally producing the most stable products.

It should be remembered, however, that there are times when special conditions require the use of a grease which ordinarily would not be satisfactory. Thus, in the



Balance in Production

The balance of Fafnir production between standard and specialized ball bearings results in important advantages. Because so wide a range of types and sizes are standard items in the Fafnir line, engineering and production of specialized bearings can be limited to those where a definite departure from stock material is absolutely necessary.

Yet, when required, these specialized bearings are more efficiently produced because of Fafnir's extensive experience with *all* types. That is why Fafnir engineering and production staffs are better able to handle all customers' demands for specialized applications. And that is how Fafnir brings down costs and speeds up service on specialized bearings.



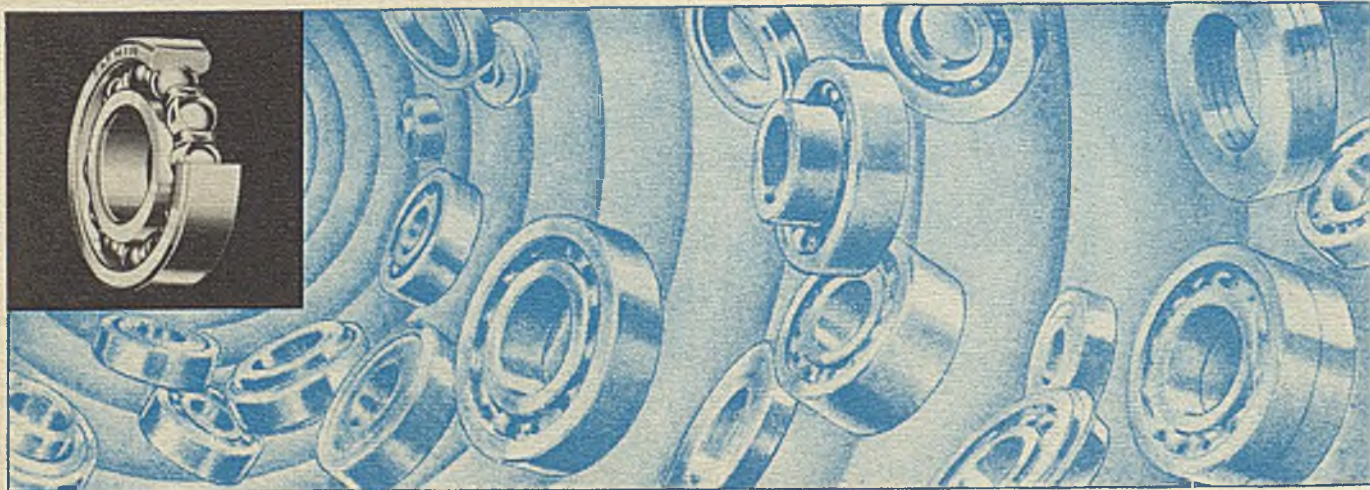
FAFNIR BALL BEARINGS

THE BALANCED LINE . . . MOST COMPLETE IN AMERICA

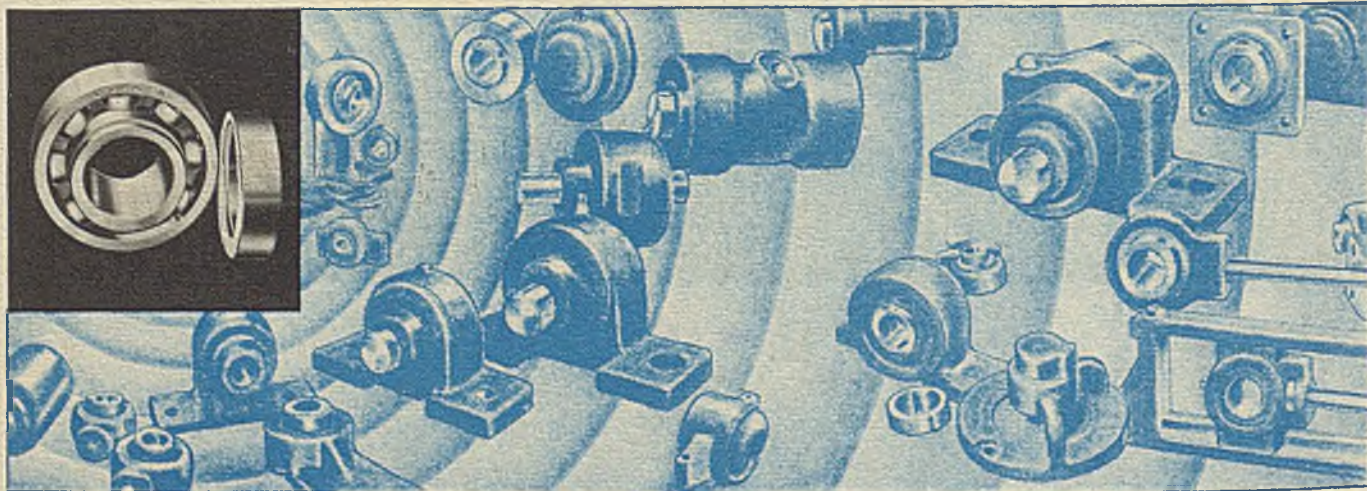


“STANDARD” AND “SPECIALIZED”

ARE *Sisters Under the Skin*



The headlong pace of to-day's industrial expansion has resulted time and again in a specialized bearing development from Fafnir today becoming the standard of the industry tomorrow. From its two basic Radial and Wide Inner Ring Bearing types, Fafnir has pioneered hundreds of specialized bearings which, now in regular pro-



duction, have extended the range of Fafnir types and sizes into the most complete line in America. Every single one of these pioneering jobs has broadened Fafnir's experience—added to Fafnir's ability to pioneer further as industry reaches into newer fields—so that to-day, Fafnir offers to standard bearing users *the most complete line*; and to those whose demands are specialized, *the most complete store of experience*, resulting from building that line. The Fafnir Bearing Company, New Britain, Conn.



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Engineering Manual No. 35



FAFNIR BALL BEARINGS

THE BALANCED LINE . . . MOST COMPLETE IN AMERICA

NEW EQUIPMENT



New Trucks Designed for Use by Wide Strip Mills

■ Baker-Raulang Co., Cleveland, has brought out an entirely new series of heavy-duty, center control, ram and fork trucks for particular application to transportation tasks in connection with high-speed, wide strip mills.

Truck shown in the accompanying illustration has a capacity of 16,000 pounds, a wheelbase of 92 inches and, when carrying a coil of steel 72 inches long by 60 inches in diameter, will turn in 10-foot intersecting aisles, the outside radius being 152 inches. The truck weighs approximately 18,000 pounds without battery. Power steer is provided for easy maneuvering without effort on the part of the operator.

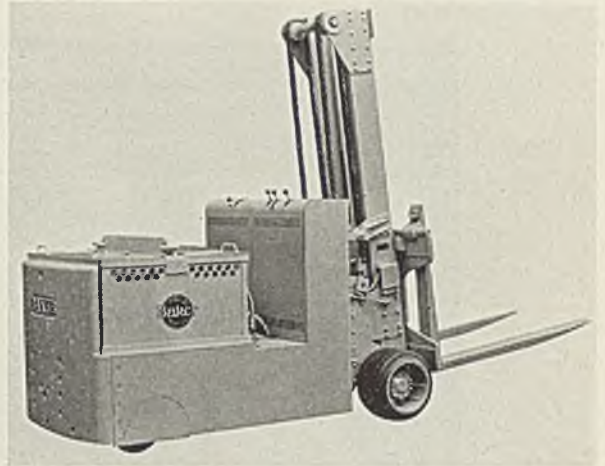
One outstanding feature is in the control system. Full contactor control is provided for all motors through mill-type, magnetic blow-out contactors operated by small master controllers located convenient to the driver. The travel control system provides full automatic acceleration through three speeds in both directions and includes an anti-plugging feature to prevent reversal of the motor without bringing the truck to a stop. Snap-action limit switches act as cut-outs at both limits of the hoisting, tilting and steering motions.

In addition, dead-man control is provided by interlocking of the operator's platform with the travel circuit and the parking brake so that the brake is set and the circuit broken when the operator leaves his position.

Multiple Boring Units Added to Excello Line

■ Excello Corp., Detroit, has announced a new line of high-production, high-speed, multiple boring, facing and turning machines comprising both two and three-way types,

Baker-Raulang heavy-duty, center control ram and fork trucks embody many radical departures from previous units of the same general design



with from two to nine boring spindles.

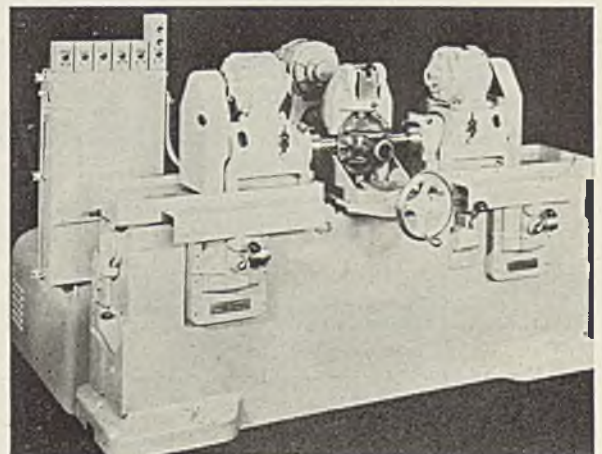
For parts requiring boring, turning or facing operations from more than one direction the machines are said to eliminate the possibilities of errors in machining arising from locating parts in separate fixtures on different machines for individual machining operations. For parts requiring operations from one side only, multiple fixtures provide high productivity per machine hour.

Feature of the new line is the compactness of the flexible units

and the productivity possible, exemplified by the complete boring and facing, in one setup, of such parts as differential carriers in a total cutting time of approximately 37 seconds.

In the three-way machine illustrated, the boring spindles with their individual motor drives are separately mounted on sliding tables. Table feed is by the Ex-Cell-O hydraulic system with individual hydraulic pumps for each table. The spindles are standard Ex-Cell-O precision ball-bearing spindles mount-

This three-way multiple boring, facing and turning machine is one of the new line announced by Excello Corp., Detroit



ed in special heads for compactness and so designed that additional spindles may be provided. Cutting cycles are completely automatic. Each table is provided with micrometer-adjustment dogs for setting the distance for fast approach, cutting, dwell and fast return. The dwell period at the end of the cutting stroke is separately adjustable for everything from one to 30 seconds to insure desired finish characteristics with a minimum of time per operation. A rapid advance between two holes bored by one spindle may also be provided for in the cycle.

Spindle speeds are constant for any particular job, and designed to

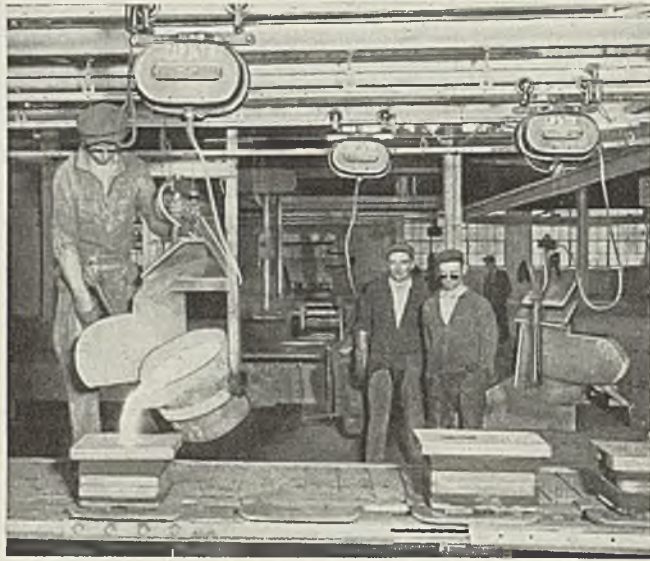
give a cutting speed of around 400 feet per minute with carbide cutting tools.

Feeds may be varied from nothing to 42 inches per minute to meet any requirements as to materials to be cut as well as types of work and character of finish required. If high speed cutting steels are to be used, lower spindle speeds are provided.

Unit Controls Magnets

Ohio Electric Mfg. Co., 5900 Maurice avenue, Cleveland, has announced its MS-X controller for the operation of lifting magnets of any

make that use more than 14 amperes of current. Panel is shown with the cover removed and the front let down about its hinge for inspection of the resistance and connections. Control provides automatically for quick drop of any kind of load without hand adjustment. It is claimed it will drop its load of light or thin material in two seconds and of the heaviest material such as slab or ingot in 4 to 5 seconds. When handling pig iron or assorted scrap, 6 to 10 lifts per



1/4-TON LO-HED HOIST GIVES FOUNDRY A LIFT

In many cases where loads of 500 pounds or under are being handled by manpower or with inadequate mechanical assistance, a 1/4-ton Lo-Hed Hoist could do the work faster, more efficiently and more economically . . . For example, in one foundry, 1/4-ton Lo-Hed Hoists operated by one man are used for pouring along mold conveyors. The operator can devote all his attention to maneuvering the spout into the right position for the important job of pouring. Look into the possibilities of the 1/4-ton Lo-Hed and of the other 97 standard Lo-Heds. Send coupon for new Lo-Hed catalog.



AMERICAN ENGINEERING COMPANY

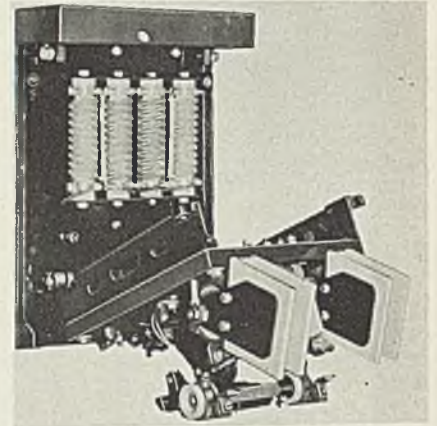
2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

Other Products: A-E-CO Taylor Stokers, A-E-CO Hele-Shaw Pumps, Motors and Transmissions, A-E-CO Marine and Yacht Auxiliaries.

Gentlemen: Please send me your complete new Lo-Hed Hoist catalog including an outline showing how to select the correct hoist for any requirement.

Name of Company _____ Your Name _____

Company Address _____ Your Title _____



Ohio MS-X magnet controller operates lifting magnets using more than fourteen amperes

minute are claimed. Special resistors connected across the magnet terminals at the moment the circuit is opened reduce the kick arc to a minimum, wear on contacts being saved and high kick voltage kept off the line.

Grinds Rolls or Wheels

■ Hisey-Wolf Machine Co., Cincinnati, has introduced a new two-wheel, wide-range precision grinder which is available in 6 sizes, from 1 to 10 horsepower and for wheels 8 to 20 inches in diameter.

It is claimed that grinders are particularly adapted for grinding rolls where space is limited. Larger sizes may be used for grinding car wheels. Same wheel may be used on either end of the grinder spindle or two wheels can be used at the same time, work permitting. Dynamically-balanced, alternating and direct-current motors power the machine. Dovetail slide with screw feed and handle affords rapid adjustment of the wheel at work. Rotation direction of grinding wheel is reversible through motor.

Grinding spindle is mounted on matched precision ball bearings. Lubrication system envelops all bearings in a mist of oil and oil is automatically filtered. Protection of bearings is effected through combination labyrinth and contact seals.



Careful Belt Maintenance Results in Economies

(Concluded from Page 46)

veyor belt practice has done more to save maintenance time and expense than the perfection of the field vulcanized splice. Simple and inexpensive electrical vulcanizing equipment is now available through distributors, or can be purchased outright by the operator.

Vulcanized splices can be made at the time a belt is installed provided the conveyor permits 3 per cent take-up. If this amount of take-up is not available, it is common practice to operate with metal joints until part of the stretch has been removed and then make the vulcanized joint.

Continual repairing of cuts, chafed spots, gouges and snags in the covers and edges pays big dividends. The most thorough and satisfactory method of repairing belts is with the aid of an electric vulcanizer. This may be a large vulcanizer similar to that used for splicing belts, or a very good job can be done with a small vulcanizer costing only \$58.

Many factors determine belt life. First consideration is to choose the right belt for the job. Belt users today are offered a wide selection of standard and special constructions designed for almost every type of service. When replacing an old belt, examine its points of wear carefully. It is entirely possible that a change in the grade, number of plies or cover thickness may be the answer to longer belt wear. Install the belt according to manufacturer's instructions. Give a reasonable amount of thought and effort to the maintenance of belt and conveyor equipment. Time and trouble taken in following these instructions will be repaid many times over in actual savings.

More Uses for Fiber Cans

■ Uses to which laminated fiber cans may be put, according to M. D. Knowlton Co., Rochester, N. Y., have increased greatly in the past few years. This is because of progress in the development of fibers and adhesives which immunize the contents and which are proof against the materials packed in such containers. In many cases these cans have tops and bottoms made of tin plate.

THE NAME THAT MADE THE ROLLER FAMOUS

MATHEWS engineers pioneered the roller conveyor for steel mill use and developed most of the features which make it possible to lock the axle in the frame and to permit the roller and bearing to float axially. And most of the advanced features of Mathews conveyers are protected by patents.

Twenty years ago, 1916, Mathews engineers pioneered the adaptation of Ball Bearing Roller Conveyers for Steel Mill use, which led to the highly developed types of Live Roller, Belt, Chain, Wheel and Roller Conveyers being applied today.

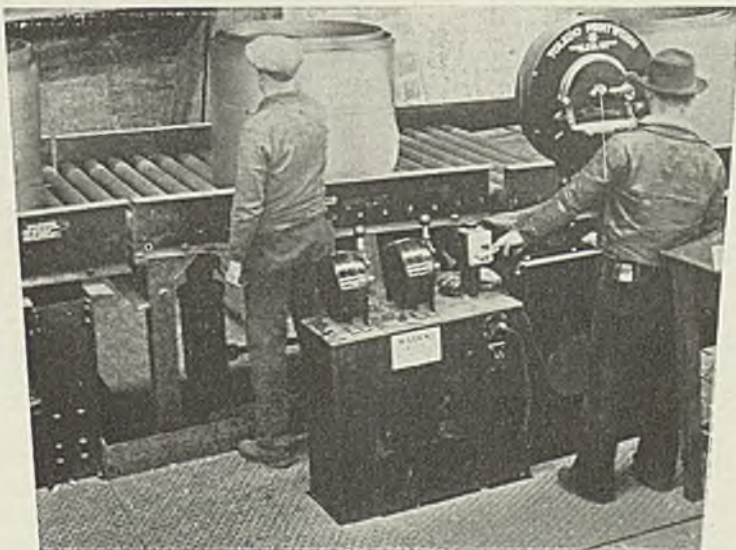
The same thinking developed the larger concept of Continuous Flow as the integrating principle in handling materials.

Continuous Flow production is today the dominant idea in the Steel Industry. Mathews systems have embodied this idea for more than 32 years.

Processing Equipment installed during 1936-37, embracing the ultimate in design and engineering in the Steel Industry, is illustrated and described in our catalog on Steel Plant Conveyers. Available now.

The leaders in this industry, responsible for 85% of steel production in the United States and Canada, are applying the Continuous Flow Principle of Handling Materials.

MATHEWS CONVEYER COMPANY 142 TENTH STREET
ELLWOOD CITY PENNA.



MATHEWS

CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

CONVEYERS



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

Embossing — Pannier Bros. Stamp Co., 207 Sandusky street, Pittsburgh, has issued a folder describing its metal tag embossing machine.

Arc Welders — Hobart Bros., Troy, O., has published a new catalog describing its new line of arc welders and equipment.

Grinders — Norton Co., Worcester, Mass., has released a folder illustrating and describing its D-86 crankpin grinder.

Washers — Wrought Washer Co., 2100 South Bay street, Milwaukee, has released a catalog bulletin entitled "Over 20,000 Varieties," describing the company's products.

Grinders — Landis Tool Co., Waynesboro, Pa., recently issued catalog E-37 embodying the features of its 16-inch, type B plain hydraulic grinders.

Technical Equipment — Hays Corp., Michigan City, Indiana, recently published catalog RA 346 on combustion meters based on the Orsat method.

Gears — D. O. James Mfg. Co., 1114 W. Monroe street, Chicago, has just published cut gear catalog 144-A covering all types of gears and containing engineering data.

Ball Bearings — New Departure division, General Motors Corp., Bristol, Conn., has published an illustrated 16-page booklet dealing with self-sealed ball bearings and their lubricants.

Belt Conveyors — Stephens-Adamson Mfg. Co., Aurora, Ill., has compiled catalog 47 containing engineering data on various types of belt conveyors and bucket elevators.

Welding — Lincoln Electric Co., Cleveland, has released an additional leaflet giving useful information on its welded, shop-constructed steel rafters.

Pumps — Pennsylvania Pump & Compressor Co., Easton, Pa., is distributing bulletin 481 containing engineering data on its multi-stage centrifugal pumps.

Stainless Steels — J. K. Smit & Sons, 157 Chambers street, New York, has recently published a pamphlet entitled "Diamonds in Indus-

try," an interesting discussion of the use of diamonds in the steel industry.

Joists — Bethlehem Steel Co., Bethlehem, Pa., has published a 32-page booklet describing open-web steel joists. Illustrations and engineering data are included.

Conveyor Chain — Link-Belt Co., 307 North Michigan avenue, Chicago, has issued folder 1651 on its No. 4250 detachable, swivel conveyor chain that will travel around curves as small as 12-inch radius.

Lubrication — Texas Co., 135 East 42nd street, New York, discusses the subject of cold weather lubrication of industrial machinery in the October issue of "Lubrication."

Alloy Steel Tools — International Nickel Co., 67 Wall street, New York, has published bulletin U-3 on nickel alloy steels for hand tools. Illustrations and engineering data are included.

Technical Instruments — Laboratory Equipment Co., 146 Lafayette street, New York, has issued a folder containing information regarding instruments used by technicians in testing and formulating.

Castings — Electro Alloys Co., Elyria, O., has issued bulletin 102 on Thermaalloy X-ray-inspected castings. Bulletin covers recommended applications, X-ray inspection and illustrates typical castings.

Washing Fixtures — Bradley Washfountain Co., Milwaukee, has published a catalog illustrating and describing its washfountains, group showers, drinking fountains and industrial washroom equipment.

X-Ray — Adam Hilger Ltd., 98 Kings road, Camden road, London, has published booklet S. B. 257 describing its Dexrae industrial X-ray unit used to determine metallurgical conditions in metals and alloys.

Tempering — Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia, has released a 4-page folder entitled "Uniformity and Costs." Information on the hardening of small nonferrous clips is included.

Microscopes — Bausch & Lomb

Optical Co., Rochester, N. Y., has released pamphlets describing its KX wide field binocular microscope and including useful engineering data.

Spray Guns — Binks Mfg. Co., 3114 Carroll avenue, Chicago, announces publication of a folder containing complete instructions on operation and maintenance of its Thor model 7 spray gun. Illustrations are included.

Fractional-Horsepower Motors — Century Electric Co., St. Louis, recently released an illustrated 24-page booklet presenting information and descriptions of all types of fractional-horsepower motors.

High Temperature Steels — Timken Roller Bearing Co., Canton, O., announces the publication of a booklet entitled "Digest of Steels for High Temperature Service," containing engineering data for steel buyers.

Thermal — Heat Exchange Institute, 9 West street, New York, announces the publication of "Standards of the Tubular Exchanger Section" covering mechanical, construction and thermal standards for shell and bare tube heat exchangers.

Productimeters — Durant Mfg. Co., 1925 North Buffum street, Milwaukee, has released a condensed bulletin including engineering data and illustrations regarding its counting and registering instruments.

Files — Heller Bros. Co., Newark, N. J., has issued a 96-page catalog covering its line of Nocut files and rasps. Illustrated and described are American pattern, Swiss pattern and vixen files, as well as horse, horse tooth, hot and wood rasps.

Squaring Shears — Niagara Machine & Tool Works, 637 Northland avenue, Buffalo, recently issued bulletin H which contains interesting illustrations and engineering data concerning power squaring shears.

Electric Tools — Skilsaw Inc., 3310 Elston avenue, Chicago, has compiled general new catalog No. 38, illustrating and describing Skilsaw portable electric tools—hand saws, drills, grinders, belt sanders, disk sanders, floor sanders and blowers are included.

Boiler Service — Roots-Connersville Blower Corp., Connersville, Ind., has published bulletin 260-B14B descriptive of its automatic boiler service units for plants using steam for processing. Condensate return for all gravity systems, combination boiler make-up and condensate return, and direct feed boiler supply are the three types of equipment covered.

Steel Buying Below October Volume

**Scrap Decline Slows;
More Rails Placed;
Auto Output Down**

NOVEMBER steel buying has been at a rate between 10 and 15 per cent lower than in October, with practically all producers meeting about the same conditions. Much of the current lack of buying is attributed to existence of sufficient inventories in the hands of consumers to meet present reduced demands for their products.

In the automotive field this appears less evident than in others, but limited production of cars has cut deeply into requirements. Some miscellaneous consumers have been buying at a fair rate and had railroad and automotive needs been at the usual rate for this time of year total steel sales would have been at practically a normal rate, in the opinion of many steelmakers. It has been apparent for some time that steel consumption has been proceeding at a much better rate than production, the difference being supplied from stocks accumulated during the summer and early fall.

With the Thanksgiving day holiday causing some weekend idleness the national steelworks operating rate last week declined 3.5 points to 31.5 per cent. There was some increase of production in a few centers, caused by accumulation of small orders but this was not sufficient to overcome the general curtailment. At Chicago the rate increased 2.5 points to 30 per cent, at Cleveland 13 points to 28 per cent, at Cincinnati 4 points to 29 and at St. Louis 5.6 per cent to 20.6. Birmingham continued without change at 54 per cent for the fourth week. Pittsburgh lost 7 points to 27, Eastern Pennsylvania 8 points to 27, Youngstown 5 points to 37, Wheeling 8 points to 35, Buffalo 7 points to 21, New England 3 points to 27 and Detroit 12 points to 59.

Automobile production fell sharply last week to 59,405, with some producers closing Wednesday night for the week. General Motors assembled 24,075 units, compared with 40,900 the week before; Chrysler 16,020, compared with 26,700 the previous week; Ford 7960 against 3525; and the independents 11,350 compared with 14,632. Ford apparently has licked production difficulties and assemblies last week were close to 2500 daily.

Railroads continue to contribute some important tonnages to the market, though delay until the matter of increased rates is settled has reduced the vol-

MARKET IN TABLOID

DEMAND Slow, miscellaneous buying somewhat better.

PRICES Steady, scrap decline at slower rate.

PRODUCTION . . Operations down 3.5 points to 31.5 per cent of capacity.

SHIPMENTS Below October volume.

ume of buying below what their needs would normally bring out. Rail tonnage recently placed has benefited Birmingham and Colorado mills while those in the Pittsburgh and Chicago districts have received little benefit. Withdrawal of an inquiry for 500 cars by the Delaware, Lackawanna & Western places about 12,000 cars on the deferred list, awaiting rate decision. Rail and car tonnages will give mills relatively little occupation before the first of the year, although some rails will be rolled at once.

Some plate tonnage is in prospect in the East for shipbuilding, a Standard Oil company considering bids on one to four tankers and the war department asking bids on a seagoing dredge, which will require 1800 tons of plates. These are in addition to the steel required for two battleships for the navy.

Although scrap prices are largely nominal in the absence of actual sales and quotations continue to settle sentiment is developing that indicates the situation may change within a short time. Current prices are tempting dealers to lay down supplies for higher prices and the export situation is giving some strength along the Atlantic seaboard. While tonnage buying is almost nonexistent an occasional purchase indicates that not all melters have large stockpiles or that the present level promises a profit on material accumulated now.

Decline in STEEL'S composite price of steelmaking scrap continues to show a slower rate, last week reaching \$12.75, which is 33 cents below the preceding, the second consecutive drop of that amount. Chicago and Pittsburgh markets declined 50 cents while prices in the East were nominally unchanged. The composite has reached the same level as in the first week of July, 1936. The iron and steel composite is 4 cents lower, at \$38.86, resulting from the scrap decline. The finished steel composite is steady at \$61.70.

COMPOSITE MARKET AVERAGES

	Nov. 27	Nov. 20	Nov. 13	One Month Ago Oct., 1937	Three Months Ago Aug., 1937	One Year Ago Nov., 1936	Five Years Ago Nov., 1932
Iron and Steel	\$38.86	\$38.90	\$38.93	\$39.59	\$40.34	\$34.65	\$28.79
Finished Steel	61.70	61.70	61.70	61.70	61.70	53.90	47.20
Steelworks Scrap . . .	12.75	13.08	13.41	15.93	20.41	16.05	6.87

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

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

Finished Material	Nov. 27,	Oct.	Aug.	Nov.	Pig Iron	Nov. 27,	Oct.	Aug.	Nov.
	1937	1937	1937	1936		1937	1937	1937	1936
Steel bars, Pittsburgh	2.45c	2.45c	2.45c	2.05c	Bessemer, del. Pittsburgh	\$25.26	\$25.26	\$25.26	\$20.8132
Steel bars, Chicago	2.50	2.50	2.50	2.10	Basic, Valley	23.50	23.50	23.50	19.00
Steel bars, Philadelphia	2.74	2.74	2.74	2.36	Basic, eastern del. East. Pa. . . .	25.26	25.26	25.26	21.81
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	1.95	No. 2 fdy., del. Pittsburgh	25.21	25.21	25.21	20.3132
Shapes, Pittsburgh	2.25	2.25	2.25	1.90	No. 2 fdy., Chicago	24.00	24.00	24.00	19.75
Shapes, Philadelphia	2.45 1/2	2.45 1/2	2.45 1/2	2.11 1/2	Southern No. 2, Birmingham . . .	20.38	20.38	20.38	15.75
Shapes, Chicago	2.30	2.30	2.30	1.95	Southern No. 2, del. Cincinnati . .	23.89	23.69	23.69	19.69
Tank plates, Pittsburgh	2.25	2.25	2.25	1.90	No. 2 X eastern, del. Phila.	26.135	26.135	26.135	22.68
Tank plates, Philadelphia	2.43 1/2	2.43 1/2	2.43 1/2	2.09	Malleable, Valley	24.00	24.00	24.00	19.50
Tank plates, Chicago	2.30	2.30	2.30	1.95	Malleable, Chicago	24.00	24.00	24.00	19.75
Sheets, No. 10, hot rolled, Pitts. . .	2.40	2.40	2.40	1.95	Lake Sup., charcoal, del. Chicago .	30.24	30.04	30.04	25.87
Sheets, No. 24, hot ann., Pitts. . . .	3.15	3.15	3.15	2.60	Gray forge, del. Pittsburgh	24.17	24.17	24.17	19.6741
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.80	3.20	Ferromanganese, del. Pittsburgh .	107.49	107.29	107.29	80.13
Sheets, No. 10, hot rolled, Gary . . .	2.50	2.50	2.50	2.05	Scrap				
Sheets, No. 24, hot anneal., Gary . .	3.25	3.25	3.25	2.70	Heavy melting steel, Pittsburgh . .	\$13.25	\$17.15	\$21.85	\$17.40
Sheets, No. 24, galvan., Gary	3.90	3.90	3.90	3.30	Heavy melt. steel, No. 2, E. Pa. . .	12.25	14.01	18.00	13.75
Plain wire, Pittsburgh	2.90	2.90	2.90	2.50	Heavy melting steel, Chicago	11.75	13.95	19.75	16.50
Tin plate, per base box, Pitts. . . .	\$5.35	\$5.35	\$5.35	\$5.25	Rails for rolling, Chicago	14.25	17.25	21.75	17.25
Wire nails, Pittsburgh	2.75	2.75	2.75	2.05	Railroad steel specialties, Chicago .	15.75	19.35	22.25	18.25
Semifinished Material					Coke				
Sheet, bars, open-hearth, Youngs. . .	\$37.00	\$37.00	\$37.00	\$32.00	Connellsville, furnace, ovens	\$4.37	\$4.40	\$4.50	\$4.00
Sheet bars, open-hearth, Pitts. . . .	37.00	37.00	37.00	32.00	Connellsville, foundry, ovens	5.25	5.25	5.30	4.25
Billets, open-hearth, Pittsburgh . . .	37.00	37.00	37.00	32.00	Chicago, by-product foundry, del. . .	11.00	11.00	11.00	9.75
Wire rods, No. 5 to 3/4-inch, Pitts. . .	47.00	47.00	47.00	40.00					

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	2.53 1/2 c
Detroit, del.	2.60c
New York, del.	2.74c
Philadelphia, del.	2.70c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pacific ports, f.o.b. dock	2.96c

Hot Rolled Annealed No. 24	
Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28 1/2 c
Detroit, delivered	3.35c
New York, delivered	3.49c
Philadelphia, del.	3.45c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pacific ports, f.o.b. dock	3.81c

Galvanized No. 24	
Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93 1/2 c
Philadelphia, del.	4.10c
New York, delivered	4.14c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pacific ports, f.o.b. dock	4.41c

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	3.31c
Philadelphia, del.	3.40c
New York, del.	3.44c
St. Louis, del.	3.33c
Granite City, Ill.	3.30c
Pacific ports, f.o.b. dock	3.71c

Cold Rolled No. 20	
Pittsburgh	3.55c
Gary	3.65c
Detroit, delivered	3.76c
Philadelphia, del.	3.85c
New York, del.	3.89c
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 stp.	28.00 30.00

Straight Chromes				
No. No. No. No.				
410 430 442 446				
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.	2.54c
Philadelphia, del.	2.44 1/2 c
Boston, delivered	2.66c
Buffalo, delivered	2.49 1/2 c
Chicago or Gary	2.30c
Cleveland, del.	2.45 1/2 c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific ports, f.o.b. cars, dock	2.81c
St. Louis, delivered	2.52c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.46 1/2 c
New York, del.	2.51 1/2 c
Boston, delivered	2.64 1/2 c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.46c
Buffalo	2.35c
Gulf Ports	2.66c
Birmingham	2.40c
Pacific ports, f.o.b. cars, dock	2.81c
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	2.56c
Detroit, delivered	2.60c
Pacific ports, f.o.b. cars, dock	3.01c
Philadelphia, del.	2.75c
Boston, delivered	2.86c
New York, del.	2.79c
Pittsburgh, forg. qual.	2.80c

Rail Steel	
To Manufacturing Trade	
Pittsburgh	2.90c
Chicago or Gary	2.35c
Cleveland	2.35c
Moline, Ill.	2.35c
Buffalo	2.40c
Birmingham	2.45c

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. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
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	25.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	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	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	26.57	.....	26.07	.....
Boston from Everett, Mass.	26.30	26.80	25.80	27.30
Boston from Buffalo	26.45	26.95	25.95	27.45
Brooklyn, N. Y., from Bethlehem	27.47	27.97	.....	.....
Brooklyn, N. Y., from Bmghm.	27.25	.....	.....	.....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	24.42	.....	24.30	.....
Cincinnati from Hamilton, O.	24.27	25.11	24.61	.....
Cincinnati from Birmingham	23.89	.....	22.89	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.10
Muskegon, Mich., from Chicago, Toledo or Detroit	27.10	27.10	26.60	27.60
Newark, N. J., from Birmingham	26.21	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham	25.58	.....	25.46	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	(Neville, base plus 63c, 76c, and \$1.13 switch'g charges)	.....	.....	.....
Saginaw, Mich., from Detroit	26.45	26.45	25.95	25.95
St. Louis, northern	24.55	24.55	24.05	.....

Nonferrous

METAL PRICES OF THE WEEK

spot unless otherwise specified. Cents per pound

Copper				Straits Tin, New York		Lead	Lead	Zinc	Alumi-num	Antimony	Nickel
Electro, del. Conn.	Lake, del. Midwest	Castings, refinery		Spot	Futures	N. Y.	East St. L.	St. L.	99%	American Spot, N. Y.	Cath-odes
Nov. 20	11.00	12.12½	10.50	41.25	41.25	5.00	4.85	5.75	20.00	15.50	35.00
Nov. 22	11.00	12.12½	10.50	40.87½	40.87½	5.00	4.85	5.50	20.00	15.50	35.00
Nov. 23	10.75	11.12½	10.27½	41.50	41.50	5.00	4.85	5.50	20.00	15.50	35.00
Nov. 24	10.75	11.12½	10.27½	41.85	41.85	5.00	4.85	5.50	20.00	15.00	35.00
Nov. 25—Holiday											
Nov. 26	10.75	11.12½	10.27½	41.62½	41.62½	5.00	4.85	5.25	20.00	14.75	35.00

MILL PRODUCTS		OLD METALS	
F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.00c Conn. copper		Nom. Del. buying prices	
Sheets		No. 1 Composition Red Brass	
*Yellow brass (high)	17.37½	New York	5.50-5.75
*Copper, hot rolled	19.12½	Cleveland	6.12½-6.37½
Lead, cut to jobbers	½ 8.50	*Chicago	5.75-6.00
Zinc, 100-lb. base	10.50	St. Louis	5.87½-6.12½
Tubes		Heavy Copper and Wire	
*High, yellow brass	20.12½	New York, No. 1	7.50-7.75
*Seamless copper	19.87½	Cleveland, No. 1	7.25-7.50
Rods		Chicago, No. 1	7.50-7.75
*High yellow brass	13.37½	St. Louis	7.25-7.50
*Copper, hot rolled	15.62½	Composition Brass Borings	
Anodes		New York	5.00-5.25
*Copper, untrimmed	16.37½	Light Copper	
*Yellow brass (high)	17.62½	New York	5.50-5.75
		Cleveland	5.25-5.50
		*Chicago	5.25-5.50
		St. Louis	5.00-5.25

Light Brass		Lead		Zinc	
Cleveland	2.37½-2.87½	New York	4.00-4.25	*New York	2.50-2.75
Chicago	3.75-4.00	*Cleveland	3.25-3.50	*Cleveland	2.00-2.25
St. Louis	3.12½-3.62½	Chicago	3.75-4.00	St. Louis	2.50-2.75
Aluminum		St. Louis	3.25-3.50	Aluminum	
*Borings, Cleveland	5.50-6.00	Secondary Metals		Brass, ingot, 85-5-5-5, lcl.	11.25
*Mixed cast, Cleve.	9.50-9.75	*Stand. No. 12 alum.	17.50-18.00		
*Clips, soft, Cleve.	11.00-11.50				
Mixed cast, St. L.	10.00-10.50				

	No. 2 Fdry.	Malle-able	Basic	Besse-mer
St. Louis from Birmingham	24.12	.....	23.82	.....
St. Paul from Duluth	26.08	26.08	.....	26.58
†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	
Valley furnace	\$23.50
Pitts. dist. fur.	23.50
Charcoal	
Lake Superior fur.	\$27.00
do., del. Chicago	30.24
Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent \$28.50; 6.51-7—\$29.00; 7-7.50—\$29.50; 7.51-8—\$30.00; 8-8.50—\$30.50; 8.51-9—\$31.00; 9-9.50—\$31.50; Buffalo \$1.25 higher.

Bessemer Ferrosilicon‡

Jackson county, O., base: Prices are the same as for silveries, plus \$1 a ton.
†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.
Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick		Magnesite	
Super Quality		Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) .. \$45.00	
Pa., Mo., Ky.	\$64.60	Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) .. 43.00	
First Quality		Base Brick	
Pa., Ill., Md., Mo., Ky.	51.30	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Alabama, Georgia	51.30	Chrome brick .. \$49.00	
New Jersey	56.00	Chem. bonded chrome .. 49.00	
Second Quality		Magnesite brick .. 69.00	
Pa., Ill., Ky., Md., Mo.	46.55	Chem. bonded magnesite 59.00	
Georgia, Alabama	41.80		
New Jersey	51.00		
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		

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	\$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	\$20.00
Do., for barge	\$22.00
No. 2 lump	22.00-23.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	\$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.49
Spiegeleisen, 19-21% dom.	
Palmerton, Pa., spot	33.00
Do., New Orleans	33.00
Do., 26-28%, Palmer-ton	39.00
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.	
Sillcoman, 2½ carbon	106.50
2% carbon 11½; 1%	121.50
Ferrochrome, 66-70 chrom-ium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	2.95-3.00
Ferrovandium, 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	63.50
Ferrophosphorus, electro-lytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% \$3 unitage	80.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads. Quan. diff. apply.	

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL		New York, fdry. †8.50- 9.00	Buffalo 9.00- 9.50	Cincinnati, iron 15.00-15.50
Birmingham, No. 1. 10.00	St. Louis 9.50-10.00	Cincinnati, dealers. 4.00- 4.50	Cleveland 9.00- 9.50	Eastern Pa., iron. 16.50-17.00
Birmingham, † No. 2 9.00	Toronto, deal'rs, net 10.00	Detroit 6.00- 6.50	Eastern Pa., steel. 18.00-18.50	Pittsburgh, iron 15.00-15.50
Bos. dock No. 1 exp. 13.50-14.00		Eastern Pa. 8.00- 8.50	Pittsburgh, steel. 17.00-17.50	St. Louis, iron 14.00-14.50
N. Eng. del. No. 1. 13.50	SPRINGS	New York †4.50- 5.00	Toronto, dealers. 8.00- 8.50	St. Louis, steel 15.00-15.50
Buffalo, No. 1. 13.00-13.50	Buffalo 18.00-18.50			
Buffalo, No. 2. 11.50-12.00	Chicago, coil 16.50-17.00			
Chicago, No. 1 11.50-12.00	Chicago, leaf 15.50-16.00			
Cleveland, No. 1. 12.50-13.00	Eastern Pa. 18.00-18.50			
Cleveland, No. 2. 11.50-12.00	Pittsburgh 17.00-17.50			
Detroit, No. 1. 9.00- 9.50	St. Louis 15.00-15.50			
Eastern Pa., No. 1. 13.50-14.00		CAST IRON BORINGS		
Eastern Pa., No. 2. 12.00-12.50		Birmingham 6.00- 7.00		NO. 1 CAST SCRAP
Federal, Ill. 11.50-12.00	ANGLE BARS—STEEL	Boston dist. chem. †7.50- 8.00		Birmingham 14.00-14.50
Granite City, R. R. 12.50-13.00	Chicago 13.50-14.00	Bos. dist. for mills †7.00- 7.50		Boston, No. 1 mach. †11.00
Granite City, No. 2. 11.50-12.00	St. Louis 14.00-14.50	Buffalo 9.00- 9.50		N. Eng. del. No. 2. 12.00
New York, No. 1 †13.00		Chicago 7.00- 7.50		N. Eng. del. textile. 15.50-16.00
N. Y. dock No. 1 exp 13.00-13.50	RAILROAD SPECIALTIES	Cincinnati, dealers. 4.00- 4.50		Buffalo, cupola 13.50-14.00
Pitts., No. 1 (R. R.) 14.00-14.50	Chicago 15.50-16.00	Cleveland 9.00- 9.50		Buffalo, mach. 14.50-15.00
Pitts., No. 1 (dir.) 13.00-13.50		Detroit 6.00- 6.50		Chicago, agri. net. 10.50-11.00
Pittsburgh, No. 2. 12.00-12.50	LOW PHOSPHORUS	E. Pa., chemical. 12.00-12.50		Chicago, auto 11.50-12.00
St. Louis, R. R. 12.50-13.00	Buffalo, crops 18.50-19.00	New York †4.50- 5.00		Chicago, rail'r'd net 10.50-11.00
St. Louis, No. 2. 11.50-12.00	Cleveland, crops 19.50-20.50	St. Louis 6.00- 6.50		Chicago, mach. net. 11.50-12.00
San Francisco, No. 1 14.00-15.00	Eastern Pa., crops. 19.00-19.50	Toronto, dealers. 9.00		Cincin., mach. cup. 11.00-11.50
Seattle, No. 1 8.00	Pittsburgh, crops. 18.00-18.50			Cleveland, mach. 17.00-17.50
Seattle, No. 2 7.00	Pittsburgh, crops 17.00-17.50	PIPE AND FLUES		Eastern Pa., cupola. 16.00-16.50
Toronto, dirs. No. 1. 12.00		Cincinnati, dealers. 7.00- 7.50		E. Pa., mixed yard. 13.50-14.00
Toronto, No. 2 11.00	FROGS, SWITCHES	Chicago, net 7.50- 8.00		Pittsburgh, cupola. 16.50-17.00
Valleys, No. 1 13.50-14.00	Chicago 11.50-12.00			San Francisco, del. 13.50-14.00
COMPRESSED SHEETS	St. Louis, cut 12.75-13.25	RAILROAD GRATE BARS		Seattle 8.00
Buffalo, dealers 11.50-12.00		Buffalo 9.50-10.00		St. Louis, No. 1. 14.00-12.50
Chicago, factory 10.50-11.00	SHOVELING STEEL	Chicago, net 8.50- 9.00		St. L., No. 1, mach. 12.50-13.00
Chicago, dealer 10.00-10.50	Federal, Ill. 11.50-12.00	Cincinnati 6.00- 6.50		Toronto, No. 1, mach., net 14.00-15.00
Cleveland 12.00-12.50	Granite City, Ill. 11.50-12.00	Eastern Pa. 12.00-12.50		
Detroit 9.75-10.25	Toronto, dealers. 10.00	New York †8.50- 9.00		
E. Pa., new mat. 13.50-14.00	RAILROAD WROUGHT	St. Louis 9.00- 9.50		
E. Pa., old mat. 10.50-11.00	Birmingham 11.00-11.50			
Pittsburgh 13.00-13.50	Boston district †9.00- 9.50			
St. Louis 7.25- 7.75	Buffalo, No. 1 11.00-11.50			
Valleys 12.50-13.00	Buffalo, No. 2 13.00-13.50			
BUNDLED SHEETS	Chicago, No. 1 net. 10.00-10.50			
Buffalo 9.50-10.00	Cincinnati, No. 2. 10.00-10.50			
Cincinnati, del. 9.50-10.00	Eastern Pa., No. 1. 15.50-16.00			
Cleveland 9.00- 9.50	St. Louis, No. 1. 8.00- 8.50			
Pittsburgh 12.50-13.00	St. Louis, No. 2. 12.00-12.50			
St. Louis 6.75- 7.00	Toronto, No. 1 dir. 16.00			
Toronto, dealers 8.00				
SHEET CLIPPINGS, LOOSE	SPECIFICATION PIPE			
Chicago 6.25- 6.75	Eastern Pa. 13.50-14.00			
Cincinnati 7.50- 8.00	New York †9.50-10.00			
Detroit 6.50- 7.00				
St. Louis 5.75- 6.25	BUSHING			
STEEL RAILS, SHORT	Buffalo, No. 1 11.50-12.00			
Birmingham 15.00	Chicago, No. 1 10.00-10.50			
Buffalo 18.00-18.50	Cincin., No. 1, deal. 8.50- 9.00			
Chicago (3 ft.) 15.00-15.50	Cincinnati, No. 2. 3.50- 4.00			
Chicago (2 ft.) 15.50-16.00	Cleveland, No. 2. 8.50- 9.00			
Cincinnati, del. 17.00-17.50	Detroit, No. 1, new. 9.00- 9.50			
Detroit 14.50-15.00	Valleys, new, No. 1 12.50-13.00			
Pitts., 3 ft. and less 17.50-18.00	Toronto, dealers. 9.00			
St. Louis, 2 ft. & less 15.00-15.50				
STEEL RAILS, SCRAP	MACHINE TURNINGS			
Boston district †11.00	Birmingham 6.00- 7.00			
Buffalo 15.50-16.00	Buffalo 9.00- 9.50			
Chicago 11.50-12.00	Chicago 6.50- 7.00			
Cleveland 16.50-17.00	Cincinnati, dealers. 5.50- 6.00			
Pittsburgh 14.50-15.00	Cleveland 7.50- 8.00			
St. Louis 12.50-13.00	Detroit 5.00- 5.50			
Seattle 10.00	Eastern Pa. 8.50- 9.00			
STOVE PLATE	New York †5.50- 6.00			
Birmingham 8.00- 8.50	Pittsburgh 7.50- 8.00			
Boston district †7.00	St. Louis 5.00- 5.50			
Buffalo 11.50-12.00	Toronto, dealers 8.00- 8.50			
Chicago, net 8.50- 9.00	Valleys 9.50-10.00			
Cincinnati, dealers. 6.00- 6.50				
Detroit, net 8.50- 9.00	BORINGS AND TURNINGS			
Eastern Pa. 12.00-12.50	For Blast Furnace Use			
	Boston district †2.00			

Iron Ore

Lake Superior Ore	Eastern Local Ore	nom. 12.00
Gross ton, 51% %	Cents, unit, del. E. Pa.	No. Afr. low phos. nominal
Lower Lake Ports	Foundry and basic	Swedish low phos. 17.00-18.00
Old range bessemer. \$5.25	56.63% con. 9.00-10.00	Spanish No. Africa
Mesabi nonbess. 4.95	Cop.-free low phos.	basic, 50 to 60%
High phosphorus 4.85	58-60% nominal	nom. 12.00
Mesabi bessemer 5.10	Foreign Ore	Tungsten, sh. ton,
Old range nonbess. 5.10	Cents per unit, f.a.s. Atlantic	unit, duty paid. nom. \$24.00
	Foreign manganifer-	N. F., fdy., 55% 7.00
	ous ore, 45.55%	
	Iron, 6-10% man.	

Chrome ore, 48% gross ton, c.i.f. \$25.50-26.50
Manganese Ore
Prices not including duty, cents per unit cargo lots.
Caucasian, 50-52% non. 45.00
So. African, 50-52% non. 45.00
Indian, 50-52% Nominal

Sheets

Sheet Prices, Page 66

Pittsburgh — Sheet specifications have been better recently but the November total of incoming business is below the October volume. Increased buying by two automobile manufacturers is expected soon. Fill-in orders from an auto body maker; a few specifications from miscellaneous sources, including an order for license plate material; and a good-sized export order have been the features of the market here recently. Hot mills of one producer resumed last Wednesday after a week shutdown. Operations of common and full-finished mills on the national scale are now around 38 per cent.

Cleveland—Decline in shipments of hot and cold-rolled sheets has shown some signs of leveling off, as consumers' stocks are gradually reaching the point where additional buying has become necessary. However, recent specifications are limited to actual requirements and for prompt delivery. The opinion is that finishing mill operations have reached the low point of the current recession although some additional adjustments may still be necessary before the expected improvement in specifications materializes.

Chicago—Sheet orders show occasional variations but a definite trend is lacking as buyers are regulating demand according to prompt needs and consumption shows only slight variations from the rate of previous weeks. A lag still prevails in automotive needs, with little prospect of a major upward change for the next four to six weeks. Consumers have made marked reduction in stocks this quarter but continue to reduce inventories. Prompt delivery generally is available on new business.

New York — While gaps are appearing in consumers' stocks, buying of sheets remains light, with sellers largely reconciled to a prospect of dullness over the remainder of the year. There may be some gain late in December on shipments for delivery after the inventory period, but buying at best appears likely to be greatly restricted. Operations at consuming plants, while better sustained than in the steel producing industry, are now decreasing.

Philadelphia — Sheet buying and releases are slow. Even the automotive trade accounts for little tonnage, with operations averaging only two or three days a week. Consumer stocks, including automotive, are substantial. No weakening in prices is noted.

Cincinnati—Sheet demand shows

no improvement, although the holiday last week served as one excuse for the light ordering in the last fortnight. In many cases consumer inventories preclude any new buying until first quarter. Others are interested only in covering immediate needs.

St. Louis—Slight improvement in sheet demand is noted. Interest centers chiefly in the lighter material with galvanized the most active item. Takings by the stove industry have declined sharply during the past few weeks, and smaller consumption is reported by farm implement interests. Some special jobs are being worked off, and generally backlogs have receded sharply from the high levels of midsummer. Prices are generally firm.

Birmingham, Ala. — While sheets continue to set the pace in steel products, major requirements have been for roofing, which has slackened considerably, making it problematical how long the present rate of production, practically 100 per cent, can continue.

Strip

Strip Prices, Page 67

Pittsburgh — Demand for hot and cold rolled strip steel continues light, and in addition, producers recently have received a number of hold-up orders, resulting from business uncertainties and labor difficulties. Operations of hot and cold strip mills on the national scale are around 37 per cent.

Cleveland—Sellers of hot and cold-rolled strip find specifications from miscellaneous sources are limited to relatively small tonnages to satisfy immediate needs. Some users have ample stocks for present requirements this quarter. Demand from automotive sources is considerably below former estimates. Most producers feel present operations have reached the low point of the current recession.

Chicago — Strip demand continues slow and generally unimproved. Automotive needs are restricted and with schedules in some instances declining, little possibility is seen of any marked improvement in motor car consumption during the next month or two. Miscellaneous users in many cases have curtailed their stocks materially but current needs are lighter and buying is in small lots. Producers lack backlogs and early delivery is advisable.

Boston — Conservative estimate places current consumption of narrow cold strip about 15 per cent above the rate of buying which is about in line with bookings in recent

weeks. The tempo of incoming business is unchanged, with prompt delivery asked on small fill-in lots. The diversified nature of products in this district tends to hold the rate of production slightly above that for the country as a whole. This means that finishing operations in New England approximate 45 per cent, with ingot production at 27 per cent and consumption at about 60 per cent, in some instances, notably among electrical goods makers, higher. A district producer, after a thorough survey of customers, reaches these approximate figures. There is little pressure for lower prices with no tonnage inquiries which might be used as a lever to test prices.

New York — Without material change in incoming tonnage, cold strip buying continues sluggish. Consumers are releasing only specifications not included in their stocks and demand as a result is spotty, but well spread. Until after the first of the year producers look for little change in the character of buying. Prices are firm. Users' stocks of hot strip are large and buying is light.

Philadelphia — New strip business is dull with consumer requirements more restricted. Little revival is seen this year in view of the close approach of inventory taking. Price schedules are being maintained.

Birmingham, Ala. — Buying of strip, paced by demand for cotton ties, shows quite a recession since the season for cotton is thus far advanced. Mills, therefore, expect a continual tapering in production of that specification.

Plates

Plate Prices, Page 66

Pittsburgh — Plate specifications have suffered through inactivity of railroads, whose carbuilding programs are being held in abeyance. It has been estimated that programs involving more than 12,000 cars are held up pending further increase in freight rates. The Manchurian railway is understood to be inquiring for a large tonnage, a large proportion of which is plates, and is to be the beginning of an extensive program. Tank and barge work continues inactive.

Cleveland—Plate sellers report no improvement in requirements from miscellaneous consumers. Absence of demand from many sources is attributed to belief that inventories in many instances are in excess of recent requirements. However, the character of current orders demanding prompt shipment, illustrates that inventories in more instances than generally realized have reached

the point where additional buying has become necessary. But most sellers do not look for marked improvement in buying until the first of next year.

Chicago — Only occasional inquiries are appearing for plate tonnage, most business being confined to small lots for miscellaneous needs. Shipments to railroads and car builders are small, with no marked improvement seen for at least 60 days. Tank business is quieter though production against orders still is fairly heavy.

Philadelphia—The fact that plate sellers currently are regarding the sale of a carlot a considerable achievement is ample evidence of the dull state of the market. Consumers now are occupied in cutting inventories and in some instances go so far as to shear plates to size when necessary rather than purchase the correct specifications. War department, Washington, will take bids Dec. 15 on a seagoing dredge requiring 1800 tons of plates $\frac{1}{4}$ -inch and heavier. Shipbuilders are asking prices on the steel by Nov. 30. Steel bids went in Nov. 19 on one to four tankers which the Standard Oil Co. of New Jersey may place with district yards. Demand for oil country goods has slackened in the West and Southwest. The district tubemill went down Wednesday night but is scheduled to resume December 1. Railroad carbuilding programs have slowed up. The Pennsylvania's 10,000-car program will not be completed until March or early April and the Reading's 600 cars, for which steel was bought several months ago, probably will not be ready for use until February.

Birmingham, Ala.—Plates, as with most other specifications, are in scattered demand. Buying is mostly on a hand-to-mouth basis.

Seattle—Prospects are improving with the release of specifications for new work and additional projects are coming out for figures soon. Bureau of Reclamation, Denver, received bids Nov. 24 for unstated tonnage involved in penstock and discharge pipe for the Owyhee project, Oregon.

Plate Contracts Placed

110 tons, settling tanks, Cranston, R. I., to Bethlehem Steel Co., Bethlehem, Pa.

Plate Contracts Pending

1800 tons, $\frac{1}{4}$ -inch and heavier, sea-going hopper dredge, Chester Harding; war department, Washington; construction bids due Dec. 15, steel bids Nov. 30.
700 tons, 48 and 36-inch welded steel pipe, Tacoma, Wash.; bids Dec. 6.
700 tons, 36 and 48-inch electric welded water mains for Tacoma, Wash.; bids Dec. 6.
200 tons, buoys, various types, light-house bureau, Staten Island, N. Y.,

Tippett & Wood, Phillipsburg, N. J., recommended for nun buoys, bids Nov. 9, at approximately \$31,000 delivered; Bos-Hatten Inc., Buffalo, and Standard Boiler Works, Lebanon, Pa., recommended for larger buoys; opening Nov. 15, at \$15,349 and \$2125, delivered, respectively.

200 tons, 500,000-gallon tank, federal prison, McNeil Island, Wash.; bids Dec. 3.

100 tons, 12-inch welded steel pipe, Pomona, Calif.; bids Nov. 30.

100 tons or more, water tank and tower, McNeil Island prison, Washington; bids Dec. 3.

Unstated tonnage, penstock and discharge pipe, Owyhee project, Oregon; bids in to bureau of reclamation, Denver.

Bars

Bar Prices, Page 66

Pittsburgh — Hot-rolled bar requirements remain light, with export inquiry fair. Inactivity of railroads and lighter demand from the automotive industry have been the principal factors contributing to the recent dullness. Alloy, forging and cold-finished stock are slightly more active.

Cleveland—Local consumers of carbon and alloy steel bars do not expect improvement in demand this year. This is due primarily to lack of activity of automobile builders. Most partsmakers had accumulated considerable stocks to handle normal requirements from automotive sources, but when this failed to materialize they have concentrated efforts on reducing inventories. The picture today is improved somewhat as these stocks have been depleted to the point where additional buying will soon become necessary.

Chicago — Cautious buying on the part of practically all bar consumers continues with total business at a low rate. Stocks in hands of many users have been curtailed materially the past 60 days but in view of the uncertain outlook, ordering is for only immediate needs. Consumption in the implement and tractor industries has tended downward slightly but still is high for this period.

New York — Commercial bar demand continues at a relatively low rate, with machine tool builders still showing perhaps the most lively interest of any consumer group. Demand from railroads and bolt and nut manufacturers is light, and replacement orders from jobbers are spotty. Prices are unchanged.

Philadelphia — Fill-in buying continues to characterize the market for merchant bars with total volume still disappointing to sellers. District warehouses are taking little additional tonnage as stocks are ample. Carbon bars continue at 2.74c, delivered Philadelphia, inasmuch as Pennsyl-

vania intrastate freight rates were not affected by recent increase in interstate rates.

Birmingham, Ala. — Bars are selling at not more than 50 per cent of capacity and there is no holdover business.

Pipe

Pipe Prices, Page 67

Pittsburgh — Incoming business for tubular goods producers in November fell below the October volume, but in some instances not quite as far as expected. The decline was fairly evenly distributed among all lines, although oil country goods held up a little better than some of the other products. Producers anticipate slow improvement starting in January and continuing through the better part of next year.

Cleveland—Cast iron pipe foundries have curtailed operations to one or two days a week. However, active pending tonnage is encouraging. Outstanding pending project is a water distribution system for Cincinnati, involving approximately 675 tons of 4 to 12-inch cast pipe. Three other projects aggregating close to 750 tons at Akron, Bloomfield and Geneva, O., have created considerable interest here. Prices are unchanged.

Chicago—Large inquiries for cast pipe are few, while the number of smaller jobs also is restricted by the season and by the limited amount of federal funds available for municipal work. One of the largest pipe inquiries of the past several years is 6000 tons, including fittings, for a water distributing system at Lake, Wis., a Milwaukee suburb. Pipe involved ranges from 6 to 16 inches.

New York—Cast pipe buying is light, usually rush orders for miscellaneous needs which are frequently shipped from foundry stocks. New York closes Dec. 3 on 425 tons and estimates are in on two upstate inquiries aggregating 1200 tons. Demand for commercial pipe for heating purposes is off sharply, the season for this type of work now almost at an end. In the main the season has been disappointing to most pipe sellers. Apart from a substantial aggregate tonnage of miscellaneous size pipe for the Delaware aqueduct project of the local water commission, on which pipe orders are still pending, there is little outstanding tonnage. Practically all kinds of standard pipe are available for prompt shipment, with consumers expected to buy no more than is necessary over the remainder of this year, particularly as they do not expect an increase in prices when

books are opened some time next month for the next period.

Oklahoma City, Okla. — White Deer Pipe Line Construction Co. has contract for 30 miles of gathering lines for gasoline plant for Barnsdall Oil Co. near Odessa, Tex. Twenty-seven miles two to ten-inch pipe will be oxyacetylene welded by the Lindeweld method.

J. F. Pritchard Co., Billings, Okla., has contract for about 22 miles of pipe line for Continental Oil Co., four to 20-inch diameter, also Lindewelded.

Birmingham, Ala. — Cast iron pipe operations have improved over the past two weeks to send production to approximately 50 per cent. Generally speaking, plants are producing three days a week, and inquiries indicate there might be appreciably increase in production for December from probable lettings for that period.

San Francisco—Several fair sized inquiries for cast iron pipe are now in the market. To date this year 25,893 tons have been booked as compared with 43,923 tons for the corresponding period in 1936. Little new business is expected to come out for figures during the remainder of the year.

Seattle — Inquiry has improved after a long spell of inactivity. Finances are being arranged and new projects released.

Cast Pipe Placed

475 tons, 6, 8 and 24-inch (also 17 tons fittings) for Bellingham, Wash., to H. G. Purcell, Seattle, representing U. S. Pipe & Foundry Co., Burlington, N. J.
350 tons, 16-inch Class B pipe, San Diego, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

913 tons, 4 to 12-inch, La Mesa, Lemon Grove & Spring Valley Irrigation district La Mesa, Calif.; bids Dec. 14.
675 tons, 4 to 12-inch, water distribution system, Cincinnati.
431 tons, 6 to 10-inch, Three Forks, Mont.; bids Nov. 29.
300 tons, 8-inch, class 150, Ninth avenue SW, Seattle, improvement; bids Dec. 2.
250 tons, water distribution system, Bloomfield, O.; bids Nov. 26.
120 tons, WPA project, Geneva, O.; J. B. Clow & Sons Co., Cleveland, low.
Unstated tonnage, alternate welded or transite, for Vancouver, Wash.; bids Dec. 6.
Unstated tonnage, King county district 7, Seattle; alternate for steel or transite; bids Nov. 29.

Semifinished

Semifinished Prices, Page 67

Prospects for activity in semifinished steel products are somewhat improved. Foreign inquiry is better, including a fair tonnage in billets for South Africa, while a number of inquiries are pending for England.

Prices are at the lowest point of the year on foreign business. Domestic tin plate producers will be more active as a result of the customary advance rollings. Skelp prices at 2.10c, Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, or Sparrows Point, will be unchanged during the first quarter of 1938.

Wire

Wire Prices, Page 67

Pittsburgh—Two fair-sized orders for barbed wire and spring wire in the last few days gave November wire specifications a better appearance in comparison to October. Jobbers continue to order on a hand-to-mouth basis, and in some sections of the country, it is understood considerable swapping of material is being indulged in.

Cleveland—Consumers of manufacturers' and merchant wire products have shown little interest in increasing specifications. In many instances stocks have reached the point where additional buying has become necessary. However, in some cases their sales have declined until present inventories may be more than ample for the remainder of this quarter.

Chicago—November wire business was about a standoff from October and seasonal influences are expected to cause continued light demand in December. Buyers in most instances have reduced stocks but the gradual decrease in consumption is inducing further reductions in inventories. Automotive buying is adjusted to early needs and remains relatively light. Jobbers are ordering cautiously and with the nearing of the end of the active period in farm buying of merchant products, light shipments of such commodities are in prospect.

Boston—As wire consumers continue to work off inventories, new buying has declined for some products and finishing operations are barely maintained at 40 per cent. Consumption is 10 to 15 points above this rate, indicating consumers are not lowering stocks rapidly or about three to four points weekly. Wire in car lots to Framingham, Mass., now takes a freight rate of 10.4c, an increase from 9.5c; Hopedale, Mass., 9.9c from 9.00c and Whitins, Mass., 9.9c from 9.00c. The carload rate to other important consuming points is advanced the full 20 cents a ton on delivered prices. New England mills have booked several hundred tons of wire rope and cable for the navy, Wire Rope Corp. of America, New Haven, Conn., taking galvanized plow steel wire rope at \$48,634.80 while smaller, but substantial tonnages of cable were booked by Coll-

yer Insulated Wire Co., Pawtucket, R. I., and Rockbestos Products Corp., New Haven.

New York—Wire orders are fairly numerous, but individually small for prompt shipment. Demand continues well diversified, but the aggregate volume is light, and, with some producers, slightly under the recent rate. Inventories continue to furnish consumers with a good part of current needs, the latter buying fill-in replacements only with a view of lowering stocks to the lowest possible point by the end of the year. Finishing mill operations average 40 to 45 per cent. Prices are steady and while inventory stocks are made up of lower priced material placed earlier in the year, new business is moving at higher quotations without much pressure for concessions.

Birmingham, Ala. — Orders for wire are few and scattered and there has been nothing approximating the improvement in that business that mills anticipated a few weeks ago.

Rails, Cars

Track Material Prices, Page 67

With the freight car and locomotive markets continuing quiet, activity in railroad purchasing is centered principally in track material. The Northern Pacific and Great Northern Railroads are expected to close on 1938 rail and accessory needs soon but most other roads defer issuing definite inquiries. The Southern Pacific which recently placed about 35,000 tons for its southern lines is expected to buy about a like tonnage for other properties.

The Manchurian railway is understood to be inquiring for 20,000 tons of shapes, plates and other carbuilding material. This inquiry is reported to be the beginning of an extensive program.

Withdrawal by the Delaware, Lackawanna & Western of the construction program for 500 cars has left more than 12,000 cars in abeyance until the outcome of the freight rate question is known.

Directors of the Norfolk & Western have authorized a \$3,700,000 improvement program, including the purchase of 25,000 tons of steel rails and fastenings.

Car Orders Placed

Duluth, Missabe & Iron Range, 25 cars, to Pullman-Standard Car Mfg. Co., Chicago.
New York Central, two light-weight coaches, to E. G. Budd Mfg. Co., Philadelphia.
Northwestern Refrigerator Line, 250 steel underframes for 40-ton refrigerators, to American Car & Foundry Co., New York.

Pullman Co., 100 allwelded steel passenger cars for operation on New York Central and Pennsylvania, to Pullman Standard Car Mfg. Co., Chicago.

Rail Orders Placed

Nashville, Chattanooga & St. Louis, 4890 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Car Orders Pending

Delaware, Lackawanna & Western, 500 hopper cars, bids postponed indefinitely.

Western Pacific, 250 box cars, 100 flat cars and 50 gondolas; bids asked.

Rail Orders Pending

Western Pacific, 22,000 tons 100 and 112-pound rails; bids asked.

Shapes

Structural Shape Prices, Page 66

New York—Structural steel inquiry continues to drop. New contracts recently have also slumped materially. Scattered bridge and miscellaneous needs now make up the bulk of pending business. The smaller shops appear to have a fair volume of miscellaneous work.

Boston—After months of delay the Deer Isle-Sedgwick, Me., suspension bridge, taking 1570 tons, will probably go ahead. Financing appears practically arranged. Phoenix Bridge Co., Phoenixville, Pa., is low on the steel which includes the above structural tonnage and 223 tons, cable strand; 260 tons, reinforcing steel, and 56 tons, wrought iron plates. More small structural projects are out for estimates, with active pending volume estimated at 2500 tons.

Philadelphia—Fabricators' order books are slimmer with public work failing to offset the decline in private construction. Belmont Iron Works has booked 700 tons for a power house at Peekskill, N. Y. Bids go in tomorrow on a 375-ton school at Polk, Pa. A minute revival in piling is noted. Most of the jobs, however, are small with the exception of one public project taking 1000 tons, on which a date for bids will be announced shortly.

Pittsburgh—Inquiries for structural shapes include 1400 tons for a power plant extension at New Castle, Pa., and 1500 tons for a similar project in Essexville, Mich. Fort Pitt Bridge Works, Pittsburgh, has been awarded 420 tons for state buildings in Selinsgrove, Pa.

Cleveland—Structural fabricators are comparatively active. While large projects are noticeably absent, aggregate tonnage involved in smaller jobs totals considerable tonnage. The largest award in this

district involving 650 tons for a new plant building for General Motors Corp. at Warren, O., went to R. C. Mahon Co., Detroit. Fabricated prices continue weak, but mill prices remain firm.

Chicago—Structural inquiries are heavier, new projects totaling around 14,000 tons. The bulk of pending items involve less than 100 tons at a time, but aggregate close to 10,000 tons. About 3300 tons will be required for three power plants. A bascule bridge at Bay City, Mich., will take 1000 tons.

San Francisco—Demand continues exceptionally quiet and few important projects are up for figures or pending. Bids will be called shortly for a locomotive and machine shop for the Western Pacific Railroad Co., Sacramento, Calif., involving 1000 tons or more. Awards totaled 1093 ton, bringing the aggregate for the year to 137,521 tons, compared with 150,401 tons last year.

Seattle—Highway projects are furnishing the bulk of structural awards, demand from private sources being negligible. Business is fairly active and shops have some backlog. A few important contracts are developing. Pacific Car & Foundry Co., Seattle, has taken 810 tons for the Washington state Skagit river bridge.

Shape Contracts Placed

1525 tons, apartments, 955 on Fifth avenue and Madison avenue and Eighth street, New York, to Harris Structural Steel Co., New York.

1000 tons, bridge, Mt. Vernon, Wash., to Pacific Car & Foundry Co., Seattle.

810 tons, Washington state Skagit river bridge to Pacific Car & Foundry Co., Seattle; MacRae Bros., Seattle, general contractor.

700 tons, power house, Standard Brands Inc., Peekskill, N. Y., to Belmont Iron Works, Philadelphia.

650 tons, plant addition, General Motors Corp., Warren, O., to R. C. Mahon Co., Detroit.

428 tons, bureau of roads bridge, Mineral county, Montana, to unstated interest.

420 tons, buildings, Selinsgrove, Pa., for state of Pennsylvania, to Fort Pitt Bridge Works, Pittsburgh.

380 tons, bridge FAP 441-F, Okfuskee county, Oklahoma, to J. B. Klein Steel

& Iron Co., Oklahoma City, Okla. 350 tons, warehouse, Sterling, Ill., to Clinton Bridge Works, Clinton, Iowa.

290 tons, bridge PWS-1043-R-129, point 2, Clarke county, Mississippi, to Virginia Bridge Co., Roanoke, and Jones & Laughlin Steel Corp., Pittsburgh.

270 tons, tuberculosis hospital, Hamburg, Pa. to Bethlehem Steel Co., Bethlehem, Pa. Karno Smith, Trenton, N. J., general contractor.

260 tons, state bridge, Woodbridge, N. J., to American Bridge Co., Pittsburgh; Hogan-Gaul Construction Co., Red field, Dallas, general contractor.

245 tons, 20,000 feet curb angles, procurement division, treasury department, New York, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, municipal power plant, Princeton, Ill., to Clinton Bridge Works, Clinton, Iowa.

200 tons, two bridges, highway 4 between Glenwood Springs and Dotsero, Garfield county, Colorado, to Midwest Steel & Iron Co., Denver; Hinman Bros., Denver, general contractor.

200 tons, state highway bridge, Rock Island, Ill., to Midland Structural Steel Co., Cicero, Ill.

200 tons, shapes and bars, college library, Lubbock, Tex., to North Texas Iron & Steel Co., Fort Worth, and Ceco Steel Products Corp., Dallas; N. Wohlfield, Dallas, general contractor.

200 tons, state bridge, Lakehurst, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Gray Construction Co., Morristown, N. J.

175 tons, addition and alterations, factory No. 1, Hughes-Foulkrod Co., Streator, Pa., to Pittsburgh Bridge & Iron Co., Pittsburgh.

150 tons, Polree dam trestles, U. S. engineer, Keokuk, Ia., to Worden Allen Co., Milwaukee.

150 tons, coal bunker, Jacob Ruppert brewery, New York, to Gifford-Wood Co., New York.

150 tons, new wing, metropolitan museum of art, to Weatherly Steel Co., New York; through Crest Engineering Corp., New York.

135 tons, hangar, naval supply depot, Terminal Island, Los Angeles, to Minneapolis-Moline Power Implement Co., Minneapolis.

125 tons, Central school, Canaseraga, N. Y., to F. L. Hughes & Co., Rochester, N. Y.

125 tons, power plant improvements and Snohomish, Wash., postoffice, to Standard Steel Fabricating & Boiler Works, Inc., Seattle.

120 tons, addition building No. 11, National Supply Co., Toledo, O., to Donovan Wire & Iron Co., Toledo.

110 tons, building, Kraft-Phoenix Cheese Corp., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, telephone building, Salinas, Calif., to Golden Gate Iron Works, San Francisco.

Shape Contracts Pending

1800 tons, manufacturing building, Kelley-Hayes Co., Neville Island, Pittsburgh.

1500 tons, steam plant addition, Consumers Power Co., Essexville, Mich.

1500 tons, power plant, Kalamazoo, Mich. 1400 tons, steam plant addition, Pennsylvania Power Co., New Castle, Pa.

1200 tons, building, Hawaiian Pineapple Co., Honolulu; bids in.

1000 tons, including two 250-ton cranes, locomotives and machine shop, for Western Pacific Co., Sacramento, Calif.; bids soon.

1000 tons, bascule bridge, Lafayette avenue, Bay City, Mich.; bids Dec. 9.

1000 tons, power plant, Newcastle, Ind. 800 tons, textile building, Clemson, S. C.

800 tons, power plant, Commonwealth &

Shape Awards Compared

	Tons
Week ending Nov. 27.....	8,668
Week ended Nov. 20.....	21,736
Week ended Nov. 13.....	10,242
This week, 1936.....	16,860
Weekly average, 1936.....	16,332
Weekly average, 1937.....	24,051
Weekly average, October...	15,654
Total to date, 1936.....	1,052,217
Total to date, 1937.....	1,154,710

Includes awards of 100 tons or more.

- Southern Corp., Bay City, Mich.
- 600 tons, postoffice building, for U. S. government, New York.
- 550 tons, school building, Livingston Manor, N. Y.
- 500 tons, bridge, Albord, Mo.
- 440 tons, I-beam bridge, project FAGH-442, Emerson, Mills county, Iowa.
- 400 tons, Catholic high school, Ft. Wayne, Ind.
- 375 tons, state school, Polk, Pa.; bids Nov. 30.
- 300 tons, bridge, Colorado Springs, Colo., for El Paso county, Colorado.
- 250 tons, warehouse, International Agricultural Corp., Chicago Heights, Ill.
- 240 tons, college building, Alliance college, Cambridge Springs, Pa.; bids in.
- 230 tons, state overhead crossing, FAGH-25-A, Brookings, S. Dak.
- 230 tons, library building, Connecticut State college, Storrs, Conn.
- 150 tons, Balch bridge, Cold river, and Chippenhook bridge over Clarendon stream, Vermont; bids Dec. 7.
- 150 tons, store building, Montgomery-Ward & Co., Lexington, Ky.
- 150 tons, paint mill, Socony Vacuum Oil Co., Chicago.
- 140 tons, route 4, section 36, overpass, New Jersey state highway department; bids Nov. 29.
- 110 tons, Seminole dam gates, specification 990-D, for bureau of reclamation, Parco, Wyo.
- 110 tons, bridges, specification 992-D, for bureau of reclamation, Moxee City, Wash.
- 110 tons, supporting structures, specification 989-D, for bureau of reclamation, Boulder City, Nev.
- 110 tons, junior high school, Iron Mountain, Mich.
- 110 tons, piling, Wilmington, Del., South Jetty, U. S. Engineers; Tidewater Construction Co., Norfolk, Va., general contractor.
- 108 tons, crossing, Livingston, Merced county, California; bids opened.
- 100 tons, building, Armstrong Cork Co., Los Angeles; bids Nov. 29.
- Unstated, state bridges, Flathead and Gallatin counties, Montana; Thomas Stanton, Great Falls, general contractor.
- Unstated, bridges in Clatsop, Grant and Jackson counties, Oregon; bids at Portland, Dec. 3.
- Unstated, radial gates and hoists for Pomona siphon inlet, Roza project; bids to bureau of reclamation, Denver, Dec. 1, Spec. 993-D.

has slumped, confined mostly to small lots for public works and bridges. Practically no tonnage is being estimated for highways. Mill shipments in car lots are 20 cents per ton higher to this territory, but prices to contractor-buyers, still easy, do not reflect the advance.

Philadelphia—Sweet's Steel Co., Williamsport, Pa., is reported to have taken approximately 625 tons of reinforcing bars for the Finance building, Harrisburg, for which McCloskey & Co., Philadelphia, is general contractor. The bars still are to be

bought on several jobs already let. New projects are decidedly few in number and tonnage. Most fabricating shops are carrying substantial stocks of unfabricated material.

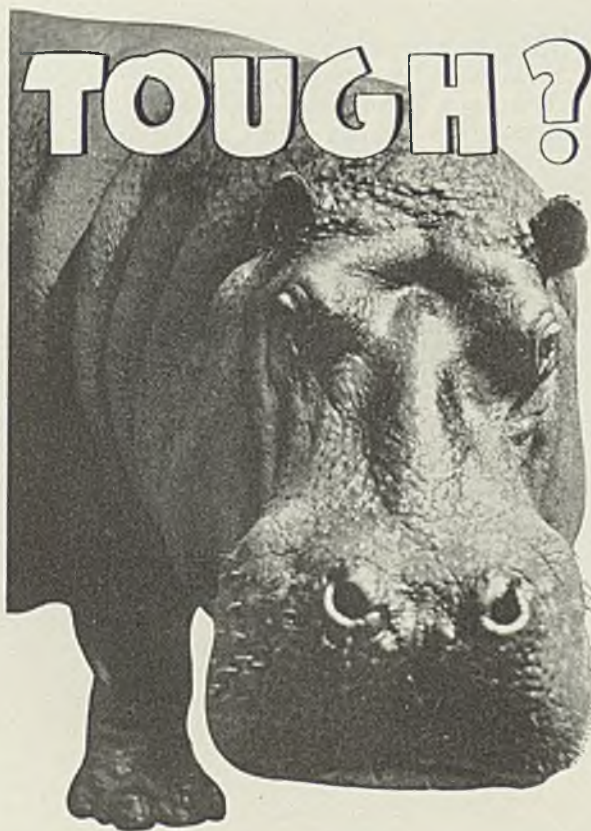
Pittsburgh—New projects for concrete reinforcing bars include two large jobs in Pennsylvania, bids will be received Dec. 17 and 18. Crooked creek dam in Armstrong county, Pennsylvania, and Tionesta reservoir, Forest county, Pennsylvania, will each require 1300 tons. Recent awards have been well maintained in volume and are headed by 1200 tons

Reinforcing

Reinforcing Bar Prices, Page 67

New York—Reinforcing steel buying has declined with small tonnage lots predominating. New inquiry is also lower, outstanding being a substantial tonnage for an approach and ramps, Union City, N. J., Lincoln tunnel. This project closes Dec. 16. Highway and bridge work now pending takes close to 1500 tons. Although up 20 cents a ton, delivered New York, because of the recent freight advance, prices to consumers do not reflect the advance and are still soft.

Boston—Reinforcing steel inquiry



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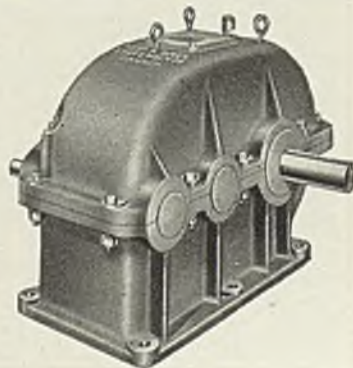
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Behind the Scenes with STEEL

What Else?

■ HAVING had from innumerable sources myriad requests as to just what our field is and what is covered in the weekly pages of STEEL, we have prepared the following list, without apologies for omissions. Our field includes steels, wheels, reels, deals, peels, puddling, muddling, melting, smelting, belting, bars, boxes, bales, scales, shears, gears, sheets, heats, treats, beats, meets, welding, working, warping, winches, inches, motors, rotors, floaters, pumps, sumps, dumps, tracks, cracks, facts, filing, piling, peening, cleaning, gas, brass, glass, mass meetings, seatings, beatings, lead, dead, red rust, dust, crust, crinkles, wrinkles, tests, pests, rests, jests, vests, mushers, rushers, crushers, gages, stages, pages, disks, risks, riots. Anybody know a word that rhymes with orange?

Ageless

■ THESE things never grow too old for good use. We mean STEEL's annual yearbook of industry. Last week came a frantic call from a gent who had lost or misplaced his 1921 issue and couldn't discover anywhere else some vital statistics. Would we be so good as to send him the figures? We would, and did. For 17 years that book has been doing service and is still valuable. We just called our vice-president in charge of reminding people about things and told him to make a note for us to check up in 1955 and see how the figures are holding out in the 1938 yearbook.

Scat, You Scut!

■ FROM our point of vantage behind the steins with STEEL we have surveyed the outlook of the industry. Lulled by the strains of Louie's Angry Five, we have decided the business

will not entirely go to pot. Not, at least, when there are fertile minds at work discovering new uses for steel and its allies daily. Among the finer of these new things brought to our attention lately is "Scoot." Scoot is something like Skeet only different. In Scoot there is a scooter, a shooter and some shot, while in Skeet there is no scooter. In playing Scoot, the shooter yells "Scoot," the scooter scoots and the shooter shoots. Then they trade places, the scooter becoming the shooter, and—oh, well, if you want to know more about it, find out from Remington Arms Co.

No Bugs

■ STERILIZED steel is an important product these days, according to the American Iron and Steel Institute. Thousands of carpenters are probably now living who might have died horrible deaths had not the nails they used been delivered fresh and sterile in germproof-paper-lined kegs. Fresh from the roasters are these nails, sterilized at 5 or 6 hundred degrees to kill off all the bugs and make them fit for human consumption. We suspect modern carpenters of being sissies. Think of all the he-men who crammed filthy, germ-laden nails in their mouths in the days of King Arthur, et al.

Add Ads

■ THIS WEEK we are especially fond of the thoughtful attitude evident from the face of the Goodrich lad on page 7. Newest in the delay series of birds, beasts and fish running currently for Edison Storage batteries is a quite timely mess of multiplying rabbits on page 42. Until the next thing comes along, then, fondest of adieux, as the French say.

—SHADLU

for the Hiram Walker building in Peoria, Ill., placed with Bethlehem Steel Co., Bethlehem, Pa.

Cleveland — Reinforcing awards and inquiries are limited to small tonnages from private sources. Present conditions have deterred ambitious expansion programs, but it is hoped this situation will be checked soon. Considerable tonnage in combination with public structural improvement is still pending. Prices are unchanged.

Chicago—While concrete bar shipments are receding, the letdown is gradual and a fairly large volume of pending and prospective business points to fair activity during the next 60 days. One of the largest of new inquiries is 524 tons for a merchandising building here.

San Francisco—The only award of size went to unnamed interests and called for 300 tons for a crossing over the Los Angeles river in Los Angeles for the Union Pacific Co. Inquiries are coming forth very slowly. Awards aggregated less than 400 tons. This brought the total to date to 88,814 tons, compared with 221,806 tons for the corresponding period in 1936.

Seattle—Current orders are confined to carlots, with local rolling mills adjusting their schedules accordingly. No improvement is expected this quarter. Business pending includes 1157 tons for the Roza irrigation project, Washington.

Reinforcing Steel Awards

1200 tons, Hiram Walker building, Peoria, Ill., to Bethlehem Steel Co., Bethlehem, Pa.
 625 tons, finance building, Harrisburg, Pa., to Sweet's Steel Co., Williamsport, Pa.; McCloskey & Co., Philadelphia, general contractor.
 525 tons, state office building, capitol grounds, Oklahoma City, Okla., to Ceco Steel Products Corp., Omaha; W. S. Bellows Co., Oklahoma City, general contractor.
 350 tons, building, Regensterner Corp., Chicago, to Inland Steel Co., Chicago.
 325 tons, U. S. marine hospital, St. Louis, to Sheffield Steel Corp., Kansas City, Mo.
 300 tons, crossing, Los Angeles river, Los Angeles, for Union Pacific Co.

Concrete Bars Compared

	Tons
Week ended Nov. 27.....	4,635
Week ended Nov. 20.....	4,714
Week ended Nov. 13.....	3,640
This week, 1936.....	3,945
Weekly average, 1936.....	6,065
Weekly average, 1937.....	6,223
Weekly average, October...	4,732
Total to date, 1936.....	313,422
Total to date, 1937.....	298,719

Includes awards of 100 tons or more.

Los Angeles, to unnamed interest.
 175 tons, building, Armour & Co., West Fargo, S. Dak., to Paper-Calmenson Co., St. Paul.
 160 tons, viaduct superstructure, Broadview, Ill., to Inland Steel Co., Chicago.
 150 tons, Robert Walker high school, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.
 150 tons, health building, University of Minnesota, Minneapolis, to Ceco Steel Products Corp., Omaha, Nebr.
 140 tons, bureau of roads bridge, Mineral county, Montana, to unstated interest.
 130 tons, postoffice, Evanston, Ill., to Bethlehem Steel Co., Bethlehem, Pa.
 105 tons, junior high school, Syracuse, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.
 100 tons, sewage regulation chambers, group 4, Detroit, to Bethlehem Steel Co., Bethlehem, Pa.
 100 tons, state bridge, near Danville, Ill., to Calumet Steel Co., Chicago.
 100 tons, tuberculosis hospital, Hamburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.
 100 tons, Karno Smith, Trenton, N. J., general contractor.

Reinforcing Steel Pending

1300 tons, Crooked creek dam, Armstrong county, Pennsylvania; bids to army engineers, Pittsburgh, Dec. 17 and 18.
 1300 tons, Tionesta reservoir, Forest county, Pennsylvania; bids to army engineers, Pittsburgh, Dec. 17 and 18.
 524 tons, retail merchandising building, 6434 Sheridan road, Chicago.
 275 tons, apartment building, Detroit.
 200 tons, addition to St. Louis Masonic home, Boaz-Kiel Construction Co., St. Louis, general contractors.
 155 tons, highway work Santa Cruz county, California; bids Dec. 8.
 142 tons, five culverts Montezuma and in Dolores county, Colorado; bids opened.
 135 tons, bridge over Olympla boulevard, Los Angeles; bids Dec. 8.
 120 tons, Kenmore bridge, King county, Washington; L. Romano Engineering Co., Seattle, general contractor.
 100 tons, bridge over Rock creek, project 3B4, National Capitol Parks, Washington, D. C.; bids Dec. 9, bureau of public roads, department of agriculture.
 100 tons, state highway bridge, Fargo, N. Dak.
 100 tons, barracks and quartermaster warehouse, Hickam Field, T. H., invitation 397-38-8; bids Dec. 30.

Pig Iron

Pig Iron Prices, Page 68

Pittsburgh — Closing out of numerous furnaces since Oct. 1 has improved relationship of shipments to production, but spot demand continues at the weakest point of the year. Absence of buying has forced all price tests. Since the Pennsylvania commission has not yet approved the railroad freight increases, delivered prices on iron are unchanged within the state.

Cleveland—Pig iron sellers do not anticipate improvement in sales and shipments this quarter. Most foundries continue their policy of cutting into inventories. Many have ample stocks or orders on producers' books to supply present requirements

through December. Demand from automotive foundries is particularly light since most had stocked heavily expecting a continued upward trend in automobile production. Requirements from farm implement manufacturers have resisted the general business recession better than many other industries.

Chicago—Foundry operations are receding slowly and pig iron shipments also are declining. Curtailment in the pig iron movement is accentuated by a further reduction in consumers' stocks. A further de-

crease in the movement is seen for December, with a fairly large carry-over of unfilled tonnage into first quarter. The market is steady but is provided little test by the small volume of business.

Boston — Large melters, operating on curtailed schedules, continue to draw on stocks for supplies without placing much replacement business. As a result inventories are being steadily lowered. Small users, many without supplies on hand, are buying as needed in small lots for immediate delivery. Foundry con-

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sumption is running about 10 per cent under last month. Any improvement in the demand for castings and foundry products would likely be reflected at once in pig iron buying. Whereas some weeks ago export shipments surpassed imports, the latter have picked up materially recently. A wharfage charge of 5½ cents a ton has been assessed on coke and coal handled over railroad wharves at Boston and not forwarded by rail.

New York — Pig iron sales are still confined largely to single carlots, with orders scattered. Most consumers have stocks sufficient for remainder of the year. Export, as well as domestic demand, is probably as light as at any time this year.

Philadelphia — Pig iron buying continues on a hand-to-mouth basis and even this adds up to a relatively small tonnage. Little change is seen until first quarter unless the industrial picture brightens unexpectedly. Current slow rate of shipments indicates stock piles may be growing at one or two points but these by no means constitute a burden on the market. Pig iron production costs are somewhat lower, the principal item being the drop in blast furnace scrap to \$8.50 per ton and less, delivered Eastern furnaces.

Buffalo — With pig iron buyers asking for delayed shipments on fourth quarter contracts indications point to a substantial carryover of orders to the next quarter. Total shipments for November will be below October and well under the volume of the same month last year. Foundries continue to taper operations while reducing inventories. Eight stacks out of 15 remain active.

Cincinnati — Pig iron market is dull, several unusual factors lowering what would be a normal level of activity. Some smelters took in early requirements to avoid the freight rate increases, others avoided shipments last week because of the holiday. Demand for castings for machine tools is dropping but remains stronger than the general melt, which is about 40 per cent.

St. Louis — The market for pig iron is virtually at a standstill as far as new buying is concerned. Sales include a few small lots for prompt shipment, mainly of special analysis. Shipments for the first three weeks of November indicate that the total for the month will be the smallest this year, and a moderate decline as contrasted with the November, 1936, total. All classes of melters have reduced operations, and further curtailment is indicated before the turn of the year. Stove foundries in the Belleville area are

operating on small schedules or are entirely down.

Toronto — With plant operations continuing at high level demand for merchant pig iron is correspondingly high. Blast furnace representatives say melters are interested in the market and while current orders are for spot delivery they are totaling around 2500 tons weekly. Deliveries are being made on schedule against old contracts but no new booking has been done for forward delivery. Producers will not open books for first quarter business until about the middle of next month. Foundry iron is the most active on the list and regular orders are being received in lots of 50 to 300 tons. Production continues at the peak level, with October output showing the greatest tonnage for any month since 1930. Prices are steady and unchanged.

Scrap

Scrap Prices, Page 70

Pittsburgh — Heavy melting steel in the Pittsburgh district drifted 50 cents per ton lower last week to a range of \$13 to \$13.50. No. 2 heavy melting, flashings, hydraulic compressed, and bundled sheets were off 50 cents also. All quotations continue nominal in the prolonged absence of mill purchases.

Cleveland — A few shipments of scrap are still being made, but involve only the fag-ends of old business. New buying is at minimum. A number of dealers have closed down their yards, due to lack of trade, and others are preparing to do so next week. Most dealers are holding to their supplies, laying them down rather than sell at today's quotations.

Chicago — While scrap has weakened further and prices of most grades are off an additional 50 cents to \$1 a ton, the trade is inclined to the belief that the drastic reduction in quotations the past 60 days has brought values to a point where a leveling off may be expected. Consumers still show little interest in new commitments but shipments against orders are slightly heavier. A stronger tone has been noted in recent bidding on railroad lists. Heavy melting steel at \$11.50 to \$12 is back to the level prevailing in August, 1935.

Boston — Iron and steel scrap prices have a firming tendency, and the steady sagging of recent weeks is less pronounced. This situation has developed without much domestic demand, shipments to district and Pennsylvania consumers being nil. As a result quotations on numerous grades for rail delivery are

nominal. For export, dock delivery, however, the stronger tone is more evident and some No. 1 heavy melting steel is bringing \$14, dock, with other grades generally steady. Cargo space is more ample with 19,000 tons loaded at Boston and Portland, Me., relieving the congestion considerably at the latter port. Material has accumulated in volume at Providence, R. I., but an early ship is promised that point. Shippers had covered on a large part of the tonnage needed for the three boats.

New York—A substantial increase in cargo bottoms for export accompanies steady prices for barge deliveries, with indications that moderate accumulations of material for foreign shipment will be materially lowered shortly. For export, heavy melting steel prices are unchanged, but old compressed sheets are off 50 cents. The domestic market continues dull with prices nominal on most grades. Many hold the opinion that prices for export have touched bottom, believing lower prices would slow up offerings, as scrap is not coming out any too freely now.

Philadelphia — Quotations on iron and steel scrap are unchanged for the first time in several weeks. This does not mean that an immediate reversal in the price trend is impending but it does reflect renewed interest in the export market. As the result, eastern prices are on a somewhat higher plane than at Pittsburgh. Usually the reverse is true. As reported last week, \$14.50, f.a.s., is being paid for No. 1 steel and \$13 for No. 2. In fact, somewhat more than \$14.50 was offered for a round lot of No. 1 steel required to complete a cargo for export shortly. On the basis of competition with export buying selling interests point out that it would be necessary to sell No. 1 steel at between \$15 and \$16, depending upon the delivery point. However, mills are almost entirely out of the market, but indicate that No. 1 steel might be had at \$14.50 or less. In view of the absence of buying, the current quotation of \$13.50 to \$14 is entirely nominal. The published price of \$12 to \$12.50 on No. 2 steel, however, continues to be substantiated by tonnage moving to two points. The scrap market now is in a somewhat volatile state in view of the recent heavy export orders which must be filled. The trade feels that the first re-entrance of consumers into the market may send prices upward.

Detroit — The scrap market remains quiet with prices nominal. First test will come in a few days with appearance of new automobile lists, and opinion is that they will

be considerably smaller and will bring lower prices. Chrysler lists are out Monday. Operations in automobile plants were scaled down over the holiday and in many cases are being continued on a restricted basis.

Buffalo — Iron and steel scrap is dull as small dealers refuse to sell stock at current low nominal prices to large operators who are laying down stock in anticipation of higher prices next year.

Dealers are of the opinion that scrap is a buy at the present nominal range of \$13 to \$13.50 a ton for No. 1 heavy melting steel and yard space is being sought by even the small dealers to accumulate offerings.

Cincinnati — Prices on some items of iron and steel scrap are down further, and all items nominal in the face of almost vanished consumer demand. Occasional sales of miscellaneous lots show the prevailing weakness. Dealers generally are not laying down tonnage but find it necessary to hold accumulations unless they accept distress prices. Heavy melting steel is down another 50 cents, at \$10 to \$10.50.

St. Louis—Further cuts, ranging from 50 cents to \$1.50 per ton, affecting nearly all grades, were made in iron and steel scrap prices during the week. The new quotations are based entirely on dealer transactions, no buying having been done by melters. One large east side mill contemplates the purchase of a round tonnage early in December, to be delivered subsequent to Jan. 1. Dealers are seeking bargains for laying down in their yards, and generally more interest is being displayed in the market. Mill releases have improved, and offerings from all sources are small.

Birmingham, Ala. — The scrap market is less active than for several months, with the largest consumers entirely out of the market. Dealers report practically no activity with immediate prospects not at all reassuring.

Seattle—Reports that Shanghai is again open have given exporters a ray of encouragement but no steel orders from China have been placed. Japan is in an importing position but restrictive measures are still in force and new business is lacking. Only occasional small lots are being forwarded to the Orient. Local rolling mills are out of the market. Tidewater stocks are fully ample for present needs. Prices remain on a par with a week ago.

Toronto, Ont. — Scrap buying and prices show no special change. Consumers are entering the market for both steel and iron grades and the movement out of dealers' yards is

in fair volume. Shipments of heavy melting steel to Hamilton consumers have tapered, due to limited supply of scrap rather than decline in demand. Railroad offerings have been absorbed with the result that mills are protected for immediate needs. Foundries continue to seek cast scrap, stove plate and wrought scrap and stocks held by dealers are small.

Warehouse

Warehouse Prices, Page 69

Cleveland — Warehouse distributors report no change in current miscellaneous orders or aggregate shipments. It is generally believed the decline in mill operations over the past 30 days has aided tonnage shipped out of local warehouses. One distributor reports that October shipments were less than 50 per cent of the March peak. Prices are firm.

Chicago—November sales showed a decrease from October and a further letdown is seen for December. While warehouse buying has receded less than mill business, jobbers are attempting to reduce stocks. Prices generally are steady.

Philadelphia — Warehouses are

well stocked with average inventories estimated at about 25 per cent above normal. Business is reported quieter although some interests expect to book about as much business in November as in October. The small-order business is reported holding up better than those of usually larger size which is said to indicate a fairly well sustained rate of activity among the smaller industrial plants. The price situation is unchanged.

Buffalo — Warehouse distributors report November sales below October and November last year. No improvement is looked for until the new year gets well under way.

Inventories are about equal to stocks on hand last March, but are about 35 per cent greater than November a year ago.

Stocks are balanced fairly well with sheets generally in the greatest supply. With prices re-affirmed for the first quarter sellers don't seem to be unduly alarmed.

Cincinnati—Warehouse demand is comparable to levels since Labor Day. Some shutdowns Friday and Saturday, as well as Thanksgiving Day, created a lowered market last week and it is likely tonnage for November will show a decrease from October.

St. Louis—Business of iron and

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steel warehouses and jobbers has fallen to small proportions. Sales during the first three weeks of November were the smallest for any similar interval this year, and slightly below a year ago. All classifications of buyers are taking only enough for actual and immediate requirements. This is particularly true of the railroads.

Seattle — Volume shows no gain over last month and continues at low levels. Absence of government projects is affecting the jobbing trade while depression in lumber and allied industries is curtailing purchase of both new and replacement items. Improvement is not expected until after Jan. 1. Price schedules are steady.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 67

Cleveland—Prices of bolts and nuts have been reaffirmed for first quarter delivery. Prices have been steady since May 28, when an advance was made on hot-pressed and cold-punched nuts and small rivets. An increase had been made March 15 on machine, carriage and light bolts and one March 8 on large rivets and track bolts. These earlier advances resulted in some anticipatory coverage. Such stocks and supplies since laid in have been largely worked off, and consumers generally have only moderate stocks, it is believed. Meanwhile producer backlogs are disappearing rapidly and sellers are hopeful of replacement orders early in the year. Present operations of the industry is

at 35 to 40 per cent of capacity.

The only exception to the general reaffirmation of current prices into first quarter is on cotter pins. The former discount was 50-10-5, but this has been adjusted to 50-10-10.

Chicago—Slow demand for bolts, nuts and rivets continues in spite of fairly heavy consumption among some users. Inactivity of railroads is responsible for a major share of current quietness. Farm implement and tractor plants are holding operations at a seasonally high rate though the tendency lately has been downward slightly. Both jobbers and consumers are buying sparingly, with stocks still being reduced. Continuation of present prices is anticipated for next quarter.

Tin Plate

Tin Plate Prices, Page 66

New York—Tin plate trade expects immediate reaffirmation of prices for next season. Consuming plants in this district have been fairly active on container packages and specialties and it appears as if they will work off practically all the low priced tonnage, tonnage contracted for prior to Oct. 1 at \$4.85, Pittsburgh, before the end of this year.

Pittsburgh—Activity in tin plate is improved, but with producers preparing for advance rollings as usual in this season. In the rolling of advance plate this year, an uncertain factor is the extent of consumers' stocks and the probable resultant effect. Some consumers are believed to have good inventories. Mill stocks,

however, are negligible after the heavy canning season. Operations continue at 63 per cent. The McKeesport producer plans to resume Monday, Nov. 29, and activity will be strengthened by gradually improved operations on the part of other producers. Announcement is still awaited regarding the 1938 contract price of tin plate.

Iron Ore

Iron Ore Prices, Page 70

Cleveland — Three thousand tons of iron ore from the Witherbee Sherman Corp. mines near Port Henry, N. Y., operation of which has been taken over by Republic Steel Corp. pending conclusion of a 25-year lease of these mines to Republic, arrived in Cleveland by lake freighter last week. The ore was shipped from Port Henry by barge through the New York state ship canal to Oswego, N. Y., where it was loaded into the ADRIAN ISELIN which carried the cargo to the Corrigan, McKinney docks in Cleveland. This was the first shipment of New York State ore into Cleveland by boat in many years.

New York—Tungsten ore prices have declined further, now holding at around \$22.50, duty paid. Both Chinese and domestic material is available at this price, and for prompt shipment where some relatively small lots are involved. There is little buying interest, however, with little activity expected until after the turn of the year at which time some replacements will likely be necessary. As a matter of fact, had steel business continued at anything like a normal rate, tungsten ore stocks in consumers' hands would have been well exhausted by this time, according to trade leaders.

Coke By-Products

Coke By-Product Prices, Page 67

New York—Distillate, phenol and naphthalene prices have been reaffirmed for the first six months of 1938, and leading distributors have opened books for contracts during that period. Current demand for coke oven by-products has declined, notably buying by the chemical industry of distillates, and industrial requirements for phenol are lower. The lacquer-makers are also taking less material.

Ferroalloys

Ferroalloy Prices, Page 68

New York—Ferromanganese shipments for this month will be the lowest so far this year, with a further decline likely in December. This re-

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flects particularly the sharp drop in steelmaking operations. Meanwhile the market is holding at \$102.50, duty paid, Atlantic seaboard. Domestic spiegeleisen is also moving at a low level for the year to date and for the same reason. Prices are unchanged on 19 to 21 per cent material at \$33, Palmerton, Pa., and on 26 to 28 per cent, at \$39.

Virtually the only change in ferro-alloy prices at this time is in ferro-tungsten, which, reflecting further weakness in the tungsten ore market, is now holding at \$1.85 to \$2.00, per pound tungsten contained, freight allowed, in carlots.

Steel in Europe

Foreign Steel Prices, Page 69

London—(By Radio)—All pig iron prices are now stabilized. The recent loyalty rebate of 5s reduces foreign imports but hinders shipments to home consumers until domestic supplies equal demand. New business in iron and steel is quiet as present bookings extend into 1938. The semifinished position is approaching normal. Export inquiry is dull, particularly in black and galvanized sheets.

The Continent reports markets are quiet but the outlook slightly better. The steel cartel is attempting to undercut American offers.

British Iron and Steel federation has announced increases on hematite pig iron, effective Jan. 1, from 4s 6d to 10s (\$1.13 to \$2.50). This will be effective for all of 1938.

A dispatch from Luxembourg to the Agency Economique, in Paris, states the European steel cartel has agreed to leave prices unchanged as a result of arrangements with American exporters, representatives of whom attended the meeting.

High Speed Steel Scrap Prices Are Lower

New York—Following the continued drop in tungsten ore prices, the market on high speed steel scrap has undergone further decline, with solids now holding at around 25 to 28 cents as against a high several weeks ago of 48 cents. The market on high speed steel scrap is now almost back to a normal basis of around 20 to 25 cents per pound, the range which prevailed early in the first quarter of this year.

Contributing to a decidedly easier market on high speed steel scrap are the resumption of shipments of tungsten ore from China, following a suspension of several weeks beginning late last summer, and gen-

eral lack of interest on the part of scrap consumers. At present, the larger users of this material are delaying purchases due to curtailed demand for high speed steel and to an actual suspension of orders in some cases. As a consequence a further decline in prices appears likely over the next few weeks, with accumulations in sellers' hands increasing.

Once demand for high speed steel revives, however, a quickening in high speed steel scrap is regarded as sure to follow as this material is an important factor in the manufacture of high speed steel.

Nonferrous Metals

Nonferrous Metal Prices, Page 68

New York — Major nonferrous metal markets eased further last week on lack of active consuming and lower prices in London. Weakness in metal markets abroad was attributed to the unfavorable outlook for an early upturn in American industrial activity as reflected in the decline in security values.

Copper — A custom smelter lowered electrolytic copper prices 1/2-cent to 10.75c, Connecticut, on Tuesday following a drop of one full cent in the primary mine producers' quotation to 11.00c. Copper and brass rolled products and wire prices were revised downward proportionately. Export copper closed around 9.80c, c.i.f. European ports. Consumers continued to buy lightly and showed little interest in offer-

ings of electrolytic on the outside market at 10.25c.

Lead — Buying in the lead market fluctuated from day to day in line with the rise or decline in stock prices in Wall street. Prices held at 5.00c, New York, and 4.85c, East St. Louis.

Zinc — Producers cut prices \$5 per ton on Monday and a like amount on Friday, bringing the market down to the lowest levels since December, 1936. Prime western closed at 5.25c, East St. Louis. Demand increased slightly at the lower level. The market is now around 25 points below Atlantic import costs.

Tin — Prices fluctuated widely, following the trend in London. Straits spot closed around the low for the year at 41.62 1/2c. Market observers do not anticipate any substantial consumer buying until after the turn of the new year.

Antimony — American spot antimony eased \$15 per ton last week to 14.75c, New York, for spot and 14.50c, smelter shipment. Chinese spot closed nominally at 15.00c but late in the week it was expected to meet the new competitive level.

Scovill Mfg. Co., Waterbury, Conn., has become a member of the American Supply & Machinery Manufacturers Association Inc., Clark building, Pittsburgh.

Buoy Chain Tonnage Let

New York—Five producers have been recommended to share in contracts for 390 tons of wrought iron

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link buoy chain, lighthouse bureau, Staten Island, N. Y., American Chain & Cable Co. Inc. being low on six items to share in the major part of the tonnage.

Canada's October Pig Iron Output at 7-Year Peak

■ Steel ingots and castings production in Canada in October was 114,527 tons, compared with 114,622 tons in September. October pig iron output at 80,922 tons reached the highest level since January, 1930, and compares with 76,180 tons in September and 70,051 tons in October, 1936. Ferroalloy production was 7604 tons, against 7720 tons in September and 5253 tons in October, 1936.

For ten months this year Canada produced 1,191,989 tons of steel ingots and castings compared with 912,064 in the corresponding period in 1936. Pig iron production increased from 735,360 tons to 535,836 tons. Ferroalloys gained slightly from 61,340 to 63,140 tons.

Six furnaces were in blast at the end of October, with a combined daily capacity of 2525 tons, or 64 per cent of the total capacity.

30% of G. E. Employees Drive Autos to Work

■ More than 30 per cent of the employes of the Schenectady works, General Electric Co., now drive automobiles to work, as compared to less than 12 per cent in 1929.

There is now one car for every 3.3 employes, while figures for 1929 showed one car for every 8.8 employes. During the peak years of 1928 and 1929, when the number of those employed in the works and offices totaled more than 30,000, the greatest number of cars parked by workers was 3600. At the present time, with about 18,000 employes, or 44 per cent less than in 1929, the number of cars parked is 5500 each week day.

The increase has necessitated an enlargement of the parking spaces to nearly twice that of 1929 and a one-way traffic system to handle the movement of cars during the hours of going to and coming from work.

Get More Coke From Coal

■ Better results in by-product coke production were attained in 1936 than in the preceding year, according to a report on coke and by-products just issued by the bureau of mines. The quantity of coal required to make one ton of by-product coke in 1936 was 1.42 tons and the cost was \$5.24, compared with

1.43 tons costing \$5.46 in 1935. Beehive production was also more economical, requiring 1.58 tons of coal, at a cost of \$2.94 in 1936, compared with 1.60 tons of coal, at a cost of \$2.85 in 1935.

The report covers all details of coke production, both by-product and beehive, for 1936 and preceding years and will form a chapter in the minerals yearbook for 1937.

Production figures for 1936 were presented in STEEL, Aug. 2, page 19, from the preliminary report of the bureau.

Recommends List and Discount Price Policy

■ Distributor relations committee of the American Supply & Machinery Manufacturers Association Inc., Clark building, Pittsburgh, has recommended all members adopt a pricing policy of list prices and discounts, instead of quoting net prices which, in these days of cost uncertainty, are subject to frequent change. Use of list prices and discounts makes unnecessary to distributors the expense of publishing new catalogs as often as when net prices are quoted.

San Francisco Bridges In Attractive Booklet

■ A well illustrated booklet entitled "Our Bridges" has been issued by E. E. Newhall Inc., San Francisco, dealer in wholesale hardware, glorifying the Golden Gate and Oakland-Bay bridges. Views of these great engineering feats which link San Francisco to the surrounding areas show the structures from many angles and give a clear idea of their magnitude. A single page modestly calls attention to the products handled by the Newhall organization.

SCOTLAND PLANNING EMPIRE EXPOSITION DURING 1938

■ An Empire exhibition, featuring social and industrial progress of the British Isles, dominions and colonies, will be held in Glasgow, Scotland, from May to October, 1938. The Palace of Engineering will house extensive sections on general manufacturing, shipbuilding, building construction, transport, mining and gas.

Mirrors of Motordom

(Concluded from Page 26)

law and order and the rights of others to work. He deprecated the rule of force in labor disputes, and inferentially condemned recent sit-downs and plant seizures.

Further fuel was added to the con-

flagration by difficulty at the Ford assembly plant in St. Louis where the UAW called a strike which was followed by battles between union and nonunion workers. With the assistance of local police, operations continued normal in the plant.

Adding up all these outbreaks, many wonder whether the automobile industry may be approaching the inevitable "sitdown" on the part of managements which has been talked of since last spring.

■ NEW MODEL shown at the London, England, automobile show was General Motors' Vauxhall 10-horsepower 4-cylinder model, selling at \$840 and inserted in the hottest competitive spot in the British market. The new car features gasoline economy of 40 miles to the gallon.

Construction differs from American practice in the complete elimination of a frame or chassis, the body being welded throughout and built up on a box girder skeleton shape with a small frame projecting from the front of the body shell to carry the engine and the tubular front axle. Steel floor is ribbed to give added strength and reinforced by a propeller shaft tunnel.

The Vauxhall has wheelbase of 94 inches, tread 46 inches in front and 47 inches at the rear. Among its competitors is the Ford "10" which sells for \$90 less.

■ STOP orders from automobile companies have been reflected in the closing of four plants of Libbey-Owens-Ford Glass Co., three in Toledo, O., and one in Ottawa, Ill. Having maintained steady operations over recent months, the company reports its warehouses filled and stop orders have left no other alternative but to close the plants temporarily.

First formal showing of the two new Ford lines will be made in showrooms throughout the country Tuesday of this week. Production difficulties apparently have been licked, and assemblies last week were close to 2500 daily.

R. H. McCarroll, Ford metallurgist, breaks down the weight of a Ford two-door sedan as follows: 1919 pounds of steel, including cast steel; 357 pounds of gray iron, 70 pounds of rubber, 89 of cotton, 51 of glass, 34 of copper, 31.5 of lead, 14.5 of zinc, 14.5 of manganese, 10.6 of aluminum, 4 of tin, 3.5 of wool and mohair, 2.8 of chromium, 1.5 of antimony, 0.8 of nickel, 0.7 of cadmium and lesser amounts of tungsten, vanadium, molybdenum, titanium, columbium, cobalt. Selling price of the Ford per pound: 20 cents.

Pontiac has opened a model used car reconditioning plant in Pontiac with total floor space of 20,000 square feet and a force of 50.

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Equipment for steam cleaning, sheet metal repair, painting, striping, and the like has been installed, with the aim of showing the company's dealers the newest methods of rebuilding and repairing used cars.

Piston fits on 1938 models are tighter than ever before in the history of the industry, according to a report from engineers of Bohn Aluminum & Brass. Clearances on the new aluminum alloy autothermic type of piston range from 0.0005 to 0.001-inch, compared with clearances of 0.006 to 0.008-inch originally required on aluminum pistons. In spite of closer fits, the report states frictional losses have been reduced, primarily by better thermal control of the piston and the use of tin plating on the piston's surface. The latter provides an initial bearing surface which reduces breaking-in time and minimizes dangers of scuffing.

"When we men in the automotive industry set out to redesign and improve our cars," says Stuart G. Baits, vice president and general manager of Hudson, "we do just what anybody else would do—we find out what the boss wants. And our boss is the public—our chief engineer." After looking over most of the 1938 models, the thought occurs that either the boss was busy last year, or else he didn't have

much to offer in the way of suggestions.

Kingham Trailer Co., Louisville, Ky., has announced a price reduction of approximately 10 per cent on trailers and trailer bodies. "We not only believe that prices have reached the top in our line, but also in many other lines, and that in order to stimulate and do our part in bringing back to normal, business that has been good over the past few years, a price reduction was in order," declared E. J. Lucas, sales manager.

Equipment

Chicago — November marked a definite recession in machine tool and plant equipment buying while the lag in inquiries points to some further decrease in December. Small tool buying is slow, business being off sharply from the rate of 60 days ago and earlier. New inquiries for machine tools usually are for individual items, with railroads still conspicuously absent from the market.

Seattle — Automotive equipment and items for winter road maintenance are in good demand while inquiry for electrical goods and pumping equipment is well maintained. Manufacturers of diesel engines expect an active season.

ucts Co. soon takes bids for constructing plant addition. Cost \$40,000. F. J. McFadden, care of owner, is architect.

NEWTON FALLS, O.—Plans are being prepared for municipal electric power plant, for which appropriation of \$150,000 has been voted. D. M. Bailey Jr., mayor, is in charge.

Rhode Island

WOONSOCKET, R. I.—National Body Works Inc., Hamlet street, maker of automobile bodies, will rebuild part of its plant recently destroyed by fire.

Vermont

DANVILLE, VT.—Danville Mfg. Co., C. H. Davis in charge, plans building a factory. Cost \$40,000.

New Jersey

TRENTON, N. J.—Solfo Paint & Chemical Co., 821 Pennington avenue, will spend approximately \$50,000 for erection of a new one-story plant and equipment, on a three-acre tract which it recently acquired.

Michigan

ADRIAN, MICH.—R. A. White, Adrian, engineer, will soon let contract for two diesel engines, outside transformers, switchboard equipment and traveling crane for installation in two-story electric generating plant for Southeastern Michigan Electric Co. Cost \$130,000.

ARMADA, MICH.—Nufold Mfg. Co. has been incorporated by Archie L. Perrigo to engage in general manufacturing.

Illinois

CHICAGO—Central Refining & Asphalt Corp., care of H. L. Phoenix, attorney, 58 East Washington street, has purchased the site and buildings formerly occupied by Peerless Oil Co., and plans remodeling same, at a cost of about \$50,000.

SPRINGFIELD, ILL.—City, J. Knapp, mayor, will take bids Dec. 10 for constructing municipal power plant addition to house boiler and generator at the Lakeside plant. Cost \$400,000. Burns & McDonnell, 107 West Linwood boulevard, Kansas City, Mo., engineers.

Indiana

BLUFFTON, IND.—Board of public works, F. Buckner, chief, will soon take bids for construction of 400-horsepower boiler, stoker, soot blower and superheater for municipal light and water plant. B. H. Freeland, care of owner, is engineer.

LAWRENCEBURG, IND.—Joseph E. Seagram & Sons Inc., 405 Lexington avenue, New York, plans improvements and extensions to its distillery plant here, including new units for still house, feed grinding mill and other divisions. Cost \$1,500,000 with equipment.

Alabama

MOBILE, ALA.—Hollingsworth & Whitney, 140 Federal street, Boston, plans erection of paper manufacturing plant here. Site has been acquired.

Maryland

BALTIMORE—A. & X. Steel Products Co., Hans Batham, 1200 Bush street, has plans in progress for addition to building.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids until 10 a. m., Nov. 30, schedule 2148, for five motor-driven power

Construction and Enterprise

New York

BROOKLYN, N. Y.—Signal Corps Procurement district, Army base, Fifty-eighth street and First avenue, will take bids until Dec. 10 for 58,500 feet of cable and 59 reels (circular 71).

ELMIRA, N. Y.—New York State Electric & Gas Corp. has applied to public service commission of New York for permit to construct electric plants in Erin and Millport, N. Y., costing about \$40,000.

HEMPSTEAD, N. Y.—Village board plans making alterations to waterworks system, including erection of 1,000,000-gallon tank. Cost \$260,000.

NEW YORK—Johns-Manville Co., 22 East Fortieth street, New York, has awarded contract for a factory at Watson, Calif., to Stone & Webster Engineering Co., 90 Broad street, New York. Estimated cost \$250,000.

Pennsylvania

BLAIRSVILLE, PA.—Conemaugh Sanitary Mfg. Co., recently formed to manufacture cast iron enameled sanitary ware, will remodel the former plant of the Conemaugh Iron Works which it recently acquired.

McKEESPORT, PA.—National Tube Co., Frick building, Pittsburgh, plans

erection of power house on plant property.

PITTSBURGH, PA.—Volupe Coal Co. will build a coal tipple and handling plant costing approximately \$40,000.

POLK, PA.—Commonwealth of Pennsylvania, A. S. Janeway, executive director, 600 North Second street, Harrisburg, Pa., has plans nearing completion for rebuilding stokers, one boiler, installing three new 500-horsepower boilers, new pumps, new engine generator, at a cost of \$90,000. H. B. Joyce, 810 Commerce building, Erie, Pa., engineer.

Ohio

CANTON, O.—Canton Stamping & Enameling Co., 810 Carnahan avenue, Northeast, will soon take bids for erection of two-story addition to factory, costing \$40,000.

CINCINNATI—Hilton-Davis Chemical Co., Langdon road and Pennsylvania railroad, plans to construct new office and laboratory buildings, new color and pigment building and also purchase equipment for these buildings as well as other equipment.

KENT, O.—C. L. Gauger Machine Co., maker of machinery and parts, is considering building a one-story addition, costing \$35,000, with equipment. Charles Kistler, 105 East Main street, is architect.

LORAIN, O.—American Crucible Prod-

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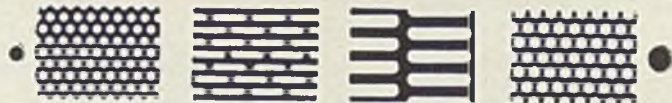
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North Carolina

ASHEVILLE, N. C.—American Enka Corp., 271 Church street, New York, maker of cellulose rayon products, is taking bids on general contract for constructing an addition to its mill near Asheville. Cost estimated at \$500,000 including equipment.

WASHINGTON, N. C.—Moss Planing Mill contemplates erection of mill building costing \$40,000 with equipment.

Louisiana

BATON ROUGE, LA.—Ethyl Gasoline Corp., 135 East Forty-second street, New York, plans erection of a plant adjoining its present works here. Project includes power house, machine shop and other mechanical units. Estimated cost with machinery is over \$4,000,000.

DELCAMBRE, LA.—Village, J. V. Delcambre, mayor, receives bids Dec. 4 for constructing waterworks system, including cast iron mains and fittings, valves and valve boxes, installing pumping units and connections, pumping station and engine house and furnishing all pumping machinery.

Tennessee

CHATTANOOGA, TENN.—Lookout Oil & Refining Co., Kirkland avenue, producer of cottonseed oil products, has approved plans for new steam power house, costing about \$100,000 with equipment.

CHATTANOOGA, TENN.—Combustion

Engineering Corp., care of A. J. Moses, superintendent, has plans by R. H. Hunt Co., architect and engineer, James building, for one-story steel shop, costing \$45,000.

CLARKSVILLE, TENN.—Kentucky-Tennessee Light & Power Co., Bowling Green, Ky., plans new power substation here. Site has been selected.

Virginia

NORFOLK, VA.—City of South Norfolk has rejected offer of Virginia Electric & Power Co. to furnish light and power to city, and will erect its own municipal plant. Wiley & Wilson, engineers, Peoples National Bank building, Lynchburg, Va., has been authorized to bring survey made in 1936 up to date. Work to begin soon. Cost \$331,000.

ROANOKE, VA.—Board of directors, Norfolk & Western railway, W. J. Jenks, president, has authorized an improvement program totaling \$3,700,000, including purchase of 25,000 tons of steel rails and fastenings.

Missouri

ST. LOUIS—McDonald Machinery Co., 1531 North Broadway, has let general contract for erection of one-story addition, 35 x 115 feet, to be used for storage and distribution purposes. Will spend \$40,000, including equipment.

Oklahoma

BLACKWELL, OKLA.—City, Mae Q. Williamson, attorney general, has approved \$300,000 bonds for improvements and extension of city power plant; will install 4000-kilowatt turbine. C. A. Stoldt, city engineer.

Wisconsin

DENMARK, WIS.—Denmark Brewing Co. will build a bottling plant. Cost with equipment \$40,000.

Kansas

NORTON, KANS.—State board of administration, Topeka, Kans., J. A. Mermls, manager, is taking bids to Dec. 1 for the construction of a complete new sewage disposal plant to cost about \$80,000. Paulette & Wilson, 1006 Kansas avenue, Topeka, Kans., consulting engineers.

ST. FRANCIS, KANS.—City is taking bids to Dec. 1 on construction of addition to power plant, two diesel gen-

erating units and accessories, one 400-horsepower and one 300-horsepower, to cost about \$90,000. E. T. Archer & Co., 609 New England building, Kansas City, Mo., consulting engineers.

Iowa

AVOCA, IOWA—Voters at recent election approved a \$20,000 bond issue to finance improvements to present waterworks system. Charles P. Blust is mayor.

DES MOINES, IOWA—Des Moines Ice & Fuel Co., 100 Maple street, is considering building a coal handling plant and storage and mine buildings. Cost to exceed \$70,000 with equipment.

LAKE PARK, IOWA—City will hold an election Nov. 30 on a \$15,000 bond issue to finance construction of a purifying plant and storage facilities. L. N. Rowe is mayor.

Nebraska

HARTINGTON, NEBR.—Cedar-Knox Rural Public Power district, M. L. White, secretary, is taking bids to Dec. 9 for construction of approximately 180 miles of rural transmission lines in first unit of project at an estimated cost of \$200,000. Plans and specifications obtainable from owner or engineer upon payment of \$5. Certified check of 5 per cent to accompany bid. H. H. Henningsen Engineering Co., 326 Union State Bank building, Omaha, Nebr., consulting engineer. (Noted Nov. 6.)

Pacific Coast

LOS ANGELES—Standard Tank Co. has been incorporated in Los Angeles county with a capital stock of \$25,000. Directors are: J. T. Sparling, P. W. Seals and Spencer C. Olin. The new corporation is represented by Sparling & Tell, attorneys, 1105 Subway Terminal building, Los Angeles.

LOS ANGELES—Swift & Co., Union Stockyards, Chicago, plans installation of motors and controls, conveyors, regulators, electric hoists and other equipment in new meat packing plant here. Bids are being received on general erection contract. Cost over \$750,000.

LOS ANGELES—A certificate to conduct business under the firm name of Johnson Tank & Steel Co., 2901 Poppy avenue, Compton, a suburb of Los Angeles, has been issued to the owner, Carl C. Johnson, 7316 California avenue, Huntington Park, Calif.

RIVERSIDE, CALIF.—Plans have been completed for construction of a large machinery factory at Twelfth street and Pachappa avenue, for the Citrus Machinery Co.

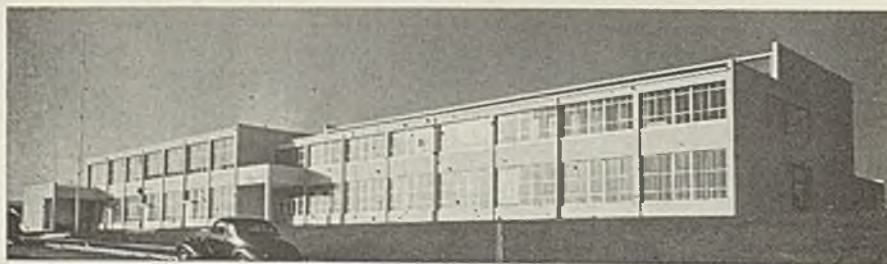
SEATTLE—Latta Brothers, 2321 Northlake avenue, maker of mechanical equipment, auto parts, will build a one-story machine shop 30 x 54 feet. Cost \$30,000 with equipment. Harold Adams, Securities building, architect.

Canada

WINDSOR, ONT.—Windsor Coal & Ice Co., W. J. Pulling, general manager, 1504 McDougall avenue, is interested in prices of complete new equipment and materials for rebuilding two-story coal compression factory.

WOODSTOCK, ONT.—Ralston Purina Co., 121 Prenott street, Buffalo, has awarded contract to Tope Construction Co., 677 Main street, Hamilton, Ont., for erection of two story 60 x 60-foot warehouse. The company is interested in prices of conveyor system for carrying bagged products. R. A. Blair, 372 Bay street, Toronto, Ont., district manager.

Indoor-Outdoor Schoolhouse Built in Los Angeles



■ The new Ralph Waldo Emerson junior high school at Westboro village, Los Angeles, incorporates the indoor-outdoor class room idea, suited to warm climates. Steel and glass doors, many of them 16 feet wide, may be pushed back to throw the outdoor patio and the indoor room into one. Richard J. Neutra, Los Angeles, is the architect



Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

NRA Chickens Come Home

To the Editor:

Paper, rubber, meat, rope, office supplies, cans, chemicals, medical supplies, plumbing, explosives, and "other materials without end" were cited as well as reinforcing steel, pipe and cement by Attorney General Cummings in his speech to the grocery manufacturers in New York recently, referring to similarity in bids submitted to the government.

The fact that the attorney general points to "materials without end" is significant. Not a few industries have submitted identical bids on like products—but many industries.

Is this not an effect of the government's own policies? Did not the government ask industries to control their prices, and did it not encourage uniformity? The latest in that direction is its dictating prices on bituminous coal.

Surely there could not be such widespread adherence to price levels unless the government itself had laid the groundwork for it. Chickens are coming home to roost!

MANUFACTURER

Cleveland

Good Job, Well Done

To the Editor:

Please accept our highest compliments for a very fine piece of reporting contained in the Nov. 15 issue on the Cartel purchase of scrap.

The New York brokers consummating such sales exert every effort to shroud such news, to the detriment of all the scrap iron dealers

vitaly interested in such reports. Every scrap iron dealer should feel greatly indebted to you. Please keep it up.

B. H. BASSOW

Bassow Bros.,
Bronx, N. Y.

Halts Industrial Growth

To the Editor:

It may interest you to know we are not now making any new developments in our business, excepting some improvements in the plating operations.

We would make some material changes if we were not taxed excessively, which does not permit us to build constantly for the future out of income.

Our present plant, appraised at \$200,000, is the result of plowing back earnings into new facilities thereby making more jobs.

PROTECTION

Detroit.

Suggests New Anthem

To the Editor:

All the discerning children who attended the summer band concerts waited politely until the end of the patriotic airs and then demanded "The Merry-Go-Round Broke Down."

The kids are right. I am recommending to my friends in congress that during the special session they adopt "The Merry-Go-Round Broke Down" as our national anthem.

It is certain that astute business men will feel impelled to dig business out of usually neglected corners. I am a good digger.

JAMES WALLEN

Hagerstown, Md.

STEEL His Sunday Reading

To the Editor:

This seems to be the season for picking All-Americans of all kinds, but hasn't one been overlooked? As a long-time reader of STEEL, I call upon other devotees to subscribe to the following resolution: "Now therefore, be it resolved, and it hereby is resolved, that STEEL is the All-American business paper."

Our firm takes a copy of STEEL, but I find myself unable to give it the attention it deserves, so for several years I've been getting a personal copy. It arrives at my post office box around 4 o'clock on Sunday afternoon, and from then until 10 p.m., dinner is the only thing able to distract my attention from it.

The engineering stories especially attract me, but I can truthfully say I read everything else also. Some time ago I noticed in Reader Comments a letter to the effect that STEEL was leading the way toward development of a better writing style for business papers, and I heartily agree. That is why I find the news section so interesting. It's meaty and condensed.

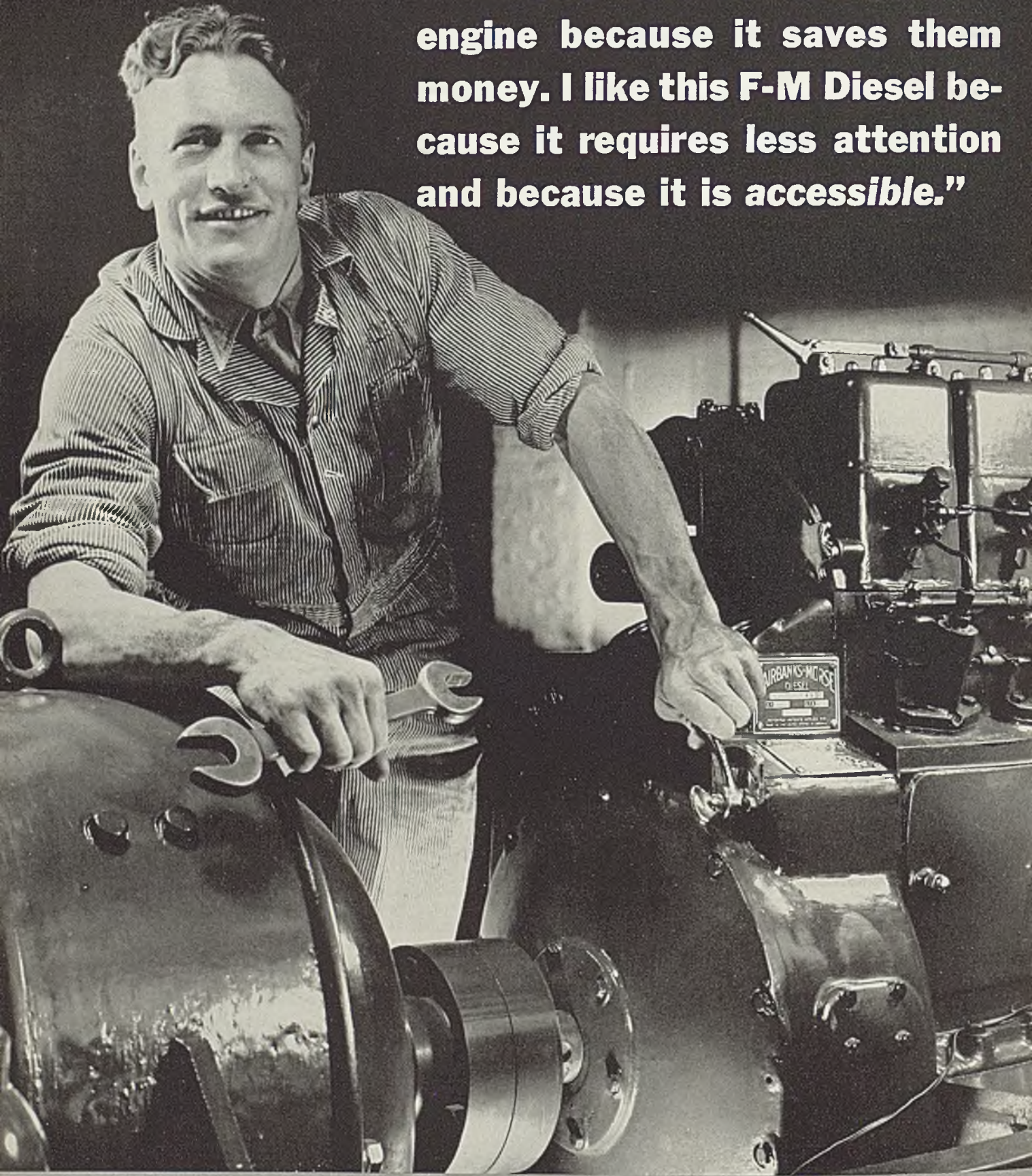
Incidentally, your Mirrors of Motordom feature enjoys such a reputation around our office that one of the boys once made a bet with an automobile dealer solely on the strength of some information he'd read in Mirrors.

We're eagerly awaiting your new Yearbook of Industry. In the past, we've felt each issue was better than the one preceding, and those old copies are plenty dog-eared.

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Owatonna, Minn.

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