

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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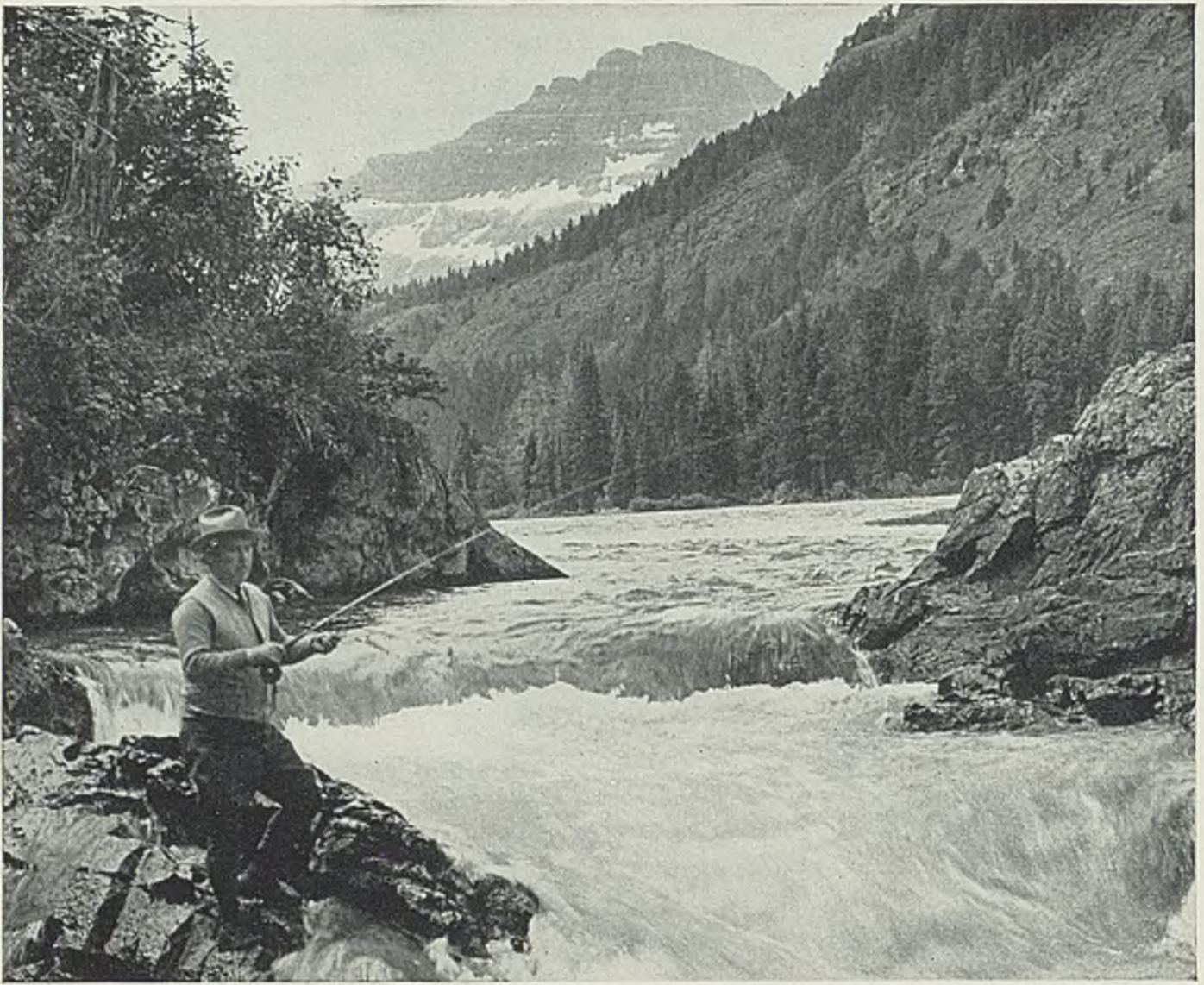
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RYERSON

As the Editor Views the News

AS THE zero hour for the drive to "organize" the steel industry approaches, every employer in the metalworking industries should consider well just how the lines of battle are forming. It would be a serious mistake to assume the employers, and employees who do not wish to join a professional union, are confronted only by John Lewis, his committee for industrial organization, its union henchmen and camp followers. The opposition is much more formidable than that. It embraces also an active element in the new deal administration which for political advantage will do everything in its power to help CIO to win.

* * *

Regardless of how the courts may finally rule on the legal aspects of government jurisdiction in labor relations, the only fair and logical

Is New Deal a Fair Umpire?

position of a government administration—whether it be federal, state or local—is that of an impartial umpire whose primary duty is to see that the employees of the country receive a square deal. Of course the new deal administration has used its high-powered propaganda machine effectively in attempting to convince the American public that its policies on labor relations are solely for the purpose of protecting employees. It has assumed a saintly air in its promotion of collective bargaining.

* * *

But three dismal years of experience in government-dictated labor relations have proved that the administration is not a fair umpire and that it does not give employees a fair deal. Its entire

"Throws" Game to Labor Unions

program has been based on the fallacy that millions of workers desire to join professional unions and that they are prevented from joining by coercion on the part of employers. Proceeding on the basis of this erroneous pre-

mise, new dealers—coached and intimidated by ambitious labor union leaders—have gone to extreme and unconstitutional lengths to curb the influence of employers and have done all in their power to promote ill feeling between employer and employe, but they have done absolutely nothing to prevent intimidation and violence by professional union agents. The umpire calls strikes on one side only. He is "throwing" the game to the unions.

* * *

Why is it that the new deal has tried to sell American workmen into the bondage of professional unions? The answer is political greed.

Union-New Deal Forces Arrogant

Leaders like John Lewis think they see a chance to seat a union man in the White House some years hence. To attain this objective they need power in the form of dues-paying members. They are swapping support to new dealers for their assurance of aid to the union labor movement. New dealers are delivering handsomely. Witness the emotional outburst of Secretary Ickes (p. 14) in the Jones & Laughlin case. This, if nothing else, should indicate that the new deal-union labor alliance has become an arrogant dictatorship.

* * *

In brief, the steel industry is pitted against a strong opposition. Undoubtedly public opinion will have much to do with the outcome. If this

Carry Steel's Case to Public!

is true, the CIO-new deal army has a running start by virtue of its adroit use of publicity. It knows how to win the man in the street through the medium of the printed word. Industry is woefully weak in its appreciation of the power of this art. To the leaders of steel we ask these questions: Are you willing to incur the risk of defeat because your lawyers insist that the industry thrust its head in the sand? Or will you enhance the chance of victory by taking the public into your confidence? Why maintain a clam-like silence when your cause is so worthy?

E. L. Shaner

Ickes' Reprisal Keyed With Labor Drive; Award Spurned

AS JOHN L. LEWIS marshaled his forces for organizing the steel industry last week, completing the set-up of CIO, some measure of support was thrown to the committee by the government, after the government was defeated in an attempt to enforce another labor act.

"I am glad to take advantage of a case of identical bidding to throw additional weight behind the government's effort to obtain and enforce fair treatment of labor," said Secretary Ickes, withdrawing an order given to the Jones & Laughlin Steel Corp., for \$40,000 worth of steel piling for the All-American canal on the Colorado river.

"It has always been the policy of work-giving agencies under my direction to see that labor gets a square deal."

Following which John L. Lewis released a tirade against "judicial autocracy . . . nullifying the representative form of our government."

J. & L. Officials Take No Action

Timed and tuned to the organization drive, as it appeared to be, the Ickes cancellation and comment were viewed in the steel industry as acts of reprisal. Though the secretary said he had been considering holding up the J. & L. contract before the United States circuit court at New Orleans had ruled against the labor board and in favor of J. & L., the withdrawal did not occur until after the court had rendered its decision.

Four bids had been submitted for the steel, including Bethlehem Steel Co.'s, which the secretary said was disqualified because of a discrepancy; Inland Steel Co.'s, and Carnegie-Illinois Steel Corp.'s. The contract was awarded J. & L. because this would afford the longest transportation.

While the secretary was considering the Inland and Carnegie-Illinois bids, these companies said they would refuse to accept the award. New bids will be called for about June 30.

Jones & Laughlin executives have taken no action on the cancellation of the verbal order. None of the 719 tons has been rolled or shipped. The company did not receive a signed contract.

To date the labor relations board has received 982 complaints of violations of the Wagner law. Complaints

will continue to be filed, and the board will continue to make decisions, it is said, until the Supreme Court decides the issue. The court does not meet until Oct. 5, and a final decision may not be obtained until next spring.

The suit was brought in New Orleans because of the crowded docket in the third federal appeals court at Philadelphia and because J. & L. has a plant at New Orleans within jurisdiction of the fifth district court.

The court was asked to enjoin J. & L. from interfering with union activities of its employes and to reinstate ten employes the labor board alleged were discharged for union activities at the Aliquippa, Pa. plant.

The unanimous decision quoted from the Supreme Court's ruling in the Guffey coal act, which this court recently declared unconstitutional. The circuit court held that the labor relations board "has no jurisdiction over a labor dispute between employer and employes touching the discharge of laborers in a steel plant who were only engaged in manufacture.

"The making and fabrication of steel by the Jones & Laughlin Steel Corp. is production regulable by the

state of Pennsylvania, notwithstanding the corporation also engages in interstate commerce regulable by congress in bringing its raw materials and again in selling and delivering its products.

"No specific present intent appears to impede or destroy interstate commerce by means of a strike in a manufacturing plant, or other like direct obstruction to or burden on interstate commerce. The order we are asked to enforce is not shown to be one authorized to be made under the authority of congress."

President Roosevelt signed the Wagner bill July 5, 1935, despite strong protests that it was framed by friends of organized labor. It attempted to perpetuate section 7a (collective bargaining) of the recovery act, and to give labor a right to organize industry. Among other regulations, it purposed to prohibit employers from giving advice or assistance to the so-called company unions.

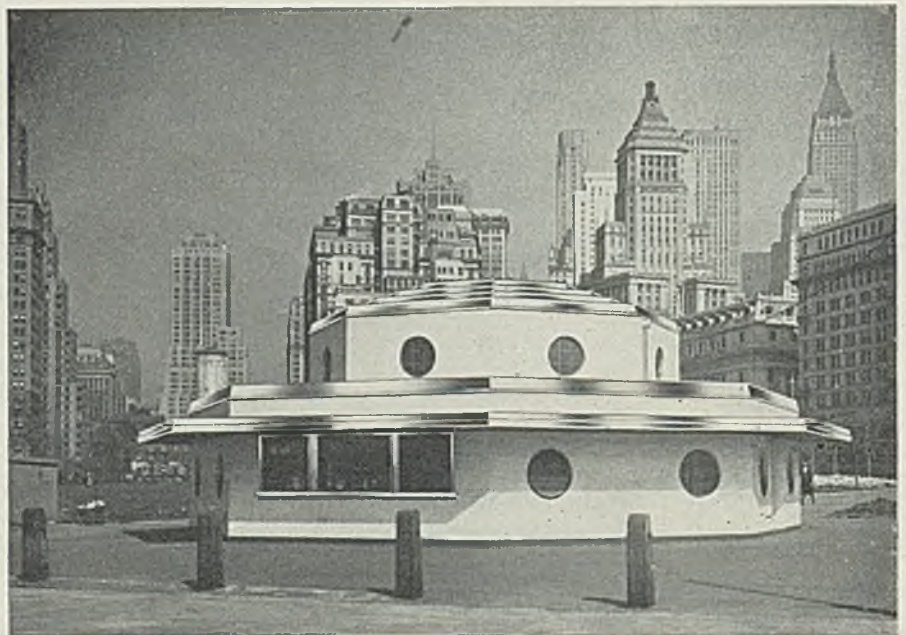
The labor board is now involved in seven similar cases in the circuit court of appeals.

High Percentage of Employes Vote in Steel Plant Elections

CARNEGIE-ILLINOIS STEEL CORP. announced the following results of its plant elections which began June 12 and were concluded June 16:

At the Mingo, O., works 95 per

Stainless Steel Defies Ocean Spray



AN INTERESTING application of stainless steel is the trim on the new Consolidated ticket booth in Battery park, New York. The glistening top is visible from far down the harbor, also from many of Manhattan's skyscrapers. Salt mist from the ocean will continually put to the test this steel, Enduro, manufactured by Republic Steel Corp.

cent of those eligible voted; Homestead, 85.9; Isabella and Lucy furnaces, 99; river transportation, 83.29; Farrell and Central furnaces, 90.91; Duquesne, 94.02; Clairton, 83; Edgar Thomson, 81.7; and Texas Warehouse division, 91 per cent.

The following divisions formerly operated by American Sheet & Tin Plate Co. reported: New Castle, 97.99; Shenango, 95.12; Guernsey, 97.08; Farrell sheet mill, 93.23; Laughlin, 98.2; National, 93; Vandergrift, 85.06; Wood works, 100; roll and machine division, 97.59; and Lorain division (Johnstown, Pa.), 91.

At the Gary tin mill, 99.5 per cent of eligible employees voted, and the Gary sheet mill, 81.5. The figure for the Youngstown division of Carnegie-Illinois Steel Corp. was 88.68.

In the main, Carnegie employees elected men in their own department as their company union representatives and few outsiders were elected. Most of the incumbents were returned to office. At the Homestead works where 26 employee representatives were to be named, only six represented a turn-over.

In two instances in the Pittsburgh district outsiders were named to represent Carnegie-Illinois Steel Corp. employees. Charles Scharbo, president of the Rankin, Pa., lodge of the Amalgamated Association of Iron, Steel and Tin Workers, was elected at the Carrie furnaces.

John J. Mullen, recently chairman of a group of Carnegie-Illinois Steel Corp. employees which requested higher wages and vacations with pay, was elected at the Clairton plant.

95 Per Cent at Republic

In 37 plants of Republic Steel Corp. and subsidiaries 27,701 employees voted in elections. This represented 95 per cent of those eligible. A total of 280 employee representatives were elected.

Elections are conducted by secret ballot under supervision of employees. Representatives are elected for one year. Employee representatives in Republic plants in 1935 handled 1643 questions with a settlement favorable to employees of 78 per cent of the total.

The steelworkers' organizing committee, of which Phillip Murray is chairman, last week stated that at least 200 more workers will be assigned within the next week to ten days. Offices will be opened in Chicago and Birmingham.

Taylor Goes to Europe

Myron C. Taylor, chairman, United States Steel Corp., sailed late last week for Europe. He will visit the corporation's offices in the principal countries, following his usual custom.

Trade Commission Charges Collusion in Steel Bids

PRESIDENT ROOSEVELT has referred to the department of justice "for appropriate action" the long-awaited report of the federal trade commission on alleged collusive bidding on steel sheet piling for certain construction projects financed by the PWA.

In its report, the commission said it found "reasonable ground to believe that the anti-trust laws have been violated," and made the recommendation that the report be referred to the department of justice.

The commission also recommended that the President suggest to con-

out that "the entire price structure of the steel industry is an elaborate concert of action among supposedly competing interests and that other important industries are similarly organized."

The commission's report relates to bids on three specific public works projects submitted in September, 1935.

It declared that business in steel sheet piling is concentrated in the United States Steel Corp., Bethlehem Steel Co., Jones & Laughlin Steel Corp., and Inland Steel Co. The report states that these companies admitted that they quoted identical delivered prices because they were acting pursuant to a resolution of the

Ickes, the Federation, and the Three Projects

SECRETARY ICKES went to the White House some months ago and asked the President to order an investigation of alleged collusive bidding in the steel industry. That resulted last week in the federal trade commission's report, quoted in the accompanying article.

It will be recalled, last November and December identical bids were submitted by steel piling producers on three public works projects, one the Triboro bridge, New York; others at Morehead City N. C., and Miami, Fla.

The secretary ordered foreign steel for the Morehead City job, and that was signed and sealed before the American Federation of Labor became aroused. The other two also were marked for foreign steel but the federation's protest led him to change his mind. The secretary switched to domestic steel, but demanded an investigation.

gress the advisability of enacting legislation aimed specifically at "delivered price systems that frustrate price competition," and that all government purchasing officers be requested to develop and furnish evidence regarding cases of identical bidding on various commodities.

In his letter to the attorney-general, the President said in part:

"Will you be good enough to prepare for me the necessary letters to purchasing agents to be sent out by me at once, and also to prepare a draft of recommendations to congress at the next session."

In answer to the President's inquiry whether steel prices quoted in three cases investigated were fair and reasonable, the commission reports that an affirmative answer cannot be given.

It stresses the broader social and economic significance of conditions typified by collusive bidding. It points

industry, continuing in effect provisions of the former steel code with respect to the basing point system of delivered prices, and related practices.

The commission apparently confirms these reported admissions by breaking down the identical delivered prices into their constituent elements, and then accounting for each element.

These include the mill base, price at the government basing point, and freight from that point to destination, charges for extras and discounts for early shipments.

The methods of calculating each element, the commission reports, were found to have been expressly authorized either by the code or by resolutions and interpretations made by the American Iron and Steel institute.

These methods, the report states, were either continued in force or

established anew after the steel code passed out of existence. The identity of the delivered prices on steel products generally is said to be preserved to one-tenth of a cent by elaborate formulae worked out by a committee of the institute.

The commission's report further states that it was unable to ascertain whether or not there is any dumping of German steel piling in this country.

TinPlate "Collusion" Hearing Postponed Indefinitely

Hearings on the federal trade commission's charges of collusion against 15 manufacturers of tin plate, which were scheduled in five cities, beginning at Wheeling, W. Va., June 10, have been indefinitely postponed.

A general denial of unlawful practice was filed by the companies which were accused last March by the commission with refusing to sell stock tin plate to jobbers and small manufacturers. No indication has been given by the commission as to when the hearings will be ordered.

At Washington Friday it was stated by E. F. Haycraft, counsel for the commission, that "negotiations are pending for settling the case without the taking of testimony."

Meetings

MEETING jointly in Pittsburgh June 18, board of directors and technical advisory committee of American Hot Dip Galvanizers association approved as tentative standards 15 of 16 proposed revised specifications for hot dip galvanizing. Stuart J. Swensson, 903 American Bank building, Pittsburgh, is secretary-treasurer of the association.

FOOTE BROS. SALES RALLY

About 50 salesmen and representatives of Foote Bros. Gear & Machine Co., Chicago, met in that city, June 11 and 12, for the company's first national sales convention. Talks and discussions were heard throughout the two days, with a plant inspection conducted Thursday morning. F. A. Emmons, vice president and sales manager, presided at the sessions. Guest speakers included J. P. Sanger, vice president in charge of purchasing, United States Gypsum Co., Chicago, and Ralph O. McGraw, editor, *Industrial Marketing*.

HARDWARE MEN OCT. 19-22

National Wholesale Hardware association, Philadelphia, has decided to hold its forty-second annual convention in Atlantic City, Oct. 19-22. Headquarters will be at Marlborough-Blenheim hotel.



Leon Fraser

Once a Teacher, Leon Fraser Succeeds Baker on Steel Board

GEORGE F. BAKER, chairman, First National bank, New York, resigned as director of the United States Steel Corp. and member of the finance committee. He was director since 1922, member since 1930. The Steel board at a special meeting last week accepted with regret. Mr. Baker is son of the late George F. Baker, for many years one of the outstanding figures in American finance. The elder Baker co-operated with James Pierpont Morgan Sr. in founding the Steel corporation.

Mr. Baker's resignation was in line with his desire to limit his burden of activities. His investments and those of his family in the Steel corporation are not affected. His father is said never to have sold a share of Steel corporation stock. The Baker block has from the formation of the corporation been one of the largest interests. Except for change of ownership in the family it is believed to be practically the same as at the time of the elder Baker's death in 1931, at the age of 93.

Leon Fraser, vice president of First National, was elected to both positions relinquished by Mr. Baker.

Mr. Fraser has been a reporter, teacher, lawyer, diplomat and president of the Bank of International Settlements. He resigned the latter post in February, 1936, to become vice president of First National.

Metal Employment Up

Metalworking employment at principal centers increased 1.1 per cent to the highest level for that month since 1930, according to the National Metal Trades association. The May index was 83.6 compared with 70.2 a year ago and 47.5 in

May, 1933. The index is based on the 1925-1927 monthly average.

Steel Houses

BETHLEHEM STEEL CO. will erect 50 all-steel houses on property near its new strip mill in Lackawanna, N. Y. Others were built there several years ago. The new steel houses will sell for \$3000 to \$4000.

BUILDER SEES TREND

"The steel house will do for Pittsburgh what the automobile did for Detroit," John J. Lawler, prominent Pittsburgh real estate operator and builder said last week.

"The trend toward steel can be seen in the average house built today. Formerly no steel was used in less expensive houses, but today even the least expensive homes contain steel parts. Sooner or later the steel house will create a tremendous market for steel and we should encourage the steel industry to continue the progress it is making in this direction."

Needs of Air Conditioning Helping Machinery Sales

Demand from the air conditioning industry is a factor in the general increase in machinery sales, according to George R. Kinney, sales manager, Niagara Machine & Tool Works, Buffalo, manufacturers of presses, shears and machines for plate and sheet metal work.

"Remarkable activity in machinery sales is evident from all branches of the air conditioning industry," he said. "These include manufacturers of heating and cooling surfaces, grilles, air filters, fans, ducts and other parts. Contractors who are making the installations are seeking sheet metalworking machinery.

"Manufacturers of air conditioning equipment are making heavy purchases of power operated machines. Contractors are buying both power and foot operated machines for use in their shops as well as at the point of installation."

World Output Improves

World industrial production advanced during April, according to the monthly report of the National Industrial Conference board. Output rose in the United States, Canada, Great Britain, Sweden, Australia, Mexico, Chile, and Peru. Production in France, Germany, Italy, the Netherlands, Belgium, Switzerland, and Japan showed little change and in Spain remained at a low level.

Heavy Appropriations; High Taxes from Congress Session

TAX legislation of the second session of the seventy-fourth congress, huge appropriations, and large number of pending bills, are the results most significant to business in legislation of the past six months.

Last week's drive toward adjournment made uncertain the passage of several proposed measures affecting industry. Efforts of both houses centered on clearing the tax and relief-deficiency appropriation bills, but the substitute Guffey bill, the Wagner housing bill, the Healey government contracts bill, and the ship subsidy bill were also shoved along toward passage.

In examining the six months' record, the unwillingness of both houses to act decisively on some matters which could be avoided represented the most striking difference between the activity at this session and the two preceding legislative years. Fall elections appeared to be the reason. Action on several bills which were important to business, and which might have been considered under ordinary circumstances was postponed.

Threatened revision of the corporate taxing system aroused more protests from business than almost any other legislation of the session. Under an agreement by conferees from the house and senate last week graduated taxes on undistributed income were drafted, ranging from 7 to 27 per cent. The normal tax now ranging from 12½ to 15 per cent would be graduated from 8 to 15 per cent.

Normal Rate Unchanged

The measure as approved by the conferees imposes a 22½ per cent tax on foreign corporations in business in this country, 15 per cent for such firms in part-time business and 10 per cent on dividends from United States firms to foreign stockholders. The capital stock and excess profits tax was reduced from \$1.40 per \$1000 to \$1 per \$1000. The normal 4 per cent income tax rate was not changed. A proposal to increase surtaxes 1 per cent on incomes between \$6000 and \$50,000 was discarded. The amount of intercorporate dividends subject to taxation was reduced from 90 per cent to 85 per cent.

The section on penalties against corporations piling up "unreason-

able" surpluses was strengthened. Earnings set aside by previous contracts for liquidating business debts are to be exempt from the corporate profits tax.

The undivided profits tax is graduated as follows: 7 per cent on the first 10 per cent of earned income retained; 12 per cent on the next 10 per cent; 17 per cent on the next 20 per cent; 22 per cent on the next 20 per cent, and 27 per cent on the balance of retained income over 60 per cent. The President had strongly urged such levies.

As the conferees agreed to the tax bill the 3 cent per pound tax on palm oil for tin plate manufacture was taken out. Palm oil for this purpose remains exempt.

Heavy Yield From Profits

From corporate profits the bill is expected to collect \$630,000,000; from increased liquidation of holding companies \$33,000,000. Revisions in irrevocable trust regulations are expected to yield \$20,000,000 while the windfall tax on unpaid or refunded AAA processing taxes is calculated to bring \$82,000,000.

The Healey government contract bill, which would require employers to establish a 40-hour week and eight hour day and pay prevailing wages, was passed by the house Friday without any record vote. It was then taken to conference, since it had already passed the senate.

The Patman anti-price discrimination bill won the approval of the senate and was sent to the President Thursday. It seeks to prevent discounts and rebates for services not actually performed and permits the federal trade commission to set deadlines beyond which discounts for quantity purchases could not go.

Appropriations total approximately \$8,000,000,000 for this session. Combined with the amounts appropriated in the first session ending last August, the grand total of \$17,700,000,000 sets a new high mark for peace-time spending. One of last week's principal items of business was the \$2,375,000,000 deficiency-relief bill, carrying \$1,425,000,000 for relief, about \$500,000,000 for the social security program and \$300,000,000 for emergency conservation work. This was sent to the White House Thursday.

First effects of another important piece of legislation, the bill for immediate payment of the soldiers'

bonus, became apparent last week when distribution of \$1,600,000,000 to 3,500,000 veterans began. Passed by both house and senate in January over the President's veto, this bill ended a 16-year fight by the veterans.

Other major measures enacted in the session include:

Neutrality—compromise resolution extends existing neutrality law until May 1, 1937.

Commodity Exchange—sets up new commission for regulating trading in grains, cottons, potatoes, butter and eggs, etc.

Rural Electrification—REA placed on a permanent basis, and will receive \$410,000,000 over period of ten years.

Soil Conservation—substitute measure for AAA. This bill was signed by President March 1. It was designed to help maintain a ratio between purchasing power and net income of farmers.

Flood Control—omnibus bill called for projects totaling \$384,000,000. The \$272,000,000 Overton Lower Mississippi flood control bill was signed by the President last week.

Highways—the house adopted a conference report on the \$486,000,000 Hayden-Cartwright bill providing for a program for highway construction in 1938 and 1939, and sent it to the President in the week of June 7.

Sugar Control—present marketing quota system extended in stop-gap resolution sent to President last week.

Congress also passed the Kerr-Smith tobacco act and numerous minor measures.

Most impressive defeat of the session was the rejection of the Frazier-Lemke farm mortgage bill by the house, after strong protest by the American Federation of Labor.

Pending measures late last week included:

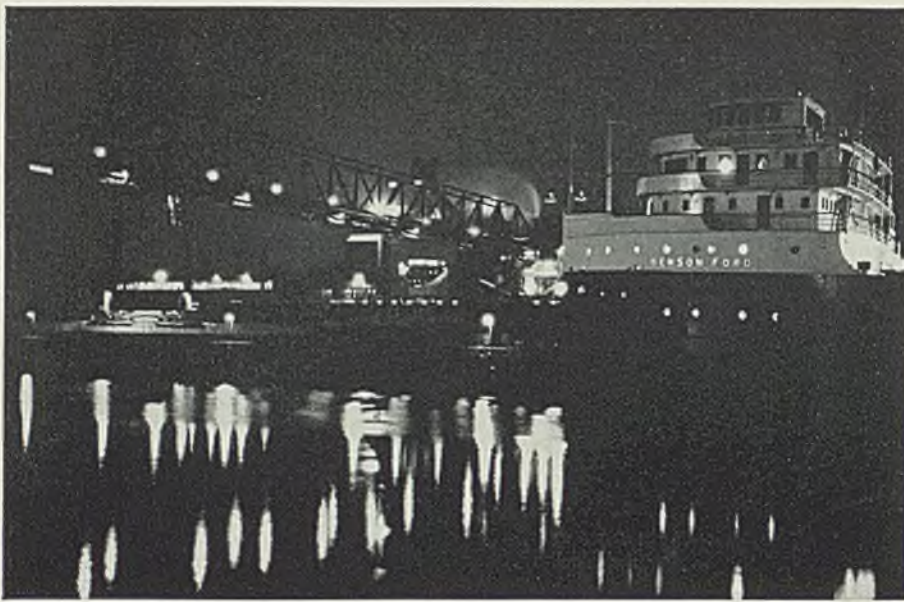
Thirty-hour week bill; Wood bill to nationalize the structural steel fabricating industry; war profits tax bill; lobby regulation; Bankhead farm tenant bill; Wheeler anti-basing point bill; Kerr-Coolidge immigration bill; anti-lynching bill; and the long and short haul repealer.

House Approves New Coal Bill

Senate hearings on the substitute Guffey bill ended with warnings from the United Mine Workers that strikes would be resorted to, as "our only weapon," if the measure failed to pass immediately. Operators protested price fixing provisions of the bill would wreck the industry eventually. The bill was approved in the house without a roll call.

Congress failed to retain the post of co-ordinator of railroads, held by Joseph B. Eastman, whose term expired June 17. He remains as a member of the interstate commerce commission.

Financial



WHERE FORD MOTORIZED, IRON-ORE SHIPS COME IN: Night scene at the Rouge plant, Dearborn, Mich. Lights of the Benson Ford are mirrored in the waters of the slip. In the background are the company's blast furnaces, and at left, the electric furnace building. Ford's ore receipts in 1935—approximately 600,000 tons

Iron Ore Shipments Up 37 Per Cent

SHIPMENTS of Lake Superior iron ore so far this year are 37 per cent ahead of the comparable period last year, a gain which if held to the end of the season will mean a total of approximately 39,000,000 tons. This compares with 28,500,000 tons shipped in 1935.

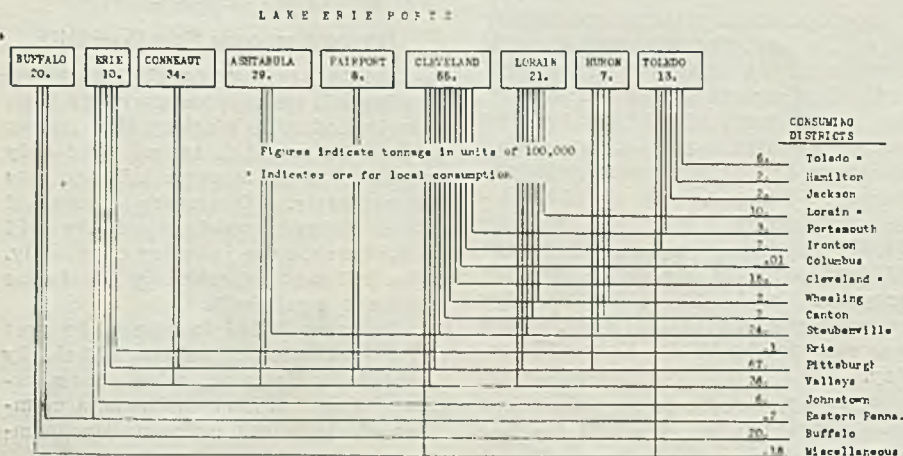
Shipments this month are likely to amount to 6,000,000 tons. In June, 1936 they were 4,241,000 tons. Up to July 1 this year 11,000,000 tons are indicated, against 8,145,000 tons for the same period in 1935.

The Great Lakes fleet of bulk cargo carriers numbers 319, of which 237 are in service, 204 carrying iron ore. Last year only 120 were engaged in transportation of Lake Superior ore.

Distribution of Lake Superior iron ore from lower lake docks,

eastern ore, and imported ore for 1935 are shown in the accompanying charts prepared by the Lake Superior Iron Ore association. Figures are in units of 100,000 tons. Cleveland shipped out 5,500,000 tons; Conneaut, O., 3,400,000 and Ashtabula, O., 2,900,000 tons. The Pittsburgh district received 6,700,000 tons; valleys 3,600,000; Cleveland, for local use, 1,500,000, and the Steubenville, O., district took 2,400,000 units.

Last year 790,000 tons of iron ore were imported into the United States from Chile, and 220,000 tons came from mines in Cuba. Of the total of foreign shipments during 1935, 1,200,000 tons of ore were received at Sparrows Point, Md.



DIRECTORS of the American Rolling Mill Co., Middletown, O., have declared a dividend of \$1.50 on the 6 per cent preferred stock, to stockholders of record July 1, payable July 15. They also declared a regular quarterly dividend of 30 cents per share to the holders of common stock of record June 15, payable July 15.

BEST FIRST MONTH SINCE 1929

Remington Rand Inc. reports April the best first month, with the exception of 1929, of any fiscal year in its history. Net income amounted to \$277,330, compared with \$193,030 in April, 1935. The company's fiscal year is to March 31. Total sales for May were slightly under April.

OTIS POSTPONES OFFERING

Otis Steel Co., Cleveland, has filed an amendment with the SEC, postponing the offering date of its proposed \$13,000,000 issue of 4½ per cent first mortgage bonds to June 23. It was reported that the company may reduce the amount of the offering to \$12,500,000 and raise the interest rate to 4¾ per cent.

GENERAL ELECTRIC DIVIDEND

A dividend of 25 cents a share on the common stock was declared at a meeting of the board of directors of the General Electric Co., June 12. The dividend is payable July 27 to stock of record June 26.

BUDD WHEEL DECLARES

Budd Wheel Co. has declared the regular quarterly dividend of \$1.75 per share, plus a participating dividend of 25c per share, on the first preferred stock of the company to holders of record at the close of business June 16, 1936, payable June 30, 1936.

OFFERS NEW PREFERRED

Driver-Harris Co., Harrison, N. J., filed a statement with SEC covering 192,000 shares of 5 per cent participating preferred stock of \$10 par and nontransferable receipts. New preferred will be offered the present 7 per cent preferred holders, par for par.

STOCKHOLDERS VOTE JULY 27

Pittsburgh Steel Co. stockholders will vote July 27 on proposed changes in capitalization. Changes revolve about an offering of new common stock to shareholders. It is proposed to change the \$100 par common to \$10 stated value and to increase the authorized issue to 1,000,000 shares from 253,500 now outstanding.

EARNING STATEMENTS

A. O. Smith Corp., Milwaukee, Wis., reports net income of \$831,748, after

depreciation and taxes, for the 12 months ended April 30. This equaled \$1.64 on the 498,575 common shares, after dividends on the 7 per cent preferred, now retired.

Pressed Metals of America Inc., Port Huron, Mich., shows net income of \$97,353 for the three months ended March 31, equaling 86 cents each on 112,989 shares.

Cleveland-Cliffs Iron Co., Cleveland, making first interim report, showed net loss of \$180,660 in operations for the March quarter. Taking into consideration profit of \$108,479 on sale of securities there remained a loss of \$72,180 for the quarter. In view of the fact that the quarter closed before the opening of lake navigation, the operating results should not be considered as an indication of the year's results.

Republic Steel Corp. has declared regular quarterly dividend of \$1.50 per share on its 6 per cent cumulative convertible prior preference stock series A, payable July 1, 1936, to stockholders of record June 12.

Spang, Chalfant & Co. Inc., Pittsburgh, has declared a \$2.50 preferred dividend, payable July 1 to June 16 record, leaving unpaid accumulated dividends of \$13.50 a share.

Thompson Products Inc., Cleveland, has net profit for the first quarter of \$218,520 equal to 78 cents a common share, against \$150,083 or 54 cents a year ago.

Black & Decker Mfg. Co., Baltimore, had approximate net earnings of \$350,000 for the six months ending March 31. This equaled \$1.04 a share as compared with 34 cents a share in the first quarter of 1935, when the net earnings were \$140,599.

General Steel Castings Corp., Ed-dystone, Pa., and Granite City, Ill., reports net loss of \$622,983 for the first quarter. This compares with a net loss of \$498,235 in the similar period last year.

National Malleable & Steel Castings Co., Cleveland, shows net income of \$186,005 for the first quarter of this year.

The financial report of the Sharon Steel Corp., formerly the Sharon Steel Hoop Co., and wholly owned subsidiaries for the quarter ended March 31 shows net profit of \$212,616 after depreciation, interest, amortization, federal and state income taxes, etc. This is equal to 58 cents a share on 368,359 no-par shares of common stock outstanding at the close of the period. No comparison is available as the merged company was formed within the past half-year.

Spang, Chalfant & Co., Pittsburgh, in the quarter ending March 31, shows net profit of \$313,522 equal to \$2.41 a share. This compares with \$131,903 or \$1.01 a share in 1935.

Chapman Valve Mfg. Co., Indian Orchard, Mass., for the first quarter

ended March 31 reports net income \$53,118 or 32 cents a common share. For the same period last year net income was \$165,423 or 4 cents a share.

DIVIDENDS DECLARED

Wheeling Steel Corp., Wheeling, W. Va., declared a regularly quarterly dividend of 50 cents, on the preferred stock payable July 1, to stockholders of record June 12.

Continental Steel Corp., Kokomo, Ind., declared a quarterly dividend of \$1.75 on the preferred stock payable July 1, to holders of record June 15.

Gulf States Steel, Birmingham, Ala., declared a dividend of \$3.50, on account of accumulations, on the preferred stock payable July 1, to stockholders of record June 15. Similar amounts were paid on April 1 and Jan. 15, 1936.

Midvale Co., Philadelphia, declared a dividend of 50 cents payable July 1,

to stockholders of record June 20. A similar amount was paid on April 4.

McKeesport Tin Plate Co., McKeesport, Pa., has declared the regular quarterly dividend of \$1 a share, payable July 1 to June 16 record. In the last quarter the company paid a dividend of \$1 plus 25 cents extra.

Bliss & Laughlin Inc., Harvey, Ill., declared a quarterly dividend of 37½ cents on common stock, payable June 30 to shares of record June 20. This boosts the common dividend rate to \$1.50 annually from \$1. A dividend of 17 cents on the 5 per cent preferred stock, payable June 30, covering the issuance of the stock May 22 to June 30, was also declared.

American Brake Shoe & Foundry Co., New York, has declared a dividend of 40 cents on common stock. The company previously paid 30 cents quarterly. It also declared a dividend of \$58.34 on the 7 per cent preferred for the period April 1 to April 30.

Freight Surcharges Remain on Steel; Pig Iron Benefits Only on Long Hauls

EXAMINING the action of the interstate commerce commission in extending freight surcharges for six months, with some reductions for raw materials, as reported briefly in STEEL last week, producers can see only nominal benefits. The extension is to Dec. 31, instead of an indefinite period as railroads petitioned.

The surcharge on steel products will remain unchanged, at 7 per cent of the regular carrying charge. This affects consumers mainly, and no concerted protest was made, as in the case of iron ore and pig iron.

The surcharge on iron ore, which has been in effect from April 18, 1935 has been 10 cents per net ton, or 11.2 cents per gross ton, to be applied on the railroad haul to upper lake ports. This has been reduced to 8 cents per net ton, or 8.96 cents per gross ton, an actual reduction of 2.24 cents. On the ore which may be moved after July 1 this year the saving will be about \$625,000.

Limit Surcharge on Pig Iron

On pig iron the surcharge remains 7 per cent additional on freight rates, as before, but the maximum has been reduced from 40 cents per net ton to 25 cents. The effect of the reduction will be to impose the same extra as before on shipments where a rate is \$3.57 per ton or less. On rates over this level the maximum will be 25 cents per ton instead of 40 cents.

Thus on pig iron shipments from Pittsburgh to Cleveland and Toledo, O.; from Youngstown, O., to Cleveland and Toledo; from Chicago to Milwau-

kee, South Bend, Ind., Muskegon, Mich., Peoria, Ill., the surcharge will be unchanged under the new ruling, the rates in all these cases being under \$3.57 per ton.

On shipments from Birmingham, Ala., to northern points, from Buffalo and from Erie, Pa., to New England, and from Chicago to the Pacific coast the surcharge will be limited to 25 cents per ton instead of the 40 cents formerly the maximum. As heavy ton-nages move between the points named and between others at like distances, the saving on the longer hauls will be material.

The contention of producing interests was that it helped strong railroads which did not need assistance, as much as or more than the weaker roads which do not participate heavily in this class of traffic.

It was also contended in the case of iron ore that the surcharge was to be applied only once it was imposed on the haul from mine to Lake Superior port and not from lower lake ports to consumers at inland points, such as Pittsburgh and Wheeling. The commission was asked to make a division between the rail lines at the head of the lakes and those completing delivery from lake docks to furnaces, to equalize costs.

The order also reduced the surcharge on coal, which had been 15 cents per ton on rates from \$1.50 upward, making it 10 cents per ton. Slight changes were made on sand, gravel, slag and other roadbuilding materials. Limestone was not mentioned.

Men of Industry

WILLIAM P. EWING has been elected vice president, Superior Steel Corp., Pittsburgh. Since Oct. 1, 1935, he was vice president in charge of sales, succeeding the late John E. Wetzel. Mr. Ewing has been with Superior since May, 1918, and after five years in various capacities in the plant, entered the sales department in 1924. In 1930 he was made assistant manager of sales. He is a member of the Duquesne club, Pittsburgh Athletic association, and the Chartiers Heights Country club.

L. W. Briggs has been elected vice president in charge of sales, succeeding Mr. Ewing. He formerly was general manager of sales for West Leechburg Steel Co., and resigned recently after the proposed merger of the latter company with Allegheny Steel Co. He is a graduate of Swarthmore college and had been district representative of West Leechburg Steel Co. in Detroit and Chicago prior to his transfer to Pittsburgh as general manager of sales in 1930.

David Pryde has been elected vice president in charge of operations, having been previously works manager at the Carnegie, Pa., works of the company. He is also a director. Mr. Pryde began his career in 1894 at the Edgar Thomson works of Carnegie Steel Co. in the mechanical engineering department, later becoming superintendent of the Lower Union mills. He has been with Superior since January, 1928, and is active in civic affairs in Aspinwall, Pa.

Charles K. Seymour has resigned as president of the Niles-Bement-Pond Co., New York, but will remain as a director and treasurer. Clayton R. Burt has been elected president.

Edward A. Livingstone has been appointed manager of alloy tube sales for the Babcock & Wilcox Tube Co., Beaver Falls, Pa. He formerly was engaged in the development and introduction of special high-temperature, corrosion-resistant alloys to the oil industry.

L. W. Grothaus has been elected vice president of Allis-Chalmers Mfg. Co., Milwaukee. He has been associated with Allis-Chalmers for 32 years, first working successively in the Norwood shops, the purchasing, drafting, engineering and sales divisions. He served as district sales manager at Minneapolis, and later at Cleveland. In 1925 he was made assistant manager of the electrical division, first at Norwood and later at Milwaukee; in 1931 he was made general representative, and since



William P. Ewing



L. W. Briggs



David Pryde

1933 has been assistant to the president.

George M. Snodgrass has been appointed general sales manager of Imperial Electric Co., Akron, O.,

manufacturer of electric motors and generators. For the past 15 years Mr. Snodgrass had been with Fairbanks, Morse & Co., where he advanced to the position of general sales manager of the electrical division. Prior to that he was with Allen-Bradley Co. for seven years where he handled sales engineering work on motor control problems.

K. C. Gardner, vice president, United Engineering & Foundry Co., recently left Pittsburgh for an extended trip to Europe.

J. Gordon Smith, formerly district manager for eastern New York state, Porter-Cable Machine Co., Syracuse, N. Y., has been promoted to assistant sales manager, effective June 15. Mr. Smith's duties will consist of field sales promotion and the co-ordination of activities of representatives.

Joseph A. Scott, melting foreman, Driver-Harris Co., Harrison, N. J., has been elected president of Electric Metal Makers Guild. David J. Giles, works manager, Latrobe Electric Steel Co., Latrobe, Pa., has been made vice president, and J. H. Chivers, melting foreman, Braeburn Alloy Steel Co., Braeburn, Pa., has been renamed secretary-treasurer.

Charles F. Mattern, general superintendent, Elliott Co., Jeannette, Pa., was elected chairman of the Western Pennsylvania Industrial conference for the 1936-1937 term at the annual convention at Conneaut Lake, Pa., June 13 and 14. Mr. Mattern succeeds Earl F. Blank, director of personnel of Jones & Laughlin Steel Corp. More than 600 executives attended the conference.

Fred D. Baker has been named district representative in central and northwestern Ohio for Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. For many years Mr. Baker represented the Strong, Carlisle & Hammond Co., machinery dealer, Cleveland, and prior to his present position he represented Charles H. Besly & Co., Chicago, as sales engineer in northern Ohio, Pennsylvania and New York. He is located at 17545 Madison avenue, Lakewood, O.

J. W. Gleason has resigned as general manager of Knapp Bros. Mfg. Co., Joliet, Ill., to take charge of the Chicago branch of the Rawlplug Co. Inc., New York. Mr. Gleason was assistant general sales manager of Kalman Steel Co. for five years; was associated with General Fireproofing Co. for seven years, and prior to that was with the Northwestern Expanded Metal Co. and Link Belt Co.

Gilbert U. Radoye has been placed in charge of publicity of the various divisions of Gar Wood Industries

Inc., Detroit. These divisions include the Gar Wood hydraulic hoist and dump body, truck and trailer tank, winch, crane and pole derrick, roadbuilding machinery, heating and air conditioning, automotive and motor coach.

V. C. Hogren has been appointed advertising manager for Acme Steel Co., headquarters in Chicago. For the past two and one-half years Mr. Hogren was in the New York office of Acme Steel Co. in sales promotion.

F. P. Shephard has been appointed district sales manager of the Cleveland office of Haynes Stellite Co., New York, succeeding the late W. A. Moore. Mr. Shephard has been associated with the cutting tool industry for more than 20 years, and for the past 9 years has been sales engineer in the Chicago office of Haynes Stellite.

George Endicott has joined the engineering staff of the Morgan Construction Co., Worcester, Mass., where he will be associated with the design and production of Morgoil bearings and other rolling mill machinery. Mr. Endicott was graduated from Stevens Institute of Technology in 1915 with a degree in mechanical engineering and in the same year entered the employ of the Morgan Spring Co. in its wire mill department. In 1917-1918 he was associated with Wickwire Spencer Steel Co. at Buffalo, and from 1918-1926 he was assistant to the vice president in charge of operations of Wickwire Spencer. During the past ten years he has been engaged in reorganization work and in consulting practice.

Mr. Endicott is a member of the American Society of Mechanical Engineers and the American Iron and Steel Institute.

H. C. McElhone has been appointed assistant to vice president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Associated



George Endicott



Carl H. Morken

with Westinghouse since 1919, Mr. McElhone for the past five years has been attached to the president's office.

Joseph A. Miller, master mechanic, Youngstown Sheet & Tube Co., Youngstown, O., has retired, after 35 years association with the company, many of which were spent in new mill construction. Going from Lebanon, Pa., in 1901, he built Sheet & Tube's first puddle mill, old sheet mill, and erected the original blooming and skelp mills.

H. C. Mann, senior materials engineer, ordnance department, United States government, Watertown arsenal, has been chosen as the winner of the Charles B. Dudley medal for 1936 by the American Society for Testing Materials, Philadelphia, for his paper entitled "The Relation Between the Tension Static and Dynamic Tests." The medal will be awarded to Mr. Mann July 1 during the 1936 annual meeting of the A.S.T.M. in Atlantic City, N. J.

R. E. Brown has been named district manager at San Francisco for the Electro Metallurgical Sales Corp., New York, a unit of Union Carbide & Carbon Corp. He joined the organization in 1920 soon after graduation from Lehigh university, and for the past 11 years has been engaged in metallurgical work and in sale of ferroalloys on the Pacific coast.

S. C. DuTot has been named district manager at Chicago for Electro Metallurgical. For the past 12 years he has been engaged in sales for the company in New York and Chicago. Prior to this he was employed as chemist at the Niagara Falls plant of Electro Metallurgical Co., another unit of Union Carbide & Carbon Corp.

Charles H. Stamm, for many years an executive with the Empire Steel Corp. and its successor, the Empire

Sheet & Tin Plate Co., Mansfield, O., resigned effective June 1. He is now associated in a like capacity with the Newport Rolling Mill Co., Newport, Ky.

Carl H. Morken has been appointed director of engineering sales for Carondelet Foundry Co., St. Louis. He formerly was foundry engineer for Detroit Electric Furnace Co. Mr. Morken's work will be in development and sales of electric furnace iron castings for special applications.

W. C. Conger, vice president of Truscon Steel Co., Youngstown, O., has been named manager of sales of the industrial division of the company, succeeding C. I. Auten, resigned. Mr. Auten, one of the oldest employes of Truscon, will remain with the company for several months before assuming new activities, as yet unannounced.

Mr. Conger will be assisted by D. W. Hibbard, formerly chief engineer, while Robert D. Snodgrass, formerly assistant manager of the industrial division, has been appointed chief engineer.

L. B. Schumacher, formerly in charge of reinforcing bar sales for Jones & Laughlin Steel Corp., becomes manager of the reinforcing division sales, succeeding John Bowditch Jr., who has been named district sales manager at Philadelphia. H. B. Miller moving from Philadelphia to Chicago as district sales manager; Charles Spatholt, of Youngstown, going similarly to Milwaukee, and W. H. Stewart from Birmingham, Ala., to St. Louis, and Jack Yaeger becomes manager at Birmingham.

Stanley M. Mercier has joined the sales and engineering staff of the Boston Woven Hose & Rubber Co., Boston, manufacturer of products used extensively in the steel and al-



Stanley M. Mercier

lied industries. Mr. Mercier for many years was identified with sales, engineering and construction of conveying systems for the Jeffrey Mfg. Co., Columbus, O.

Oliver C. Henkel has been appointed district sales manager in the New York metropolitan area by the Empire Sheet & Tin Plate Co., Mansfield, O., effective June 15. He has been associated with Empire for the past five years, recently serving in the capacity of sales promotion engineer and advertising manager. Mr. Henkel will be located at 500 Fifth avenue, New York.



Oliver C. Henkel

Died:

WILLIAM P. GLEASON, 71, general superintendent in charge of the construction of the Gary works of the Carnegie-Illinois Steel Corp., and retired superintendent of that plant, at his home in Chicago, June 14. A native of Chicago, Mr. Gleason became associated with the Illinois Steel Co.'s Joliet works in 1880. In 1887 he became foreman of the machine shop and later was master mechanic of the works. From 1901 to 1906 he was the assistant manager at the Clairton steelworks of the Carnegie Steel Co., Clairton, Pa. In 1906 Mr. Gleason was made superintendent in charge of the building of the Gary, Ind., works. He retired early last year.

David Posey, 59, superintendent of Alabama Foundry Co., Birmingham, Ala., subsidiary of the Standard Gas Equipment Co., Baltimore, in Birmingham, recently.

Charles Henry Edwards, 65, retired, but for 20 years vice president and general manager of C. Parde Works, Perth Amboy, N. J., manufacturer of pottery machinery, at his home in Plainfield, N. J., June 15.

August W. Krause, 70, since 1922 president and treasurer of the Western Hardware Mfg. Co., Milwaukee, maker of tool grinders, vises and other shop specialties, in Milwaukee, June 11.

Robert Jardine, 60, chief engineer. Wilcox-Rich Corp., of heart attack on the steamer EASTERN STATES as he was arriving in Cleveland on a business trip, June 12. He had been chief engineer of the corporation since 1914.

Percival Dewees Browning, 52, consulting engineer and formerly associate professor at the School of Mines, Columbia university, New York, in that city, June 15. For a time he was

connected with the United States bureau of mines at Pittsburgh. In 1925 he was appointed assistant professor in the Columbia School of Mines, and held this position until 1929, when he retired to devote himself to his business as consulting engineer to several coal companies. He was a member of the American Institute of Mining and Metallurgical Engineers.

John Millhiser, 91, claimed to be the oldest veteran of Westinghouse Air Brake Co., in point of years and service, at Pittsburgh, June 16. He had been retired since 1903, but was a foreman of department A of the Westinghouse company.

Lloyd Newcomb Allen, 76, one of the most widely known foundrymen in the Middle West, in Detroit, June 10. For the past 30 years he was the Detroit representative of the Benton Harbor Malleable Industries, the Muncie Malleable Foundry and the Fremont, O., Foundry.

Dr. Lucius Pitkin, consulting chemist, and an organizer of Lucius Pitkin Inc., New York, consulting chemists, chemical engineers and metallurgists, in New York, June 14. He was a member of the American Chemical society, the New York Microscopical society and the Chemists' club.

John Brunner, 69, formerly manager of the department of metallurgy and inspection, Illinois Steel Co., Chicago, in Evanston, Ill., June 15. Born in Sweden, Mr. Brunner came to this country in 1888, and after a short association with the Boston & Maine railroad, joined the Carnegie Steel Co., Pittsburgh, in 1890. From 1899 to 1902 he was head of the bureau of engineering and construction for the latter company. In 1902 he joined Illinois Steel Co. and in 1923 was made manager of the department of metallurgy and inspection. Recently he had served as consulting engineer for the company.

Malleable Founders Name Officers

At the opening of a two-day session of the Malleable Founders' society which convened in Hot Springs, Va., June 18, the election of directors by the three sections of the society was announced. These follow:

Western section: R. R. Fauntleroy, president, Moline Malleable Iron Co., St. Charles, Ill.; C. S. Anderson, president, Belle City Malleable Iron Co., Racine, Wis.; W. V. Tiscornia, vice president, Auto Specialties Mfg. Co., St. Joseph, Mich.; Brinton Welsler, vice president, Chain Belt Co., Milwaukee.

Central section: R. N. Cole, president, Canton Malleable Iron Co., Canton, O.; C. C. Gibbs, president, National Malleable & Steel Castings Co., Cleveland; John C. Haswell, president, Dayton Malleable Iron Co., Dayton, O.; A. F. Jackson, vice president, Michigan Malleable Iron Co., Detroit.

Eastern section: L. A. Dibble, president, Eastern Malleable Iron Co., Naugatuck, Conn.; F. O. Parker, sales manager, Acme Steel & Malleable Iron Works, Buffalo; Frank E. Shumann, president, Lehigh Foundries Inc., Easton, Pa.; H. L. Steeves, vice president, Rhode Island Malleable Iron Works, Hillsgrove, R. I.

Thursday's session covered reports of the society's officers, a resume of activities and a study of the spread of rates and hours in the period 1933-36 with the effect on cost. This study was prepared by Robert E. Belt, secretary.

At the annual dinner Thursday night, Prof. H. H. Maynard, Ohio State university, Columbus, O., addressed members on "Can American Business Govern Itself?"

Carnegie-Illinois Assistant Managers Appointed

Carnegie-Illinois Steel Corp. has announced appointment of assistant managers of sales at the following offices: Birmingham, R. J. Stakelum; Boston, Russell W. Baker; Hartford, Conn., suboffice, William Gregor Cook; Chicago, W. P. Andrews, Albert P. Selby; Cincinnati, Wilber G. Somes; Cleveland-Buffalo, N. Y., suboffice, William S. Saylor; Detroit, H. B. Maguire, Howard V. Clark; Houston, Tex., F. C. Buck. G. J. Stewart; Milwaukee, Arthur Bronson; New York, Richard Wayland-Smith, Walter C. Carroll; Philadelphia, Harry E. Duff, S. J. Cotsworth; Pittsburgh, Harry C. O'Brien, George A. Higgins, Joseph G. Armstrong Jr.; Bluefield, W. Va., suboffice, Peter D. Woods; St. Louis, O. J. Willis; Kansas City, Mo., suboffice, Jerome F. McGee; Washington, Andrew J. Snow.

Production

STEEL output rose sharply last week to 70½ per cent, a gain of 2½ points, and reflects a large volume of speculative buying against third quarter price advances. Indications point to a continuation of this strong upward trend at least until the end of this month. Further details follow:

Youngstown—Increased 2 points last week to 78 per cent, but operations are expected to dip to 77 per cent at this week's start.

Chicago—Increased 2 points to 71 per cent, equalling the peak rate for the year to date, established during late April and early May. Ingot production by several plants is at capacity, but still is insufficient to meet requirements of rolling mills. Blast furnace operations are steady, with 24 to 41 stacks active.

Buffalo—Continued at 84 per cent last week, and will remain at this level until the end of the month. Demand is heavy and pressure for shipment is strong. Thirty-one open hearths are in production, and all are scheduled to operate this week.

Cincinnati—Removal of one open hearth from production caused a 4-point drop in steelmaking to 76 per cent last week. Possibility of restoration of the rate to finish out the quarter is seen. Rolling schedules on light material were unchanged.

Cleveland-Lorain—Held at 82 per cent last week. Corrigan, McKinney added 1 open hearth to operate 13, Otis took off 1 to operate 7, while National Tube operated all 12.

New England—up 5 points to 83 per cent last week, with indications of a further advance of 4 points this week.

Pittsburgh—Up 2 points to 67 per cent last week, with expectation that further gains may be expected over the balance of June. Corporation subsidiaries were operating at 65 per cent, and the independents completed the week at an average of 68 per cent. Among finishing mills, tin plate continues at 100 per cent, but sheets are up five points to 70 per cent, strip has gained five points to 60 per cent, wire products hold at 60 per cent and pipe at 50. Thirty-six out of 60 steelworks blast furnaces are making iron.

Wheeling—Up 3 points to 71 per cent last week. Twenty-six out of 37 open-hearth furnaces are making steel. Open hearths at the Wheeling Steel Corp.'s Portsmouth, O., works continue closed for the fifth week.

Birmingham — Dropped 14½ points last week to 54½ per cent, as two open hearths were taken off active schedule, making a total of 13 in operation.

Central eastern seaboard—Up 1 point to 45½ per cent last week, with a further increase expected before the

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Distracts

	Week ended		Same week	
	June 20	Change	1935	1934
Pittsburgh	67	+ 2	30	56
Chicago	71	+ 2	39	63
Eastern Pa....	45½	+ 1	29	46
Youngstown...	78	+ 2	41	62
Wheeling	71	+ 3	48	81
Cleveland	82	None	48	78
Buffalo	84	None	32	47
Birmingham...	54½	-14½	30	55
New England ..	83	+ 5	56	70
Detroit	100	None	70	82
Cincinnati	76	- 4	†	†
Colorado	50	None	†	†
Average.....	70½	+ 2½	35½	59

†Not reported.

end of the month. With eastern producers accepting orders at current levels on most, if not all products until the end of the month, a good operating rate in July is expected.

Detroit—Unchanged at 100 per cent last week, with all open hearths of the two district plants melting.

Colorado—Held at 50 per cent last week, eight open hearths continuing in production.

Activities of Steel Users and Makers

HUTTON H. HALEY and Associates, Detroit, has been formed by Hutton H. Haley, Ralph J. Hutchinson, Howard Lungren and William Bleil. The organization will represent exclusively in Michigan, the lines of equipment of the American Foundry Equipment Co., Bryant Machinery & Engineering Co., Howell Industrial Truck Co., Milwaukee Foundry Equipment Co., Aerovent Fan Co., and Ajax Flexible Coupling Co.

Commercial Shearing & Stamping Co., Youngstown, O., has fabricated 480 tons of purlins for the steel excavation bracing of the Fort Peck dam in Montana. Federal inspectors have passed the material and it will be shipped at once.

Chauncey J. Hamlin Jr. Inc., Buffalo, and Thermalite Co., North Tonawanda, N. Y., two of the largest insulating and air conditioning firms in the Buffalo area, have been consolidated. Arthur J. Slade, owner of Thermalite, has been made manager of the insulating division of the Hamlin organization.

Robins Conveying Belt Co., New York, has made a sales agreement with the Mine & Smelter Supply Co., of Denver, Salt Lake City, Utah and

El Paso, Tex., for sale of Robins equipment in the states of Arizona, Colorado, Montana, New Mexico, Utah, Wyoming, and in parts of Idaho, Nebraska, South Dakota and Texas.

Tomlinson Steam Specialty Co., 1603 St. Clair avenue, Cleveland, has been appointed sales representative for Edward Valve & Mfg. Co. Inc., East Chicago, Ind.

H. C. Frick Coke Co., Pittsburgh, is planning extensive improvements at two of its mines on the Monongahela river. At its Bridgeport mine, the company plans to construct steel sheet ice breakers, a steel sheet pile fender and six steel pile clusters for mooring barges. Plans also call for the placing of 3200 cubic yards of stone along the river bank. At the company's Ronco mine a stone-filled timber crib is to be reinforced by driving sheet piling.

Latrobe Tool Mfg. Co., Latrobe, Pa., manufacturer of twist drills and reamers, has acquired the Buckeye Teamer Drill Co., Alliance, O. The Buckeye plant will continue to operate at Alliance, as a separate unit under the direction of A. A. Mulac, general manager, who has served as president of the Buckeye company for the past 20 years. J. G. Eck will continue in charge of sales at Alliance, under the direction of Harry J. Cogswell, president of Latrobe Tool, whose headquarters are in Chicago.

Vulcan To Make Ingot Molds by French Process

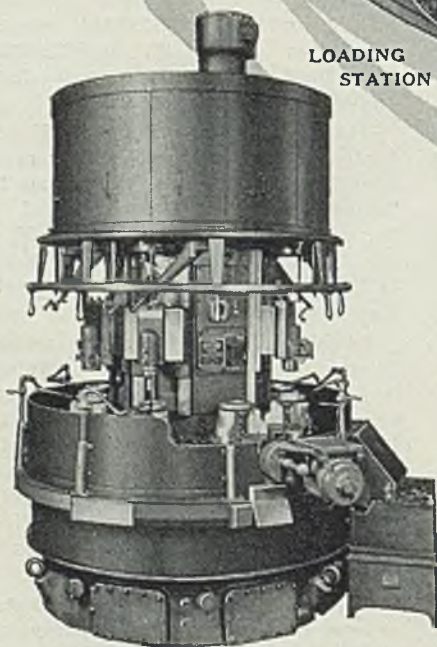
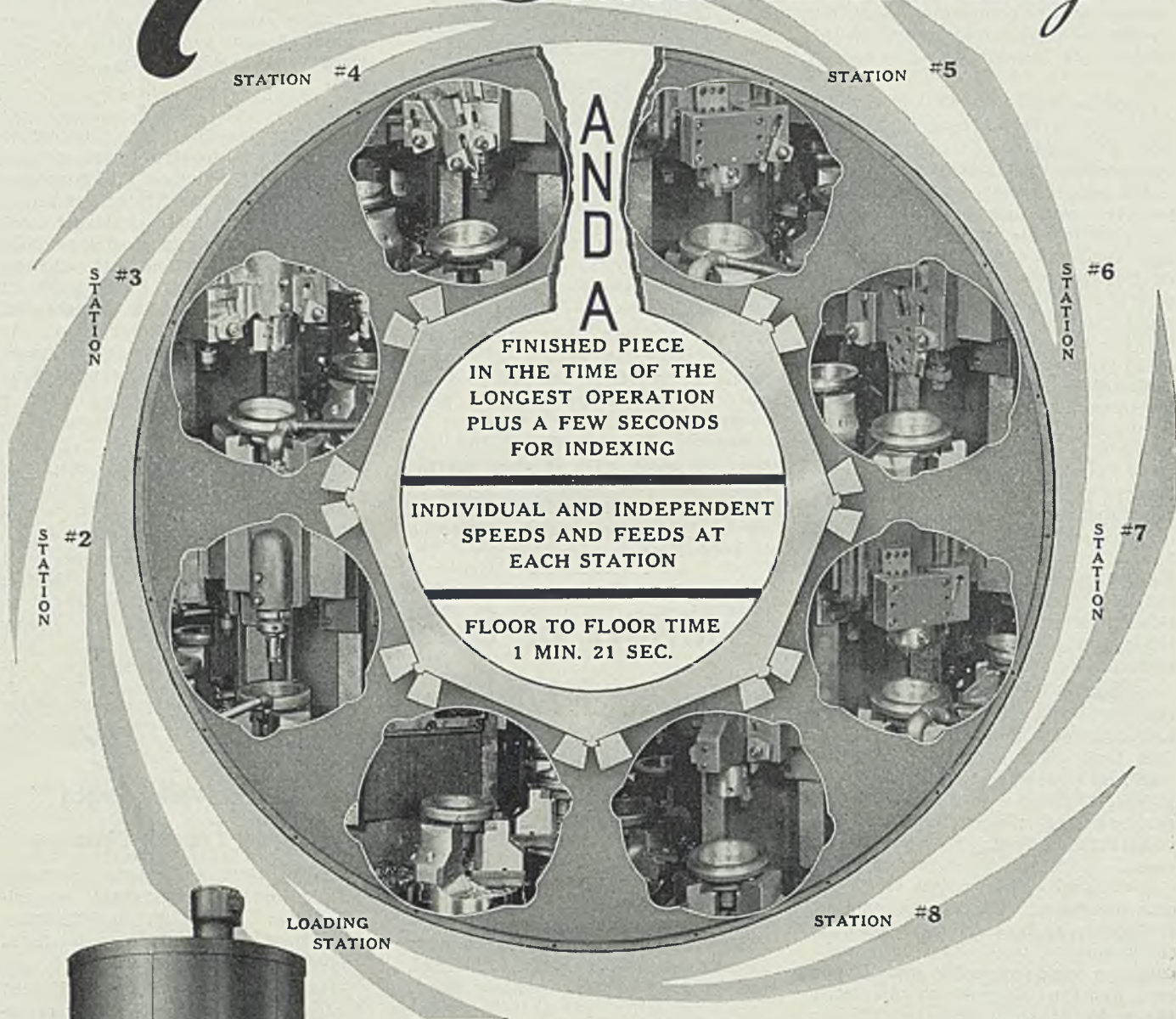
Vulcan Mold & Iron Co., Latrobe, Pa., following considerable experimentation and test, is changing equipment to manufacture its ingot molds by a new process.

The company has secured a United States license to use the cement-bonded sand process known as the "Rand-Upson." It is covered by Durand patents, which are held by the French Societe D'Electro-Chemie D'Electro-Metallurgie et des Acieries Electriques D'Usine.

Developed especially to remove factors productive of surface defects in the casting, and to promote greater accuracy in size and contour, the Rand-Upson process is represented by the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., as United States agent. For some time, Birdsboro has used the process in its own plant.

The use of the cement-bonded sand process by Vulcan entails a complete changeover of its plant facilities. The company expects to be manufacturing its entire output by the new process by mid-July.

7 Machining Operations Simultaneously



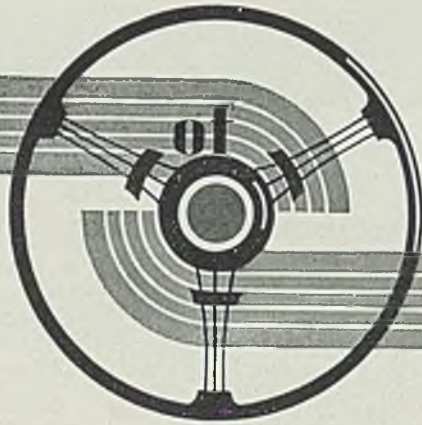
TYPE D MULT-AU-MATIC
ON DIFFERENTIAL GEAR CASE

The Mult - Au - Matic Method provides manufacturing Efficiency and Economy through effective Savings.

Proof of this is Bullard Estimates on your work. Send us Blue Prints or Samples.



BRIDGEPORT, CONN.



DETROIT

THE big parade is on. It's far quieter than the push on Chateau Thierry or the Argonne 18 years ago, but those same war veterans are again the chief participants.

Bright and early last Monday morning the advance barrage started when Uncle Sam's mailmen toted out bonds, valued at nearly two billion dollars to distribute among 3,500,000 veterans. After the smoke had cleared, the scramble was on to convert bonds into cash.

How many bonds last week were salted down in safe deposit boxes is not easy to determine, but it is a safe bet that there are not many compared with the number of certificates that are being turned into cash.

What this all means to the automobile industry is very much to the point. Such a flood of cash is going to be a great stimulus to American retail trade.

Call it another treasury raid, if you will, but undeniably over a billion in money suddenly unleashed is bound to have an auspicious effect. And the Detroit automobile industry believes that a big slice of the money will go into shiny new cars.

Some estimated that 6 cents out of every bonus dollar will go directly into the purchase of new automobiles. This figures out to about \$114,000,000.

Bonus Boosts Automobile Sales

Dividing the latter by \$700, which is a fair average price of a new car today and the answer is 163,000 automobiles, fresh from the assembly line. The way the market is going, that's a full two weeks' production, for one class of buyer alone.

Detroit, however, thinks its 6 per cent ration is exceedingly moderate and reasons somewhat in this manner: The present season of the year with vacations at hand plus the urge to be on the highways, will tempt a far larger percentage out of the bonus fund into the purchase of new automobiles.

Furthermore, much of the sums diverted to payment of old debts and other miscellaneous channels will doubtless indirectly and secondarily

wind up into new automobiles. Secondly, the purchase of used cars by the veterans is a bullish factor for the new car market. Thus, automotive opinion more or less agrees that a new car sale of over 250,000 units will result from the bonus.

Translated into production, developments of the past week have put motor executives here into a sanguine mood. Though they admit that automobile assemblies are waning for seasonal reasons, the decline has been moderate considering the proximity of July.

Some producers, such as Chevrolet, are turning to the consideration of building up field stocks so that deliveries can be uninterrupted while the factory changes over to 1937 jobs in August.

August Is Changeover Period

Chevrolet, for example, has had to tentatively set up schedules for two or three Saturdays in July, in order to meet its production quota, which ostensibly ends with July 31. This division of General Motors calculates on selling 610,000 jobs for the five months, March 1-July 31 and is now producing accordingly.

Such a total would compare with 540,000 units sold in the corresponding period of Chevrolet's best previous year, which was 1929.

The individual story for other motor car makers follows Chevrolet to a large degree and its repercussion so far as introducing 1937 models is by now obvious. At mid-spring, July was set down as the changeover period, but the strength of retail demand for cars has knocked plans into a cocked hat.

The summer dip for getting the stage ready on 1937 jobs will still be narrow, that is, confined to from four to six weeks, but apparently it will fall more in August than in July.

September should see the motor-makers with their new models on the lines, followed by general announcements to the public around Oct. 15, or two weeks prior to the New York show in the first week of November.

At Packard the strategy council has had its heads together on a price for the new small six on a 115-inch

wheelbase. Something between \$720 and \$740, f.o.b. Detroit, seems to have been hit on.

At least judging from present manufacturing costs, Packard will be able to market the new series beginning at that figure. No later than another six weeks, bringing Aug. 1 up on the calendar, should see the "115" out and announced to the public. This will considerably pre-date the usual 1937 announcement of other motor makers.

At \$720-\$740 base the Packard six will fall in a field that has shown the most remarkable recuperation in 1936. For the price bracket just above Ford, Chevrolet and Plymouth has made a wider gain in registrations than any other.

In its latest thrust at the automobile market, Packard will thus stack up face-to-face with the Olds 6, Pontiac, Hudson-Terraplane, and to a certain extent, the Buick 40, Dodge, Lafayette and Graham. From a price standpoint, the Packard six will probably dovetail closest into the niche in the market in which Terraplane, Pontiac and Olds have so firmly entrenched themselves.

Packard's assemblies last week were around 1200 jobs, of course, mainly 120's with the eight-cylinder motor. Parts banks, blocks, etc. are being built up preparatory to swinging the six on the line sometime late in July. This turn about should boost the Packard assembly rate, which judging from the first three weeks of June, will be slightly beneath the 6100 assemblies of May.

Zephyr's New Headlamp Draw

Lincoln assembled 250 models last week, preponderantly Zephyrs. One of the changes in the Zephyr for next year hinges on something the man on the street will never recognize, yet it has caused a lot of advance thought and planning on the part of Lincoln and will be something of interest to sheet steel makers.

The front fender headlamp draw on the Zephyr is to be made out of a single piece, rather than the present method of welding an insert covering the lamp. To all appearances the result is the same, yet the change is de-

signed to cut down manufacturing costs.

Lincoln, like the rest of motordom, has other changes in mind for next year on the two Zephyr lines, but the distinctive body lines of this model will be little changed themselves and in fact will be paid the compliment by competitors that proves imitation is the sincerest form of flattery.

For one thing the influence of Zephyr is generally conceded to be in store for the next change Ford makes. While the particular type of frame construction that the Zephyr uses is not readily adaptable to a quantity production car like Ford, nevertheless some of the exterior features such as the rear panel slope that Lincoln started are due to be copied by other makers.

Another trend that the Zephyr exemplifies is away from running boards. Wider bodies next year in the interests of greater passenger comfort will more or less preclude the use of the running board. Many motor car designers as a matter of fact have dubbed the running board as a useless appendage.

The guessing game is again popular when the subject of Ford is brought up in automotive circles. Everything that ends with a question mark concerns when, as and if Ford is to bring out the abbreviated V-8 motor it has been toying with.

Tests have been exhaustive the last few months on the small eight, which is simply a trimmed down version of the present motor. Tests, therefore, have been more on performance than on manufacturing bugs. The Ford organization wants to see first what behavior such a motor would show in the hands of the driving public.

Will Ford Announce Small V-8?

Judging from the absence of stir in other respects, that is, over prospective revisions in chassis or body parts, it is fair to presume that the small eight could be dropped into the present Ford without a great loss of time or preparation, at least nothing comparable with the delay of the 1927 swingover.

The small eight's adoption would be one entirely motivated by economy. It is the conclusion of automotive observers that Ford has lost sales to Chevrolet and Plymouth this year due to the latter's stress on the economies of a six.

The used car market, with its plentiful supply of good transportation in the \$300 to \$400 price field would be bang-up competition for a new car in that price category. Many say that now with the greater will-

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1934	1935	1936
Jan.	155,666	289,728	364,004
Feb.	230,256	332,231	287,606
Mar.	338,434	425,913	420,971
Apr.	352,975	452,936	502,775
May	330,455	361,107	*493,651
5 mo.....	1,407,786	1,861,915	2,069,007
June	306,477	356,340	.....
July	264,933	332,109	.....
Aug.	234,811	237,400	.....
Sept.	170,007	87,540	.....
Oct.	131,991	272,043	.....
Nov.	83,482	395,059	.....
Dec.	153,624	404,528	.....

Year 2,753,111 3,946,934

*Estimated.

1935 and 1936 figures revised.

Estimated by *Cram's Reports*

Week ended:

May 23	109,821
May 29	108,300
June 6	101,896
June 13	100,415
June 20	100,733

ingness of America to spend that much, the time for a cheap small Ford was in 1932, not 1937, and go one step further in stating that Ford might do better to drop a series in above the price of the present eight or between the eight and the Zephyr.

At all events it must be recorded that the small Ford that almost reached the baptism stage in the spring and early summer of 1933 was a great deal farther along than the present junior edition. Three years ago a good many parts specifications were out and obligated for, the size of the frame, body and motor dimensions were all agreed upon, when Henry Ford himself, so the story goes, issued the word that threw the whole matter out of the shop.

Murray Body, a leading supplier of Ford frames and bodies, last week closed on a contract for making "a substantial part" of Plymouth's 1937 frame requirements. It is said that some \$350,000 is being spent to expand the Murray frame division so as to take care of the new order.

Figuring in Chrysler work is something new for Murray, which also is lined up to make a line of convertible sedans for both Plymouth and Dodge next year. Time was when the Murray plant was so choked with Ford work that smaller contracts for such as Lincoln had to be taken out of the plant and sublet to competitors. But the slowing by Ford so far in 1936 has placed Murray in the position of soliciting other business.

Since Murray has been making

some of the Packard 120 stampings, it is also in a favorable position to get in on the Packard 115 business. Murray and others in its field have been hot on the trail of the chassis and cab contract International Truck is placing for around 3000 jobs monthly.

Assemblies of motorcars last week were led by Chevrolet at around 29,000 passenger cars and trucks, followed by Ford with 23,400 models. The Plymouth total was a shade better than 11,000 and firmly entrenched in fourth position was Dodge at 8600 units.

Buick, in order to work out the 22,000 models as set as the final lot of its 1936 quota, showed an advance in assembly total to 3600 jobs for the week. Olds was off to around 4000 units, compared with 5100 the week preceding. The Hudson-Terraplane total was 2400 jobs, slightly up from two weeks ago.

Other weekly assembly rates were: Chrysler with 1250 jobs, DeSoto accounting for 1000 units, Pontiac at 3700, Studebaker having 1900, Nash-Lafayette with 1050, Cadillac and LaSalle at 440 and Reo with 360. Excepting Studebaker which made a gain, these weekly rates were down to a moderate degree from two weeks ago. Hupmobile remains closed for the present.

Owner Driveaways Increase

This time of the year always sees a pickup in owner driveaways, buyers who go to Detroit to get delivery on their new models from the plants in which they were built. Plymouth last week said its deliveries of this nature have begun to average 50 to 100 jobs daily The 250-inch long planer in the Koestlin Tool & Die Corp. Detroit, is claimed to be one of the largest in Detroit. Its other dimensions are 78-inch height and 140-inch width Use of anolite pistons in 1937 is more than likely by most of the General Motors lines Hudson figures it makes a quarter of a million blueprints a year and that on some of the parts it places in outside shops as many as 40 copies per print are required Eighty-six DeSoto dealers were factory guests last week On June 15 General Motors produced its 1,000,000th car since Jan. 1, 1936, and was 54 days ahead of 1935. Production so far this year is double the entire year of 1932 and equal to all of 1934 Along with Hupp's pamphlet report, stockholders were given copies of the court decision at Cincinnati which definitely put Archie Andrews out of the management. Interesting exhibits lie in recital of the various novel sales

HERE'S A BETTER BEARING SEAL

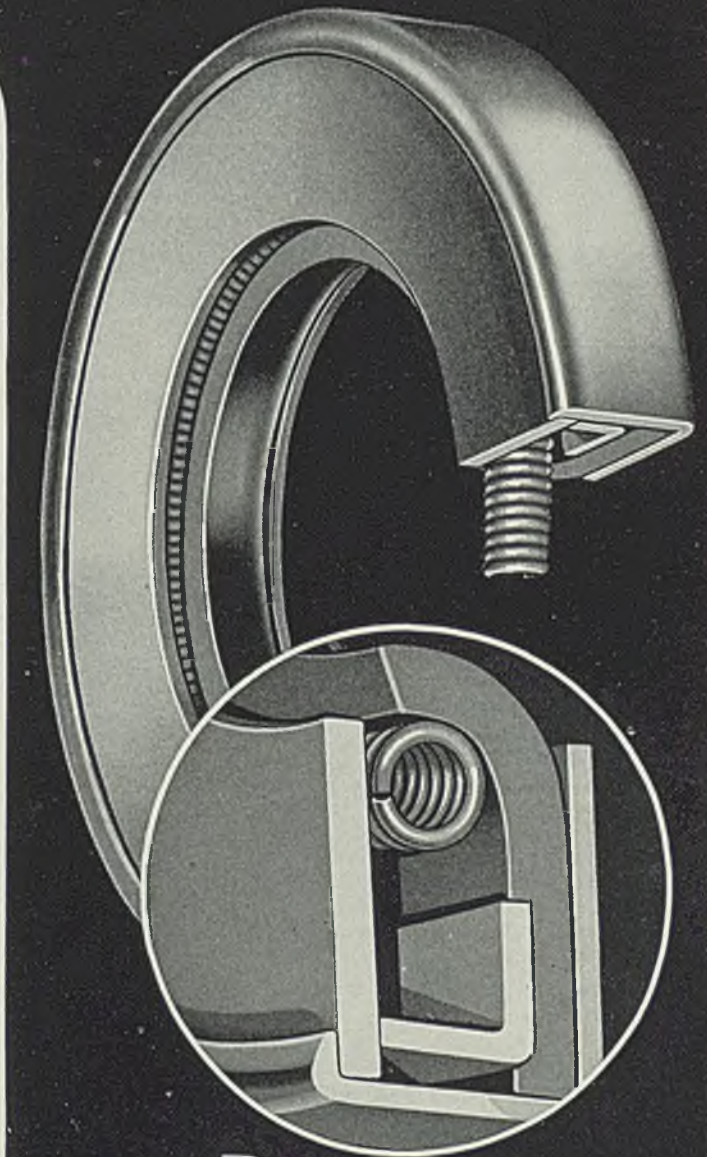
THE universally accepted leather packing member specially selected and tanned, the positively locked and braced inner shell construction and the scientifically specified spring tension member . . . these are the fundamental advantages of the "Perfect" Oil Retainer.

The centerless ground outside diameter, the dimensional accuracy and the pre-softened and oiled shaft contact surface are additional features which make the "Perfect" Oil Retainer the most practical and economical bearing seal available to Industry today.

The "Perfect" Oil Retainer keeps lubricant in . . . foreign matter out. Oil can't leak and waste or stain products. Grit, dust, water, etc., can't get into the bearings. The Leather Packing Member provides an effective seal with minimum shaft friction, and no shaft scoring.

Every machine you make needs this protection. It gives any machine greater sales value and reduces manufacturing costs. "Perfect" will give satisfaction under the most severe operating conditions.

Try the "Perfect" Oil Retainer and join the large company of satisfied users.



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DETROIT

BOSTON

PITTSBURGH

CINCINNATI

Mirrors of Motordom

contracts Mr. Andrews entered into for Hupp . . . Some of the small stamping plants dependent on Packard work have been feeling the effect of Packard's drawing in more of its work to the main plant. One in New England is a noteworthy example. . . Hudson's personnel director goes the insurance business one better in say-

Chevrolet Scrap Conveyor Overcomes Handling Hazard

DIFFICULTY and hazards handling sheet metal scrap have been overcome at the Flint, Mich. plant of Chevrolet Motor Co. by recent installation of a mechanical system. Conveyors serve each gang of presses, and carry the scrap first to balers, which compress the material into compact blocks and then carry these blocks to mechanical loaders from which they drop into gondola cars.

Top photo: General view in the fender section showing the series of sloping conveyors that carry scrap from presses to the main conveyor.

Left photo: At the right, a hopper which has been filled from the conveyor chute, and which will tip its load into the baler recess in the floor. The material then is compressed lengthwise under 3000 pounds thrust by a piston driven by compressed air. A similar piston below then exerts a 3000-pound thrust from the bottom. The scrap leaves the baler in a compact mass, each bale weighing about 125 pounds. Foreman and three men operate baling machines.

Right bottom: Six or seven gondolas are loaded each 16 hours under these chutes through which baled sheet scrap metal drops from the conveyor.

ing that "the automobile is one of the greatest factors in the improvement of public health and lengthening of the life span" arriving at this conclusion because the motor car takes people out of doors to a degree not otherwise attained . . . J. L. Ballard last week was appointed the new director of distribution for DeSoto. . . Pontiac's deliveries of 21,046 cars in May were the largest of any month since 1929, and this figure brings the company's 1936 total up to 104,997 units . . . A Chicago concern, National Park-O-Graf Corp., plans to be making 1000 parking meters daily soon . . . Ford's exhibit at the Texas Centennial reproducing nine short sections of historic highways and trails has drawn considerable comment. A General Motors' exhibit highlight is the instrument which records in millionths of an inch the pressure of the hand on a railroad rail. Chrysler has gone in strong for open-air band concerts in the "Chrysler Gardens." . . . Buick's recent inquiries for transmission-making machinery have been outstanding . . . Ternstedt Mfg. Co. is lined up to make all of the small interior parts for the General Motors cars next year, some of this work having been taken over from Fleetwood Body and from A. C. Spark Plug . . . Next

year's motor, axle and transmission details for Plymouth seem to follow closely on dimensions and design in the present 1936 line.

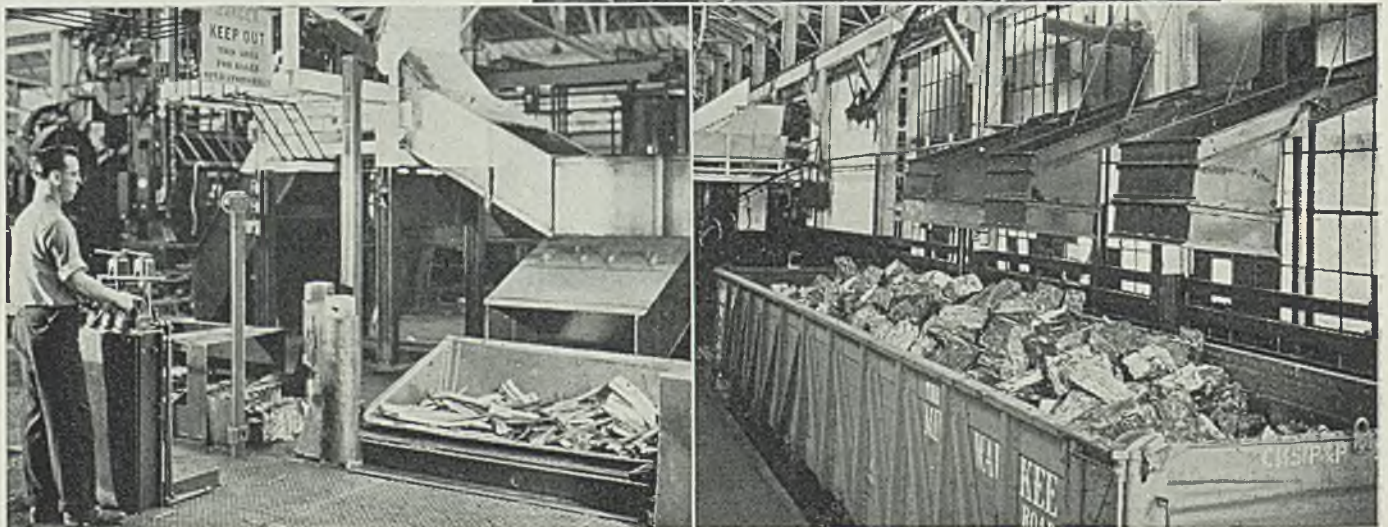
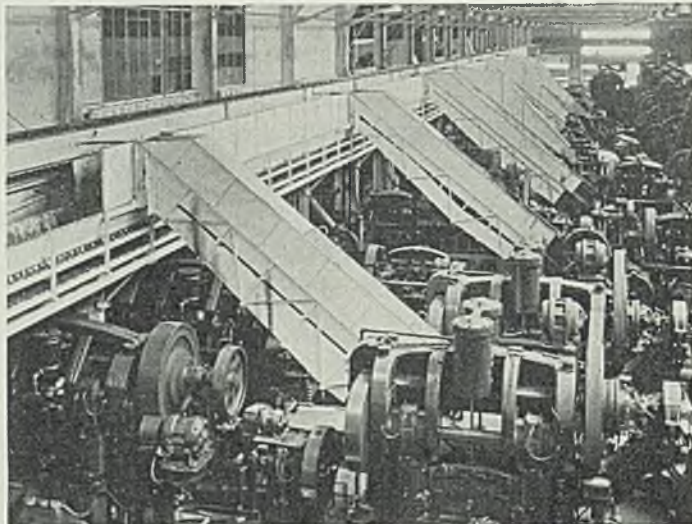
Leeds Given Medal For Management Achievement

Morris E. Leeds, president, Leeds & Northrup Co., Philadelphia, has been awarded the Henry Laurence Gantt gold medal for distinguished achievement in industrial management.

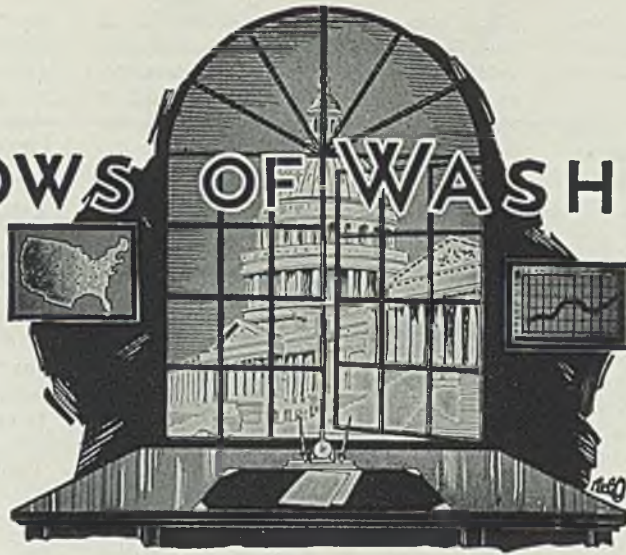
The award, memorializing the achievements of the late Henry L. Gantt, mechanical engineer, has been made annually since 1929 by the Institute of Management, research group of the American Management association. A committee appointed by the institute and by the American Society of Mechanical Engineers selects the individuals.

Alvin E. Dodd, executive vice president of the association, said Mr. Leeds' contribution to management was the emphasis he placed on a suitable background in the attitudes of all ranks of his organization toward methods for increasing efficiency.

Leeds & Northrup Co., manufacturer of electrical measuring devices, heat treating furnaces and similar products, has more than 1000 employees.



WINDOWS OF WASHINGTON



WASHINGTON

FINAL disposition of many bills of interest to the steel industry last week hinged entirely on whether congress would be able to adjourn by June 20.

Enactment of several bills may be impossible, but if no adjournment is reached these same bills may become law when both houses meet again June 29 after the Democratic national convention.

Twice now, legislative leaders have driven toward adjournment. On the first drive Representative Byrnes died, and on the second Senator Fletcher. A determined effort has been made in the last few days to clear the decks speedily.

During the last week the office of the co-ordinator of railroads, held by Mr. Eastman, went out of existence. If congress is in session later this month this office may be re-established, even though those who are in closest touch with the situation consider such action unlikely. If renewed, the office would be shorn of almost all its power, despite the fact President Roosevelt has repeatedly stated that he wanted the office continued. The President believes several investigations should be completed by the co-ordinator.

Tax Conferees Still Disagree

As this is written the tax conferees apparently are as far apart as they were two weeks ago. There is no definite word on whether the palm oil tax affecting the tin plate industry will be retained.

One of the best known political observers has stated that he does not believe the tax conferees will actually reach agreement until they meet with the President. On the other hand, Mr. Roosevelt asserted at a press conference last week that he had no intention of calling the conferees to the White House. However,

he did not say that he would refuse to confer further with them.

The house rules committee has reported out a favorable rule for consideration of the Healey government contract bill. As pointed out in these columns last week, this bill differs considerably from the bill which the senate passed and yet it is still objectionable to industry. The A. F. of L. has put so much pressure behind this proposed law that it is likely to be passed during this session. Industry made desperate efforts to stop the bill but as this is written members of congress are evidently listening more to labor.

DATE FOR ALLOTMENT OF TIN PLATE SCRAP NEAR

On July 1 allotments will be made for tin plate scrap to be exported from the United States between that date and Dec. 31, according to a statement last week by Secretary of State Hull.

The national munitions control board, acting under the secretary of state, has concluded that "to issue export licenses, based on allotments assigned to those producers who have requested such allotments would be consistent with the purposes of the act, and would assure in the public interest fair and equitable consideration to all producers of tin plate."

Accordingly, the state department has announced that all producers who desire to export tin plate scrap between July 1 and Dec. 31, including producers whose scrap is exported by third parties, are to inform the department at once of the probable quantity in long tons. Requests for allotments must be received by the department not later than June 30.

Allotments assigned July 1 will be based on the quantity specified in the individual producer's request, with the reservation that if any request exceeds 50 per cent of the producer's production during the year 1935, the latter figure shall be used as a basis.

The department states that producers who lack definite information about the ultimate destination of their scrap should ascertain immediately whether their customers dispose of it in the domestic market or export it. Unless producers are assigned allotments, the tin plate scrap which they produce may not be exported, either by them or by any other person, with certain exceptions.

The department announces that allotments will be granted to producers only. Licenses for the actual exportation of tin plate scrap may be issued to any person who makes application, provided the scrap is a portion of an allotment previously assigned to a producer.

Additional allotments may be granted after July 1 to any producer of tin plate scrap, regardless of whether he did or did not participate in the original assignment of allotments, if he "presents to the national munitions control board convincing evidence that he is not receiving the fair and equitable consideration referred to in section 2 of the act approved Feb. 15, 1936."

BERRY CRITICIZES MANUFACTURING INDUSTRY

An analysis of production, wages and employment in all manufacturing industries clearly indicates, according to Maj. George L. Berry, co-ordinator of industrial co-operation, "that manufacturing industry as a whole has not contributed to the support of the consuming market in proportion to the increase in production."

"The sole source of purchasing power for the average wage earner," says the Berry statement, "is his wages. The workers of the manufacturing industries, as a group, constitute a very large part of our national economic structure. They represented in 1920, 23 per cent of those gainfully occupied in all industry including agriculture. Consequently, the pur-

chasing power of this group represents a correspondingly large percentage of the total consuming power of the nation."

Maj. Berry says further that "the clear indication is that manufacturing industry as a whole has not contributed to the support of the consuming market in proportion to the increase in production. If manufacturing industry cannot make its proportionate contribution, it must look to the other sections of our economic structure, agriculture, trade, services, etc., to create a proportionately larger share of the market or dependence must rest upon the uncertain creation of new industries and new products to take up the slack in employment."

BUREAU ADOPTS TENTATIVE DEFINITION OF CAST IRON

Following a discussion at a recent meeting of the metallurgical advisory committee to the national bureau of standards, the following tentative definition of cast iron, modified in accordance with the suggestions of the committee, is being considered by the bureau:

"Cast iron is a cast alloy of iron and carbon, with or without other elements, in which the carbon content exceeds the maximum limit of solid solubility, as determined at any temperature (which in plain cast iron is 1.7 per cent) and, hence, contains eutectic carbide or graphite as a structural feature. It is not usefully forgeable at any temperature."

H. S. Rawdon, chief of the metallurgical division, stated that many definitions of materials are more or less of the "text-book" variety and often are not suited to serve as a practical basis for differentiation of examples in case of dispute. Especially is this true, he said, when there is no pronounced line of demarcation, as in the case of cast iron and steel.

A criterion which would be useful in any legal action such as might arise in the delivery of a doubtful material is often very desirable, he stated.

This subject was considered by the metallurgical advisory committee May 15. Although no definite action was taken, the bureau's tentative definition of cast iron has been modified in accordance with recommendations of the committee.

SAYS RUSSIAN PACT WOULD END BRAZILIAN AGREEMENT

J. Carson Adkerson, American Manganese Producers association, asked for "delay in the promulgation of any new trade agreement with Russia, following the expiration of the present agreement on July 13, until after due notice and hearings as required by law" in a communication to Secretary of State Hull.

"If the manganese duty reduction granted to Brazil is extended to Rus-

sia it may lead to the abrogation of the Brazilian trade pact," said Mr. Adkerson, pointing out that a recent document of the department of the interior reported that "if the reduction in duty is granted other nations supplying the American market, Brazil will have no competitive advantage due to the agreement."

Mr. Adkerson wrote the secretary that "if the reduction in the manganese duty is extended to Russia and other countries, there would be no particular reason why Brazil should not abrogate the trade agreement with the United States.

"The chief result of the Brazilian trade agreement is the loss to the United States treasury of approximately \$2,500,000 collectable as duty on manganese previously imported and stored in bonded warehouse yards in the United States at the time the agreement became effective. In addition to approximately \$2,500,000 per year in tariff on ores regularly being imported."

PWA'S STEEL AND EQUIPMENT ORDERS TOTAL \$678,832,000

PWA statisticians estimate that up to June 1 \$678,832,000 had been spent for iron and steel products, including machinery and transportation equipment for PWA projects.

A detailed survey is now being made to classify the total consumption by kinds of steel products used.

TRADE AGREEMENT GIVES PRIVILEGES TO ECUADOR

The state department has announced that it has entered into a tentative trade agreement with Ecuador to be effective until a formal agreement is made. The agreement provides that Ecuador shall enjoy all of the rights and privileges of the most favored nations.

During 1935 the United States exported 2500 tons of iron and steel to Ecuador compared with 2000 tons the previous year.

I.C.C. UPHOLDS RESTRICTION

The interstate commerce commission has held that the proposed restriction of transit rules and regulations governing the fabrication and reworking in transit of iron and steel articles, in carloads, so as to prohibit the threading or rethreading, in transit of iron and steel pipe at points on respondents' lines on and west of the Mississippi river is justified. The orders of suspension were ordered vacated and the proceedings discontinued.

The custom bureau has held that steel sheets, "having a gray surface finish due to the exclusion of air from, and the introduction of hydrogen gas into the annealing chambers, a process which tends to prevent or retard oxidizing or rust, not subject to additional rate of 2/10 of 1 per cent per pound authorized in the

proviso to paragraph 309, tariff act of 1930, as the introduction of hydrogen gas into the annealing chambers for the purpose of preventing the formation of scale is not regarded as a cleaning process."

Fifty Years of Progress Celebrated at Schenectady

Sponsored by the local chamber of commerce, Schenectady's half century of electrical progress was celebrated in that city June 12 and 13 to commemorate the establishment of the electrical industry there by Thomas Alva Edison. It was 50 years ago on June 14, which this year fell on Sunday, that Edison took title to two abandoned shops of the McQueen Locomotive Co. as a new location for the Edison Machine Works, thus laying the foundation for a local industry which later developed into General Electric Co.

To business and industrial leaders from all sections of the country attending the festivities, the outstanding event of the two-day celebration was a formal dinner Friday evening for more than 500 invited guests at which the chief speakers were Owen D. Young, chairman of the General Electric board of directors; Dr. George R. Lunn, New York state public service commissioner; Charles A. Edison, son of the inventor, and W. S. Barstow, Edison pioneer and president of the Thomas A. Edison Foundation.

High Tensile Rust-Resisting Steel for Bridge Cars

Bethlehem Steel Co. has started work at its Harlan plant, Wilmington, Del., on 60 two-car articulated units of lightweight construction that were purchased by the Railway Equipment & Realty Co. Ltd. (Key System) for operation over the San Francisco-Oakland bay bridge.

Bodies are to be made of Mayari R. a high tensile, corrosion-resisting steel. They will be 110 feet long and will seat 124 passengers. Each car will be equipped with a forced heating and ventilating system of a capacity sufficient to provide 4000 cubic feet of air per minute. They are designed to operate singly or up to seven units, 14 cars.

Institute Addresses Issued

Addresses before the forty-fifth general meeting of the American Iron and Steel institute in New York, May 28, have been printed in pamphlet form by the institute. Copies may be obtained by addressing the institute headquarters, 350 Fifth avenue, New York.

Mr. Ickes Tips Off Nation to Labor-New Deal Greed

LAST Monday a United States circuit court of appeals in New Orleans denied a petition of the national labor relations board for enforcement of its order requiring the Jones & Laughlin Steel Corp. to reinstate certain employes who alleged they were discharged because of their activities in attempting to organize a labor union in one of the company's plants. The decision was based on the ruling of the United States Supreme Court on the Guffey coal act, which declared that the national labor relations board has no right to regulate relations between employer and employe in manufacturing.

Fast on the heels of this decision came several enlightening developments. William Green and John Lewis dropped their own feud long enough to issue blistering blasts against the court's ruling.

But it remained for a member of the President's cabinet to take direct action. Secretary of the Interior Harold Ickes announced that a contract for steel piling which had been awarded to the Jones & Laughlin company, would be withheld. While he declared that this summary action was not influenced by the court decision and insisted that he had decided a week previously to cancel the contract, his motive is clearly indicated by his announcement:

"I am glad to take advantage of a case of identical bidding to throw additional weight behind the government's effort to obtain and enforce fair treatment for labor."

Raises Issues of Dictatorship in Government And New Deal and Labor Greed for Power

Probably without realizing it, Mr. Ickes by his erratic and emotional action in this instance has given emphasis to two important issues.

The first involves the mechanics of federal authority. Is ours a government of men or of laws? Are we to follow rules of conduct provided by the orderly processes of the law or are we to be governed by the personal opinions of men like Ickes who consider their judgment superior to the decisions of constituted authority? It comes dangerously close to an issue between self-constituted dictatorships under the cloak of bureaucracy and the freedom we have a right to expect in a democratic form of government.

The second issue involves the labor policies of the present federal administration. In one

sense the friendliness of new dealers toward organized labor is nothing more than a ghastly political farce. On the one hand, leaders like William Green and John Lewis are greedy for power. They are looking far ahead. Their ultimate goal is a labor administration in the United States. They have studied the history of labor movements in Europe. They know that their objective of a labor union administration cannot be attained immediately. Therefore, their strategy is to build up union strength in the hope of converting it into political power later on.

With this in mind they made a horse-trading deal with the new dealers. The present political support of organized labor is pledged to the new deal administration in exchange for its promise to assist the professional unions in organizing industry.

Compact Between Union Labor and New Deal Precludes Fair Decision on Part of Employes

The new dealers have attempted to carry out their part of the bargain by endorsing labor-dictated legislation. The erratic action of Ickes is but a minor episode in the farce. It is a surface indication of the arrogance that has become an obsession among new dealers and unionists.

A tip-off to this arrogance is found in the attitude of organized labor toward the Walsh-Healey government contract bill. When this bill was about to be reported out of committee Mr. Green wired representatives as follows:

"Your absence from this meeting (session at which bill was to be reported) will be construed as opposition and as being unfriendly to labor. Our representatives will be present at tomorrow's meeting. Do not fail us. Be present."

Mr. Green might just as well have said, "Be present or else . . ." The effect was the same. Only six congressmen failed to heed the threat.

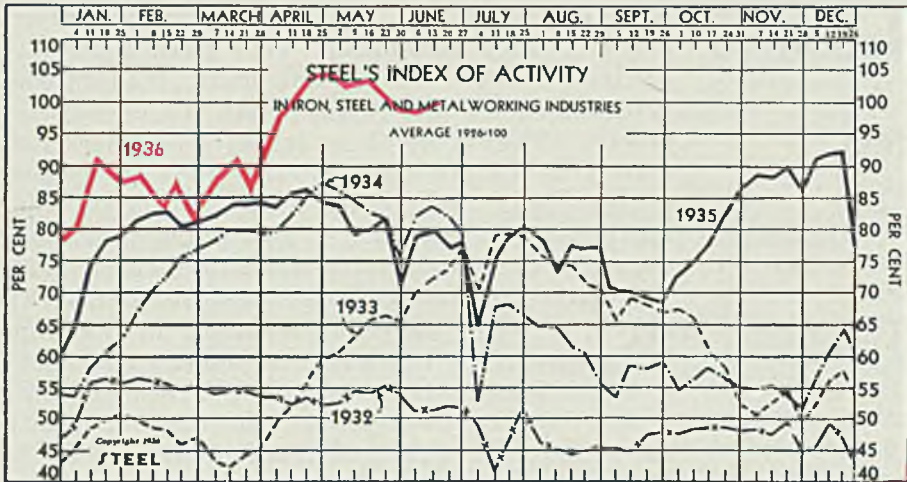
With this example of the manner in which our pro-labor legislation is black-jacked through congress, the big issue should be clear to everybody. It is largely political.

In all fairness, the question of whether employes should join a professional union should be left to the free decision of the employes themselves. They should be permitted to decide this issue without coercion by employers or intimidation or violence by union organizers.

Unfortunately greed for political power has destroyed all hope of employing this fair method under the present administration. The cards are stacked against the independently minded employe.

That in a nutshell is the situation confronting employes and employers today.

THE BUSINESS TREND



STEEL'S index of activity in the iron, steel and metalworking industries gained 0.7 points to 99.5 in the week ending June 13:

Week ending	1936	1935	1934	1933
Apr. 4	96.8	83.4	79.6	49.1
Apr. 11	99.6	85.4	82.2	52.6
Apr. 18	103.1	86.3	85.0	55.8
Apr. 25	103.6	81.9	87.5	59.5
May 2	103.2	81.6	86.0	60.3
May 9	103.0	79.3	84.4	62.5
May 16	103.1	80.5	82.4	65.2
May 23	100.4	82.8	81.9	66.1
May 30	98.6	71.9	75.7	65.3
June 6	98.8†	79.3	82.3	69.9
June 13	99.5*	80.0	83.6	72.1

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.

Strong Finish Will Make June Quarter Best Since 1929

EVIDENCE of new strength in industrial activity makes it almost certain that the present pace will be maintained throughout June. If this expectation is fulfilled, the second quarter of 1936 will rank above any three-month period since the third quarter of 1929.

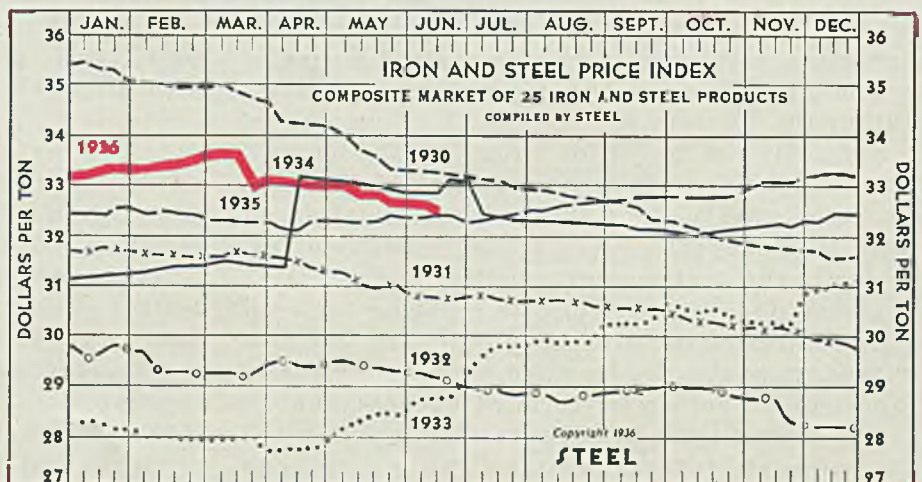
Thus far STEEL'S index averages 100.8 for the current quarter of 1936. This tops the second quarter of 1930, the best corresponding period since 1929, by a slight margin. Also the average for the current quarter exceeds that of the best three consecutive months of 1930, which were March, April and May. In other words, a strong finish for June will lift the average for

the June quarter above any comparable figure since 1929.

A small gain in the week ending June 13 carried STEEL'S index of activity to 99.5. This is the second consecutive rise since the Memorial day interruption. Increases in electric power output, revenue freight car loadings and the steelworks operating rate more than offset a small loss in automobile production. In spite of gradual recessions from the peak in April, automobile assemblies have remained above 100,000 units in each of the first two weeks of June.

Two variables undoubtedly figure in the current reports. One is the question as to how much bonus payments are easing the drop in automobile output. The other is the question as to how much speculative buying of steel to anticipate higher prices is forcing July requirements into shipments in the current month.

	1936	1935	1934
June 13	\$32.77	\$32.41	\$32.84
June 6	32.81	32.45	32.83
May 30	32.83	32.43	32.81
May 23	32.87	32.41	32.89
May 16	32.94	32.34	32.94
May 9	32.96	32.34	33.00
May 2	33.00	32.30	33.03
April 25	33.08	32.30	33.09
April 18	33.09	33.31	33.12
April 11	33.11	32.27	33.15
April 4	33.13	32.30	31.33
March 28	33.13	32.33	31.34
March 21	33.05	32.38	31.42
March 7	33.60	32.39	31.43



Finished Steel Shipments Continue Upward Trend

	Gross Tons		
	1936	1935	1934
Jan.	721,414	534,055	331,777
Feb.	676,315	583,137	385,500
March	783,552	668,056	588,209
April	979,907	591,728	643,009
May	984,097	598,915	745,063
June ....	.....	578,108	985,337
July ....	.....	547,794	369,938
Aug. ....	.....	624,497	378,023
Sept. ....	.....	614,933	370,306
Oct. ....	.....	686,741	343,962
Nov. ....	.....	681,820	366,119
Dec. ....	.....	661,515	418,630

Class I Railroads Earn 2.18 Per Cent in Four Months

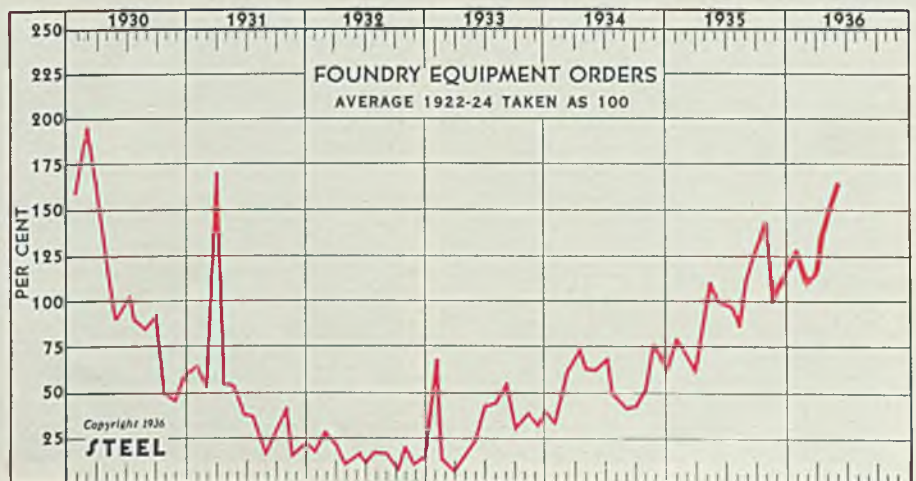
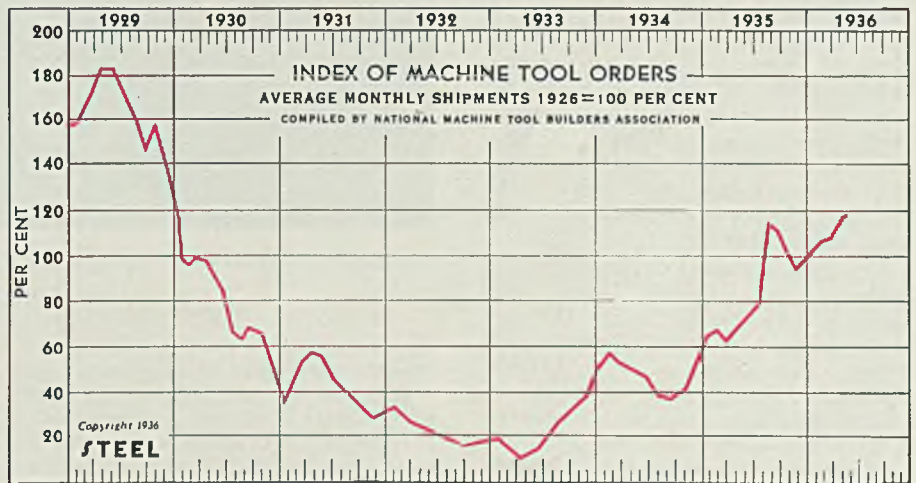
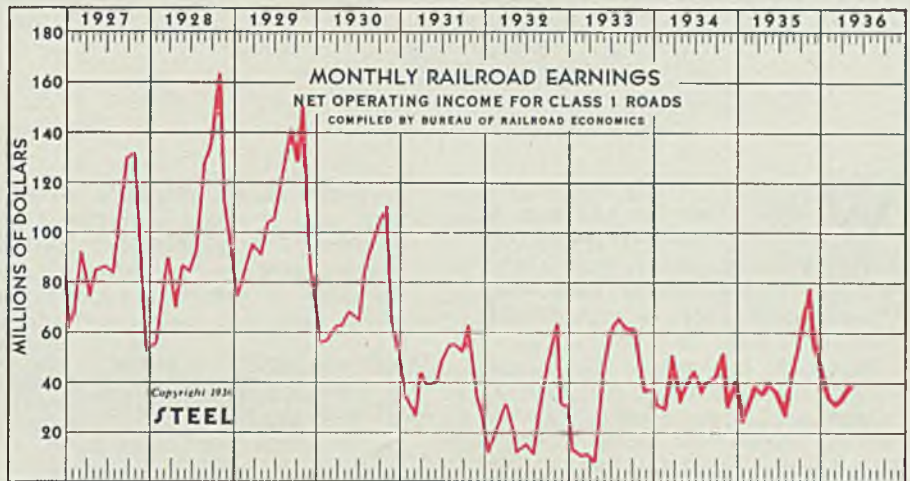
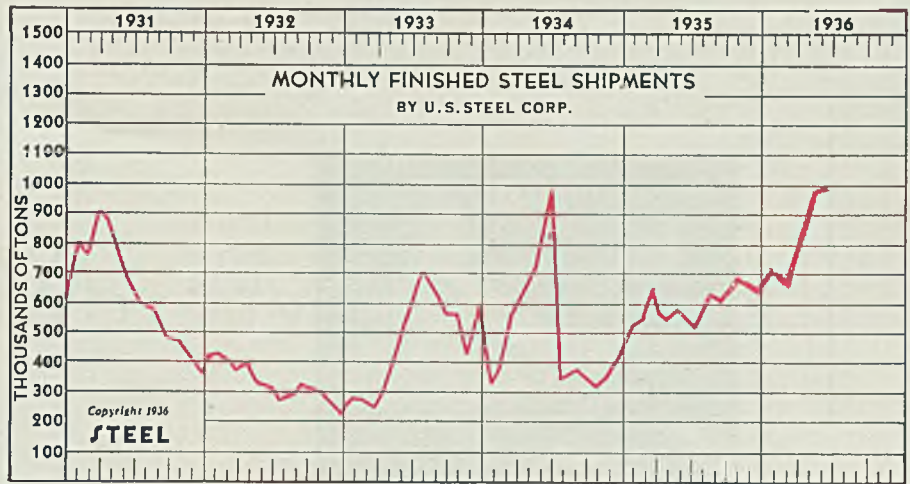
	1936	1935	1934
Jan.	\$35,764,748	\$21,348,557	\$31,058,275
Feb.	33,594,718	25,719,919	29,420,772
March	35,205,513	37,850,965	52,217,083
April	41,547,644	45,625,786	32,433,939
May ....	.....	39,505,069	39,699,194
June ....	.....	34,024,691	42,037,757
July ....	.....	26,851,397	35,441,265
Aug. ....	.....	42,074,108	40,564,071
Sept. ....	.....	57,359,339	41,713,425
Oct. ....	.....	75,425,092	49,336,307
Nov. ....	.....	54,234,305	32,540,502
Dec. ....	.....	46,040,165	38,738,295

May Machine Tool Index Highest Since 1929

	1936	1935	1934	1933
Jan.	102.6	61.3	56.5	18.3
Feb.	107.1	61.5	58.2	15.2
March	109.4	60.3	50.9	11.1
April	114.4	60.3	48.5	8.3
May	116.6	67.1	46.8	10.6
June ....	.....	76.7	42.6	15.5
July ....	.....	94.7	38.6	22.4
Aug. ....	.....	112.2	37.1	27.9
Sept. ....	.....	108.5	37.4	30.9
Oct. ....	.....	102.9	40.5	33.3
Nov. ....	.....	93.8	44.2	38.0
Dec. ....	.....	99.9	54.1	51.0

Foundry Equipment Orders Highest Since March, 1931

	Per Cent			
	1936	1935	1934	1933
Jan.	127.0	86.6	37.2	68.4
Feb.	110.4	75.7	65.8	16.1
March	115.0	69.4	75.4	9.8
April	134.0	113.2	67.9	19.4
May	165.4	100.7	66.5	25.6
June ....	.....	100.2	70.4	45.5
July ....	.....	94.0	50.7	48.8
Aug. ....	.....	113.0	43.1	56.3
Sept. ....	.....	128.5	46.4	34.9
Oct. ....	.....	140.0	55.3	42.5
Nov. ....	.....	100.4	80.4	36.6
Dec. ....	.....	118.1	66.9	43.8





DR. ANTONIO LONGORIA

... Welding Metals

BY A. H. ALLEN
Associate Editor, STEEL

WELDING metals without fusion! Here is a dream of welding engineers which certainly would be dubbed purest fancy by any practical welding man today. Yet this goal may be considerably closer than many imagine.

Robert E. Kinkead, in his column, *Welding, etc.*, in STEEL for April 13, referred to a new low-temperature welding process and stated "there is little question that this development promises to be the most important in welding in the last 25 years." Following publication of this item by Mr. Kinkead, STEEL has received repeated requests from interested engineers for more information on the subject. Here, then, is an attempt to answer these inquiries and to throw some light on what may well prove to be the most remarkable scientific development of the century.

The man behind this development? Probably few readers have ever heard of him, for he is not the sort to be concerned over personal publicity. His name is Dr. Antonio Longoria. Born and educated in Madrid, Spain, he came to this country in 1911 and since that time has been continuously engaged in pure research in many fields, ranging from telephony to medicine, from photography to electronics.

At present he maintains an obscure laboratory on the west side of Cleveland, where he has assembled a considerable amount of magnificent equipment and where he labors unobserved, with one assistant, on many of the advanced phases of electrical research. Though this may appear to classify Dr. Longoria as a recluse, he is by no means such. The writer visited his laboratory one afternoon recently and in the space of a few hours learned much of his amazing career and accomplishments.

Born in Madrid, Spain, in 1890, Dr. Longoria was educated by private

tutors and received a degree in medicine from the University of Madrid. Coming to the United States in 1911,



Erichsen or cupping test in thin-gage copper-silicon-manganese sheet, center impression being directly across line of weld

he developed a portable violet-ray and X-ray machine and became associated with Rogers Electrical Laboratories in 1913 in the manufacture of these devices. About this time he also developed an improved automatic moving picture film printing machine.

Some years ago Dr. Longoria developed a machine for welding non-ferrous wire mesh or screen. The machine automatically lines up each individual wire in the mesh and welds it to the butting wire, leaving no appreciable welding bead or other disfiguration. In fact, the line of weld is barely perceptible. This work is done at high speed and at low temperature and power.

Dr. Longoria later became associated with the Sterling Electric Corp. as designer and chief engineer, becoming president in 1921 and continuing to 1925 in this post. This company built various types of meters, heating ap-

pliances and high-frequency equipment used by both American and British naval vessels.

Since 1926 he has been a consulting engineer and has to his credit the development of numerous electrical innovations. One is the perfection of so-called phantom circuits for telephone conversations, in which 27 conversations can be transmitted over

one set of wires. Another is a method for electrical purification of water, accomplished by breaking down water into its components, hydrogen and oxygen, and then recombining them. Another of his achievements is an electrical surgical knife which, by means of high-frequency current, disintegrates flesh tissue without actually touching it.

Dr. Longoria's theory of electricity, according to the *National Encyclopaedia of American Biography*, is that it is a vibratory emission. To prove this, he once built a successful type of loudspeaker in which no magnets or windings were used. In 1923 he perfected what is commonly called the "death ray," a high-frequency electric ray by means of which it was possible to kill rats, rabbits and other small animals. Along this same line, Dr. Longoria has performed experiments in which he ionizes the atmosphere

Without Fusion, by "Molecular Shock"

itself and thereby short-circuits electrical devices in operation.

But to get back to the original topic of this discussion, Dr. Longoria, in studying the mechanics of welding two pieces of metal, points out that all matter is composed of certain sets of molecules, held together by molecular attraction which involves electrical charges on the molecules. He reasons that if it were possible to break down this molecular bond in two pieces of metal while they are in contact, then they will weld together without fusion, the latter simply being another method of breaking the molecular bond.

The question resolves itself into how to break this bond. This Dr. Longoria has accomplished by the proper application of high-frequency electric currents. For instance, he will show a sample of two pieces of 28-gage stainless steel which he has welded together perfectly, the temperature during the welding not exceeding 700 degrees Fahr., and the weld showing tensile strength within one tenth of one per cent of that of the base metal. The high-frequency current

serves as a sort of "molecular hammer" and, when applied after the metal has been heated to a temperature as mentioned above, breaks down the molecular attraction in edges of the abutting pieces and they weld together.

Seams need not necessarily be butted together in the process, for a procedure has been worked out to weld lapped seams, the result resembling a stitch weld or continuous spot weld, except that each minute spot represents current flow of only one-tenth of a cycle, using 60-cycle power.

Regarding speed of welding, Dr. Longoria reports that he has welded 16-gage galvanized steel sheet at the rate of 64 feet per minute, with power consumption of only a fraction of that

used in either electric resistance or electric arc welding.

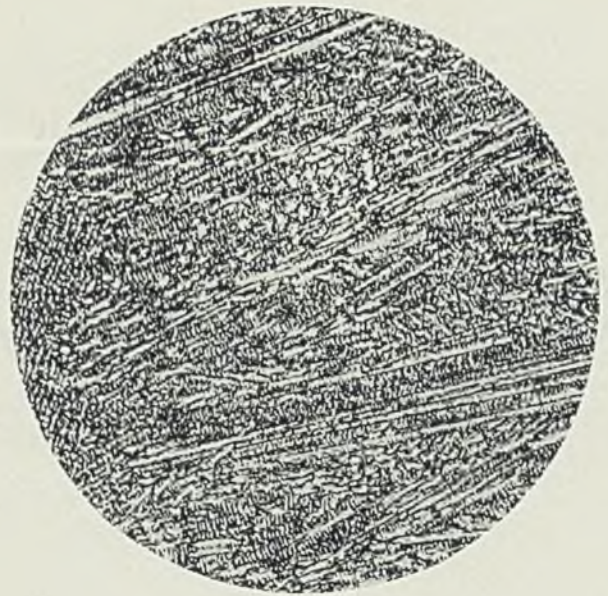
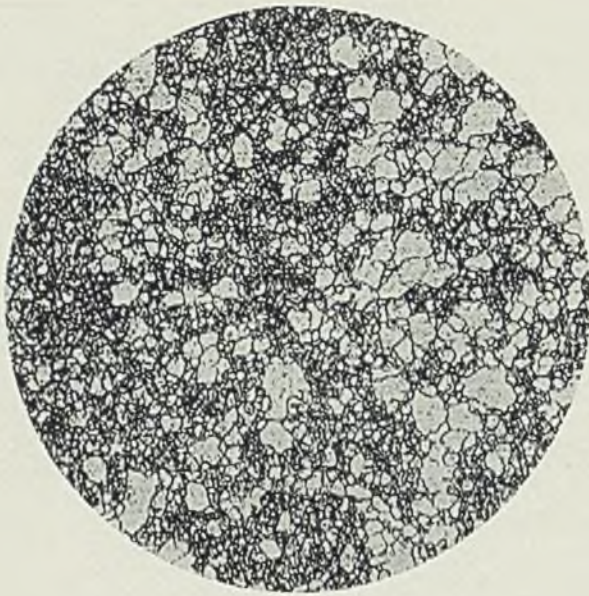
No pressure is required on pieces to be butt welded. Edges are simply sheared and placed together before running through the equipment which does the welding. No particular restrictions are placed on thickness, either, although more attention must be paid to getting a good fit on abutting edges.

This entire development is so radical and so important that one's first reaction might be to dismiss it as the dream of a quack; but an investigation of welded samples and discussion with the inventor will dispel any such idea. In fact, Dr. Longoria already has sold all rights on the process as applied to the welding of steel to a large steel company.

In recent weeks Dr. Longoria has worked out the procedure for welding nonferrous metals, and if samples are any indication, he has this problem licked as well. The writer saw samples of brass welded to brass, brass to copper, and copper to copper—all thin-gage material—30, 32, 34 gage, etc. The line of the weld was

HIGH-FREQUENCY electric current welds in three types of nonferrous sheets of approximately 32-gage thickness. From left to right, 90-10 brass, phosphor bronze and a 96-3-1 copper-silicon-manganese alloy





nothing more than a thin band of slightly discolored metal, with practically no bead whatsoever. Rights to this process also have been sold.

While full details of the equipment used to accomplish this work cannot be given, it will suffice for the present to indicate that nothing more is involved than a movable table to which the pieces to be welded are clamped, and a welding head under which the table travels as the abutting edges are joined. As the welded pieces emerge from under the welding head it is possible to place one's finger directly on the weld itself without danger of being burned. In fact, the weld is not even uncomfortably warm to the touch.

The inventor states that the equipment requires less space than present types of welding equipment, and can be built at considerably less cost. As an example he cites one type of currently-used sheet welding machine which sells for approximately \$85,000. Dr. Longoria claims he can build a machine to do the same work by his new method, at a cost of about \$15,000.

Any practical welding man will at once see the tremendous advantages to be gained from such a process, over and above the savings in equipment and power. In a considerable amount of present-day welding, it is necessary to heat the welded assembly above the critical point of the metal in order to remove any stresses which may have been set up by the welding process. Low-temperature welding would remove all necessity for such stress relieving.

From this meager account of an apparently epoch-making development, it will probably be difficult to appreciate fully the significance. But certainly not many years will elapse until the method reaches the commercial stage. Perhaps by that time welding methods of today will appear as obsolete as the horsecar of 40 years ago appears now. Stranger things have happened.

PHOTOMICROGRAPHS of 32-gage 96-3-1 copper-manganese-silicon alloy sheet, showing (left) base metal which has nonuniform grain and a tendency toward banding; and (right) weld zone with dendritic structure which etched much more rapidly than the base metal. Etchant was 5 parts ammonia, 5 parts water and 1 part hydrogen peroxide; both X250. Micrographs courtesy James H. Heron Co., Cleveland

The tubes housing the screws are of heavy steel, and the screw is equipped with an external shearing pin which does not require tools to replace. The hopper base is made of heavy cast iron and has an external cleanout port in case foreign materials stop the screw. The power unit is of the continuous feed type. Worm, worm gear and spur gears are made from drop forgings and bronze.

Making Furnaces More Efficient, His Theme

How To Build Up Furnace Efficiency, by Joseph W. Hays, cloth, 599 pages, published by the Dunes Publishing Co., Michigan City, Ind., and supplied by STEEL, Cleveland, for \$3, plus 15 cents for postage; in Europe by the Penton Publishing Co. Ltd., London.

This is the eighteenth edition of this authoritative work, and represents a greatly enlarged discussion. The author has presented the subject in a most practical way, thus providing a text of value and interest not only to those who pay for fuel, but also to those dealing with the theory of combustion.

The new edition presents numerous charts, diagrams and illustrations to illustrate some of the things considered hard to explain fully in text. The author also has illustrated certain instruments and apparatus of his own design. Cartoons have been used effectively throughout the new edition to emphasize many of the arguments.

Among other things, the author has discussed the whys and wherefores of the wasting of fuel, methods of finding the points where fuel is being wasted, ways of stopping waste, various types of fuels, such as oils, gases, powdered coal etc. A domestic heating problem also is discussed.

Battelle Establishes Research Associate Plan

Trustees of Battelle Memorial institute, Columbus, O., have established a division of research associates to supplement the work of the regular technical staff. Intensive training in practical research will be offered to young men in selected branches of metallurgy, chemistry, fuels and ceramics.

Four appointments as research associates will be available for the year 1936-37. Salaries will range from \$1200 to \$1800 a year. The associates will be expected to devote their entire time to research problems approved by the directors and supervised by members of the institute staff.

Steel Used in Construction Of New Automatic Stokers

Steel plays an important part in the construction of two new automatic stokers recently introduced by the Will-Burt Co., Orrville, O. The hoppers, which hold 350 pounds of coal, are made from heavy copper-bearing steel. The coal feed screws are made from steel in one piece.

Large Steam Hammer Forges Huge Links for Die Lock Anchor Chains

SPECIAL operating characteristics are involved in the 14,000-pound steam drop hammer recently built by the Erie Foundry Co., Erie, for forging anchor chains for the Navy department and installed in the Boston navy yard. The work for which this hammer was purchased was the manufacture of largest size die lock chain yet made by the Navy department. The hammer is shown in operation in the accompanying illustration.

Male ends of the links are of alloy steel bars, cut to length, tapered on the ends, bent, drop forged and trimmed. These parts are then heat treated before assembly. The female ends are likewise of alloy steel, the bars being cut to length and bent and the holes then pierced in both ends at once, the metal which is displaced by the piercing punch providing the stock which later in the closing of the link forms the stud between the sides of the link.

Joint is Not Welded

The sides of the stud do not weld together. This is not necessary from a strength standpoint since the function of the stud is merely to keep the link from collapsing under load, and therefore it is entirely in compression. Neither are the two halves of the link welded together in the closing operation as the joint is a mechanical one rather than a weld.

In assembling and closing the links, the female end is heated to forging temperature. The male end is stood in the bottom die of the hammer with the points upward and the heated half is dropped down over it until the shoulders come together.

The pieces are then laid over into the impression in the bottom die and the closing is effected with a single blow of the hammer. It is necessary to close the hot metal down around the lugs which have been formed on the cold end so that a perfect contact is formed throughout. Every dimension of the link is worked out carefully and the areas in bearing and in shear, as well as the areas in tension at any point along the joint, must be

proportioned exactly in order to develop the requisite strength.

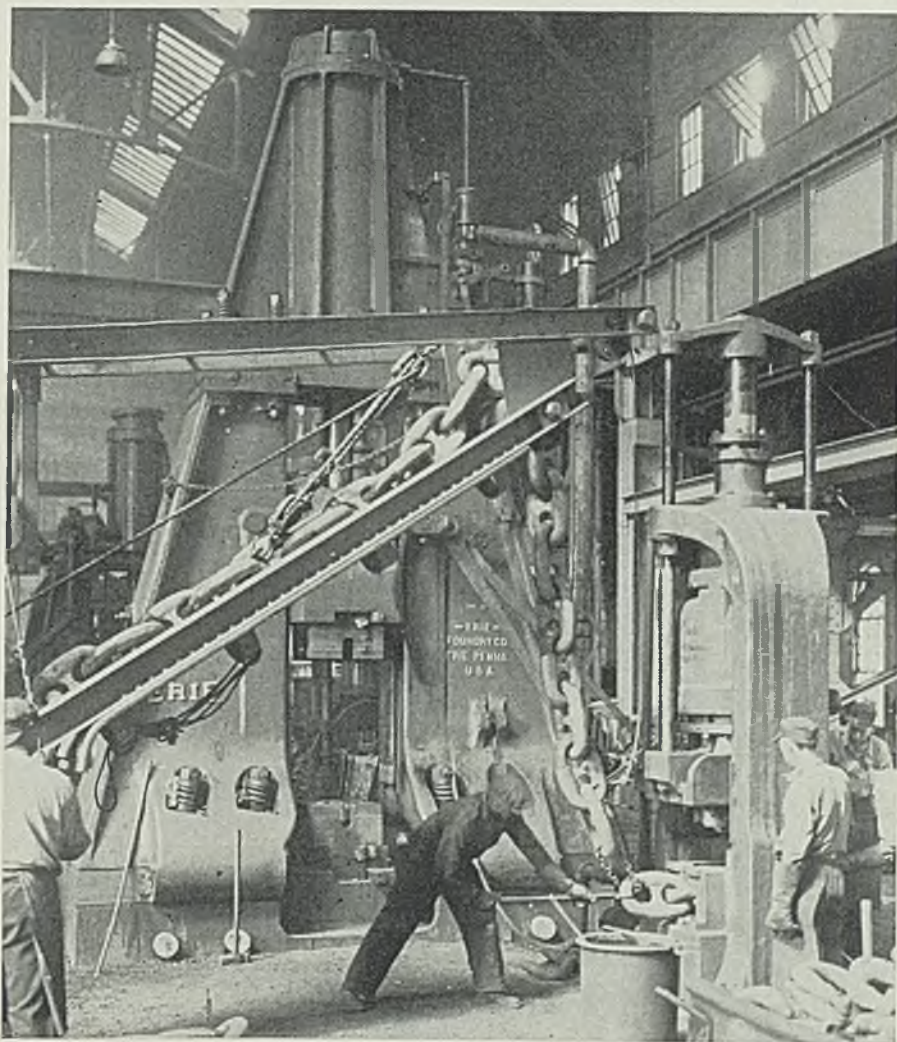
If a void is left at any point in the joint, or if the hot metal is not flowed into intimate contact throughout, then this balance is destroyed and the link will not stand the test to which every link must be subjected.

Metal flows out from either side to form the stud, the joint at the middle being barely discernible. The excess metal flows out all around the hot end at the joint between the top and bottom dies to form a flash which is hot trimmed before forming the subsequent links.

In addition to this flash, which is similar to the flash ordinarily formed in the making of any drop forging, so great is the pressure that the hot metal will flow out around the shoulder on the cold end of the link. When this collar of metal cools, it forms a perfect seal around the cold end. This shrinkage of the hot metal acts as well to grip the inner part throughout the length of the joint and adds to its strength.

In assembling the complete chain, after one link has been closed and trimmed, it is put on edge in a slot which extends out in front of the die and a cold end is inserted in the finished link and placed in position to receive the hot end which is then laid over and closed. The finished links of the chain are held suspended by an overhead crane and the as-

(Please turn to Page 73)



Forging large-size die lock anchor chain at the Boston navy yard. Here operators are hot trimming the flash before forming subsequently links. Note special boom for holding the heavy chain away from workmen

Precision Metal

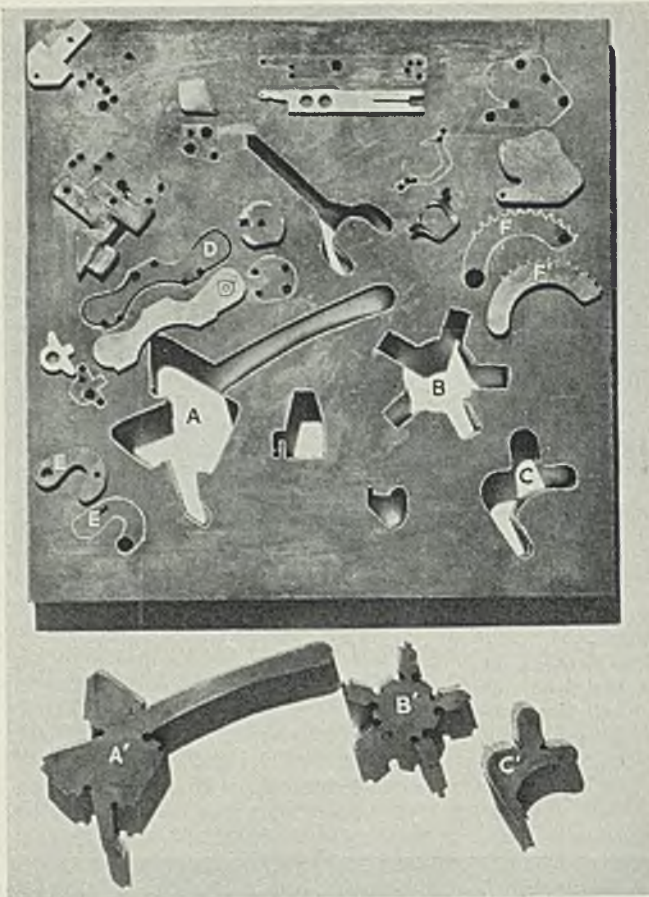


FIG. 1—Here are shown a number of specimens of dies sawed with the narrow-blade band sawing machine

A NEW tool that is capable of accurately cutting a contour hole in a 3-inch block of steel at the rate of $\frac{1}{2}$ -inch per minute yet leaving a slit only $\frac{1}{16}$ -inch wide in the wake of the cut, is deserving of study. New developments often have as their basis simple and well-known principles, and in some respects, this is true of recent developments in narrow blade precision band sawing for internal and external contours. Narrow-blade band sawing calls for the use of special metal-cutting band saws which are $\frac{1}{16}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{16}$ or $\frac{1}{2}$ -inch wide.

Use of these narrow-blade saws for internal cutting, and for intricate contours in thick sections of steel, requires a new type of machine. This machine is much different from the standard type of band saw which uses blades $\frac{3}{8}$ -inch and wider and is used generally for cutting-off operations. The saw must have the accuracy of a precision bench lathe and ruggedness to preserve this accuracy. Narrow-blade sawing involves an entirely new technique, and this technique and its application are not generally known.

Close Work Is Possible

This type of band sawing has certain fundamental and obvious advantages. Cutting is continuous; all pressure is in the downward direction; and the entire length of the cutting edge is used up. The steady pres-

sure of cutting makes it easy to follow a line and holds the work on the table.

As in all machine tools, the precision band saw must have a great deal of solid foundation and framework to surround the cutting unit. This is especially important in narrow blade band sawing machines, because the blade must run steadily, must not get out of line with the worktable, and the set of the saw teeth must be constantly maintained to produce the fine accuracy demanded.

Electric Brazier Provided

For internal sawing an ingenious process is employed. The saw blade ends are brazed together after one end has been placed through a starting hole in the work. Making the weld on the saw and the set-up for internal sawing takes approximately 5 minutes. Provision of a conveniently-located, semiautomatic electric saw welding device makes the brazing operation a simple one. Saws will not break at the joint for an electric braise is stronger than the saw itself. The saw may be reopened at the joint by re-setting it in the brazing fixture and applying the electric heat which causes the silver solder to melt. After a joint has been brazed and opened five or six times, it is desirable to make a fresh joint at a new place on the bend.

The most immediate and broadest applications of narrow-blade band

sawing are in tool and die work. Holes in die shoes and the cut-outs for the die, stripper plate and pad are made with decided savings. Internal band sawing obsoletes the costly method of drilling a row of holes, hammering out the slug, and filing off the drill marks in order to make an inside cut-out.

Thick Sections Are Sawed

The narrow blades have the ability to cut through steel up to 8 inches in thickness. This capacity makes possible the obvious application of stacking up several plates where duplicates of a certain shape are re-

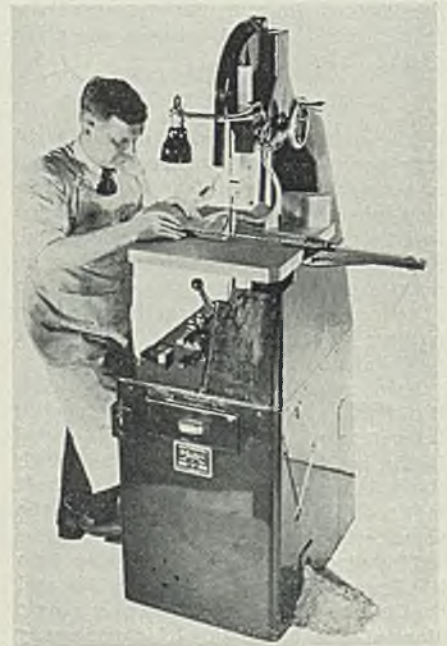


Fig. 2—Power feed is provided by an ingenious application of a spring motor. Work is kept free of chips by an air jet. Chips carried down by the saw fall onto a chute and accumulate outside the machine

Cutting with Narrow Band Saws

BY L. A. WILKIE

President, Continental Machine Specialties Inc.,
Minneapolis

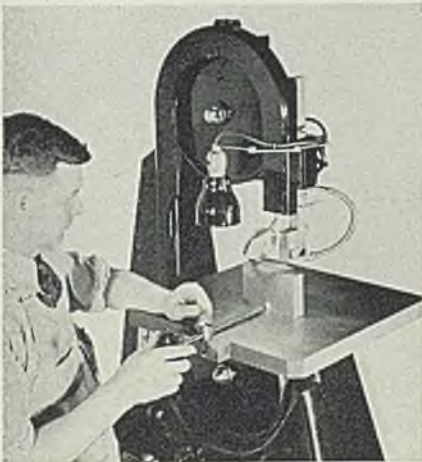


Fig. 3—A 3-power magnifying glass mounted on the machine assists in performing close work. A detachable screw feed is available when required

quired. This feature has excellent possibilities in die making where identical holes often are required in die block, stripper plate, and punch holder. By dowling these parts together, they may have the contour sawed in all of them simultaneously.

Among the many other toolroom applications for narrow-blade band sawing are cutting out shapes for forming dies, and making screw machine cam blanks, templets and sample parts.

Cuts Smooth and Clean

Narrow blade sawing has broad applications in the type of work done by the gas torch cutting processes. Sawing leaves a clean, smooth cut and cuts through appreciable thicknesses. It does not burn the edges of the cut and, hence, has several advantages over flame cutting methods. It does more intricate, accurate work than

is possible with flame cutting. The cost of saws and speed of cutting results in more economical operation. However, it supplements rather than replaces torch cutting, as its field is for smaller or more intricate parts, while flame cutting is for roughing out and for larger shapes. Flame cutting has the operating advantage in handling large plates, in that the plate remains stationary while the relatively light torch cutter is moved over the surface of the plate.

Component parts that are sawed to shape and then electrically welded into assemblies for drill jigs, fixtures, etc., result in a quick process of obtaining units that is economical and efficient.

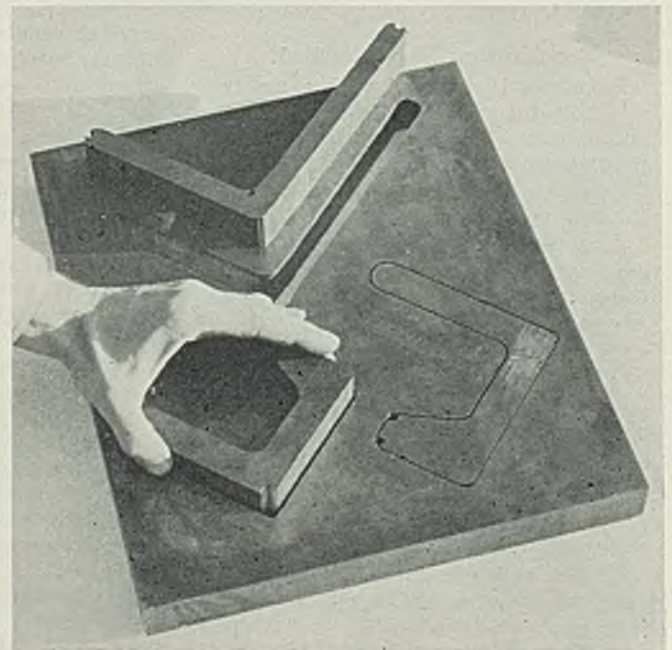
This new tool offers unlimited opportunities in production work. Work may be held in a jig or fixture mounted on the table of the saw

as in other machine tools. The fact that a narrow, deep slit may be cut on a curve make possible the solution of certain difficult operations that could not be accomplished in any other way. An example of such an application is the production of a bronze transformer frame. The casting required 18 lineal inches of narrow curved slot though a 4-inch thickness. The sawing time was 12 minutes per casting.

Edge of Blade Annealed

Only a few of the several manufacturers producing metal cutting band saw blades make the narrow ones. Rapid strides have been made recently in the development of these narrow band saw blades. They are standardized at 0.025-inch thick, and have the back edge of the band annealed. The hardness extends only

FIG. 4 — The three dies shown here, made of high-chrome, high-carbon steel plate, were produced in 3 hours. The same dies could have been made of tool steel in 1 hour



to the base of the teeth and the teeth cannot be reset or resharpened. Three tempers are available, these being classed as soft, medium, and hard. The number of teeth per inch varies from 10 to 32.

Tooth construction is of three distinct types, namely: 1. *Raker tooth*, having one straight tooth alternated with two teeth set in opposite direction. This tooth construction is used exclusively for cutting iron and steel except sheets and tubing; 2. *Wave tooth*, which is set in such a way as to make the set of the teeth form a wave over about 8 teeth in length

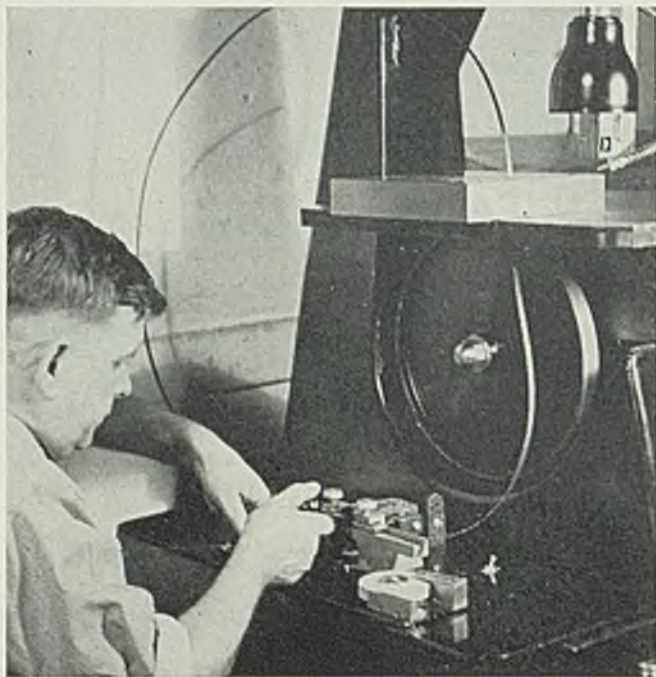


FIG. 5—For internal sawing, joints in the saw are prepared and brazed and afterward opened in the electric brazing unit provided as an integral part of the machine

—is used for cutting sheets and tubing; and 3. *Straight tooth* which has each consecutive tooth set in opposite directions and is used for sawing brass, copper, plastics and non-metallics.

Specification Tag Attached

Each saw is supplied with a firmly attached tag which specifies length, width, gage, teeth, temper, set, and whether the saw is joined or unjoined. On the reverse side of the tag appear the following precautions:

1. Be sure you are using the correct number of teeth per inch for the material you are cutting.
2. Use the widest saw consistent with the radius of curves to be cut.
3. Tension on new saws should be medium. The saw will stretch slightly after it is used. This stretch should be taken up and the tension on the saw can be increased slightly.
4. The teeth must project clear of the guides.
5. The roller bearings should turn only when pressure is put on the saw.
6. This adjustment is controlled

by tilting the upper wheel, causing the band to track in the right position on the wheel.

7. The upper guide should be as close to the work as possible.

8. Do not force the cut on curves.

9. Release tension on the band when the machine is idle.

Life Depends on Usage

The saws are available in coils up to approximately 100-foot lengths. Their cost is \$0.07 to \$0.13 per lineal foot, which is extremely low for so efficient a cutting edge. Saw life depends upon usage, but an

average ¼-inch wide 4-foot band, which costs about \$0.70, will easily cut through over 100 lineal feet on 1-inch thick cold-rolled steel before it is ready to be discarded.

The precision saw cuts all metals from the toughest high-carbon, high-chrome steel to the softest aluminum. It also handles all other materials with equal efficiency—such materials as molded plastics, leather, rubber, cork, and the like. It may be used also as a wood saw where an intricate pattern is required.

The most essential factor in the success of narrow blade sawing is use of the correct operating speed for each job. The saw must travel at the rate of 75 feet per minute when cutting high-chrome, high-carbon steel. When cutting aluminum, the saw must travel at 450 feet per minute. Within this wide range of cutting speeds, each different kind of metal and each thickness of job requires a different cutting speed.

To provide the exacting speed requirements, an infinitely variable speed is essential. It is also neces-

sary to have an indicator to show the operating speed. If an incorrect speed is used, the saw will tend to burn up or will not cut properly. The exact speed required for each job is readily learned with a little experience in narrow band sawing. Following is tabulated a general classification of materials and cutting speeds required:

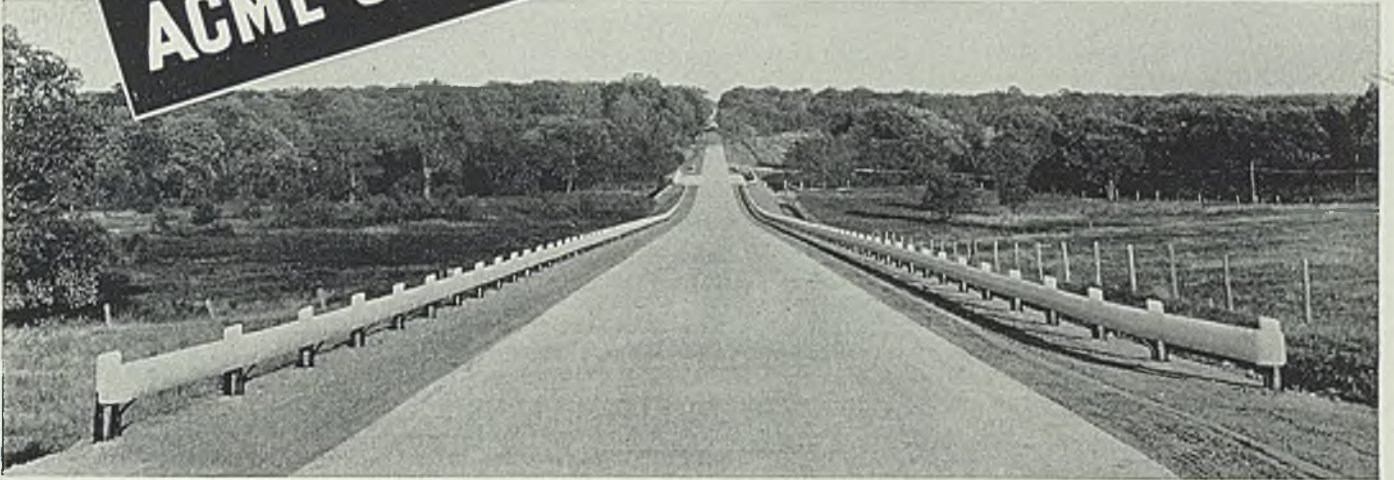
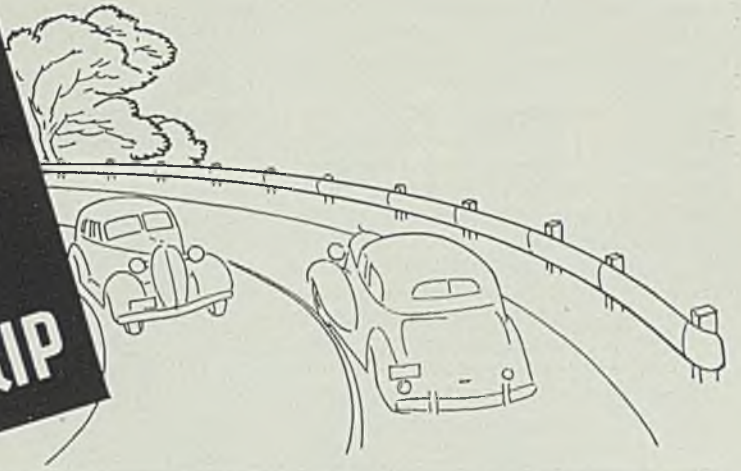
Speed in feet per minute	Material
75 to 110	High-chrome, high-carbon steel
	Alloy steel of high carbon content
	High speed steel
	High-carbon steel (over 0.75) Hard steel and special alloys
110 to 150	General tool steel
	Oil-hardening tool steel
	Water-hardening tool steel Air-hardening tool steel
150 to 200	General low-carbon steel (0.10-0.25)
	Cold-rolled steel
	Soft and mild steel
	Machine steel
	Cast iron Manganese and government bronze
200 to 300	Very soft and very mild steel
	Heavy-gage sheet steel
	Malleable iron
	Thin-walled sections Steel tubing Brass tubing
300 to 400	Thin sheet and tubing
	Duraluminum Hard brass
400 to 450	Aluminum
	Soft brass
	Copper
	Zinc
	Fiber Molded plastics Hard wood

While the technique of narrow blade sawing is an entirely new one, it is readily grasped by the average machine tool operator. The machine is one that encourages craftsmanship and skill, because the operator's hands and judgment play an important part in cutting out intricate jobs. In the several accompanying illustrations are shown and described a few jobs and methods which are employed.

Magnifying Glass Is Used

Because of the intricate and exacting nature of some of the jobs accomplished with the precision narrow blade sawing machine, a magnifying glass often is essential. The glass shown in Fig. 3 magnifies approximately three times and is sufficiently large to permit the operator to watch the cutting action with both eyes. Thus, painstaking precision work can be performed with greater ease and comfort. The craftsmanship and skill of a mechanic is brought out and encouraged in a machine of this kind where the hands and judgment of the op-

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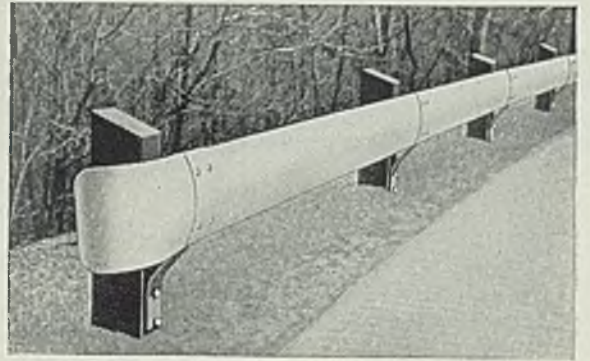
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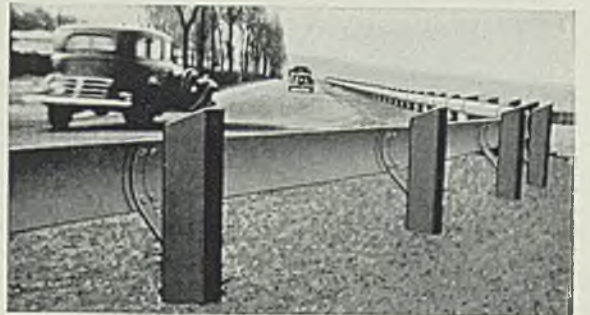
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Front View Convex Guard Rail and end piece.



Showing Highway Guard on curved road.

Photographs courtesy Tuthill Spring Co., Chicago, Ill.

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erator contribute more than in most machine tools.

A large volume of chips is made in a day's work, and it is essential that a means be provided to dispose of them. It is also necessary to prevent the cuttings from piling up on top of the work so the operator can follow his lay-out lines. An air jet, through a flexible, adjustable cable, as shown in Fig. 2, keeps the work free. Most of the chips are carried down by the band saw and fall by gravity in passing the bottom pulley. A chute is provided to carry the chips outside the machine as shown.

A novel screw feed which pushes the work into the saw is shown in Fig. 3. The screw is carried in an unlocking nut to permit quickly shifting from one position to another without turning the screw through the threads. Provision is made to swivel the screw about 30 degrees for cutting radii. A hardened tip at the point of the screw engages the work. To assure a good contact, a center punch mark may be put on the edge of the work. When this feed is not required, the whole assembly of it may be lifted out of the socket on the edge of the worktable.

Power Feed Available

The technique of using narrow blade saws requires a carefully controlled constant pressure for most efficient operation. The work feed illustrated in Fig. 2 is said to be particularly adaptable to precision sawing requirements. The power or pressure is delivered through an ingenious application of spring motor. This spring motor delivers a constant pressure of 50 pounds. However, the pull is controlled by foot pedal to give any pressure desired; pedal control of pressure also provides an instantaneous release of the pressure while both hands are free to guide the work. The chain which

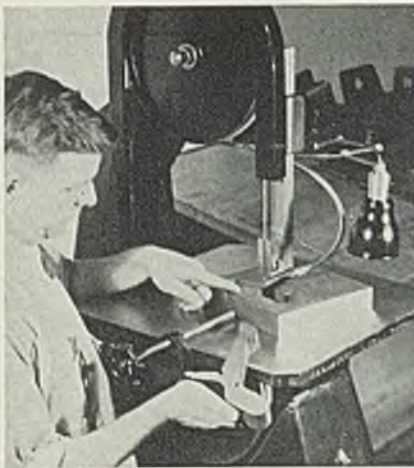


Fig. 6—A starting hole in this blanking die permits passing the saw through prior to the brazing operation

grips the work is a noose that may be readily unhooked.

The band saw blade is cut so that one end may be put through a starting hole in the work, then the two ends are rejoined in the brazing unit provided as an integral part of the machine as shown in Fig. 5. The steps in making the braze are as follows:

1. Grind a lap on the ends of the saw. This is done with the grinder and automatic lap grinding jig shown at the right.

2. The ends are centered between the terminals of the electric jig. Silver solder and flux are inserted between the lapped ends of the saw.

3. The saw heats when the switch is turned on. At the same time, a clamp applies pressure which squeezes out the excess silver solder while the joint is being brazed. The saw is stronger at the place it is brazed than the rest of the band.

4. The surfaces are smoothed with the lap grinding wheel, and the band saw is replaced in the machine.

Total time required for these operations for the internal sawing set-up is less than 5 minutes.

Starting Hole Is Drilled

A starting hole in the typical blanking die shown in Fig. 6 permits passing one end of the saw blade through prior to the brazing operation. Other holes are drilled wherever the die has sharp corners to facilitate turning the saw into them. Total time for setting up and sawing out the die illustrated was 45 minutes.

Cutting out holes in die shoes as illustrated in Fig. 7 is one of the many profitable applications for internal band sawing. The old method is to drill a row of small holes all along the lay-out line, then hammer out the slug and file off the drill marks.

The problem of cutting a true

circle is simplified with the ingenious method shown in Fig. 8. Adjustable centers in the worktable provide a pivoting point any desired distance from the saw. Hence, a disk of any diameter may be made by putting an axis on the plate or sheet stock to be cut and revolving the metal into the saw. There is practically no limit to the size of circles that may be cut by this method. Since thickness up to 8 inches may be cut with narrow blade saws the scope and range of work that may be handled with this circle cutting process is broad. An inside circle cut-out is made the same way except that the saw is brazed after it has been put through a starting hole.

Total time required for sawing out all three dies shown in the high-chrome, high-carbon steel plate illustrated in Fig. 4, required 3 hours. One saw blade, which costs \$0.70, was worn unfit for further use. The same three jobs in tool steel would have taken 1 hour, and the saw would have lasted for three such jobs.

Die Specimens Explained

Specimens of dies sawed with the narrow-blade band sawing machine are shown in Fig. 1. Die holes A, B, and C show that little additional finishing is necessary after sawing. Slugs A', B', and C', which were sawed out, are shown in the foreground. Specimens E and E' show a hole made up entirely of radii, and, therefore, only one hole—the starting hole—is required. Specimens F and F' show a similar condition, but here a sharp corner necessitated an additional hole to permit the saw to turn readily into the corner. Specimens D and D' show a starting hole for 1/8-inch saw and in an additional hole at each of the corners of the shape. Other examples of the technique of using starting holes and corner holes also are shown in this illustration.



Fig. 7—Cutting out holes in die shoes is an operation which is performed easily on the machine



Fig. 8—True circles are made by pivoting the work between centers and revolving it into the saw

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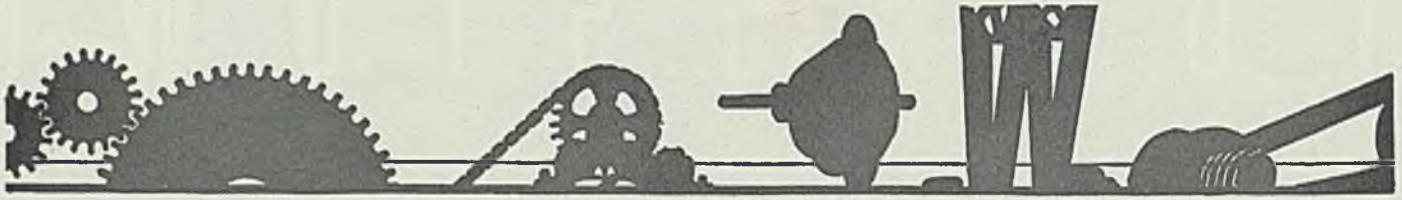
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Power Drives



Looking at the Matter of Drive Costs From the Dollars-and-Cents Angle

INDUSTRIAL executives considering additions to or revamping of equipment will find some pertinent facts in regard to drive installation costs and operation in connection with a Midwestern plant which was recently removed to a new building. This plant operated 78 machines. After careful study of the load, power and operation requirements the engineers decided 11 machines could be driven individually to better advantage than in groups. The other 67 machines were divided into four groups.

Comparison of the cost and horsepower of motors under the two conditions indicated a wide difference in cost between group and individual drives. Grouping required a little less than 150 horsepower total motor rating (including the 11 individually driven machines). These motors cost roughly \$2300, and about \$1000 for control, wiring and installation. If all were individually driven the 78 machines would have required motors of slightly over 400 rated horsepower, costing almost \$9000 and an additional \$5000 for installation and auxiliary equipment.

Substantial Saving Effectuated

Combination grouping and individual drives indicated a saving of over \$11,700 in first cost of motor drives installed to balance against cost of lineshaft installed. This latter figure is not given but under ordinary conditions should not be over \$2500 with antifriction bearings, leaving a net gain of over \$9000 in first cost of investment. Assuming fixed charges at 15 per cent of cost installed would give an annual operating saving of \$1350 or over \$110 per month.

Also, by combination individual and group driving each machine requires approximately 1.8 horsepower in motors to operate against about 5 horsepower with motors on all machines. Induction motors were used and with approximately 3 to 1 ratio

in motor horsepower rating with the two types of drive would, no doubt, incur heavy power factor penalties, if individually driven, against no penalties in the combination group. Also underloaded induction motors operate inefficiently resulting in power losses which, combined with power factor penalties, would increase the power bill considerably.

Maintenance of the lineshaft with antifriction bearings should be much lower than that necessary for the extra 62 motors and their starting or control equipment which requires periodic cleaning and inspections against the annual expense for lubrication of the lineshaft.

Savings in power and maintenance are difficult to estimate although a saving of \$50 per month

Erecting Lineshafts

UNTIL within the last few years most lineshafts were generally erected on a superstructure of wooden stringers. With the increasing tendency toward frequent shifting and rearranging of equipment the use of steel superstructures is increasing rapidly, largely because of the greater ease in changing and the fact that the same material can be used again in new locations with no waste. About one shift will pay the difference in first cost.

Steel superstructures are of three types:

1. Special patented box rails or stringers used in pairs, each made up of two special steel shapes fastened together with spacers between leaving a vertical slotted opening for inserting bolts to attach the special crosspieces holding the hangers. Special bolts and clamps permit easy and rapid installation or dismantling.

2. Plant assembled stringers made from standard channels bolted in

in favor of the group would be conservative under ordinary operating conditions.

In this case, to drive individually all machines the management would spend \$9000 additional in first cost for the privilege of spending about \$160 per month, \$1950 per year, more for operating expenses above what a carefully engineered combination group and individual driven installation would cost. This saving is available for profits or application to lower costs of production.

All individual drives often have certain advantages but they cost more. Will these advantages repay the extra cost? A careful study usually shows that these advantages exist only on some machines under certain conditions. Therefore, combinations of group and individual machines, which is the modern practice, practically always provides a more economical and satisfactory solution than to go 100 per cent group or individual drive. In stiff competition few plants can overlook savings in either first cost or operating expenses.

pairs back-to-back with spacers between so that bolts with large washers at the heads may be inserted between to attach the cross members of similar channels or I-beams for mounting the hangers. These two are shifted easily.

3. Stringers consisting of two separate channels mounted with the web downward and holes drilled for attaching the hangers and lagging on bolting to the building structure. This is the least expensive method in cost of steel but when making changes or shifting hangers usually new holes must be drilled. Also, heavy channels must be used unless they can be supported every 4 to 6 feet.

For concrete buildings inserts or slots set in the ceiling before the concrete is poured simplify fastening the stringers to the ceiling.

Where changes are made frequently it pays to stock extra stringers, hangers, bearings and shafting so that the new installation can be erected before the old installation is torn down.

Surface Treatment and Finishing



Selection, Application and Use of Finishes for Metals

V—Testing Organic Coatings (concluded)

THIS is the second and concluding installment of Part V, and the conclusion of the *Selection, Application and Use of Finishes for Metals* series. The first installment of Part V appeared in the June 8 issue of STEEL and included a discussion of flexibility and impact testing of organic finishes. This installment covers abrasion testing, and a general discussion of the technique of modern testing practice.

Various devices have been used to determine the effect of abrasional forces on finishes. One of the first methods used was to fasten panels coated with competitive finishes to the treads of a stairway, relying on the abrasive action of shoe-leather to wear through the materials; the wear resistance being proportional to the time required to wear through the finish. This method, however, is slow and difficult to control and attempts were made to imitate the scuffing action mechanically. In one type of apparatus of this sort a disk coated with a finish is revolved rapidly while it is in contact with a fine mesh sand. In this test abrasion resistance is proportional to the number of revolutions required to wear through the finish.

Another form of abrasion test favored by Dr. H. A. Gardner, of the Paint and Varnish Manufacturers' association, utilizes the abrasive action of sand or carborundum when dropped from a constricted funnel through a long tube onto the finish sample. In this test wear resistance is recorded in terms of either the total time or the weight of abrasive required to wear through a unit thickness of material.

Another form of abrasion machine, known as the "Abrasiometer",

THE accompanying article concludes the series of articles on metal finishes which has appeared biweekly in eight installments, beginning March 16. Requests for previous articles or for the entire series should be addressed to STEEL, Readers' Service Department, 1213 West Third street, Cleveland.

in which the time of test is considerably shortened, was developed by the Bell Telephone Laboratories Inc., New York. In this device, illustrated in Fig. 1, a carborundum air blast is utilized; the large excess of air used being sufficient to remove all abrasional heat. The panel under test is mounted directly under the nozzle at an angle of 45 degrees. A stream of carborundum flows from the container and impinges on the finish under the action of a controlled air blast which enters through the side arm of the nozzle. The wear resistance is proportional to the amount of carborundum required to wear through a unit film thickness of material. The thickness of coating can be measured with the aid of any of the commercially available thickness gages.

The procedure used in testing a series of finishes for their physical properties is as follows: Flat panels, 3 x 6 inches in size, 1/32-inch thick, of the base metal for which the finish is designed, are coated with uniform films of the various finishes under consideration. Uniform film

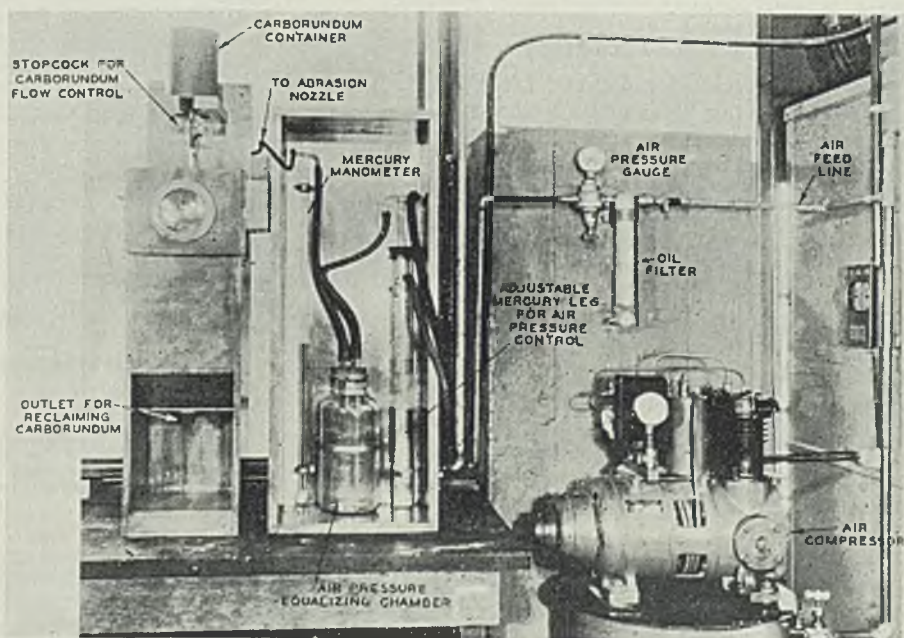


Fig. 1—Air-blast type of abrasiometer for testing the abrasion resistance of organic finishes

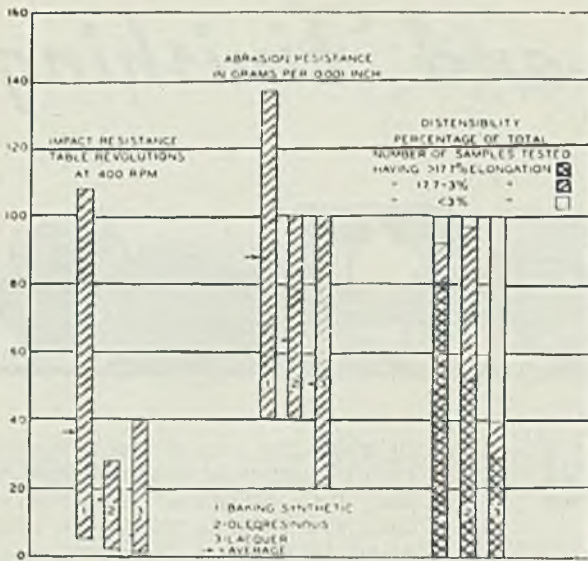


FIG. 2—Comparative physical properties of enamels based on 35 enamels of each type. The film thickness was 0.0005 to 0.001-inch and the films were aged approximately one month before testing

thickness is obtained by using one of two methods. The first, known as the *spinning method*, utilizes the centrifugal force developed when the panel on which the paint sample has been poured is rotated in a horizontal plane at a relatively high speed, (300 revolutions per minute) for 30 seconds. The second method, which is preferable since it more nearly duplicates finish-shop application methods, utilizes a commercial spray gun. Any desired film thickness can be obtained by mechanically varying the speed of spray gun travel, keeping the viscosity of the paint and the air pressure on the gun constant. Having prepared samples for test by one of the above methods, they are then aged under simulated service conditions and tested under controlled conditions of humidity and temperature, for resistance to bending, impact and abrasional stresses, at one month intervals for the first three months of age.

Synthetic Enamels Analyzed

Table I gives a typical analysis for three air-drying commercial synthetic enamels which were applied to bright acid-dipped brass panels. A glance at this table indicates that the materials are listed in order of quality. Material A has high wear, impact, and bending resistance and has a slow rate of deterioration in these properties. It has, therefore, excellent life characteristics and will stand up best in service. Although material B has good initial film properties, it deteriorates rapidly with aging as shown by its rapid loss in distensibility and impact resistance. Material C is an example of a poor material, since it has poor wear resistance, which reflects low cohesive strength and accounts for its poor distensibility and impact resistance. The correlative actual exposure data included in Table I confirm this order of selection.

During the past few years the

physical properties of numerous enamels of the synthetic, oleoresinous and lacquer types have been determined. Fig. 2 shows diagrammatically the range of quality which was obtained in an investigation covering over 100 samples of enamels submitted by representative suppliers. The analysis indicates that the modern synthetic enamel has on the average the best physical characteristics, although individual samples of the lacquer and oleoresinous types which have equivalent characteristics are obtainable.

Perhaps the most striking information which the data yield is that although individual samples of each class of material can be found which have excellent properties, the average material of each class is well below this value. For example, a lacquer enamel was found which has a wear resistance of 100 grams, an impact resistance of 40 table revolutions, and a distensibility of better than 17.7 per cent, whereas the average lacquer enamel had a wear resistance of only 46 grams, an impact resistance of only 3 table revolutions, and a distensibility of less than 3 per cent.

Although, in general, the physical

tests discussed above are used jointly, specific problems arise from time to time in which one or more of them may be omitted. For example in the linoleum industry abrasion resistance becomes the controlling factor. Several manufacturers of this product are now using the carborundum-air blast test as a routine means of controlling the wearing quality of their floor coverings. In those industries where sheet metal is coated with a finish before fabrication, bending resistance and adhesion become of prime importance. In these cases the mandrel test, as used in the above analysis, is an effective tool.

Tests Solve Problem

A specific instance in which the mandrel and variable speed impact tests solved a problem about which there had been considerable conjecture on the part of paint technologists may be of interest. In the finishing of automobile bodies it is customary to apply a coat of primer to the steel parts, followed by several coats of surfacers. After drying, this surfacer is sanded to a smooth surface, after which two or more coats of color enamel are applied. This procedure gives the car a desirable high gloss finish.

A good surfacer is one which leaves a thick film of material on the job for every coat applied, and which sands away to a smooth surface with the least amount of rubbing effort. These properties are realized in materials which have high pigment content and low cohesive strength. A material with poor cohesive strength has low impact resistance and poor distensibility.

It was a matter of considerable conjecture as to what effect these heavy coats of brittle material had on the finish system as a whole. Some technologists claimed that these materials lowered the quality of the entire system; others said that these coats acted as a cushion for the system and tended to relieve impact and bending stresses.

Table I
Characteristics of Typical Synthetic Enamels

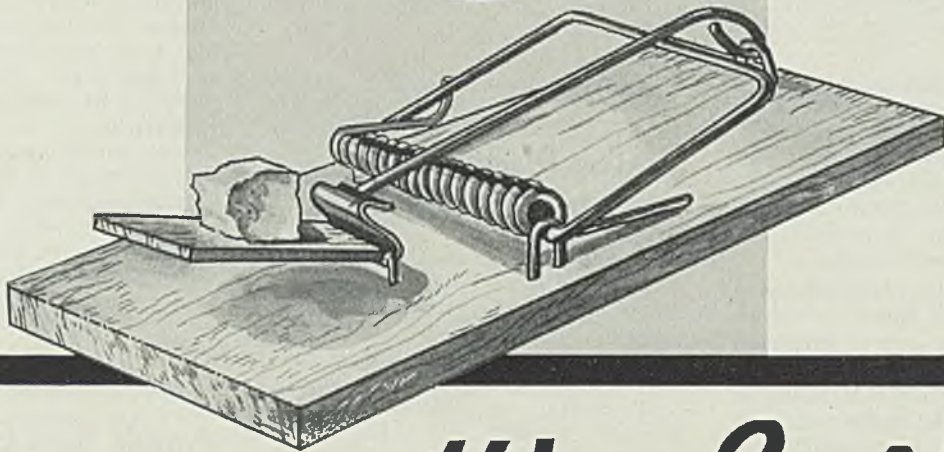
	Distensibility in per cent elongation			Impact resistance in R.P.M.			Abrasion resistance, in grams of carborundum per 0.001-inch of coating			Outdoor exposure results
	1 Mo.	2 Mo.	3 Mo.	1 Mo.	2 Mo.	3 Mo.	1 Mo.	2 Mo.	3 Mo.	
A	17.7	10.5	10.5	1500	1500	1500	55	50	48	*2 yrs. No failure
		†17.7	†17.7							
G.A.	G.A.	G.A.	G.A.							
B	17.7	†3	†3	1500	1500	1300	45	48	41	Checking 8 mos.
G.A.	G.A.	G.A.	G.A.							Cracking 12 mos.
C	†3	†3	†3	†185	†185	†185	17	15	12	Checking 3 mos.
N.A.	N.A.	N.A.	N.A.							Cracking 11 mos.

G.A. = Good Adhesion
P.A. = Poor Adhesion
N.A. = No Adhesion
* Minimum.
† Maximum.

As determined by scratching the surface with the fingernail after bending.



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Table II

Characteristics of Typical Finish Systems

	Impact resistance in R.P.M.		Distensibility in per cent elongation	
	I	II	I	II
Primer+enamel.....	430*A	†400*A	†17.7 G.A.	3.9 G.A.
Primer+surfacers+enamel.....	550*B	480*B	5.7 G.A.	†3 P.A.
Primer+surfacers+glaze+surfacers+enamel.....	430*C	670*C	†5 N.A.	†3 N.A.

*Letters refer to amount of shattering caused by the impact hammer.
 †Maximum reading
 A, end point confined to area of impact.
 B, shattering not in excess of 1/8-inch around point of impact.
 C, shattering over areas larger than 1/8-inch around point of impact.
 I = Aged 3 months at 75 degrees Fahr., 50 per cent relative humidity.
 II = Aged 14 months in a high-low humidity cycle.

Actual physical measurements show that both were right, but that the gain in impact value due to cushioning action was far outweighed by other attendant disadvantages.

Table II gives the data obtained when a good primer and color enamel had varying amounts of surfacers left between them. The data indicate that although some increase in the force required to shatter the finish was noticeable, when shattering occurred the area of damage increased with the amount of brittle surfacers left in the system. Moreover, as increasing amounts of surfacers were used the distensibility and effective adhesion of the system diminished rapidly.

Fig. 3 is an actual photograph of the impact patterns obtained in these tests. The conclusion to be drawn is that from a durability standpoint surfacers should be used sparingly if at all, and that if necessary some of the mirror-like appearance should be sacrificed for the better life characteristics of the unsurfaced system.

Summary

In special cases other properties such as perspiration resistance, acid resistance and electrical insulation become of considerable importance in the selection of a finish. In these cases special tests are used to evaluate these properties, since they are not directly measurable by any of the above methods. It should be noted, however, that finishes designed to meet these special requirements, also must have good wear, impact and bending characteristics.

It is felt that the widespread use of these testing methods, or of similar methods, would be of advantage to both the consumer and producer of finishing materials — to the consumer because they afford him a quick and reliable method of choosing the best finish for a particular job; to the producer because they afford him a method of determining the effectiveness of formulation changes.

—THE END—

Pickling Practice for Enameling Sheets Improved

A new type of electrocleaner has been used to advantage in the preparation of steel sheets prior to enameling according to a paper, "Electric Cleaning and Pickling of Sheet Iron Prior to Enameling," by Dr. A. E. Chester, J. T. Irwin and Clayton Ellinger, presented recently before the enamel division of the American Ceramic society at Columbus, O., and abstracted in the May issue of the *Enamelist*, published by the Enamelist Publishing Co., Cleveland.

In order to take advantage of the speed of direct-current cleaning, and yet retain the advantages of batch cleaning, an unusual type of electric current wave was used. To obtain this wave form a 6-volt direct current, upon which a 5-volt alternating current is superimposed, was used. By cleaning with this type of current the work was kept cathodic except for short periods during each cycle when it became slightly anodic. This eliminated the polarization effects of direct current, and a higher cleaning efficiency was obtained.

In a commercial trial 3-volt currents were used with a specially compounded cleaner, and a current

density of 1/2-ampere per square foot. The usual cleaning time was cut in half and the method was successful in removing mineral oils and greases which could not be removed by ordinary cleaning processes.

A new patented process which uses an alternating current in an acid bath was also described. In this process a low-voltage alternating current is passed through a sulphuric acid (plus gluconic acid) pickling bath, and the sheet steel ware to be pickled is placed between the electrodes. The current passes through the bath and through the work in traveling from one electrode to the other. This results in an electrical stimulation of the bath and in producing the same alternating polarity on the work as appears in the alternating current itself. These rapid alternations which make the work anodic and then cathodic result in a stimulated corrosion of the base metal on the anodic half cycle and complete protection on the cathodic half cycle, according to these authors.

Anode Bags Eliminate Sludge in Plating Baths

The growing need for producing a nickel plate free from pits and inclusions, especially when chromium is to be applied over the nickel, has caused platers and producers of plating materials alike to cast about for a simple method of keeping nickel baths free from sludge.

What appears to be the simplest solution of this problem has appeared in the development of an anode bag of special design. This bag has two layers of cloth, between which is a layer of filter paper. The passage of metal ions from the anodes is not hampered and insoluble impurities cannot escape into the solution. The bags are discarded when the anodes have been exhausted.

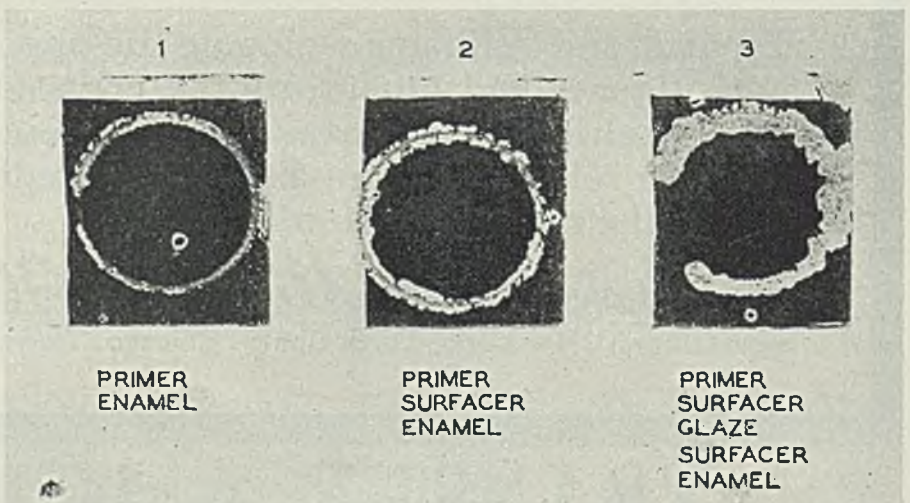


Fig. 3—Effect of surfacing materials on impact resistance as illustrated by the rotating hammer type of impact testing machine

Methods and Materials



Combination of Steel and Gypsum Adapted to New Building Material

COMPOSITE steel and gypsum lumber for floor and roof construction now is being marketed in the industrial field by the Structural Gypsum division, American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, under the trade name Gypsteel Plank. Designed as a fireproof roof deck for plant buildings, it has been used extensively in the past three years not only for roofs, but also for floors of light load buildings, such as offices, stories, schools, hospitals and homes.

The units are made in standard size, 2 inches thick, 15 inches wide and 10 feet long. The plank is a fireproof, nailable gypsum compound bound on the sides and ends with steel. First the steel frame is formed of galvanized copper-bearing steel sheets, tongued and grooved in the same way as wood lumber. Then the gypsum compound is placed in this frame and allowed to harden. The plank weighs 12 pounds per square foot, of which the steel weighs a little more than one pound per square foot.

Application Is Conventional

These units are laid over the usual steel supports just the same as ordinary tongued and grooved lumber, and attached to the roof purlins by means of galvanized steel clips which are nailed to the sides of the gypsum plank. An unusual feature is that the end joints are laid at random, without regard to location of supports, thus permitting standard length units to be used on any purlin spacing, up to the 7 foot maximum recommended. The plank is cut with an ordinary hack saw and a short piece left over from one row is used to start the next.

Because of its adaptability and the ease with which it is installed, this decking is particularly useful for roof replacements. No special equipment or skill is necessary, and

the new deck may be laid as rapidly as the old is removed, without interference with plant operations. The plank may be covered with any standard roofing material such as would be used over a wood or concrete deck.

\$ \$ \$

Zinc Improves Properties Of Casting Alloys

Improved physical properties of magnesium-tin-cobalt casting alloys may be obtained through the addition of zinc or manganese, it is claimed in a patent. An alloy containing 5.0 per cent tin, 1.0 per cent cobalt, remainder magnesium, had its tensile strength increased from 19,000 pounds per square inch and its elongation from 5.2 per cent by the addition of 4 per cent zinc. After a thermal treatment of 22 hours at 480 degrees

Cent., the tensile strength increased to 29,000 pounds per square inch and the elongation to 10 per cent. Further aging for 20 hours at 150 degrees Cent. gave 32,700 pounds per square inch tensile strength, and 6.5 per cent elongation.

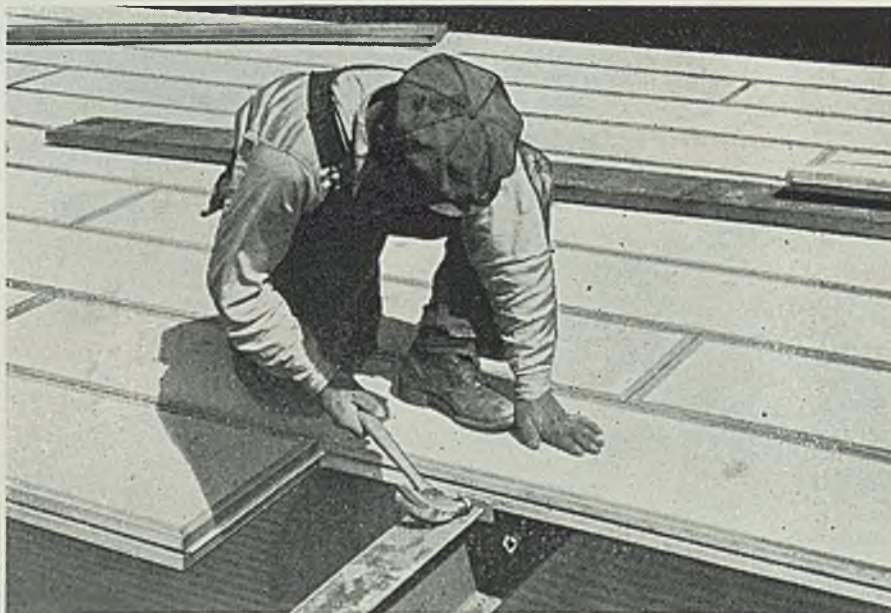
\$ \$ \$

Must Use Care in Repair Of Boilers by Welding

Welding has a splendid record as a tool for effecting repairs, however, it is sometimes used without the benefit of sound engineering judgment, particularly in the case of pressure vessels. An instance of the later is given in the June issue of the *Metals Safety News Letter* published by the National Safety Council, Chicago.

In March, 1935, a small leak appeared in the top dished head of a vertical boiler of the type used on locomotive cranes. A crack was found at the bend of the dished head and this was welded and the crane put back into service. No thought was given to the fact that the crack was the effect of some cause and that even after welding was performed this influence would still be operating.

The crane continued in service in-



Assembling a roof of special planks made up of gypsum compound bound with galvanized copper-bearing steel

HOW *the* G-E Single-

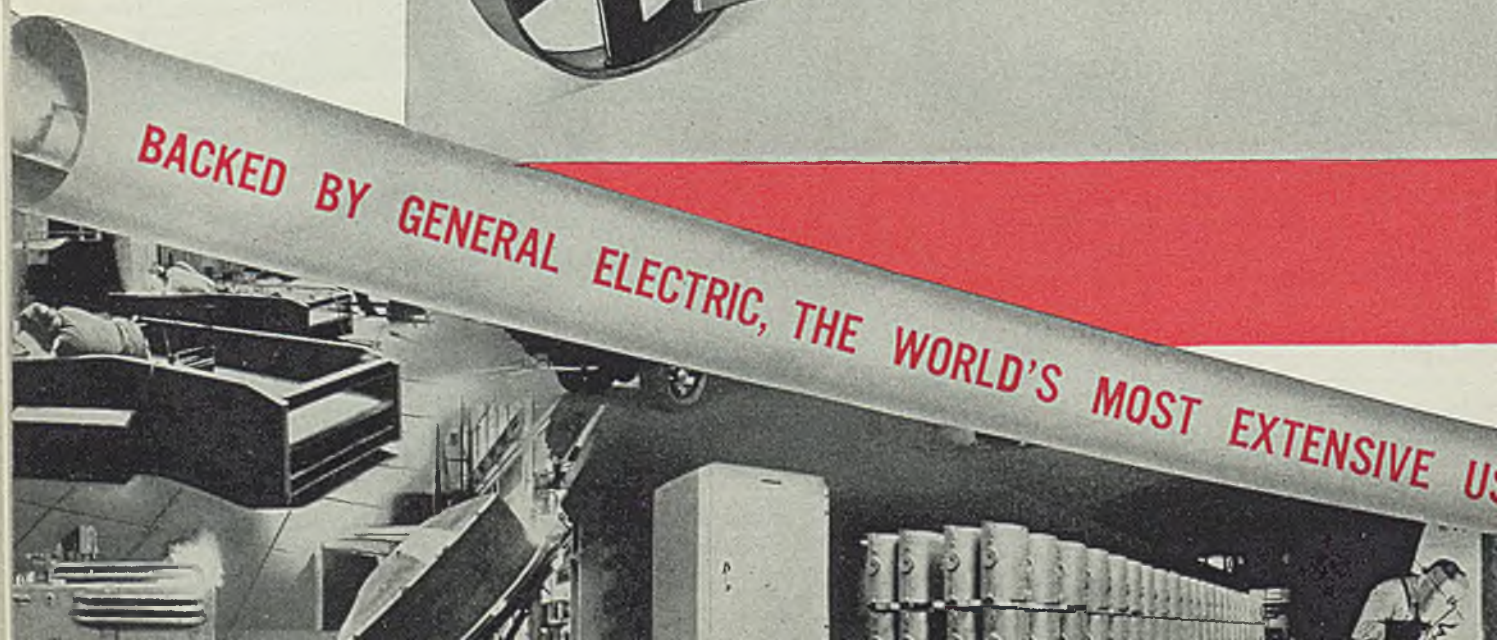
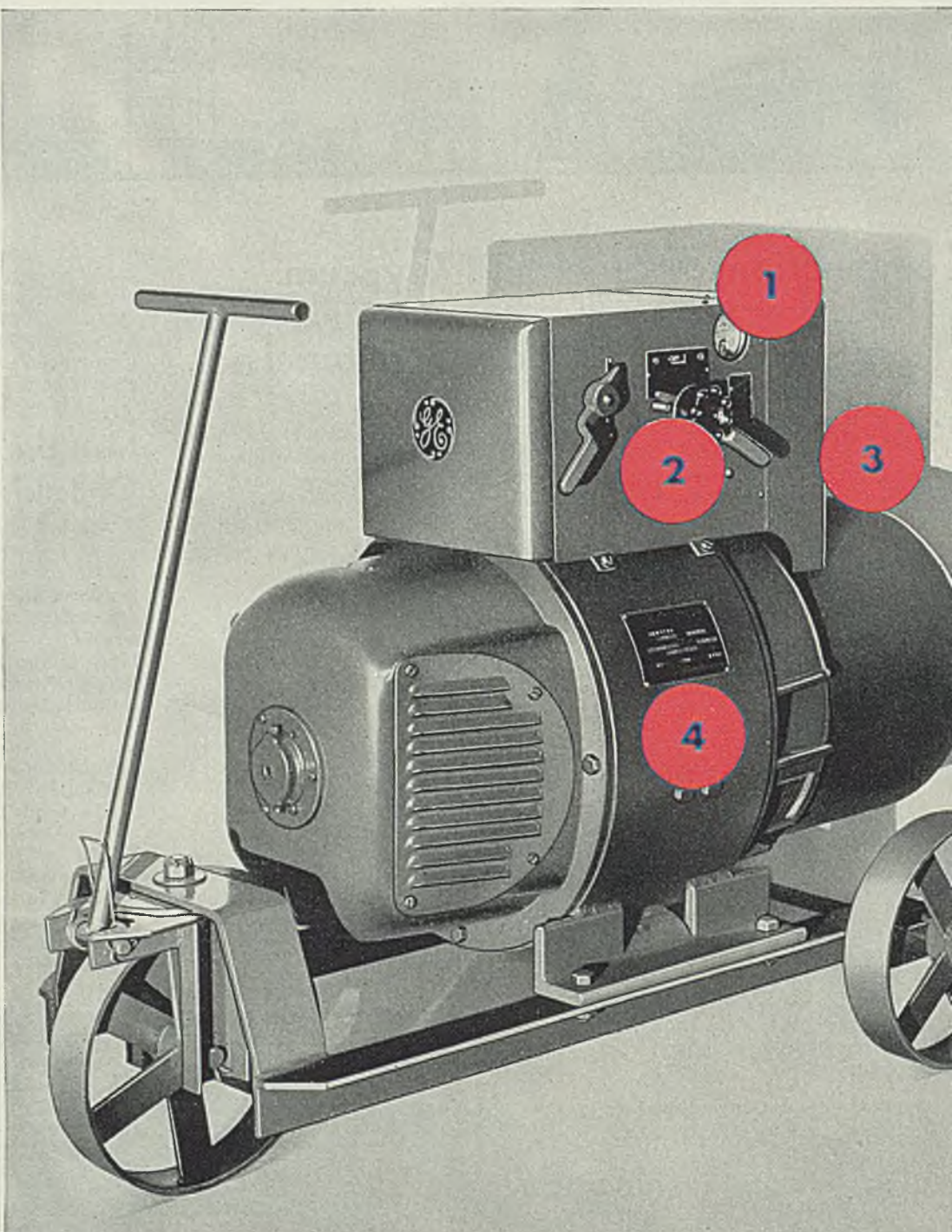
You Get All These Features, and More, at No Additional Price

① Accurately calibrated, easily read, full-range voltmeter gives positive indication of welding current and voltage throughout the entire range of the set.

② Duplex control provides easy adjustment of both current and voltage to meet exactly the requirements of any job. Quick, easy selection of amperage and voltage is provided by an easy-to-grasp knob and handle.

③ Overload and under-voltage protection for the motor prevents burnouts, and thus minimizes maintenance expense.

④ This set includes *everything* you need in a welder to meet your requirements, including production, plant maintenance, and repair work, and to assure you of an efficient money-making investment.



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Operator Welder Reduces Electrode Spatter 30 Per Cent



The smooth, stable, quiet arc produced by the popular G-E single-operator welder saves as much as 30 per cent of the electrode ordinarily wasted in spatter loss, and makes more uniformly high-quality joints.

The arc produced by ordinary welding machines, being less stable and more readily disturbed by magnetic blow, may waste as much as 15 per cent of the electrode in spatter loss. Moreover, it does not provide sufficient penetration. The result is low-quality welds which are ununiform and which contain excessive slag inclusions.

THE adequate arc stability built into the G-E single-operator welder provides an arc which considerably reduces the amount of weld metal wasted in spatter, thereby reducing the cost of electrodes and finished welds.

The small globules of molten metal which splatter away from a welding arc (ordinarily known as spatter loss) account for 15 to 18 per cent of electrode costs when you use ordinary welding machines.

Carefully conducted tests under identical conditions show definitely that as much as 30 per cent of this spatter loss—about 5 per cent of the total electrode cost—is saved by the use of the G-E single-operator welder.

At a nominal rate of 10,000 pounds of electrode a year, this saving may easily amount to enough to pay the interest on the investment in a G-E single-operator set—a worth-while return for simply selecting the *right* equipment.

For this and many other reasons—including stronger joints because of deeper penetration, easier operation because of adequate stability, minimum maintenance expense because of simple sturdy design—you are assured of the maximum return on your welding dollar when you purchase the G-E single-operator welder. If you will call the nearest G-E welding distributor or G-E sales office, they'll be glad to tell you more. Or mail this coupon to General Electric Company, Dept. 6B-201, Schenectady, N. Y.

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ARC WELDING

termittently until May 5, 1936, when the leak again showed up in the same place. The crane was taken out of service at once, but the engineer and fireman had not left the cab when the boiler let go, badly burning both men, one probably fatally.

Upon investigation, it was found that the feet of the stays tying the

dished head to the side sheets had broken away from the head and that they had been broken away for some time, probably before the first leak was observed a year before. This was the cause of the first leak and should have prompted a complete investigation before repair by welding was ordered.

free edge of large openings should be supported to prevent failure by buckling. Where flat plate members cannot be avoided, it is sometimes desirable to corrugate them to aid in the cooling conditions.

Often metal concentrations can be prevented by avoiding large radii at the inside of corners and small radii at the outside. Designers sometimes build up such corners (Fig. 4) to improve the section modulus, but usually all that is gained mathematically is more than lost due to poor feeding in such corners.

Designers of Steel Castings Should Co-operate with Foundrymen

BY CLARENCE B. HARBISON

Chief Engineer, Ohio Steel Foundry Co., Lima, O.

DESIRABILITY of steel castings in certain constructions subjected to severe stresses is well established. There are some points, however, which should be given careful consideration in designing steel castings. Where it is possible for the designer to confer with the foundryman in regard to the best method of molding, this should be done. It is often possible to make some slight alteration in the design that will improve the molding conditions by providing for better gating and feeding.

It is customary to gate steel castings near the bottom and provide feeding heads at the highest points to feed as directly as possible down through the members joining top and bottom. Since the first metal poured finds its way to the feeding heads, it is the coldest metal and the heads should therefore be made of sufficient size so they will remain hot enough to feed the casting properly. The heads should also be high enough to provide sufficient ferrosstatic pressure to insure sound sections in the casting.

Freezing Proceeds Inward

In the design of steel castings the freezing of any section proceeds from the outside surface inward. The inner portion thus has to suffer the combined liquid and solid contractions after the outer solidified portions are set in position.

The natural tendency to form a cavity must be met by having an adjacent supply of hot fluid metal which can run into the desired position in sufficient quantity to prevent the formation of a cavity. The thinner portions naturally tend to draw from the thicker portions and therefore heavy concentrations of metal are to be avoided as far as possible.

On account of the method of mold-

ing and the mechanism of feeding, it should be evident that the thickest metal should be in the cope (top part of mold), the sections gradually growing thinner to the bottom or drag. If steel castings are designed with a gradual decrease in thickness from the cope to the drag (Fig. 1), we are always feeding the thinner sections through the thicker sections and are therefore providing correct cooling conditions which should result in sound castings.

Many times concentrations of metal can be avoided when designing a casting by staggering ribs and webs (Fig. 2). In many cases such concentrations can be avoided by providing for openings in webs and ribs (Fig. 3) where they join the body of the casting, especially in the corner. Such openings should be as large as possible consistent with strength and stiffness.

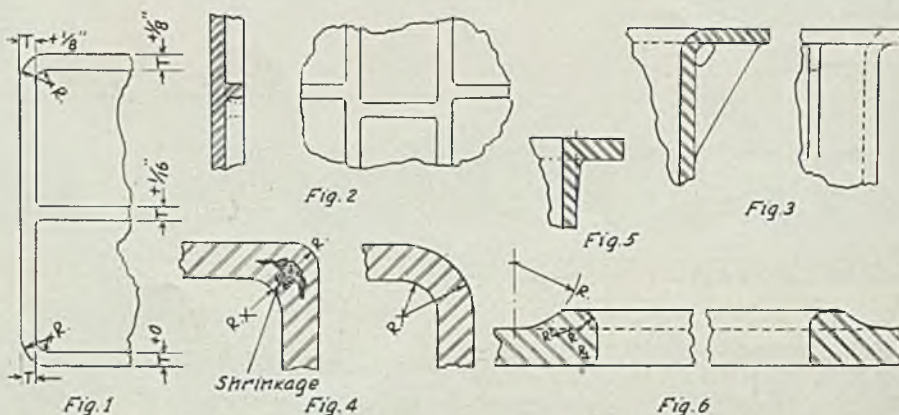
Large, flat, thin plate members should be avoided as far as possible, since during cooling it is extremely difficult to keep such members from tearing or cracking. Openings should be provided in such members and the edge of the opening beaded. The

Use of Chills and Brackets

Such thick corners require the use of chills or of cracking brackets to prevent cracking during cooling. Cracking brackets are used by the foundryman to tie such corners during the cooling to prevent them from tearing or cracking. Chills are used to equalize cooling, not as in cast iron to provide surface hardness. When it is not possible to avoid a metal concentration, it is often necessary to use chills. The proper use and size of chills is a matter of experience and judgment. When heavy chills are required to equalize the cooling of a section, it is found that the cracking is merely transferred to another section in the vicinity of the chill. Such effects can sometimes be avoided by gradually blending the thick section (Fig. 5) into the surrounding thin metal.

Steel castings should be designed to avoid stress concentrations. It is well known that in tension members small holes and notches may raise the stress as much as three times. It is also known that the stress at the edge of bosses may be one and one-half times the normal stress. Where bosses are used, they should be gradually blended into the body of the casting (Fig. 6).

The force lines should be determined in designing a steel casting and the metal distributed along these lines. This will usually result in the



Sketches showing various design factors to be considered in planning steel castings. Refer to text for detailed analysis

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most simple design and the easiest one for the foundry to produce. Steel castings should be designed so that the cores can be supported by printing through, thus avoiding the use of chaplets. No matter how carefully chaplets are handled it is not always certain they will fuse into the metal. Chaplets may also cause incipient cracks which later cause trouble due to stress conditions. In pressure castings, chaplets may not fuse properly and leakage may occur. In such a case there is only one way out—to chip or drill out the offending chaplets and carefully weld the holes.

Steel is extremely weak as it passes from the liquid into the solid state. According to some recent investigations, the lower carbon steels are weaker and more prone to cracking at this time than the higher carbon steels. On account of the many analyses obtainable and the variations of heat treatment possible steel castings are indicated for many constructions. The isotropic property of cast steel is also of some importance in many constructions.

Careful consideration should be given to the endurance value of the

steel, especially where reversals of stress are encountered or where the load varies considerably. Under these conditions the metal requires a high endurance ratio. For grade "B" (A.S.T.M. specifications for steel castings) steel, the endurance is considered to be about 45 to 50 per cent of the tensile strength. It seems to be a function of the tensile strength and independent of the yield point. It is evident that heat treatment to raise the yield point nearer the tensile strength does not help the endurance. In heat treated alloy steels the endurance limit is less than in grade "B" steel, as it appears that in the light of recent research the percentage loss in fatigue value at notched areas is greater when the steel is heat treated to high strength and hardness.

Since by alloying and heat treating the tensile strength of the steel may be raised considerably above that of grade "B" steel, even though the alloy steel may not have as high an endurance value in proportion to its tensile strength, it may still have a distinct advantage in this respect. Both properly heated grade "B" steel and the alloy steels have good im-

perfect properties, due to their ductility. Because of the many forms in which steel can be cast it is an extremely useful material.

Tin Research Council Publishes New Bulletins

Three new publications describing researches sponsored by the International Tin Research and Development Council are now available, according to the council's American office, 149 Broadway, New York.

Series A, No. 35 "Corrosion of Metals by Technical Insulating Oils", gives results of researches made at Utrecht, Germany, by P. J. Haringhuizen and D. A. Was. Extremely thin films of tin, lead and copper were deposited on squares of mirror glass, and by a series of measurements thickness of film was related to amount of light transmitted. This relationship allowed thinning of the films due to corrosion in insulating oils to be determined.

A. W. Hothersall and W. N. Bradshaw have written the results of research in "Detinning Tinplate for Examination of the Thickness and Continuity of the Alloy Layer" as bulletin 37 of series A.

Collaborating with J. C. Prytherch. Mr. Hothersall has made a study of causes of porosity in tinplate, the results of which are published in bulletin 38, series A. "A Study of the Origin of Porosity in the Tin Coating of Tinplate".

Regional Program Launched By Oil Burner Institute

Oil Burner Institute has launched a program for familiarizing regions of the East and Middle West with its programs and policies, according to G. Harvey Porter, managing director.

In each of the key market areas selected, one member of the institute has been appointed to serve as regional director for one year.

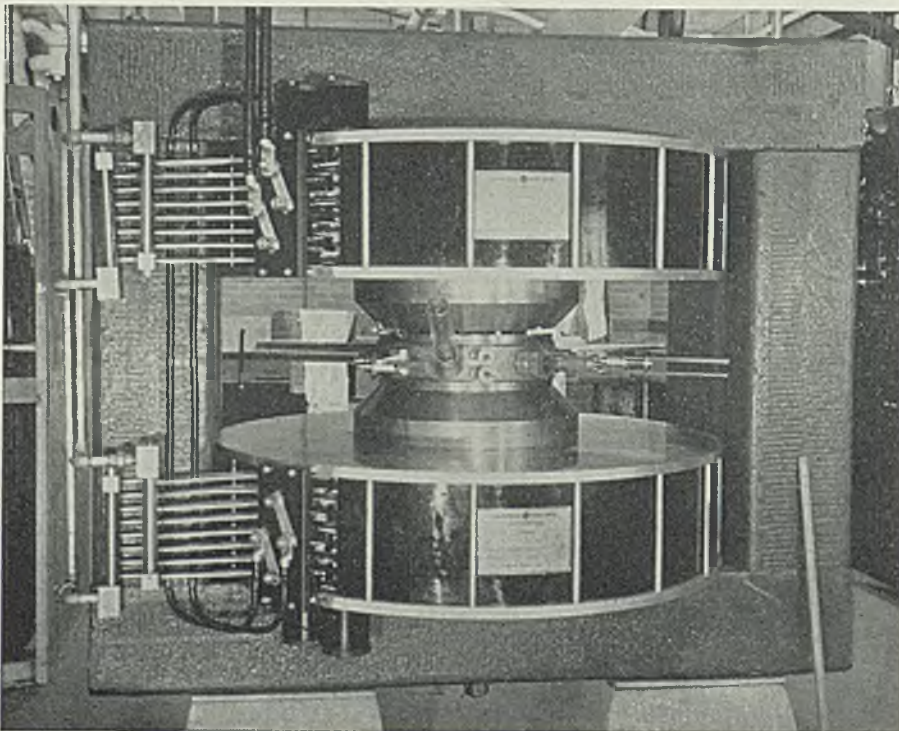
The regions include Boston, Providence, Brooklyn and Queens, Northern Jersey, Westchester, Bronx and Fairfield, Philadelphia, Baltimore, Detroit, Chicago and Minneapolis-St. Paul.

Publishes Symposium on Pearlitic Malleable Iron

American Society for Testing Materials has published in pamphlet form the symposium on pearlitic malleable cast iron sponsored by the Cleveland District committee of the society on Jan. 27.

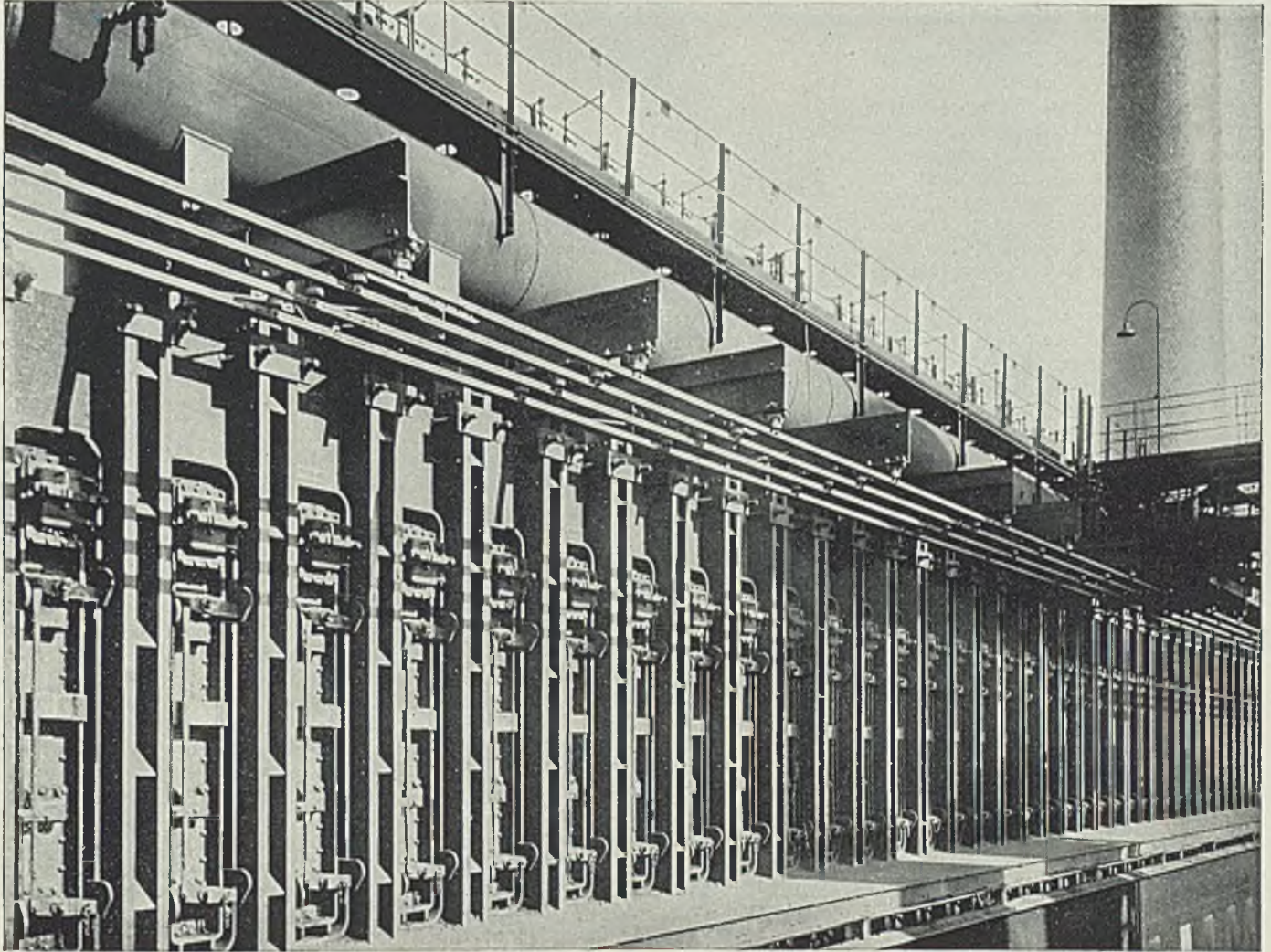
This symposium consists of material assembled from various sources and contributed by individuals in-

Atom-Smashing Magnet Has 15-Ton Iron Core



DISINTEGRATION of the atom is accomplished by the experimental apparatus shown here, which is known as the cyclotron and has been installed at the University of Rochester, Rochester, N. Y. The magnetic circuit, which sets up a field of 21,000 gauss across a 3-inch gap, is made up of six annealed Armco ingot iron castings made by the American Rolling Mill Co., Middletown, O. Four rectangular forgings make up the yoke. Each is 12 x 26 inches in cross section, while the cylindrical pieces used for the poles are 26 inches in diameter. Weight of the iron is about 15 tons, and overall dimensions are 6 feet high, 8 feet long, and two feet deep. Four tons of copper are used in the exciter coils, taking a current of 400 amperes at 110 volts

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- The new BECKER OVENS, characterized by exceptionally low differential pressures represent an advance of prime importance in the economical production of steel. More precise control of coke and gas quality is characteristic of these ovens.
- The pioneer installation at Camden, New Jersey, placed in operation in October, 1935, has already demonstrated a distinct advance in the art of coking. The use of the Becker Type Ovens should be considered in every building and modernization program in the steel industry.

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terested in pearlitic malleable iron, which term is used as the best compromise for materials cast as white cast iron and subsequently treated to retain significant amounts of combined carbon. The American Foundrymen's association co-operated closely with the committee which assembled the information.

The introduction details the scope of the discussion with some historical information and describes a systematic subdivision of the pearlitic malleables. Some 16 distinct types are in common use. This iron seems to have a large potential field because of wide variation of physical properties by heat treatment and is being sold under several trade names.

A section of the symposium on "Producers' Data" gives information on typical physical properties, treatment and uses of such pearlitic malleables as high silicon, copper-bearing manganese, spheroidized, bull's-eye, short-cycle, and others. Since the paper, "Hardened and Tempered Malleable Castings," by E. K. Smith in 1923, literature on the pearlitic malleables has been largely in patent papers. The symposium includes abstracts of a number of patents, thus presenting an idea of the method of manufacture and some of the physical properties claimed.

Copies of the symposium, comprising 32 pages, can be obtained from the American Society for Testing Materials, 260 Broad street, Philadelphia, or the American Foundrymen's association, 222 West Adams street, Chicago, at 60 cents each, or for ten or more copies, 45 cents each.

New Chart Presents Data On Arc Welded Design

A new engineering drafting room chart which presents in concise ready-reference form data necessary for producing arc welded designs has been prepared by the Lincoln Electric Co., Cleveland.

Data given on the chart include: Weld symbols for working drawings; illustrations and particulars for the 16 types of joints for arc welding; illustrated suggestions for better arc welded design; sketches explaining nomenclature of welds and weld dimensions; a comparison of welded and riveted drawings; and tables giving properties of base metals, weld metals, electrode metals for hard facing, length of fillet weld to replace rivets, and safe allowable loads for fillet welds in shear.

The chart, which is 24 inches wide and 35½ inches high with a metal strip across top and bottom and clip for wall attachment, is printed in such a way as to facilitate reproduction by blue printing. Copies are available upon request to the welding engineering department of the Lincoln company, 12818 Coit road, Cleveland.

Welding, etc. . . .



by Robert E. Kinkead

Early Experiments

CARROLL BURTON, vice president in charge of the Johnstown district, Carnegie-Illinois Steel Corp., has a record of welding tests carried out in 1892 that will be of interest to engineers who are celebrating the fiftieth anniversary of the invention of the Thomson process.

E. M. Barclay, who was then an engineer with the plant which at that time was called the Lorain Steel Co., was trying to weld the top and bottom sections of a street railway rail together by resistance welding. The old record, which by chance escaped the recent flood in Johnstown, shows data on hundreds of welds which were tested. The reason for the experiments was that it was not believed at that time that the whole rail could be rolled at the same time, and therefore it would be necessary to weld together the top and bottom halves of the rail section.

The record shows what would be called pretty good results so far as weld behavior is concerned. It would be interesting had Mr. Barclay recorded his thoughts and the questions that came into his mind in trying to explain the behavior of the welds.

This book of weld tests is now in the possession of Leon C. Bibber, welding engineer, Carnegie-Illinois Steel Corp.

One Fatal Blunder

The classic example of the welding shop craftsman who never made but one blunder is instructive. He was cutting a 30-inch diameter shaft. After making two cuts on the top side, he crawled underneath the end and made the final bottom cut. The piece fell off and killed him. Men who acquire a reputation for never making a blunder usually end up by making one major mistake that evens up the score. Blunders are the natural consequence of strenuous activity and constitute an important element of value in experience. The man who has never made

*I*N 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.

a blunder either has had limited experience or, by the law of probability, he is about to make a big one.

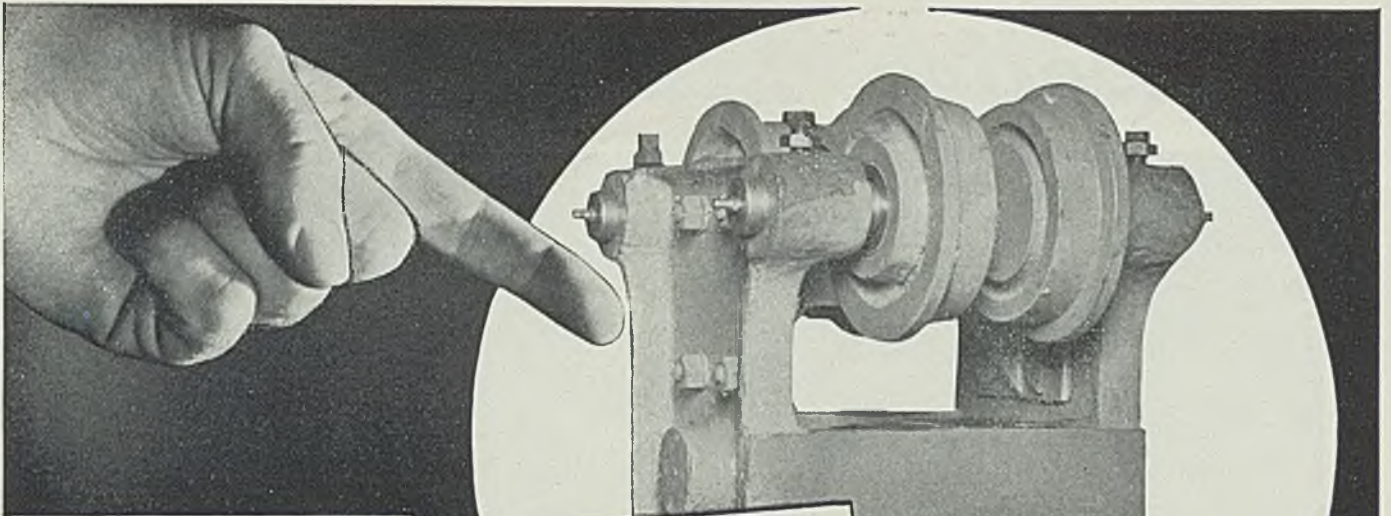
A Decision Easy To Make

THE existing shortage of skilled welding operators draws public attention to a fact that was anticipated two years ago in the welding industry. Mechanization of welding operations is the natural solution of the problem. By this means, skilled workers turn out more work and earn more pay.

It is doubtful whether there are as many as ten shops in the country fully mechanized in the operations they do in which fusion welding is involved. In two shops of the same company, an identical welding job costs twice as much when carried out in one shop without a positioning device as compared with the other shop in which a positioning fixture is used. Carried out to its logical conclusion, the shop which is not mechanized will need twice as many men and twice as many welding machines as compared with the shop which is properly equipped.

The matter is simply one of management. No more money is needed over a period of a year to provide the fixtures and automatic welding heads than to operate without them since if they are not provided about the same amount of money will be spent for additional welding machines and labor.

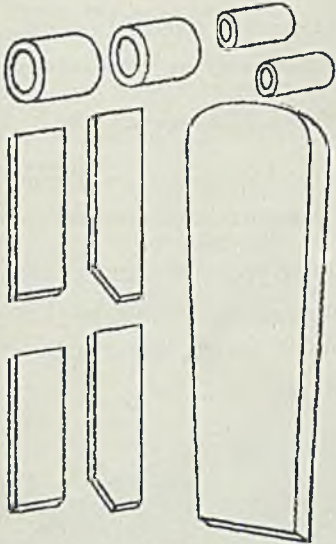
No shop can use WPA workers to fill in its needs for skilled welding operators. It is foolish to raid neighboring plant organizations. Mechanization to the fullest extent does not involve spending any more money than would otherwise be spent and does permit paying higher wages out of savings. Management has a clear-cut case for buying mechanical equipment for the welding shop.



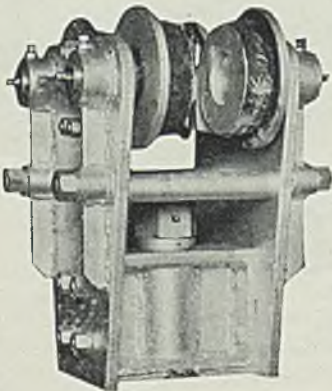
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The Lincoln man nearby can show you how. He is at your service without obligation. Photos courtesy of Euclid Crane & Hoist Co., Euclid, Ohio.

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The Lincoln man nearby can point out that part and show you how to make it in the most economical way. He is at your service without obligation. Send coupon for free copy of "Lower-Cost Manufacturing by Shielded Arc Welding," just off the press! THE LINCOLN ELECTRIC COMPANY, Dept. Y-269, Cleveland, Ohio. Largest Manufacturers of Arc Welding Equipment in the World.

P. S.—The above trolley has been changed to "Shield-Arc" welded construction. It now costs 20% less; it weighs 35% less and it can be made in less time.

THE LINCOLN ELECTRIC CO.
Dept. Y-269, Cleveland, Ohio

Send me a free copy of the new booklet, "Lower-Cost Manufacturing by Shielded Arc Welding."

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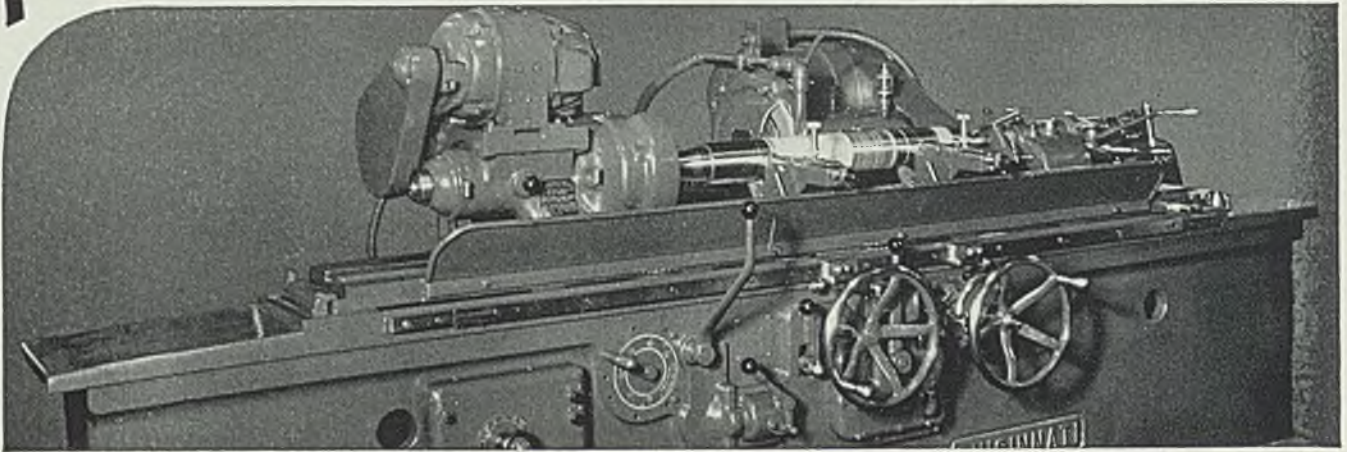
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Operation: Finish Grind Wheel Spindle.

Material: Steel Forging S.A.E. 3145.

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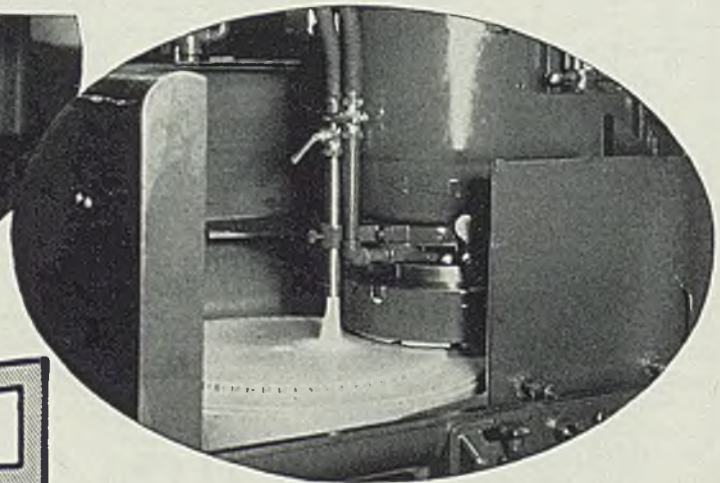
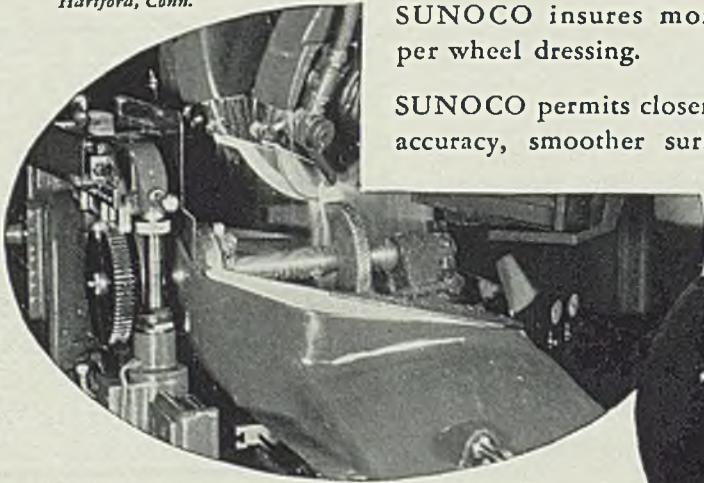
Operation: Finish Grind Gear Tooth Contour.

Material: S. A. E. 6150 Steel.

Spindle Speed: 1240 R. P. M.

Coolant: 1 Part Sunoco to 40 Parts Water.

Courtesy of Pratt and Whitney, Hartford, Conn.



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Progress in Steelmaking



Direct-Fired Heater and Exhaust Fan Removes Vapor from Pickling Room

REMOVING acid vapors quickly from pickling tanks to the exterior of the building in order to provide suitable working conditions was accomplished recently by a stripmaker in the Pittsburgh district in a simple manner. The pickling room, 60 x 100 feet, is partitioned off from the main building. Suitable ventilators are provided in the roof to exhaust the vapors into the atmosphere. The only opening in the room are two large doorways, one at each end, through which material enters and leaves.

Decision was made to maintain the temperature of the pickling room 20 to 30 degrees higher than the mill building to promote a more rapid evacuation of the acid vapors. Since coke oven gas was available it was decided to employ unit heaters of the Lee direct-fired type.

Four of these heaters were installed. One was placed at each end of the pickling room and two on one side. Air is taken from the mill building, heated to the required temperature and delivered to the pickling department.

Affords High Heat Transfer

Each heater rated at 1,000,000 B.t.u. per hour, is 7½ feet long, 4¼ feet wide and 10½ feet high. Gas is introduced at one end and burns in a bricked-up combustion trench. The fire sheet is of steel and is especially corrugated to give a high ratio of heat transmission surface to the square foot of projected area. A multiplicity of specially designed fins welded to the outside of the fire sheet have the dual function of promoting heat transfer and assuring intimate contact of air with the heating surface. The design is such as to use effectively the radiation and convection effect of the flame.

An outer casing is provided, the space between it and the fire sheet being sufficient liberal for the pass-

age of air at the rate of 12,000 feet a minute. Air is introduced at the bottom of the heater on one side, and flows upward and around and down the other side where outlets are located near the bottom. The blower is driven by a 5-horsepower motor which also drives a small exhaust fan mounted on the same shaft. The exhauster discharges the products of combustion to the atmosphere.

Depends Upon Hydrogen

The efficiency of this type heater ranges between 80 and 85 per cent depending upon the hydrogen content of the gas. The foregoing installation, which was supplied by Dravo-Doyle Co., Pittsburgh, proved effective last winter in keeping the atmosphere in the pickling department free of vapors and in affording satisfactory working conditions for the operators.

Decreases Loss of Scrap

Length of coils intended for cold rolling on reversing type mills are being increased by the use of welding equipment inasmuch as the efficiency of such mills increases in proportion to the length of coils. Idle time is greatly curtailed because less coil handling and fewer periods of acceleration, deceleration and reversals are required. Scrap loss also is small when longer coils are handled.

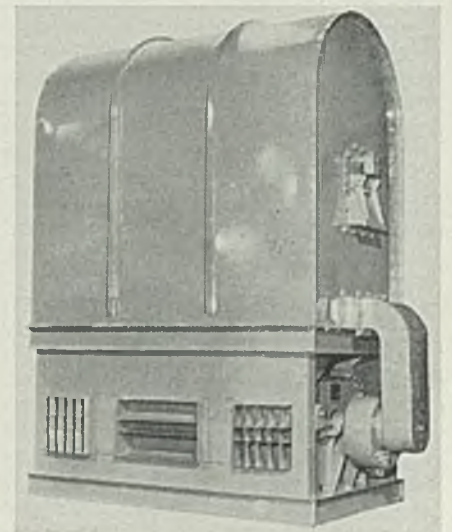
Wire Lubricant Developed

A wire drawing lubricant composed of about 98 per cent lead and bonding agent that will adhere to the metal during reduction has been developed. When the wire reaches the work hardening stage, it is rean-

nealed, cleaned, recoated with the lubricant and then drawn to the desired diameter, which may be as low as 0.025-inch, with no further annealing. The lubricant flows with the elongation and reduction in diameter. Stainless steel rods are drawn to their specified diameter with two coatings of the new lubricant and one intermediate anneal. Die life in some shops has been increased from 100 to 300 per cent. Many wiremakers using this lubricant draw wire from 0.281-inch to 0.90-inch diameter, anneal, recoat with the lubricant, redraw to 0.080-inch diameter or smaller, and place the coated material in stock to apply against future orders specifying still smaller diameters.

Minimizes Stock of Molds

Different length molds that must be carried on the mold bank at steelworks can be reduced sharply in number by the use of a recently developed hot top. Claim is made that as high as 30 ingots of different lengths can be poured in a mold equipped with this particular hot top.



Gas-fired heater which maintains uniform temperature in pickling rooms to facilitate rapid evacuation of fumes

Electric Furnaces—

Their Contribution to Metallurgical Progress

BY FRANK R. PALMER
Carpenter Steel Co.

SINCE the bulk of all electric furnace steel used today is melted in the basic heroult-type furnace, this process is almost synonymous with "electric furnace steel." One of the first things learned about this furnace was the fact that electric heat was no magic cure-all for the ills of steelmaking. The basic arc furnace is the most versatile piece of steel melting equipment ever devised. Although it can make the purest, the cleanest, and the most uniform, high quality steel ever known, it can also make a most non-uniform and questionable type of product.

Electric furnaces are unique in that there is no need for an oxidizing atmosphere to support fuel combustion. Since many of the useful elements in steel, such as carbon, manganese, silicon, chromium, etc., are readily oxidizable at steel melting temperatures, they obviously cannot be conserved in the bath under oxidizing furnace conditions. With the neutral or reducing conditions that can readily be produced and maintained in the electric furnace, many of these oxidizable elements can be held constant in the bath for long periods. Time is allowed to send samples to the control laboratory for exact analysis and then, by "dead reckoning," alloy ad-

ditions can be made to arrive at the chemistry desired.

It must not be inferred that all alloys can be added to an electric furnace as easily as salt may be dissolved in water, but the electric melter is not called upon to catch his analysis "on the fly" in the sense that it must often be done in open-hearth melting.

Another pertinent factor is the much smaller average size of electric furnaces compared to open-hearth furnaces. Obviously, it is easier to maintain accurate and uniform chemistry in 5 or 10 tons of molten metal than in 50 or 100 tons.

The high-frequency induction furnace has still another advantage which may bear upon the subject of

THE accompanying article constitutes the principal portions of a paper presented at the forty-fifth general meeting of the American Iron and Steel Institute in New York, May 28. The author, Frank R. Palmer, is assistant to the president, Carpenter Steel Co., Reading, Pa.

accurate analysis, especially in the rich alloy steels. That advantage is the rapid stirring action set up in the bath by induced currents.

It would be desirable to present a tabulated list showing just how close are the limits to which the electric furnace can work. Unfortunately, this cannot be done—there are too many variables. For one thing, the desired percentage of individual elements differs widely in different steels, and analysis tolerance must take this into account. For example, carbon specified in different steels may range from 0.05 to over 1 per cent, and a tolerance that would be practical at 0.05 per cent would be too narrow when aiming for 1.20 per cent. Chromium might be wanted as low as 0.25 per cent or as high as 20.0 per cent; obviously the same tolerance could not apply here.

The balance of alloys present often determines how close a particular element can be maintained. Consider metalloids like sulphur and selenium, both of which are being deliberately added to electric furnace alloy steel for free machining properties. Aiming for 0.25 per cent selenium, it would be easy to stay within limits of 0.20 to 0.30 per cent if the manganese is less than 0.50 per cent. However, if an attempt is made to add these same metalloids to Hadfield's manganese steel, the loss of metalloid is so rapid as to be completely out of control.

Closer Limits Practicable

Faced by a given chemical analysis, the steelmaker can tell how close he can keep each element, and he can hold to definitely closer limits in electric steel than he can in the open-hearth furnace. This applies, of course, to point blank shooting and not to "heat selection".

This advantage of electric furnace steel may seem a duplication of the first, but it is not. Forgetting the exceptional cases where these elements are deliberately added, we now consider them as a measure of the ability of a melting practice to get rid of unwanted impurities.

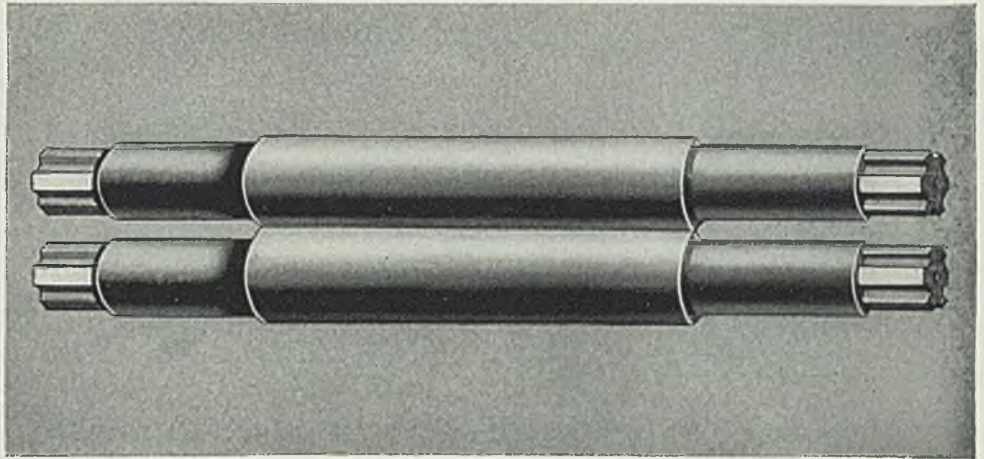
Phosphorus is removed under oxidizing conditions in a basic furnace, hence the electric arc furnace has no particular advantage over the open-hearth furnace except that because it is customary to employ lower phosphorus melting stock in the electric furnace, the final content is generally lower. Sulphur yields slightly to an oxidizing condition under a basic slag, but it can be substantially eliminated only under reducing atmospheric conditions. This was one of the earliest advantages pointed out for the electric arc furnace.

In double slag arc furnace practice, both phosphorus and sulphur can be reduced to a point that outdistances even the justly famous Swedish ores. Here again, definite figures can be used only with the



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broadest qualifications. If we forget the importance of the balance of the analysis and simply ask "How far can the basic arc practice reduce phosphorus and sulphur?", it would be possible to make some sort of an answer. The most casual control in double slag practice should keep both elements under 0.03 per cent; more concentrated care will easily keep them under 0.02 per cent, and it is entirely possible with added time and cost to get both under 0.01 per cent. Melters have been given a limit of 0.005 per cent maximum for sulphur and stayed under it.

It should be emphasized again that the foregoing figures are given simply to describe the capacity of the process. Phosphorus and sulphur limits cannot be arrived at practically without due consideration of the rest of the analysis.

The high-frequency induction furnace, like the crucible melting process, has no capacity to eliminate either phosphorus or sulphur. In this process the raw materials used determine ultimate composition.

By "clean", we refer to relative freedom from slag and other non-metallic impurities. Clean steel is not necessarily guaranteed by electric furnace melting, because the non-metallics that appear in "dirty" steel do not all originate in the furnace; a considerable part may come from ladle or spout refractories or result from dirty mold practice.

Clean Steel Demanded

Within the past 20 years a pressing demand has developed among steel users for cleaner steel, not only in tool steel, but in structural alloy steels as well. Manufacturers of aircraft, pneumatic tools, antifriction bearings, machine tools, motor cars, and almost innumerable other equipment have varied only in the degree of their specifications. They all want cleaner steel, and the hot acid etch test gives them a means of inspection to insure their getting what they want.

Progress in making cleaner steel has not been monopolized by the electric furnace, but electric steel has gone much farther than any other and is the only practice available to meet most stringent specifications.

Insofar as clean steel is made inside the melting furnace, the degree of success depends upon deoxidation and removal of sulphur, both of which can be accomplished by the electric furnace. If the steel is not properly deoxidized by the slag, some of the silicon will be converted to the oxide (silica) and the metals like iron, manganese, chromium, etc., also will be oxidized in a degree. The metallic oxide combines with the silica to form the glassy slags such as iron silicate, manganese silicate, chromium silicate, etc. As these are being formed continuously in an ox-



dized bath, they never get a chance to float out.

Sulphur always exists in the final product as a metallic sulphide which is a slag-like inclusion. These sulphides are soluble in the molten steel and are precipitated only at the moment of solidifying in the mold; hence sulphides are always present in steel in direct proportion to the percentage of sulphur contained. The only way to get rid of sulphide slag is to get rid of the sulphur.

In making clean steel, the electric process depends upon its ability to work under a reducing atmosphere and a reducing slag. Not only do these deoxidize the metal and inhibit the formation of silicates, but they remove a large part of the sulphur and decrease the sulphides proportionately.

The smaller average size of electric furnaces again is a big help. It is easier to avoid slag contamination of the metal after tapping when handling a few tons of metal than it is when handling a hundred tons or more.

Steel is a crystalline material and, therefore, must freeze selectively as it solidifies in the ingot mold. This selective freezing gives rise to segregation, the degree of which may vary greatly depending upon many circumstances. The analysis of the steel greatly affects the tendency to segregate, and the hot working operations on the ingot serve to greatly modify or alleviate it. We must leave these effects out of consideration, however, when we are trying to determine the effect of melting practice on the degree of segregation.

Effects of Electric Furnace

The question is, "In a given steel, are you likely to get less segregation in the electric furnace product?" High phosphorus and sulphur, high oxide content, high pouring temperatures, large ingots, fast teeming and slow freezing promote segregation; their antipodes discourage it. What is the effect of electric furnace practice upon these variables?

Phosphorus, Sulphur and Oxides—These have already been discussed. With respect to both metalloids and oxides, the electric arc furnace has outstanding advantages over any other melting practice in commercial use.

Metal Temperature—The electric furnace makes steel just as hot as or hotter than, any other type of melting furnace, but this is hardly the point. Metal temperature affects many things other than segregation,

and in the proper melting and pouring of steel it is necessary to determine in advance the best temperature for any given product. After this ideal temperature has been arrived at, if occasional heats come through at higher temperature, they will contain relatively more segregation. It is largely a matter of being able to accomplish what you set out to do.

More often than not, the temperature of the metal must be adjusted somewhat before tapping from the furnace. In the electric furnace time can be taken to do this without disturbing the chemistry of the heat because the elements are not constantly being changed by oxidation. Some electric furnace melters are regularly being held to a tapping temperature limit of plus or minus 10 degrees Cent., and are doing it. This close control gets the metal off to a good start.

Ingot Size—Size of ingots bears a rather definite relation to size of melting furnace. There is a practical limit to the number of times a ladle stopper can be opened and closed before the nozzle freezes, or burns out, or some other catastrophe occurs.

Small Ingots Preferred

Just for sake of illustration, let us assume that a ladle can be opened 50 times. With a charge weighing 12,000 pounds, it would be possible to cast 50 small ingots weighing only 240 pounds each. On the other hand, if the ladle held 200,000 pounds of metal, the fifty ingots would have to weigh 4000 pounds each. The 240-pound ingot might be 6 inches square while the 4000-pound ingot might be approximately 18 inches square; the small ingot chills quickly with fine crystallization and a minimum tendency to segregate; while the large ingot cools more slowly with larger crystals and more chance to segregate. Obviously, steel is not necessarily cast into the minimum sized mold, but the fact remains that small furnaces will average to cast their charge into much smaller ingots than a large furnace.

There are electric furnaces which melt as much as 50 or 100 tons of metal and these large units, of course, must cast larger sized ingots, but the vast majority of "specialty" electric steel is made in furnaces of less than 10 tons capacity and these smaller furnaces can take advantage of small sized ingots to reduce segregation.

Teeming Speed—The speed at which metal rises in the mold is so important that in some plants each ingot is clocked with a stop watch. The bigger the ladle, the faster the metal wants to rush out of the nozzle, and the more throttling action must be employed. With more throttling and slower pouring the nozzle will freeze

more quickly. Here again small melts of steel lend themselves to closer control than large ones.

Freezing Speed—During freezing time the metal is crystallizing into its solid form. The faster the metal solidifies, the less chance there is for segregations. Proper mold design can help this greatly, but metal temperature, pouring speed and ingot size are all determining factors. The three points already discussed combine to give small heats of electric steel a decided advantage over large tonnage heats of open-hearth steel.

The answer, then, is that while there is room for great variation in the amount of segregation in various electric steels, depending upon the size of the furnace and the practice used, nevertheless electric steel in general will contain, on an average, less segregation than open-hearth steel.

If a bar or a carload of a certain type of steel is purchased today and the buyer goes back for more of the same six months hence, he expects to get material just like the first lot. If the two shipments are indistinguishable in their behavior in his shop, then those two lots of steel are interchangeable. If the second lot requires a higher hardening temperature, or a lower drawing temperature, or if it is harder to machine, or if the finished parts are not as tough, etc., then the two lots are not interchangeable.

Physical Properties Differ

It is now well known that machinability, heat treating behavior, toughness, and ultimate serviceability of steels may be entirely different, even though their chemical analysis, as usually determined, is exactly alike. Appreciation of this lack of interchangeability in steels of the same chemical composition developed only when means of testing, comparing and using steels were advanced to a point where such variations could be distinguished.

The first definite step toward making and inspecting interchangeable steels was the work done by H. W. McQuaid and E. W. Ehn in 1922 on carburizing steels. They were seeking the reason why different heats of low carbon steel of the same analysis responded so nonuniformly to case hardening. They found a test which has served ever since to sort steels according to their response to this operation. In 1930 a paper was published by G. V. Luerksen describing a test which would reveal the same type of variation in high-carbon tool steel. Many other papers have contributed to making this one of the most fascinating chapters of modern metallurgy.

The past 15 years have found all steel mills digging deeply into this problem of making truly inter-

changeable steels, and the electric arc furnace has been at the apex of the wedge. We have learned that this process is truly a *steelmaking* process. So diversified are the possibilities and so delicate has become the control, that today we can literally make almost any kind of steel in the electric arc furnace.

Buyers of steel are becoming more fastidious and sensitive to steel properties. From among the variable and noninterchangeable lots of steel that constantly go through their hands they will pick out one and say, "That is what I want, make it all just exactly like that". Of all the

steel melting equipment in existence, the electric arc furnace is the only one that can step forward almost regardless of analysis or quality standards and say, "I'll do it".

It is not meant to imply that the electric arc furnace is the only one that has improved along this line, because all steel melting processes have been driven by the same lash toward a more uniform product. The open hearth is capable of turning out steel today that is much more uniform than ever before. The oxidizing conditions of open-hearth melting limit not so much the distance but the directions in which in-



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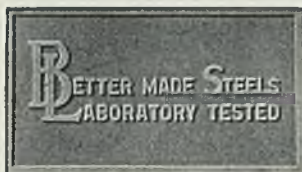
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terchangeable steels may be sought. They can certainly make uniform open-hearth steels, but they never achieve uniformity in the sense that it is found in the electric furnace.

The high frequency electric induction furnace lends itself naturally to a high degree of uniformity simply because the process is so limited that it cannot go far wrong. It is much like the crucible melting process in that a high degree of uniformity is virtually guaranteed by the limitations of the process itself.

The arc furnace, on the other hand, is almost universal in its functions.

It can make steel as bad as the worst or as good as the best, and everything in between. And like all such versatile equipment, it is a marvel in the hands of a skillful melter backed up by modern instruments and technical control. The versatility of the arc furnace has been emphasized because if a process can make a variable product at will it can make an unvariable product the same way.

Specifically, how are steels melted so they will be interchangeable? It is done in exactly the same way that interchangeable machine parts are made, by doing exactly the same op-

erations in exactly the same way on each and every melt of steel.

The ultimate character of a steel is affected by almost everything that happens to it up to the time the metal solidifies in the mold — the raw materials with which the furnace is charged; the manner of melting; the most minute details of the oxidizing and reducing phases of refining; the temperature (not only at the end, but throughout the process); the slag chemistry; the time and method of introducing alloy additions; the use of aluminum, titanium, manganese, silicon and other deoxidizers; the temperature during pouring; the time of pouring; the mold design; the design of sink heads. These and dozens of other details all have their effect. The steelmaker must know their effects and if he wants an invariable product he must have them all under control.

Today it is possible to make heats of electric steel so nearly interchangeable that present methods of use and inspection cannot tell the difference between them.

High Alloys Required

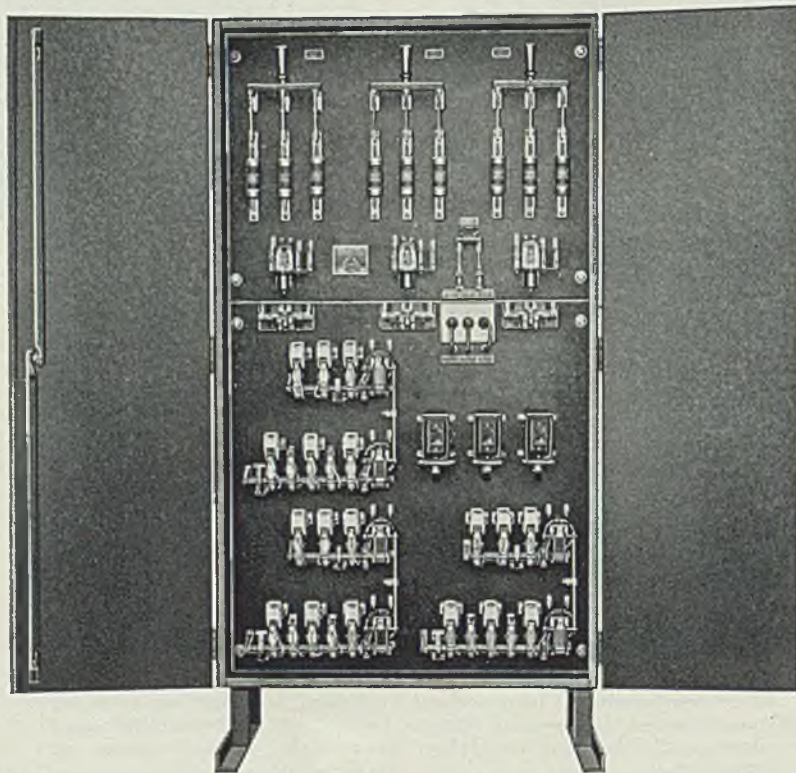
Open-hearth furnaces will seldom be found melting steels containing more than about 5 per cent of total alloys. Yet engineering progress in combating corrosion or in making automobile valves, high temperature equipment, electrical resistors, permanent magnets, high speed tools, etc. call for ferrous materials that may contain from 10 to 50 per cent of alloys. In times gone by the crucible furnace was the only means of making the rich alloy steels, but it is now no longer necessary to depend upon the relatively expensive and limited possibilities of the crucible process for supply of such alloys.

Large percentages of alloys can be added directly to the electric melting furnace with comparatively little loss. Such heavy additions to the ladle would be impracticable or impossible but they are only every day routine under the reducing atmosphere of the electric furnace.

Abilities of the electric furnace along this line gradually have broken down certain practical and understandable prejudices in the steelmaker's mind. This change of viewpoint is a direct reflection of the ease with which the electric furnace lends itself to such melting. It is not to be assumed that there are not difficult problems to solve in connection with making many of these rich alloys—but the fact remains that it can be, and is being, done.

The contribution of electric furnaces to the making of alloy-rich steels is not limited to their ability to make them in large quantities. The

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fact that this process can economically remelt the scrap from these same alloys is in itself an important contribution. For example, high-chromium, corrosion-resisting steel scrap is most unwelcome in an open-hearth charge. Not only is the chromium lost by oxidation, but its oxides are so objectionable in the slag that its value is something less than nothing. Under the reducing atmosphere of the electric furnace, however, these high alloys can be saved and have a definite economic value.

Still another related advantage of the electric arc furnace is its ability to derive alloys direct from their ores. This has been done with tungsten, vanadium, molybdenum and others, but the one likely to become most important is chromium. It is entirely practicable to make corrosion-resisting steels containing, for example, 18 per cent chromium by reducing chrome ore in the steel-making slag so that the metallic chromium is assimilated direct by the bath. An interesting manipulation recently proposed is to feed the alloy ores into the bath through hollow electrodes.

Ferroalloy Development

Finally, a word must be said regarding the contribution of the electric furnace to improvements in ferroalloys. These are the raw materials which the steelmaker uses for making alloy additions to his steel—ferrotungsten, ferrosilicon, ferrochromium, etc. Although the improvements were not achieved by the steelmaker, it is definitely an accomplishment of the electric furnace.

An interesting example is to be found in the history of ferrochromium and its effect on the manufacture of high-chromium, corrosion-resisting steel. In 1917, when stainless steel was first introduced into this country, the lowest carbon ferrochrome available contained about 0.50 per cent carbon. To add 13 per cent chromium necessitated the simultaneous addition of about 0.10 per cent carbon. Under these conditions, making very low carbon stainless steel was impossible. Today we can secure ferrochrome as low as 0.05 per cent carbon, and the steelmaker is thereby enabled to melt steels with as much as 18 per cent chromium and as little as 0.05 per cent carbon.

Manufacturers of ferroalloys have also done much to increase the purity of their product through the elimination of unwanted elements — all to the betterment of alloy steels.

Of all the contributions of the electric melting furnace to modern metallurgical progress, none surpasses the importance of these highly alloyed steels. Although the field

of more dilute alloy steels has been rather thoroughly explored, research among these richer alloys will keep electric furnace melting from becoming monotonous.

Highly oxidizable elements are closely related to the foregoing, but warrant separate treatment. Within the past ten years there have come into use certain alloying elements which are so readily oxidizable that their use was previously considered impracticable. Aluminum, selenium, and titanium are typical of this group.

Some of these have been used for many years in steel melting to serve as scavengers — but now we find

them used in appreciable percentages as alloying elements to confer scale resisting properties, free machining, etc. It is not to be assumed that these elements can be added even in the electric furnace without loss, because this is not true. It is simply one of the miracles of the process that they can be added at all.

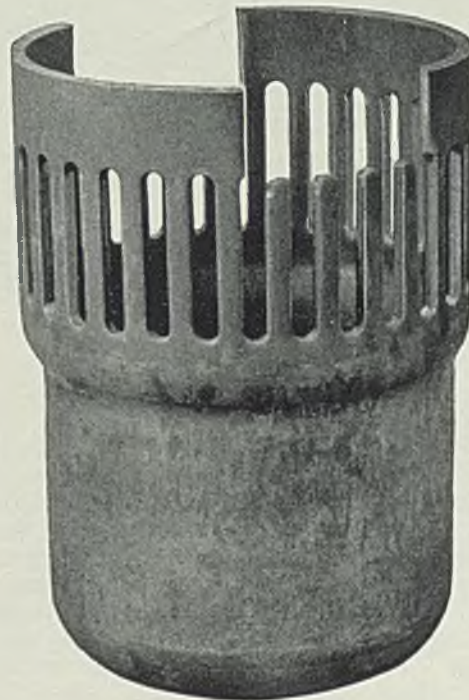
Under this heading, we are reminded of another unexplored field which the electric furnace may presently be called upon to enter, that is, melting under artificial and controlled atmospheres or in a vacuum.

The history of electric furnace melting in the United States is short in years but packed with interest.

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The first electric arc melting furnace was installed in 1906. By 1910, seven plants were making electric furnace steel and by 1913 this number had increased by 13.

The physical size of individual arc furnaces increased rather rapidly at first. Early furnaces had a capacity of around 3 tons, and the present maximum of 100 tons was reached in 1927. Since this latter date, no larger furnaces have been constructed. Furnace size seems to have become temporarily stabilized depending upon what the particular steelmaker wants to make. In general those specialty mills making tool steel and rich alloy steels are

using furnaces of less than 10 tons burden.

A rather cursory count of the arc furnace equipment in 20 American plants producing ingots shows: 2 furnaces over 50 tons; 7 furnaces between 25 and 50 tons; 12 furnaces between 10 and 25 tons; and 38 furnaces between 5 and 10 tons.

Quite independent of the size of the shells, however, there has been a marked increase in melting efficiency due to electrical and mechanical improvements in the furnace. Voltages have been increased and variable voltages made available to the melter. It is not uncommon to find modern furnaces equipped with

electrical substations from three to five times as powerful as would have been used on the same sized furnace 20 years ago.

With all of their growth and development electric furnaces are producing only about 1.5 to 2.0 per cent of the total steel made in this country. They do not compete at all in making the heavy tonnage steels used in rails, structural shapes, plates, etc. On the other hand, high-grade tool steel, stainless steel and rich alloy steels are almost exclusively electric. Structural alloy steels are being made by both open hearth and electric furnace practice, with the electric furnace melting the higher quality and higher priced requirements. About one-fifth of our national output of alloy steel is now made in the electric furnace.

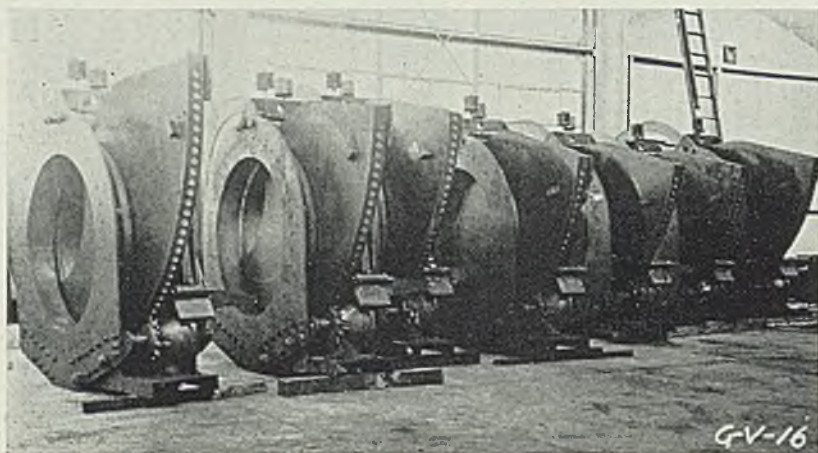
The high-frequency coreless induction furnace is fast winning an important place in the melting of special alloy steels. Even compared to other electric melting furnaces, these induction units are small — but they are growing. In 1929, maximum size was 1000 pounds; today it is 8000 pounds and there is report of a 16,000-pound furnace being built for use in Europe. Their small unit capacity is partially compensated by their ability to make from three to six heats of steel while an arc furnace is making one.

Induction Capacity Increasing

The aggregate capacity of induction furnaces is becoming appreciable. Whereas 18 years ago 96 kilowatts represented the total capacity of these units in America, today this has grown to nearly 16,000 kilowatts. Based on an empirical figure of 600 kilowatts per ton per hour, this represents a melting capacity over 200,000 tons per year.

Prophecy as to the future of electric melting furnaces seems to be rather futile. Simply as a method for making higher quality steel and steels of special analysis, it appears certain that their economic importance will increase both relatively and absolutely. However, the entire steel industry is facing a merchandising problem the like of which it never worried much about before. When an industry starts to dream of steel houses, steel furniture, steel highways etc. it places itself in a position where the whims of style and fashion may play havoc with its best laid plans. These same whims will figure largely in the future of electric furnace steel.

For example what is the future of stainless steel? Suppose in a surge of prosperous enthusiasm people decide that they want stainless steel architecture trim, stainless building hardware, stainless furniture, stainless appliances, etc.! Then again,



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suppose they don't! It would probably mean a million tons one way or the other to the electric furnace. Only of this can we feel certain: Until a better process is devised the electric furnace will continue to hold its place in the van of metallurgical progress.

Cheap Power Will Not Entice Electric Steelmakers from Industrial Centers

NO SPECIAL gift of prophecy is required to foretell that the electric furnace is here to stay and that its uses will grow with the ever growing demand for high quality and for special products, asserted F. F. McIntosh, metallurgist, Crucible Steel Co. of America, Pittsburgh, in presenting a written discussion of Mr. Palmer's paper.

In addition to prophesying, he said, it is interesting and necessary nowadays to speculate as to where any industry will find itself as a result of the many activities which are being conducted with absolute disregard of natural economic laws.

In the case of the electric melting furnace, one is led to inquire as to what the result will be in placing electric energy on the market in isolated locations at a cost materially below the actual cost of production. Will the electric furnace industry be forced to abandon its location in natural industrial centers and re-locate in an Arizona desert or in the forests of Maine, or will it go to the far Northwest or to the remote South? asked Mr. McIntosh. The steelmaker knows the answer and the arithmetic does not involve complicated equations, he stated.

At a conservative figure, it takes 700 kilowatt-hours per ton to make a heat of steel. Power is available in any industrial center for less than 10 mills per kilowatt-hour. The finished steel represents at least 65 per cent of the steel in the ingot. The cost for power, therefore, under sound economical conditions, is less than 0.5 cent per pound of finished steel, the speaker explained.

If the power is placed on the market at half the commercial rate, it will only reduce the cost of finished steel by somewhere around 0.25 cent per pound. If the steelmaker is paid 5 mills per kilowatt-hour for using the power, and such an arrangement,

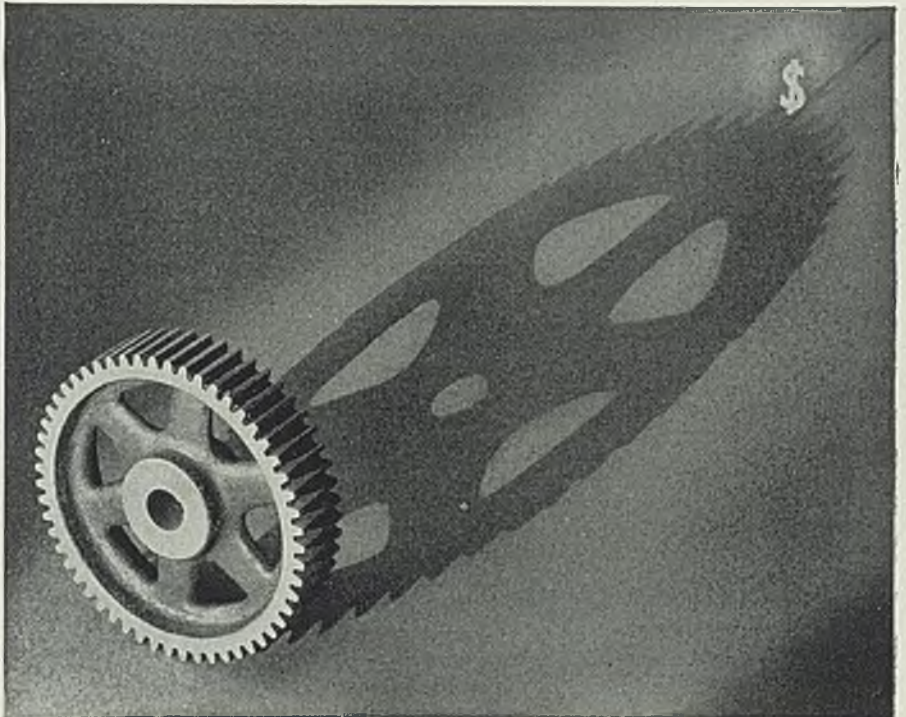
absurd as it may seem, is not beyond the realm of possibilities under the present attitude towards economic laws, the final cost of the finished steel will be reduced only about 0.75 cent per pound.

Cost of shipping bars in carload lots from the nearest of these power centers to Detroit or New York is 0.5 cent per pound. The cost of transporting raw materials to the remote power centers and shipping the finished product from remote centers to a market, completes the picture of commercial absurdity, Mr. McIntosh pointed out. In view of these facts, it was his opinion that the electric melting furnace will remain in pres-

ent industrial centers permanently.

Commenting upon Mr. Palmer's concept of interchangeable steels, the speaker asserted that the sequence of events used overlooked a most important stage in the history of the tool steel industry. The brand names of reliable tool steel manufacturers are guarantees of interchangeability and the use of these brand names antedates the practice of mechanical interchangeability.

Continuing, Mr. McIntosh said he felt that novelty cannot be claimed for metallurgical interchangeability merely because new tests have been devised for assisting the laboratory in testing the product of the mill.



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● When faulty gears interrupt your production... when every hour means money to you... remember, it pays to buy the best in gears. Performance... not promises... has won reorders for Horsburgh & Scott Gears for nearly half a century. Made better... Horsburgh & Scott Gears last longer, projecting their value into the future... giving years of outstanding service.

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

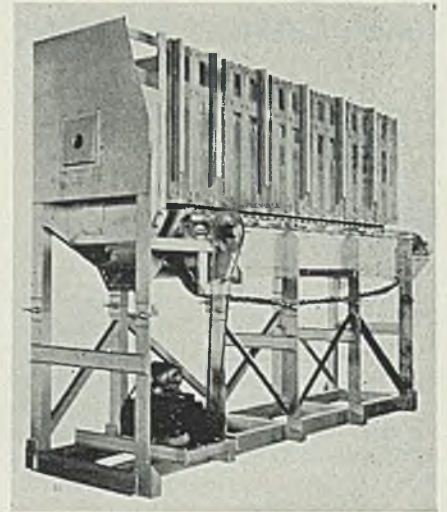
New Equipment

Forging Furnace—

Surface Combustion Corp., Toledo, O., has recently completed a continuous slot-type forging furnace for the Ziz commission, Russian manufacturer of motor trucks. Built to burn either gas or oil, the furnace is designed to heat 5 inches of the end of the motor valve rods to approximately 2000 degrees Fahr. in preparation for the

upsetting of the valve heads. The conveyor speed is geared to turn out 3000 pieces per hour. The apparatus is equipped with a variable-speed transmission by means of which speed may be varied from $\frac{1}{2}$ to 2 feet per minute. The span of the heating length from the inside of the charge end wall to the center of the discharge pulley is 10 feet. The depth is 12 inches and the height of the combustion chamber is 16 inches.

Heating is accomplished by a single oil burner placed in the discharge end wall. The work is carried from one end of the furnace to the other by a chain conveyor. Valve rods then pass through a sloping discharge of the



Slot type forging furnace built by Surface Combustion Corp.

heating part into the magazine box of the forging machine.

• • •

Grip-Lock Bearing—

S. K. F. Industries, Philadelphia, has introduced a new bearing involving the grip-lock principle, which offers the advantage of quick application of the bearing without tools and assures the user a bearing positively locked to the shaft, it is claimed. The bearing is a conventional self-aligning extended inner race bearing with an eccentric groove machined in the inner race. Fitted in the groove is a piece of spring steel known as the grip-lock shoe. When the shoe is in the deepest part of the eccentric groove, the bearing may be readily slipped on the shaft. Then, by holding the inner race of the bearing while the shaft turns in the direction of operation, the knurling at the ends of the grip-lock shoe grips the shaft, causing the shoe to wedge in the shallow part of the eccentric groove, thus locking the bearing on the shaft.

• • •

Indicating Controller—

Taylor Instrument Cos., Rochester, N. Y., have placed on the market an indicating controller, air-operated, designed for use in processes where close throttling control is imperative but a



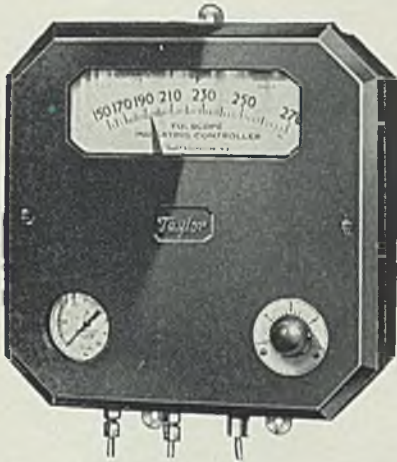
The
WYCKOFF
COLD DRAWN STEEL
PROCESS

- ★ Materially Reduces Machining Costs.
- ★ Eliminates considerable Heat Treating.
- ★ Increases Tensile Strength 15 to 25 Per Cent.
- ★ Advances Yield Point 40 to 50%.
- ★ Imparts a Greater Degree of Density.

Let us demonstrate the economy of WYCKOFF Cold Drawn Steel for your particular requirements.

WYCKOFF DRAWN STEEL COMPANY
General Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of Carbon and Alloy Steels
Turned and Polished Shafting Turned and Ground Shafting

record is not an essential. The instrument has either high-range or full-range sensitivity as required, either fully adjustable. The control point may be adjusted to any value within the control range. Controller action may be quickly reversed in the field by

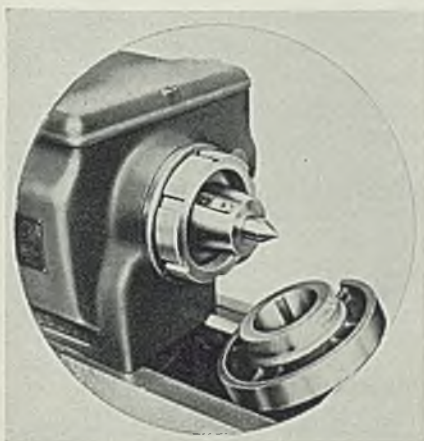


Taylor air-operated indicating controller for pressure or temperature

altering the position of a link. Control ranges are interchangeable and are supplied in standard ranges from -100 to 1200 degrees Fahr. for temperature control, and from zero to 3000 pounds for pressure control. Temperature controllers may be equipped with mercury, vapor or gas-actuated tube systems.

Spindle Nose—

R. K. LeBlond Machine Tool Co., Cincinnati, is announcing a new spindle nose which is tapered and keyed.



Taper and keyed spindle nose for installation on LeBlond lathes

It is claimed that greater safety results from this spindle nose because any sudden stoppage cannot release it, as with threaded spindles. Chucks can be mounted to run true on both the diameter and the face within close limits and as the bearing surface is not

subject to wear, it retains its accuracy indefinitely. The key on the spindle allows the operator to use both hands to start and tighten the collar. Only three sizes of chucks and face plates are required with the new spindle nose for all sizes of lathes from 12 to 36 inches, and the chucks are interchangeable on all machines.

Air Hose—

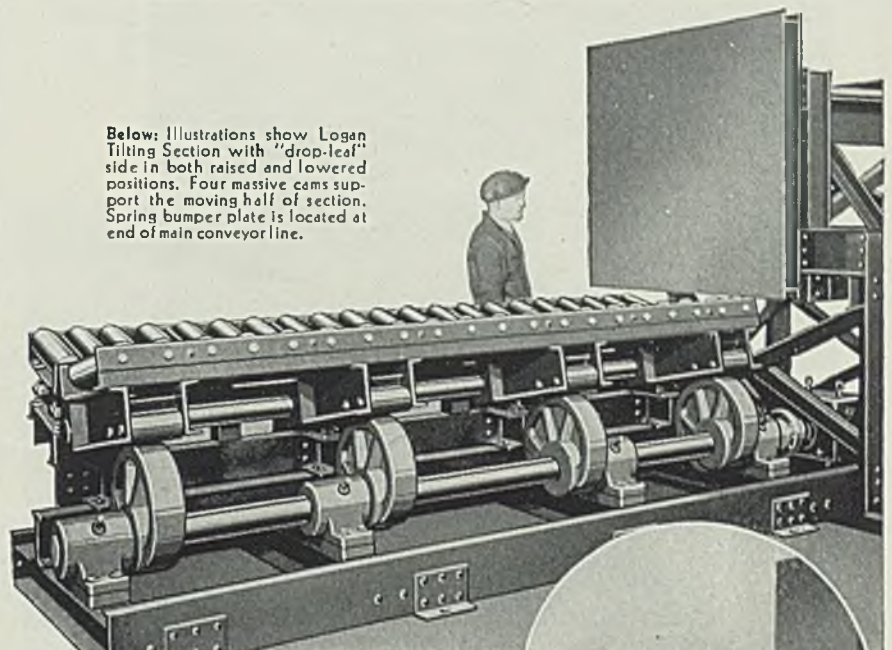
B. F. Goodrich Co., Akron, O., has announced a new product designed for use with all types of air tools, known as Hipress air hose. It is of combination construction, made in long

lengths. The inner carcass consists of four plies of specially woven duck, and the outer carcass is a tight braid of



Hipress combination construction air hose

high tensile cords. Between these carcasses is an insulation which serves as a secondary tube to seal off penetration of air through the walls and to cushion



Below: Illustrations show Logan Tilting Section with "drop-leaf" side in both raised and lowered positions. Four massive cams support the moving half of section. Spring bumper plate is located at end of main conveyor line.

Simpler, Smoother, less power required

● Logan Tilting Sections—are used where coils must be transferred at right angles from a line of trough conveyor.

In Logan construction *the entire unit does not pivot*. One half is in fixed position, the other half is lowered by motor-driven cams to permit coil to roll off. This "drop-leaf" section provides a simpler, smoother, better-controlled transfer, and a minimum of power is required to lower the load and return the empty "drop-leaf" to carrying position.

Coils are stopped on Section by brakes applied to under side of rolls, or by spring bumper if Tilting Section is located at end of line. Brakes in the line preceding section permit feeding of coils one at a time. For complete details, ask the nearest Logan engineer or write on your letterhead, for Bulletin No. 10. LOGAN CO., Inc., 535 Buchanan St., Louisville, Ky.



blows from the outside. The tube is made of a special rubber capable of resisting both oil and heat. It is claimed that this hose will last longer in service where there is oil present, and that it will not break into loose particles and clog the tools. The rubber cover of the tube is compounded to withstand abrasion and abuse. The hose is furnished in three sizes, ½, ¾ and 1-inch, and will be made in 500-foot lengths.

♦ ♦ ♦

Portable Electric Drill—

Stanley Rule & Level Plant, New Britain, Conn., is marketing a new

portable electric drill which has been named the Victor. It is 12½ inches long and weighs 5¼ pounds. It has a ca-



Victor portable electric drill

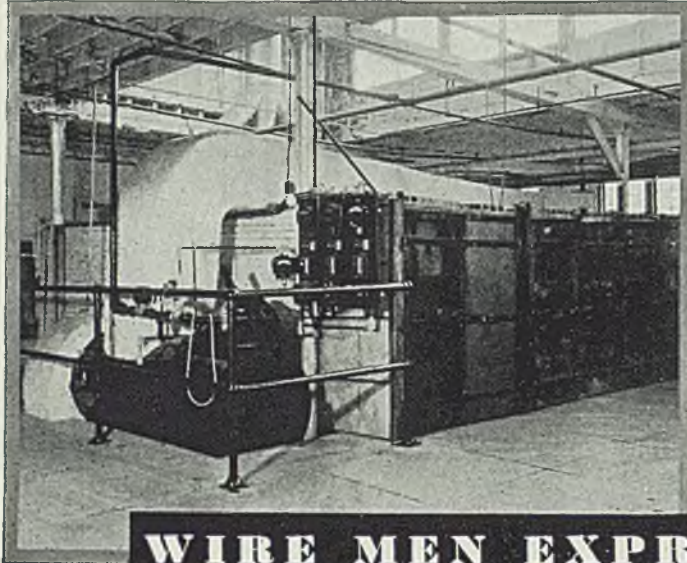
capacity up to ¼-inch in steel and has a universal motor, operating on either direct current or alternating current

of 60 cycles or less. The chuck is of heavy-duty, three-jawed type, and the drill operates at a load speed of 1500 revolutions per minute. The motor housing and handle are cast in one piece from an aluminum alloy, and the handle is equipped with a rocker motion switch.

♦ ♦ ♦

Gas Washer—

Blaw-Knox Co., Pittsburgh, has developed a new type gas washer, shown here in section. The path of the dust-laden gas is clearly indicated, and the method used in cleaning it can be easily seen. The high entrance velocity causes the heavier dust particles to be trapped by the liquid flowing down the



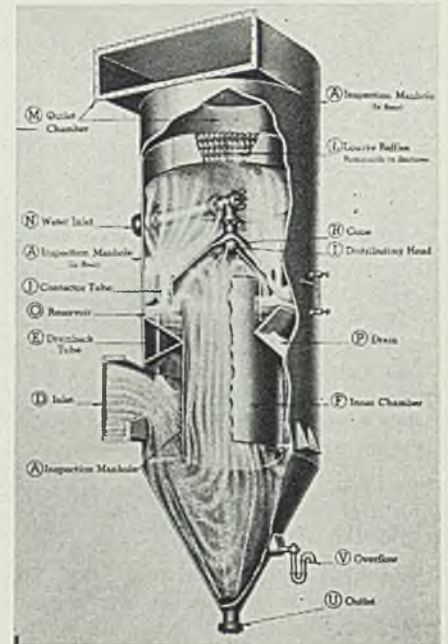
WIRE MEN EXPRESS THEIR PREFERENCE

DOLLARS saved in production mean much to the wire man. Because of this, men responsible for savings are investigating the proven economics of Morrison rod baking equipment. From actual records, a Morrison oven, taking but one-third the space and consuming considerably less than one-third the fuel used by older equipment, actually exceeded the production of the older, larger unit. Wire always comes in perfect condition for drawing no matter how it is stacked on the truck. Every coil is uniform clear through. These are some of the reasons why wire men are preferring Morrison equipment—it is saving dollars, and plenty of them, for many progressive mills today.

Other Morrison equipment is designed for annealing, heat-treating, and galvanizing; tank and pot heating; and other industrial process heating applications utilizing the recirculating forced convection method.



Morrison Engineering Co., Inc.
5005 EUCLID AVE. CLEVELAND OHIO



Blaw-Knox combined cyclone gas washer

sides of the shell. The finer particles of dust are removed by the fine spray created in the contactor tubes. Excess liquid is removed from the gas by the louvre baffles. A gage glass on the exterior of the unit shows the level of the liquid in the reservoir, and three inspection manholes are provided in the shell.

♦ ♦ ♦

Hydraulic Jack—

Blackhawk Mfg. Co., Milwaukee, is introducing a 20-ton capacity portable hydraulic jack for heavy-duty work. The jack is a unit of this company's Porto-power line, and consists of a pump and ram separated by a reinforced flexible hose. Because of this remote control feature, the ram operates at full capacity in any direction. Collapsed, the height of the ram is 10¼ inches. The plunger travels 4½ inches, while a screw extension of 3¾ inches gives an overall height of 18

inches. Overall diameter is 4 inches. The base is threaded to permit additions of heavy extensions or mounting in a press frame, converting it into a 20-ton hydraulic press. Extensions may be attached to both top and bottom of the ram.

Grapple—

Owen Bucket Co., 6029 Breakwater avenue, Cleveland, has recently placed on the market a new



Owen type RA 4-tine grapple

4-tine grapple. Most distinguishing feature of the new device is the independent action of the four tines. This feature enables each tine to exert pressure on the stone being lifted regardless of the shape of the load. It enables the operator to place the grapple more easily and increases the safety factor. The action is obtained by combining toggle-operated tines and arm controlled tines. Grapples are made by the company in capacities varying from 3 to 60 tons.

Large Hammer Forges Die Lock Anchor Chain for Navy

(Continued from Page 37)

sembly of the chain can thus be continued indefinitely over any required length. The general practice, however, is to assemble the chain a shot at a time. A shot is 15 fathoms, or 90 feet, in length.

For connecting shots of chain to form a long chain, the Navy department has developed a special shackle which is also made of heat treated alloy steel. This shackle is designed so that its outer dimensions are the same as those of a standard chain link and it therefore fits the pockets in the drum when the chain is being hoisted without any danger of jumping out as frequently happens with the ordinary type of shackle. The strength of the newly designed shackle, moreover, is slightly greater

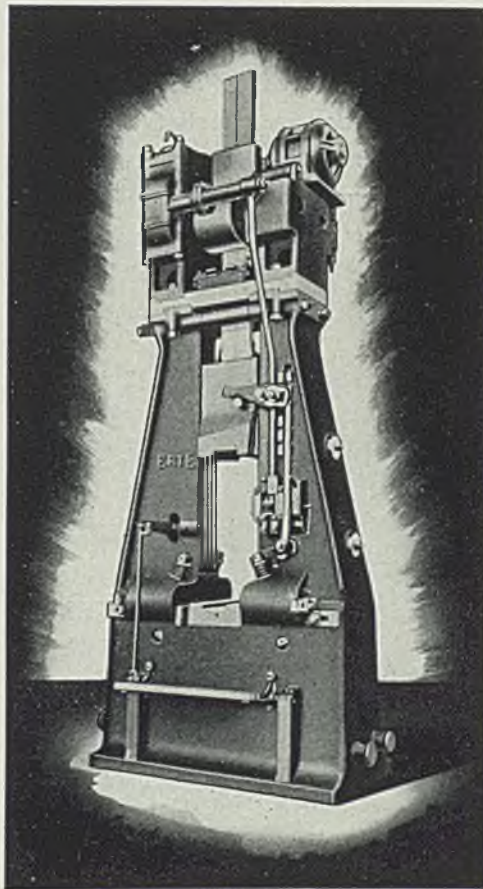
than that of the chain itself, whereas the reverse is usually true.

The dies for closing the links are keyed to the ram and sow block of the hammer. This hammer was rated as a 10,000-pound size, and has a 21-inch bore, which is standard. However, the actual falling weight including the top die is slightly more than 14,000 pounds. The anvil was made in two sections. The top section weighed approximately 90 tons, and was made of open-hearth cast steel and the bottom section, weighing about 40 tons, was made of alloy cast iron of high tensile strength. The hammer above the anvil weighed 46 tons.

The anvil sections were cast on

end without any cored openings in them, the pockets for the housing bolt nuts being machined from the solid. The housing bolts were set at an angle so that no bottom separators were used between the frames. The frames are mounted rigidly on the anvil without provision for adjustment, hardened and ground steel wearing strips being secured to both the frame and the anvil at all thrust points to eliminate wear on the heavy parts. The heavy tie-plate is of forged steel and locks the frames securely together at the top, wearing strips also being provided at these points. The ram, piston rod and sow blocks are all of heat treated alloy steel forgings and were

THE IDEA CLICKS.



Customer acceptance of a new design is really endorsement by a Jury of Critical Experts. A search of the records shows that no hammer has ever "caught on" as quickly as the ERIE Type M. It was the design that the forge shops were waiting for to put production on a modern basis of efficiency and economy.

Is your shop on the way out or are you keeping your equipment in a position to compete?

ERIE FOUNDRY COMPANY ERIE, PENNA., U. S. A.

Detroit
335 Curtis Bldg.

Chicago
549 Washington Blvd.

Indianapolis
335 Postal Station Bldg.

Paris, France
8 Rue de Rocroy



inspected rigidly for conformity to an exacting Navy department specification which covered chemical analysis, heat treatment, physical properties and grain size of the steel in its requirements.

The cylinder is of cast steel, the main bore being fitted with an alloy cast iron bushing. Cylinder porting, valves and valve operating gearing were all specially designed for this hammer in order to give the type of blow that was necessary to close the link.

The hammer is now in production at the Boston Navy yard, the focal point of an efficient production unit including a number of furnaces as well as the bulldozers, upsetters and

trimming presses required for the auxiliary operations.

New Trade Publications

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.

Tank Heater—Titusville Iron Works Co., Titusville, Pa. A bulletin on its master tank heater, covering new features of its suction tank heaters.

Temperature Conversion Chart—E. J. Lavino & Co., 1528 Walnut street, Philadelphia, have available for dis-

tribution to the industry, copies of a temperature conversion chart.

Diamond Tool—Koebel Diamond Tool Co., 1204 Oakman boulevard, Detroit. A folder illustrating its tools and describing the particular service each one renders.

Plating—Udylite Co., 1651 East Grand boulevard, Detroit. Catalog describing the more common equipment and supply items; a complete list of all the products handled are also included.

Billet Shears—Buffalo Forge Co., 490 Broadway, Buffalo. A bulletin, No. 230 A, illustrating its four types of shears for bars and other shapes, with the actual capacities based on soft steel.

Optics—Bausch & Lomb Optical Co., Rochester, N. Y. A catalog, D-10, illustrating lenses, prisms, mirrors, and the many types and grades under these headings, manufactured by the company.

Mechanics Tools—Keystone Mfg. Co., Buffalo. A catalog, No. 30, illustrating in addition to other products, short shank sleeves and sockets as well as Morse taper square hole, taper turret sockets and taper blank arbor.

Steel Cubicles—General Electric Co., Schenectady, N. Y., glossy print No. 850789, showing new steel cubicles for oil circuit breakers, to replace masonry cells and bus structures; easy to install and have high salvage, should location of equipment be changed.

Enameling Clay—Ferro Enamel Corp., Cleveland. A booklet describing its Ferro blend clay; thoroughly crushed and blended, the natural clays purified by air separation methods reducing moisture content and removing harmful contamination.

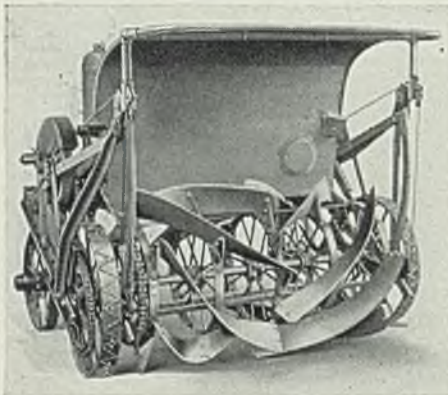
Flexible Concrete—Flexrock Co., 800 North Delaware avenue, Philadelphia. Folder describing a cement, known as Flexrock, with the flexibility of wood, that may be installed on old wood floors, presenting a hard, firm, smooth surface similar to concrete.

Fans and Blowers—Autovent Fan & Blower Co., 1805 North Kostner avenue, Chicago. A catalog, No. 30d-1, describing the company's various types of blowers. Of special attention is bulletin No. 300 explaining in detail the new Autovent V-belt drive unit blowers.

Power Transmission—Link-Belt Co., 307 North Michigan avenue, Chicago. A 208-page catalog, No. 1500, devoted exclusively to power transmission equipment; features the recently announced line of Link-Belt anti-friction roller bearing units, as well as an entirely new group of streamlined babbit bearings, several new types of take-ups, and other new products.

Power Pumps—Worthington Pump & Machinery Corp., Harrison, N. J. Folders illustrating three pumps for general services. Two are single piston pumps, type AA for pressure up to 75 pounds per square inch in folder No. W-111-B9, and type AC for pressures up to 250 pounds per square inch in folder No. W-111-B8. The third is a vertical triplex single-acting power pump with multi-V-drive motor with sliding base and flat steel base plate, illustrated in folder No. W-423-B3.

200 YEARS OF SERVICE

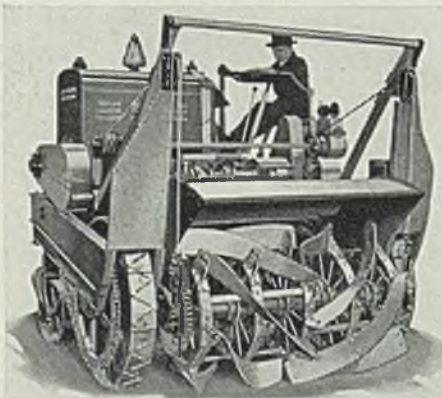


A view of the Type "AA" American Sand Cutter.

Rear view of the Type "K", 6', American Sand Cutter.

Installation view of American Sand Cutter, Motor Driven Type.

For twenty-five years American Sand Cutters have been giving efficient service in the hundreds of foundries where they are installed. There are machines for every purse and purpose and we invite the opportunity of proving to you why you should have an American Sand Cutter.



**14 USERS
TESTIFY
AMERICAN
SAND CUTTERS
HAVE CUT
COSTS FOR
COMBINED
SERVICE OF
200 YEARS**

COMPARE YOUR COSTS

These fourteen users, like hundreds of others, have found that preparation of sand that will turn out the best castings can be done most economically with American Sand Cutters. Investigate.

THE AMERICAN FOUNDRY EQUIPMENT COMPANY



641 Byrkit Street,
Mishawaka, Indiana



AMERICAN SAND CUTTERS

Steel Operations Equal Year's High Mark

Rate Up to 70½;

Mills Cautious As

Backlogs Increase

WITH rising backlogs promising to keep steelmakers busy at a high rate well into July, some producers are unwilling to take more tonnage at current prices, while others indicate they will accept orders right up to July 1.

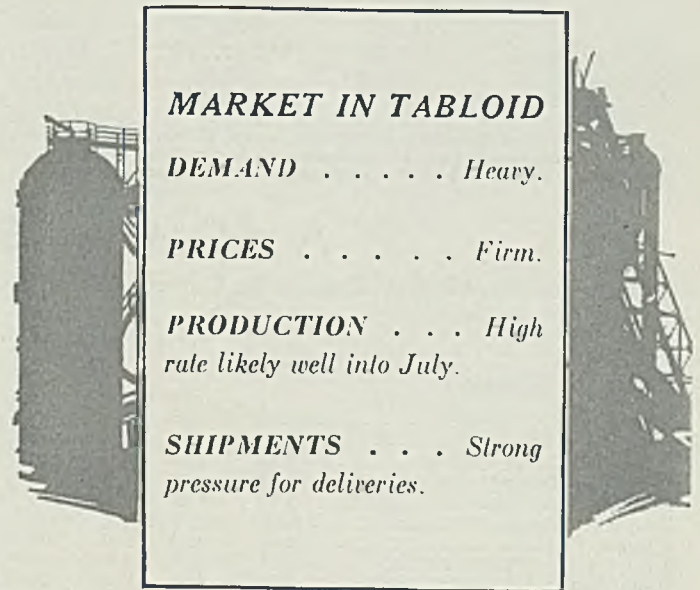
Under strong demand the national steelworks operating rate increased 2½ points to 70½ per cent last week, equaling the highest mark of this year, which was reached in the week of April 18.

Leading producers are four to six weeks behind in deliveries, some are having difficulty obtaining sufficient semifinished steel, and practically all are noting strong pressure for shipments, especially sheets. One leading interest, in order to make the July 1 price increase of \$2 a ton fully effective, announced it would accept no more orders in sheets after June 20. Others have set June 25 as the deadline.

Demand is good for material in which no price increases have been scheduled.

Operations in tin plate were at a full 100 per cent of capacity for the sixth consecutive week and some observers held the opinion that production for the first six months of this year would be at least 15 per cent ahead of the same period in 1935. A few expected operations to be maintained at a high rate well into September.

The automobile industry showed a slight gain in operations over the previous week, 100,733 units being assembled compared to 100,415. With the veterans' bonus expected to result in the sale of 200,000 to 250,000 new cars, some producers were considering building up stocks as a precaution against interrupted deliveries during changeovers. Automotive experts inclined to the belief that the summer dip for getting the stage set for 1937 models might fall more in August than in July.



MARKET IN TABLOID

DEMAND Heavy.

PRICES Firm.

PRODUCTION . . . High
rate likely well into July.

SHIPMENTS . . . Strong
pressure for deliveries.

Shape awards for the week total 27,480 tons, about 10,000 tons more than in the previous week. Pending awards, too, are heavy, including 40,000 tons for locks and dams in the upper Mississippi and Illinois rivers, and 10,000 tons for a bridge at Port Arthur, Texas. Requirements of a large plate tonnage are in prospect for construction of a steel floating dock to be shipped to Pearl Harbor, Hawaii.

Railroad equipment markets are comparatively quiet, but more than 4000 freight cars are on active inquiry. One road is about to take bids on 20,000 tons of rails.

Shipments of Lake Superior iron ore so far this year are about 37 per cent ahead of 1935, with indications that 11,000,000 tons will be transported up to July 1, compared to 8,145,000 in the same period last year.

Pig iron shipments are well maintained, with bookings so far this month three times as heavy as during the corresponding period prior to the second quarter.

A firmer tone is reflected in scrap, and demand for export has shown an increase as a result of the placing of large orders by Japanese interests. STEEL's index of scrap prices held unchanged at \$12.47 last week, the first halt in a steady decline which began in mid-April.

Pittsburgh steelworks operations were up 2 points to 67 per cent; Wheeling 3 to 71; Chicago 2 to 71; eastern Pennsylvania 1 to 45½; Youngstown 2 to 78; New England 5 to 83. Birmingham was down 14½ to 54½ and Cincinnati 4 to 76. Other districts were unchanged.

The finished steel index compiled by STEEL was unchanged at \$52.20, and the iron and steel index remained at \$32.77.

COMPOSITE MARKET AVERAGES

	June 20	June 13	June 6	One Month Ago May, 1936	Three Months Ago March, 1936	One Year Ago June, 1935	Five Years Ago June, 1931
Iron and Steel	\$32.77	\$32.77	\$32.81	\$32.92	\$33.20	\$32.42	\$30.82
Finished Steel	52.20	52.20	52.20	52.20	52.32	54.00	48.60
Steelworks Scrap....	12.47	12.47	12.79	13.40	14.48	10.45	8.84

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

A COMPARISON OF PRICES

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

	June 20, 1936	May 1936	March 1936	June 1935		June 20, 1936	May 1936	March 1936	June 1935
Finished Material					Pig Iron				
Steel bars, Pittsburgh	1.85c	1.85c	1.85c	1.80c	Bessemer, del. Pittsburgh	\$20.8132	20.8132	20.8132	19.81
Steel bars, Chicago	1.90	1.90	1.90	1.85	Basic, Valley	19.00	19.00	19.00	18.00
Steel bars, Philadelphia	2.16	2.16	2.16	2.11	Basic, eastern del. East Pa.....	20.8132	20.8132	20.8132	19.81
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75	No. 2 fdy., del. Pittsburgh	20.3132	20.3132	20.3132	19.31
Shapes, Pittsburgh	1.80	1.80	1.80	1.80	No. 2 fdy., Chicago	19.50	19.50	19.50	18.50
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.01½	Southern No. 2, Birmingham.....	15.50	15.50	15.50	14.50
Shapes, Chicago	1.85	1.85	1.85	1.85	Southern No. 2, del. Cincinnati...	20.2007	20.2007	20.2007	19.38
Tank plates, Pittsburgh.....	1.80	1.80	1.80	1.80	No. 2X eastern, del. Phila.....	21.6882	21.6882	21.6882	20.68
Tank plates, Philadelphia	2.00	1.99	1.99	1.99	Malleable, Valley	19.50	19.50	19.50	18.50
Tank plates, Chicago	1.85	1.85	1.85	1.85	Malleable, Chicago	19.50	19.50	19.50	18.50
Sheets, No. 10, hot rolled, Pitts....	1.85	1.85	1.85	1.85	Lake Sup., charcoal, del. Chicago	25.2528	25.2528	25.2528	24.25
Sheets, No. 24, hot ann., Pitts....	2.40	2.40	2.40	2.40	Ferromanganese, del. Pitts.	80.13	80.13	80.13	90.13
Sheets, No. 24, galv., Pitts.....	3.10	3.10	3.10	3.10	Gray forge, del. Pittsburgh	19.6741	19.6741	19.6741	18.67
Sheets, No. 10, hot rolled, Gary....	1.95	1.95	1.95	1.95	Scrap				
Sheets, No. 24, hot anneal., Gary	2.50	2.50	2.50	2.50	Heavy melting steel, Pittsburgh..	\$13.50	\$14.75	\$15.75	\$12.25
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20	Heavy melt. steel, No. 2, east Pa.	10.75	11.71	12.55	9.30
Plain wire, Pittsburgh	2.40	2.40	2.30	2.30	Heavy melting steel, Chicago	12.75	13.05	14.75	10.25
Tin plate, per base box, Pitts.....	5.25	5.25	5.25	5.25	Rail for rolling, Chicago	14.00	14.65	15.75	11.25
Wire nails, Pitts.	2.10	2.10	2.15	2.60	Railroad steel specialties, Chicago	14.25	14.65	16.25	11.75
Semifinished Material					Coke				
Sheet bars, open-hearth, Youngs.	\$28.00	\$28.00	\$28.50	\$28.00	Connellsville, furnace, ovens	\$3.50	\$3.50	\$3.50	\$3.50
Sheet bars, open-hearth, Pitts....	28.00	28.00	28.50	28.00	Connellsville, foundry, ovens	4.25	4.25	4.10	4.60
Billets, open-hearth, Pittsburgh....	28.00	28.00	28.40	27.00	Chicago, by-product foundry, del.	9.75	9.75	9.75	9.25
Wire rods, Pittsburgh	38.00	38.00	39.00	38.00					

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel		Tin Mill Black No. 28		Corrosion and Heat-Resistant Alloys		Structural Shapes	
Prices Subject to Quantity Extras and Deductions (Except Galvanized)		Pittsburgh	2.75c			Pittsburgh	1.80c
Hot Rolled No. 10, 24-48 in.		Gary	2.85c			Philadelphia, del.	2.01½c
Pittsburgh	1.85c	St. Louis, delivered	3.08c			New York, del.	2.06½
Gary	1.95c			Pittsburgh base, cents per lb.		Boston, delivered....	2.20½c
Chicago, delivered..	1.98c			Chrome-Nickel		Bethlehem	1.90c
Detroit, del.	2.05c			No. 302 No. 304		Chicago	1.85c
New York, del.	2.20c			Bars	23.00 24.00	Cleveland, del.	2.00c
Philadelphia, del....	2.16c			Plates	26.00 28.00	Buffalo	1.90c
Birmingham	2.00c			Sheets	33.00 35.00	Gulf Ports	2.20c
St. Louis, del.	2.18c			Hot strip	20.75 22.75	Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.40c			Cold strip	27.00 29.00	Pacific ports, f.o.b. cars, dock	2.35c
Hot Rolled Annealed No. 24						Bars	
Pittsburgh	2.40c					Soft Steel	
Gary	2.50c					(Base, 3 to 25 tons)	
Chicago, delivered....	2.53c					Pittsburgh	1.85c
Detroit, delivered....	2.60c					Chicago or Gary....	1.90c
New York, del.	2.75c					Duluth	2.00c
Philadelphia, del.	2.71c					Birmingham	2.00c
Birmingham	2.55c					Cleveland	1.90c
St. Louis, del.	2.72c					Buffalo	1.95c
Pacific ports, f.o.b. cars, dock	3.05c					Detroit, delivered....	2.00c
Galvanized No. 24						Pacific ports, f.o.b. cars, dock	2.40c
Pittsburgh	3.10c					Philadelphia, del....	2.16c
Gary	3.20c					Boston, delivered....	2.27c
Chicago, delivered..	3.23c					New York, del.	2.20c
Philadelphia, del.	3.41c					Pitts., forg. qual....	2.10c
New York, del.	3.45c					Rail Steel	
Birmingham	3.25c					To Manufacturing Trade	
St. Louis, del.	3.43c					Pittsburgh	1.70c
Pacific ports, f.o.b. cars, dock	3.70c					Chicago or Gary	1.75c
						Moline, Ill.	1.75c
						Cleveland	1.75c
						Buffalo	1.80c

Iron	
Troy, N. Y.	1.70c
Terre Haute, Ind....	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined..	2.75-7.50c

Reinforcing	
New billet, straight lengths, quoted by distributors.	
Pittsburgh	1.95c-2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young. ..	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. car docks	2.45c
Philadelphia, del.	2.26c-2.36c
Rail steel, straight lengths, quoted by distributors	
Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; less carloads \$4 higher; less carloads fencing \$5 over base column.)

Base Pitts.-Cleve. 100 lb. keg. Stand. wire nails....	2.10c
Cement c'd nails....	2.10c
Galv. nails, 15 gage and finer	4.10c
do. finer than 15 ga.	4.60c
(Per pound)	
Polished staples.....	2.80c
Galv. fence staples	5.05c
Barbed wire, galv....	2.60c
Annealed fence wire	2.65c
Galv. fence wire.....	3.00c
Woven wire fencing (base column, c.l.)	\$58.00
To Manufacturing Trade	
Plain wire, 6-9 ga.	2.40c
Anderson, Ind. (merchant products only) and Chicago up \$1; Duluth up \$2; Birmingham up \$3.	
Spring wire, Pitts. or Cleveland	3.05c
Do., Chicago up \$1, Worc. \$2.	

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination	
10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over.....	1.97½c
Gary, Ind., Cleve., Chi., up 5c Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c	

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons.)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.45c
Alloy	
S.A.E. Diff. S.A.E. Diff.	
2000.....0.25 3100.....0.55	
2100.....0.55 3200.....1.35	
2300.....1.50 3300.....3.30	
2500.....2.25 3400.....3.20	
4100 0.15 to 0.25 Mo.	0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni.	1.05
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon Van.	0.95
9200 spring flats.....	base
9200 spring rounds, squares	0.25

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

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

Hot strip to 23½-in.

Pittsburgh	1.85c
Chicago or Gary....	1.95c
Birmingham base	2.00c
Detroit, del.	2.05c
Philadelphia, del.	2.10c
New York, del....	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold strip, 0.50 carbon and under, Pitts., Cleveland..	2.60c
Detroit, del.	2.81c
Worcester, Mass....	2.80c
Cleve-ter, Mass.	
Carbon	
0.25-0.50....	2.60c
0.51-0.75....	3.45c
0.76-1.00....	4.95c
Over 1.00....	6.50c
6.70c	

Rails, Track Material

(Gross Tons)

Standard rails, mill	\$36.37½
Relay rails, Pitts. 20-100 lbs.	25.50-28.00
Light rails, billet qual. Pitts., Chi....	\$35.00
Do., reroll, qual....	34.00
Angle bars, billet, Gary, Ind., So. Chi. Do., axle steel....	2.55c 2.10c
Spikes, R. R. base	2.60c
Track bolts, base....	3.60c
Tie plates, base	1.90c
Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up \$2; 16 and 20 lbs., up \$1; 12 lbs. up \$2; 8 and 10 lbs., up \$5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.	

Bolts and Nuts

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

Carriage and Machine

½ x 6 and smaller....	70-10-5 off
Do. larger	70-10 off
Tire bolts	55 off
Plow Bolts	
All sizes	70-10 off
Stove Bolts	
In packages with nuts attached 75 off; in packages with nuts separate 75-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Step bolts	65-5 off
Elevator bolts	65-5 off
Nuts	
S. A. E. semifinished hex.; ½ to ¾-inch	60-20-15 off
Do., ½ to 1-inch	60-20-15 off
Do., over 1-inch	60-20-15 off
Hexagon Cap Screws	
Milled	80-10-10 off
Upset, 1-in., smaller.....	85 off
Square Head Set Screws	
Upset, 1-in., smaller.....	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
¾-in. and smaller, Pitts., Chi., Cleve. 70 and 5 off	
Wrought washers, Pitts., Chi., Phila. to jobbers & large nut, bolt mfrs....	\$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	\$2.75
Do. less carloads, 5 kegs or more, no discount on size extras.....	\$3.05

Do., under 5 kegs; no disc. on size extras..... \$3.20

Pipe and Tubing

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

Welded Iron, Steel Pipe

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

Butt Weld Steel	
In.	Blk. Galv.
¼ and ¾.....	60 44½
½.....	64½ 55
¾.....	67½ 59
1-3.....	69½ 61½
Iron	
½.....	31½ 15
¾.....	36½ 20½
1-1¼.....	39½ 25½
2.....	41½ 26
Lap Weld Steel	
2.....	62 53½
2½-3.....	65 56½
3½-6.....	67 58½
7 and 8.....	66 56½
9 and 10.....	65½ 56
Iron	
2.....	37 22½
2½-3½.....	38 25
4-8.....	40 28½
Line Pipe Steel	
¼, butt weld.....	56
¼ and ¾, butt weld.....	59
½, butt weld.....	63½
¾, butt weld.....	66½
1 to 3, butt weld.....	68½
2, lap weld.....	61
2½ to 3, lap weld.....	64
3½ to 6, lap weld.....	66
7 and 8, lap weld.....	65
Iron	
½-1½ inch, black and galv. take 4 pts. over: 2½-6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8-12-inch, no extra.	

Boiler Tubes	
O. L. Discounts, f.o.b. Pitts.	
Lap Weld Steel	
2-2¼.....	33
2½-2¾.....	40
3.....	47
3½-3¾.....	50
4.....	52
4½-5.....	42
Charcoal Iron	
1¾.....	8
2-2¼.....	13
2½-2¾.....	16
3.....	17
3½-3¾.....	18
4.....	20
4½.....	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron. Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads

revised as of July 1, 1935, card. Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc 100 ft. or 150 lbs. 32%
15,000 ft. or 22,500 lbs. 70%

Cast Iron Water Pipe

Class B Pipe-Per Net Ton	
6-in. & over, Birm.	\$39.00-40.00
4-in., Birmingham....	42.00-43.00
4-in., Chicago.....	50.40-51.40
6 to 24-in. Chicago..	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4 in.	46.00
Class A pipe \$3 over Class B	
Std. ftgs., Birm. base.	\$100.00

Semifinished Steel

Billets and Blooms	
4 x 4-inch base; gross ton	
Pitts., Chi., Cleve., Buffalo & Youngs-town	\$28.00
Philadelphia	34.67
Duluth	30.00
Forging Billets	
6 x 6 to 9 x 9-in., base	
Pitts., Chi., Buff....	35.00
Forging, Duluth	27.00
Sheet Bars	
Pitts., Cleve., Young, Chi., Buff., Canton, Sparrows Pt.	28.00
Slabs	
Pitts., Chi., Cleve., Young.	28.00
Wire Rods	
Pitts., Cleve., No. 4 to 5	\$38.00
Do., No. 5 to 15/32-inch	40.00
Do., over 15/32 to 47/64-inch	42.00
Chicago up \$1; Worcester up \$2 Skelp	
Pitts., Chi., Young., Buff., Coatesville, Sparrows Point....	1 80c

Coke

Price Per Net Ton	
Beehive Ovens	
Connellsville, fur....	\$3.50- 3.65
Connellsville, fdry....	4.25- 4.35
Connell. prem. fdry.	5.35- 5.50
New River fdry.....	6.00
Wise county fdry....	4.45- 5.06
Wise county fur....	4.00- 4.50
By-Product Foundry	
Newark, N. J. del.	9.70-10.16
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del....	11.50
St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del	9.00
Philadelphia, del.	9.38

Coke By-Products

Per gallon, producers' plants	
Tank lots	
Pure and 90% benzol.....	18.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c
Per lb. f.o.b. New York.	
Phenol (200 lb. drums)..	16.30c
Do. (100 lbs.)	17.30c
Eastern Plants, per lb.	
Naphthalene flakes and balls, in bbls., to jobbers	7.25c
Per 100 lb. Atlantic seaboard Sulphate of ammonia	\$1.20
†Western prices, ½-cent up.	

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
Bethlehem, Pa.	\$20.50	\$21.00	\$20.00	\$21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	15.50	15.50	14.50	21.00
Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
Cleveland	19.50	19.50	19.00	20.00
Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	.....	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Everett, Mass.	20.50	21.00	20.00	21.50
Hamilton, O.	19.50	19.50	19.00	.....
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	.....	20.00	.....
Swedeland, Pa.	20.50	21.00	20.00	21.50
Toledo, O.	19.50	19.50	19.00	20.00
Youngstown, O.	19.50	19.50	19.00	20.00

Delivered from Basing Points:

Akron, O., from Cleveland	20.76	20.76	26.26	21.26
Baltimore from Birmingham	21.08	.....	19.96	.....
Boston from Birmingham	20.62	.....	20.50	.....
Boston from Everett, Mass.	21.00	21.50	20.50	22.00
Boston from Buffalo	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem	22.93	23.43	.....	.....
Brooklyn, N. Y., from Bmghm.	22.50	.....	.....	.....
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	19.72	.....	19.60	.....
Cincinnati from Hamilton, O.	20.58	20.58	20.08	.....
Cincinnati from Birmingham	20.20	.....	19.20	.....
Cleveland from Birmingham	19.62	.....	19.12	.....
Indianapolis from Hamilton, O.	21.93	21.93	21.43	22.43
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago	.....	.....	.....	.....
Toledo or Detroit	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham	21.61	.....	.....	.....
Newark, N. J., from Bethlehem	21.99	22.49	.....	.....
Philadelphia from Birmingham	20.93	.....	20.81	.....
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	.....
Pittsburgh district from Neville Island	.....	.....	.....	.....
} \$1.21 switching charges	.....	.....	.....	.....
Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25

Delivered from Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
St. Louis, northern	20.00	20.00	19.50	.....
St. Louis from Birmingham	19.68	.....	19.50	.....
St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., \$24.00, Phila. base, standard and copper bearing, \$25.13.			
Gray Forge			
Valley furnace	19.00	Lake Superior fur.	\$22.00
Pitts. dist. fur.	19.00	Do., del. Chicago	25.25
		Lylees, Tenn.	22.50

Silvery†

Jackson county, O., base: 6-6.50 per cent \$22.75; 6.51-7—\$23.25; 7-7.5—\$23.75; 7.51-8—\$24.25; 8-8.5—\$24.75; 8.51-9—\$25.25; 9-9.50—\$25.75. 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	timore bases (bags)....	40.00
Fire Clay Brick	Domestic dead-burned gr. net ton f.o.b. Chelwah, Wash. (bulk)..	22.00
Super Quality	Basic Brick	
Pa., Mo., Ky.	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	\$45.00
First Quality	Chrome brick	\$45.00
Pa., Ill., Md., Mo., Ky.	Chemically bonded chrome brick	45.00
Alabama, Ga.,	Magnesite brick	65.00
Second Quality	Chemically bonded magnesite brick	55.00
Pa., Ill., Ky., Md., Mo.		
Ga., Ala.		
Ohio		
First quality		\$40.00
Intermediary		37.00
Second quality		28.00
Malleable Bung Brick		
All bases		50.00
Silica Brick		
Pennsylvania		\$45.00
Joliet, E. Chicago		54.00
Birmingham, Ala.		48.00
Magnesite		
Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)..		\$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Bal-		

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	\$20.50
Washed gravel, f.o.b. Ill. Ky., net ton, carloads, all-rail	\$18.00
Do., for barge	\$19.00

Ferroalloys

Dollars, except Ferrochrome	
Ferromanganese, 78-82% tidewater, duty paid	75.00
Do., Balti., base	75.00
Do., del. Pittsb'gh	80.13
Spiegeleisen, 19-20% dom. Palmer-ton, Pa., spot	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all, cl.	69.50
Do., less carload	77.00
Do., 75 per cent. Spot, \$5 a ton higher.	126-130.00
Silicomane, 2 1/2 carb. 2% carbon, 90.00; 1%	85.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.30-1.40
Ferrovandium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. 1, prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. 1, 17-19% Rockdale, Tenn., basis, 18%, \$3 unitage	68.50
Ferrophosphorus, electrolytic, per ton c. 1, 23-26% f.o.b. Anniston, Ala., 24% \$3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads, Quan. diff. apply.	

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper			Straits Tin		Lead	Lead	Alumi-	Antimony	Nickel		
Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	New York Futures	Lead N. Y.	East St. L.	num 99%	Chinese Spot, N. Y.	Cath-odes		
June 13	9.50	9.62 1/2	9.12 1/2	42.37 1/2	41.75	4.60	4.45	4.90	*19.00	13.00	35.00
June 15	9.50	9.62 1/2	9.12 1/2	41.37 1/2	40.75	4.60	4.45	4.90	*19.00	13.00	35.00
June 16	9.50	9.62 1/2	9.12 1/2	41.60	41.25	4.60	4.45	4.90	*19.00	13.00	35.00
June 17	9.50	9.62 1/2	9.12 1/2	41.25	40.80	4.60	4.45	4.90	*19.00	13.00	35.00
June 18	9.50	9.62 1/2	9.12 1/2	41.10	40.62 1/2	4.60	4.45	4.90	*19.00	13.00	35.00
June 19	9.50	9.62 1/2	9.12 1/2	41.50	41.10	4.60	4.45	4.85	*19.00	13.00	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	15.12 1/2
Copper, hot rolled	17.00
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	17.37 1/2
Seamless copper	17.50
Rods	
High yellow brass	13.12 1/2
Copper, hot rolled	13.75
Anodes	
Copper, untrimmed	14.50
Wire	
Yellow brass (high)	15.37 1/2

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	6.00-6.25
Cleveland	6.25-6.50
Chicago	5.75-6.00
St. Louis	6.00-6.25
Heavy Copper and Wire	
New York, No. 1	7.50-7.75
Chicago, No. 1	7.00-7.25
Cleveland	6.75-7.00
St. Louis, No. 1	7.00-7.50
Composition Brass Borings	
New York	5.75-6.00
Light Copper	
New York	6.12 1/2-6.25
Chicago	5.50-5.75
Cleveland	5.75-6.00
St. Louis	5.50-6.00

Light Brass

Chicago	3.50-3.62 1/2
Cleveland	3.25-3.50
St. Louis	3.25-3.75
Lead	
New York	3.50-3.75
Cleveland	3.50-3.75
Chicago	3.25-3.50
St. Louis	3.25-3.75
Zinc	
New York	2.50-2.75
Cleveland	2.25-2.50
St. Louis	2.25-2.75
Aluminum	
Borings, Cleveland	8.00-8.50
*Mixed, cast, Cleve.	11.75-12.00
Mixed, cast, St. L.	12.25-12.75
Clips, soft, Cleve.	13.75-14.00
SECONDARY METALS	
Brass ingot, 85-5-5	9.50
Stand. No. 12 alum.	16.50-17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL		COUPLERS, SPRINGS		Buffalo 8.50- 9.00		Chicago, rolled steel 14.00-14.50	
Birmingham	9.00- 9.50	Buffalo	14.75-15.25	Cincinnati, dealers..	5.25- 5.75	Cincinnati, iron	10.50-11.00
Bos. d'ck, exp. brok.	10.50	Chicago, springs.....	14.00-14.50	Cleveland	8.25- 8.75	Eastern Pa., iron	13.50-14.00
N. Eng. del. No. 1..	9.50	Eastern Pa.	16.00-16.50	Detroit	6.50- 7.00	Eastern Pa., steel...	16.00-16.50
Buffalo, No. 1	12.00-12.50	Pittsburgh	16.50-17.00	Eastern Pa.	5.75- 6.50	Pittsburgh, iron	14.00-14.50
Buffalo, No. 2	11.00-11.50	St. Louis	13.00-13.50	New York, brokers..	2.25- 2.50	Pittsburgh, steel	16.50-17.00
Chicago, No. 1	12.50-13.00			Pittsburgh	8.00- 8.50	St. Louis, iron	11.50-12.00
Cleveland, No. 1	13.00-13.50	ANGLE BARS—STEEL		Toronto, dealers	4.00	St. Louis, steel	13.00-13.50
Cleveland, No. 2	12.00-12.50	Chicago	14.00-14.50	CAST IRON BORINGS			
Detroit, No. 1	10.00-10.50	St. Louis	12.75-13.25	Birmingham, plain..	4.00- 5.00	Birmingham	10.50-11.50
Detroit, No. 2	8.50- 9.00	Buffalo	14.50-15.00	Boston, chem. brok.	6.00- 6.25	Boston, No. 1 mach.	
Eastern Pa., No. 1.	11.50-12.00	RAILROAD SPECIALTIES		Boston, brokers	3.50- 4.00	brokers	8.75- 9.00
Eastern Pa., No. 2.	10.75-11.00	Chicago	14.00-14.50	Buffalo	8.00- 8.50	N. Eng., del. No. 2..	9.50-10.00
Federal, Ill.	10.50-11.00	LOW PHOSPHORUS		Chicago, dealers	6.00	N. Eng. del. textile..	11.00-11.50
Granite City, R. R.	11.75-12.25	Buffalo, billet and	14.75-15.25	Cincinnati, dealers..	5.00- 5.50	Buffalo, cupola	11.50-12.00
Granite City, No. 2.	9.00- 9.50	bloom crops	17.50-18.00	Cleveland	8.25- 8.75	Buffalo, mach.	12.50-13.00
N. Y., brokers, No. 2	7.25- 7.75	Cleveland, billet,	16.00	Detroit	6.50- 7.00	Chicago, agri. net...	10.00-10.50
N. Y., brokers, docks		bloom crops	17.50-18.00	E. Pa., chemical....	10.00-13.00	Chicago, auto	11.00-11.50
(No. 1 for export)	9.50	Eastern Pa., crops..	16.00	New York, brokers..	4.25- 4.50	Chicago, mach. net..	12.00-12.50
Pitts., No. 1 (R. R.)	14.00-14.50	Pittsburgh, billet,	15.50-16.00	St. Louis	4.00- 4.50	Chicago, rail'd net..	11.00-11.50
Pitts., No. 1 (dlr.)..	13.25-13.75	bloom crops	15.50-16.00	Toronto, dealers....	4.00- 4.50	Cincli., mach. cup...	10.75-11.25
Pittsburgh, No. 2...	12.25-12.75	Pittsburgh, sheet	15.00-15.50	PIPE AND FLUES			
St. Louis	11.00-11.50	bar crops	15.00-15.50	Cincinnati, dealers..	7.75- 8.25	Cleveland, mach....	15.25-15.75
Toronto, dealers	7.50	FROGS, SWITCHES		Chicago, net	7.50- 8.00	Eastern Pa., cupola	13.50-14.00
Valleys, No. 1	13.50-14.00	Chicago	12.50-13.00	RAILROAD GRATE BARS			
COMPRESSED SHEETS		St. Louis, cut	12.50-13.00	Buffalo	10.50-11.00	E. Pa., mixed yard..	11.00-11.50
Buffalo, dealers	11.00-11.50	SHOVELING STEEL		Chicago, net	8.25- 8.75	Pittsburgh, cupola..	15.00-15.50
Chicago, factory	11.50-12.00	Chicago	12.50-13.00	Cincinnati	7.00- 7.50	San Francisco, del..	13.50-14.00
Chicago, dealer	11.00-11.50	Federal, Ill.	10.50-11.00	Eastern Pa.	10.00-10.50	Seattle	10.00-11.00
Cleveland	12.75-13.25	Granite City, Ill.	10.00-10.50	New York, brokers..	6.00- 6.25	St. Louis, No. 1	11.00-11.50
Detroit	10.50-11.00	Toronto, dealers	6.50	St. Louis	7.50- 8.00	St. L., No. 1 mach.	11.50-12.00
E. Pa., new mat.	11.50	RAILROAD WROUGHT		HEAVY CAST			
Pittsburgh	13.25-13.75	Birmingham	7.50- 8.00	New England del...	9.50-10.00	Buffalo, break.	10.25-10.75
St. Louis	7.75- 8.25	Boston, brokers	7.25- 7.50	Buffalo, break.	10.25-10.75	Cleveland, break	12.50-13.00
Valleys, No. 1	13.75-14.00	Buffalo, No. 1	11.00-11.50	Detroit, No. 1 mach.		Detroit, No. 1 mach.	
BUNDLED SHEETS		Buffalo, No. 2	12.50-13.00	net	13.00-13.50	Detroit, break.	11.00-11.50
Buffalo	10.00-10.50	Chicago, No. 1, net..	12.50-13.00	Detroit, auto net...	11.00-11.50	Detroit, auto net...	11.00-11.50
Cincinnati, del	7.75- 8.25	Chicago, No. 2	12.50-13.00	Eastern Pa.	12.50-13.00	Eastern Pa.	12.50-13.00
Cleveland	9.00- 9.50	Cincinnati, No. 2...	10.00-10.50	New York, break.		brokers	8.50- 9.00
Pittsburgh	12.50-13.00	Eastern Pa.	13.00	Pittsburgh	12.25-12.75	Pittsburgh	12.50-13.00
St. Louis	6.25- 6.75	St. Louis, No. 1	10.25-10.75	FORGE FLASHINGS			
Toronto, dealers	4.50	St. Louis, No. 2	11.75-12.25	Boston, brokers	6.25- 6.50	Boston, brokers	6.25- 6.50
SHEET CLIPPINGS, LOOSE		Toronto, No. 1, dlr.	7.00	Buffalo	11.00-11.50	Buffalo	11.00-11.50
Chicago	8.00- 8.50	SPECIFICATION PIPE		Cleveland	11.75-12.25	Cleveland	11.75-12.25
Cincinnati	5.75- 6.25	Eastern Pa.	12.00	Detroit	9.00- 9.50	Detroit	9.00- 9.50
Detroit	7.00- 7.50	New York, brokers..	7.50- 7.75	Pittsburgh	12.25-12.75	Pittsburgh	12.25-12.75
St. Louis	5.50- 6.00	BUSHELING		FORGE SCRAP			
STEEL RAILS, SHORT		Buffalo, No. 1	11.00-11.50	Boston, brokers	5.50- 6.00	Boston, heavy	14.00-14.50
Birmingham	12.00-12.50	Chicago, No. 1	11.50-12.00	Eastern Pa.	12.00-12.50	Eastern Pa.	12.00-12.50
Buffalo	15.50-16.00	Cincli., No. 1, deal..	8.50- 9.00	ARCH BARS, TRANSOMS			
Chicago (3 ft.)	14.50-15.00	Cincinnati, No. 2..	4.50- 5.00	St. Louis	13.50-14.00	ARCH BARS, TRANSOMS	
Chicago (2 ft.)	15.00-15.50	Cleveland, No. 2	8.25- 8.75	AXLE TURNINGS			
Cincinnati, del.	14.00-14.50	Detroit No. 1, new..	9.50-10.00	Boston, brokers	5.75- 6.00	Boston, brokers	5.75- 6.00
Detroit	14.50-15.00	Valleys, new, No. 1	13.00-13.50	Buffalo	11.00-11.50	Buffalo	11.00-11.50
Pitts., open-hearth,		Toronto, dealers	6.00	Chicago, elec. fur...	12.75-13.25	Chicago, elec. fur...	12.75-13.25
3 ft. and less	15.00-15.50	MACHINE TURNINGS		Eastern Pa.	11.00-12.00	Eastern Pa.	11.00-12.00
St. Louis, 2 ft. & less	14.50-15.00	Birmingham	5.00- 6.00	St. Louis	9.00- 9.50	St. Louis	9.00- 9.50
STEEL RAILS, SCRAP		Boston, brokers	3.00- 3.25	Toronto	4.50	Toronto	4.50
Boston, brokers	7.50- 7.75	Buffalo	6.50- 7.00	STEEL CAR AXLES			
Chicago	12.50-13.00	Chicago	6.00- 6.50	Birmingham	11.50-12.50	Birmingham	11.50-12.50
Pittsburgh	14.00-14.50	Cincinnati, dealers..	5.75- 6.25	Boston, brokers	11.00-11.25	Boston, brokers	11.00-11.25
St. Louis	12.50-13.00	Cleveland	7.50- 8.00	Buffalo	15.50-16.00	Buffalo	15.50-16.00
Buffalo	12.50-13.00	Detroit	5.75- 6.25	Chicago, net	14.25-14.75	Chicago, net	14.25-14.75
Toronto, dealers	8.50	Eastern Pa.	8.00- 8.50	Eastern Pa.	17.00	Eastern Pa.	17.00
STOVE PLATE		New York, brokers..	3.50- 3.75	St. Louis	13.00-13.50	St. Louis	13.00-13.50
Birmingham	7.00- 7.50	Pittsburgh	9.50-10.00	Toronto	8.50	Toronto	8.50
Boston, brokers	5.00- 5.25	St. Louis	4.00- 4.50	SHAFTING			
Buffalo	10.00-10.50	Toronto, dealers	4.00	Boston, brokers	13.25-13.50	Boston, brokers	13.25-13.50
Chicago	7.50- 8.00	Valleys	9.50-10.00	Eastern Pa.	18.50-18.75	Eastern Pa.	18.50-18.75
Cincinnati, dealers..	7.75- 8.50	BORINGS AND TURNINGS		New York, brokers..	13.50-14.00	New York, brokers..	13.50-14.00
Detroit, net	9.00- 9.50	For Blast Furnace Use		St. Louis	13.50-14.00	St. Louis	13.50-14.00
Eastern Pa.	10.00-10.50	Boston, brokers	2.00	CAR WHEELS			
N. Y., brokers, fdry.	7.00- 7.25	IRON ORE		Birmingham	11.00-11.50	Birmingham	11.00-11.50
St. Louis	7.50- 8.00	Eastern Local Ore		Boston, iron, brok...	7.50- 7.75	Boston, iron, brok...	7.50- 7.75
Toronto, dealers, net	5.50	Cent's, unit, del. E. Pa.		Buffalo, iron	13.50-14.00	Buffalo, iron	13.50-14.00

Iron Ore	
Lake Superior Ore	
Gross ton, 51½%	
Lower Lake Ports	
Old range bessemer	\$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore	
Cent's, unit, del. E. Pa.	
Foundry and basic	
56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos.	
58-60% (nom.)	10.00-10.50
Foreign Ore	
Cent's per unit, f.a.s. Atlantic	
ports (nominal)	
Foreign manganiferous ore, 45.55%	

iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	\$15.85-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore	
(Nominal)	
Prices not including duty, cents per unit cargo lots	
Caucasian, 50-52%	26.00
So. African, 50-52%	26.00
Indian, 50-52%	26.00

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	Cincinnati	3.25c	Buffalo	3.37c	Pittsburgh(h)	2.95c	St. Louis.....	3.55c	
Baltimore*.....	3.00c	Houston	3.25c	Chattanooga..	3.56c	San Francisco	3.35c	St. Paul	3.55c
Boston††	3.10c	Los Angl., cl..	2.45c	Chicago	3.20c	Seattle	3.70c	COLD FIN. STEEL	
Buffalo	3.00c	New Orleans	3.50c	Cincinnati	3.42c	St. Louis.....	3.45c	Baltimore (c)	3.73c
Chattanooga..	3.36c	Pitts., plain (h)	3.05c	Cleveland, ¼-		St. Paul	3.30c	Boston	3.90c
Chicago (j)....	3.00c	Pitts., twisted		in. and over	3.31c	Tulsa	3.70c	Buffalo (h)....	3.55c
Cincinnati	3.22c	squares (h)	3.175c	Detroit	3.42c	NO. 24 BLACK		Chattanooga*	4.12c
Cleveland	3.00c	San Francisco	2.45c	Detroit, ½-in.	3.65c	Baltimore*†...	3.60c	Chicago (h)...	3.50c
Detroit	3.09c	Seattle	2.45c	Houston	3.00c	Boston (g)....	3.95c	Cincinnati	3.72c
Houston	3.00c	St. Louis.....	3.25c	Los Angeles..	3.60c	Buffalo	3.25c	Cleveland (h)	3.50c
Los Angeles..	3.60c	Tulsa	3.25c	Milwaukee	3.31c	Chattanooga..	4.16c	Detroit	3.79c
Milwaukee..	3.11c-3.26c	Young.....	2.30c-2.60c	New Orleans	3.55c	Chicago	3.85c	Los Ang. (f) (d)	5.85c
New Orleans..	3.35c	SHAPES		New York†(d)	3.40c	Cincinnati	4.02c	Milwaukee	3.61c
New York†(d)	3.31c	Baltimore*....	3.00c	Philadelphia*	2.98c	Cleveland	3.91c	New Orleans	4.30c
Pitts. (h).....	2.95c-3.10c	Boston††	3.19c	Phila. floor...	4.95c	Detroit	3.94c	New York†(d)	3.81c
Philadelphia*	3.03c	Buffalo	3.25c	Pittsburgh(h)	3.15c	Los Angeles..	4.35c	Philadelphia..	3.76c
Portland	3.50c	Chattanooga..	3.56c	Portland	3.35c	Milwaukee	3.96c	Portland (f) (d)	4.50c
San Francisco	3.25c	Chicago	3.20c	San Francisco	3.25c	New Orleans	4.50c	San Fran. (f) (d)	5.95c
Seattle	3.70c	Cincinnati	3.42c	Seattle	3.55c	New York†(d)	3.89c	Seattle (f) (d)	6.15c
St. Louis.....	3.25c	Cleveland	3.31c	St. Louis.....	3.45c	Philadelphia††	3.60c	St. Louis.....	3.75c
St. Paul	3.25c-3.40c	Detroit	3.42c	St. Paul	3.45c	Pitts.* (h)....	3.55c	St. Paul	4.02c
Tulsa	3.25c	Houston	3.00c	Tulsa	3.50c	Portland	4.10c	Tulsa	4.65c
IRON BARS		Los Angeles..	3.60c	NO. 10 BLUE		San Francisco	4.00c	COLD ROLLED STRIP	
Portland	3.40c	Milwaukee	3.31c	Baltimore*....	3.10c	Seattle	4.40c	Boston, 0.100-	
Chattanooga..	3.36c	New Orleans	3.55c	Boston††	3.30c	St. Louis	4.10c	in., 500 lb. lots	
Baltimore*....	3.05c	New York†(d)	3.37c	Buffalo	3.62c	St. Paul	3.90c	Buffalo	
Chicago	2.75c	Philadelphia*	2.98c	Chattanooga..	3.36c	Tulsa	4.75c	Chicago	
Cincinnati	3.22c	Pittsburgh (h)	3.15c	Chicago	3.05c	NO. 24 GALV. SHEETS		Cincinnati (b)	
New York†(d)	3.36c	Portland (i)...	3.50c	Cincinnati	3.22c	Baltimore*†...	4.30c	Cleveland (b)	
Philadelphia*	2.93c	San Francisco	3.25c	Cleveland	3.11c	Buffalo	4.00c	Detroit	
St. Louis.....	3.25c	Seattle (i)....	3.70c	Det., 8-10 ga.	3.14c	Boston (g)....	4.00c	New York†(d)	
Tulsa	3.25c	St. Louis.....	3.45c	Houston	3.35c	Chattanooga..	4.86c	St. Louis.....	
REINFORCING BARS		St. Paul	3.45c	Los Angeles..	3.75c	Chicago (h)...	4.55c	TOOL STEELS	
Buffalo	2.60c	Tulsa	3.50c	Milwaukee	3.16c	Cincinnati	4.72c	(Applying on or east of	
Chattanooga..	3.36c	PLATES		New Orleans	3.55c	Cleveland	4.61c	Mississippi river; west	
Chicago.....	2.10c-2.60c	Baltimore*....	3.00c	New York†(d)	3.31c	Detroit	4.72c	of Mississippi 1c up)	
Cleveland (c)	2.10c	Boston††	3.21c	Portland	3.35c	Houston	4.40c	Base	
				Philadelphia*	3.08c	Los Angeles..	4.40c	High speed	
						Milwaukee	4.66c	High carbon, high	
						New Orleans	4.95c	chrome	
						New York†(d)	4.30c	Oil hardening	
						Philadelphia††	4.40c	Special tool	
						Pitts.** (h)...	4.15c-4.45c	Extra tool	
						Portland	4.50c	Regular tool	
						San Francisco	4.50c	Uniform extras apply.	
						Seattle	5.00c	BOLTS AND NUTS	
						St. Louis.....	4.65c	(100 pounds or over)	
						St. Paul	4.50c	Discount	
						Tulsa	5.10c	Chicago (a).....	
						BANDS		Cleveland	
						Baltimore*....	3.20c	Detroit	
						Boston††	3.30c	Milwaukee	
						Buffalo	3.42c	Pittsburgh	
						Chattanooga..	3.61c		
						Chicago	3.30c	(a) Under 100 pounds.	
						Cincinnati	3.47c	65 off.	
						Cleveland	3.36c	(b) Plus straighten-	
						Detroit, ½-in.		ing, cutting and quan-	
						and lighter	3.39c	ity differentials; (c)	
						Houston	3.25c	Plus mill, size and	
						Los Angeles..	4.10c	quantity extras; (d)	
						Milwaukee	3.41c	Quantity base; (e)	
						New Orleans	3.95c	New mill classif. (f)	
						New York†(d)	3.56c	Rounds only; (g) 50	
						Philadelphia..	3.18c	bundles or over; (h)	
						Pittsburgh (h)	3.20c	Outside delivery, 10c	
						Portland	4.25c	less; (i) Under 3 in.;	
						San Francisco	4.10c	(j) Shapes other than	
						Seattle	4.25c	rounds, flats, fillet an-	
						St. Louis.....	3.55c	gles, 3.15c.	
						St. Paul	3.85c	‡Domestic steel; *Plus	
						Tulsa	3.45c	quan. extras; **Under	
						HOOPS		25 bundles; †#50 or more	
						Baltimore	2.30c	bundles; †New extras	
						Boston††	4.30c	apply; ††Base 40,000	
						Buffalo	3.42c	lbs., extras on less.	
						Chicago	3.30c	Prices on heavier	
						Cincinnati	3.47c	lines are subject to new	
						Det., No. 14		quantity differentials:	
						and lighter	3.39c	399 lbs. and less, up 50	
						Los Angeles..	5.85c	cts.; 400 to 3999 lbs.,	
						Milwaukee	3.41c	base; 4000 to 7999	
						New York†(d)	3.56c	lbs., 15 cts. under; 8000	
						Philadelphia..	3.43c	to 14,999 lbs., 25 cts.	
						Pittsburgh (h)	3.70c	under; 15,000 to 39,999	
						Portland	5.60c	lbs., 35 cts. under; 40,-	
						San Francisco	6.15c	000 lbs. and over, 50	
						Seattle	5.60c	cts. under base.	

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, June 18

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

PIG IRON	British gross tons U. K. ports		Channel or North Sea ports, metric tons		Continental	
	£	s d	Quoted in dollars at current value	£	s d	**Quoted in gold pounds sterling
Foundry, 2.50-3.00 Silicon	\$15.69	3 2 6*	\$13.86		1 15 0	
Basic bessemer.....	15.69	3 2 6*	11.89		1 10 0	
Hematite, Phos. .03-.05..	17.82	3 11 0				
SEMIFINISHED STEEL						
Billets.....	\$29.49	5 17 6	\$18.61		2 7 0	
Wire rods, No. 5 gage....	44.93	8 19 0	35.65		4 10 0	
FINISHED STEEL						
Standard rails.....	\$41.42	8 5 0	\$43.57		5 10 0	
Merchant bars.....	1.74c	7 15 0	1.12c to 1.16c		3 2 6 to 3 5 0	
Structural shapes.....	1.68c	7 10 0	1.11c		3 1 6	
Plates, ½ in. or 5 mm....	1.81c	8 1 3	1.53c		4 5 0	
Sheets, black, 24 gage or 0.5 mm.....	2.18c	9 15 0	2.08c		5 16 0††	
Sheets, gal., 24 gage, corr.	2.63c	11 15 0	2.15c		6 0 0	
Bands and strips.....	1.96c	8 15 0	1.43c		4 0 0	
Plain wire, base.....	2.18c	9 15 0	1.89c		5 3 0	
Galvanized wire, base....	2.58c	11 10 0	2.10c		5 17 6	
Wire nails, base.....	2.69c	12 0 0	1.71c		4 15 0	
Tin plate, box 108 lbs....	\$ 4.71	0 18 9				

British ferromanganese .575 delivered Atlantic seaboard, duty-paid. German ferromanganese 59 0s 0d \$(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs	Belgian Francs	Reich Marks
Fdy. pig iron, Si. 2.5	\$17.57	3 10 0(a)	\$17.16	260
Basic bessemer pig iron...	18.20	3 12 6(a)	12.54	190
Furnace coke.....	5.65	1 2 6	6.27	95
Billets.....	29.49	5 17 6	28.38	430
Standard rails.....	1.85c	8 5 0	2.30c	671
Merchant bars.....	2.03c	9 1 0	1.67c	560
Structural shapes.....	1.96c	8 15 0	1.64c	550
Plates, ½ in. or 5 mm....	2.03c	9 1 3	2.09c	700
Sheets, black.....	2.58c	11 10 0§	1.78c	600‡
Sheets, galv., corr., 24 ga. or 0.5 mm.....	3.02c	13 10 0	2.84c	950
Plain wire.....	2.18c	9 15 0	2.68c	900
Bands and strips.....	2.20c	9 16 0	1.98c	650

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. †1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlebrough. b hematite. ††Close annealed. **Gold pound sterling carries a premium of 62.64 per cent over paper sterling.

Bars

Bar Prices, Page 76

Pittsburgh—Compared with two weeks ago the increase in bar mill tonnage in the market last week was noteworthy. This apparently indicates desire of many consumers to begin to anticipate the price advance and place specifications on mill books before next week. Promises on bar deliveries have fallen behind to a greater extent and two to three-week promises are not uncommon. For present shipment, merchant steel bars are quoted 1.85c, base, Pittsburgh, for 3 to 25-ton lots, and alloy bars, 2.45c, mill base. Both prices will be advanced 10 cents, or \$2 a ton, in the third quarter.

Chicago—Bar mills are booked heavily for several weeks and in some cases producers will be able to continue full operations through July. Speculative buying has been a factor in recent orders, though consumption is holding well in most directions. Automotive requirements have declined less than was anticipated, but are expected to recede more rapidly during coming weeks.

New York—Bar tonnage is moving briskly, this applying to carbon steel, cold-finished and alloy bars. Pending advances are driving in some tonnage for stock. Specifications for carbon bars from bolt and nut manufacturers are reported to be coming out especially well.

Youngstown, O.—Steel bar requirements continue to be urged upon district mills which now are beginning to figure whether they can complete shipments by the end of this month. However, it would appear that buyers are not being deterred by the prospect of a \$2 advance July 1 because a number of negotiations now are pending for third quarter. Beside this there are pending a number of building projects upon which figures cannot be submitted until July.

Plates

Plate Prices, Page 76

Pittsburgh — Requirements of a large plate tonnage are in prospect for the construction of a steel floating dock to be shipped to Pearl Harbor, Hawaii, 1016 feet long and 165 feet wide and on which the bureau of yards and docks of the navy department, Washington, will take bids soon. Plate producers are generally protecting customers at the second-quarter price on identified projects for the early part of the third quarter, but in the main the decision to

apply the \$2 a ton advance as soon after July 1 as possible is being adhered to. A number of railroad car shops have been actively soliciting plate price protection at the present market on prospective car building programs.

Cleveland—Unusual demand from small consumers fortells a bright outlook for the next few weeks. Only tonnage worthy of mention was 700 tons, placed at Lorain, O., for conversion of Great Lakes freighter into a self-unloader.

Chicago—Plate orders and shipments are heavier, influenced by in-

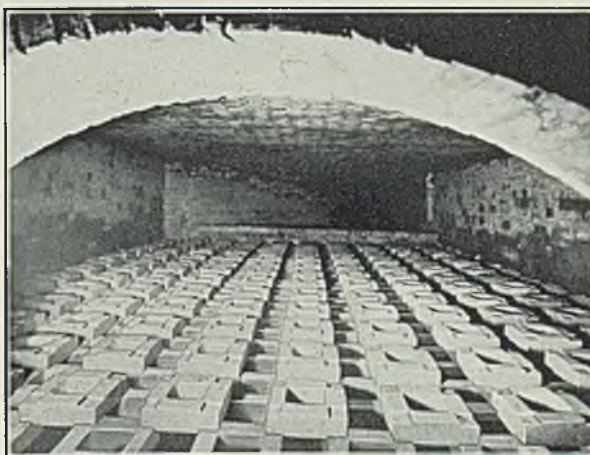
creased consumption and higher prices effective next month. Prospects for future business also are favorable in view of the substantial tonnages in prospect for railroad equipment building and for miscellaneous uses.

New York—Miscellaneous plate tonnage is more active than a fortnight ago, as warehouses and consumers lay in fair stocks against the impending increase of \$2 a ton, July 1. Most eastern mills designate this date as the limit for the receipt of orders at current prices. A good amount of railroad equipment ton-

Bailey... EQUIPMENT

WMB Co.

THE "SUPERIOR" CHECKER FOR REGENERATIVE FURNACES



STABLE

Because the bricks are interlocked and cannot shift; with all flues in perfect alignment.

STRONG

Because of careful design to eliminate all dead brick but to retain structural strength required for long life.

SUPERIOR: — To Standard Shapes—Because of its simplicity in laying, high heating surface and large free area per horizontal checker area.

WILLIAM M. BAILEY COMPANY

Engineers

MAGEE BLDG.

PITTSBURGH, PA.

European Agents—Ashmore, Benson, Pease & Co. Ltd., Stockton-on-Tees, England

nage is expected to be quoted at the current market before the end of this month, with equipment builders granted 30 days' leeway for definitely closing on such tonnage at this price for identified projects.

Philadelphia — Plate sellers anticipate further improvement in buying over the remainder of the month, pointing out that usually a number of buyers defer action in obtaining protection until the last minute. Considerable railroad car tonnage is expected to be quoted on over the remainder of June.

Birmingham, Ala.—Plate mills are

maintaining activity with prospects of going strong for several weeks to come. Local fabricators are bidding on another contract for steel pipe for the Birmingham industrial water project, 86,000 lineal feet of 60-inch pipe to be purchased.

San Francisco—While awards were not particularly heavy more than 9000 tons are pending. So far this year 87,963 tons have been booked as compared with 21,662 tons for the corresponding period in 1935.

Seattle—Chicago Bridge & Iron Works, Chicago, is reported to have been awarded 7475 tons, for the Port

Peck, No. 1 tunnel lining, on a low bid of \$908,960. Plate fabricators report continued interest, mostly in small lots which are in sufficient volume to maintain operations at double that of a year ago.

Contracts Placed

500 tons, 80 dredge pontoons, New Orleans, to St. Louis Shipbuilding Co., through United States engineer office, New Orleans.

375 tons, five tanks, Tide Water Oil Co., Brewer, Me., to Hammond Iron Works, Warren, Pa.

250 tons, one all-welded steel cattle barge, 196 x 36½ x 8 feet, for Jersey City Stockyards Co., Jersey City, N. J., to Dravo Contracting Co., Neville Island, Pittsburgh.

175 tons, sewage plant gas holder, Green Bay, Wis., to Chicago Bridge & Iron Works, Chicago.

120 tons, dredge pipe, St. Louis, to Treadwell Construction Co., Midland, Pa., through United States engineer office St. Louis.

Contracts Pending

2120 tons, various naval yards, Pennsylvania; bids opened June 19.

495 tons, Brooklyn naval yard, New York; bids open June 23.

442 tons, siphons No. 1 and No. 2, Vasquez creek tunnel, Denver, Colo.; bids opened.

430 tons, 28 to 44-inch welded steel pipe, Contract 107, San Francisco; bids June 24.

212 tons, two steel dump scows for Cincinnati engineers, to be delivered to Fernbank, O.; Treadwell Construction Co., Midland, Pa., low at \$19,700 each, on a riveted basis; American Bridge Co., Pittsburgh, second low at \$23,150.

Unstated tonnage, construction of a steel floating dock, 1016 feet long by 165 feet wide, for Pearl Harbor, Hawaii; bids to be taken soon by the bureau of yards and docks, United States Navy, Washington.

Transportation

Track Material Prices, Page 77

With more than 4000 freight cars on active inquiry, the market is far from inactive, while steel requirements for an unusually large volume of carbuilding already placed are bringing orders for steel to mills in considerable volume. Chief among the pending car inquiries are 2820 cars for the Southern Pacific and 1000 for the Norfolk & Western, with several smaller lots also active.

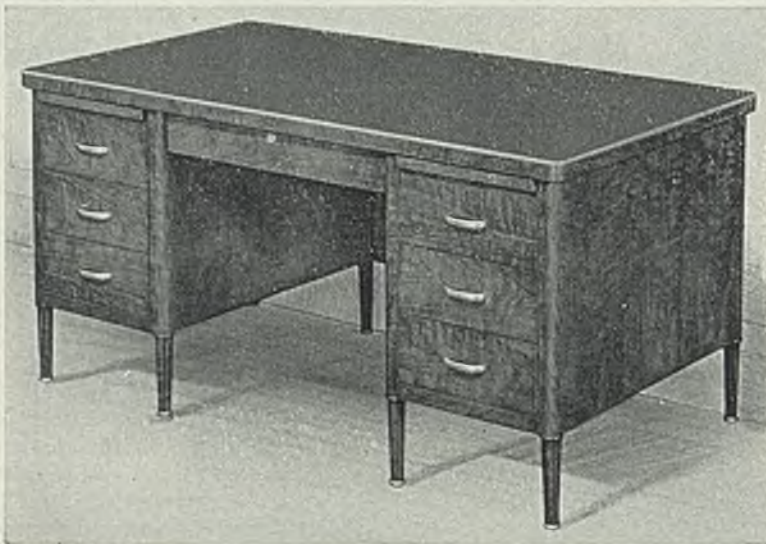
Impending advance in prices of steel for third quarter is forcing in tonnage for identified work in car and locomotive building.

Some secondary buying of rails is being done but is in small lots, one purchase of 3300 tons from a Chicago mill being made by an unidentified road.

Harlan plant of Bethlehem Steel Co., at Wilmington, Del., will begin work at once, it is said, on the con-

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struction of 60 2-car articulated electric trains for operation on the new San Francisco-Oakland bridge in California.

Norfolk & Western will close bids June 23 on 2500 tons of plates, shapes and bars for routine quarterly requirements. This road also is about to ask bids on 20,000 tons of rails, in addition to the 1000 box cars.

Relaying rail prices show considerable stability. The market on 20 to 45-pound relaying rail sections appears to hold at around \$28 per ton, with 45 to 50-pound sections quoted \$25; 50 to 60-pound sections, \$26; and 70 to 75-pound sections, \$25.50. On 100-pound relayers and over, the market is quoted \$27 per ton, and on 80 to 90-pound sections, \$26.

Cars Orders Placed

Cornwall Railroad, Bethlehem, Pa., 20 seventy-ton hoppers, to Bethlehem Steel Co., Bethlehem, Pa.

New Orleans, Texas & Mexico, 200 40-ton box cars; bids asked.

Standard Oil Co. of New Jersey, 6 tank cars, 10,000 gallons capacity, to Pullman-Standard Car Export Corp., for shipment to Brazil.

Railway Electric & Realty Co. Ltd. (Key system), San Francisco, 60 two-car articulated electric trains for operation on San Francisco-Oakland bridge, to Harlan plant of Bethlehem Steel Co. at Wilmington, Del.

Car Orders Pending

E. I. du Pont de Nemours & Co., Wilmington, Del., one to five chemical tank cars, 70 tons capacity.

Norfolk & Western, 1000 box cars, various types.

Locomotives Pending

Green Bay & Western, three locomotives.

Rail Orders Pending

Columbia Construction Co., Bonneville, Oreg., 522 tons 65-pound rails for Grays Harbor, Wash., jetty, bids asked.

Norfolk & Western, 20,000 tons.

St. Louis Southwestern, 740 tons 112-pound rails; court permission granted.

Sheets

Sheet Prices, Page 76

Pittsburgh — By the end of last week several sheet producers here, including a leading interest, had advised district offices that no more tonnage would be accepted at the present level of prices, thereby adhering closely to the determination of applying the \$2 a ton higher market July 1. While some exceptions to this policy are reported, in that some sheet producers are accepting tonnage through June 30 at the sec-

ond-quarter market, in general a more consistent attitude is being taken than in former times when price increases were impending. As is usual, sheet producers are granting customers protection at the lower second-quarter market against identified projects in third quarter.

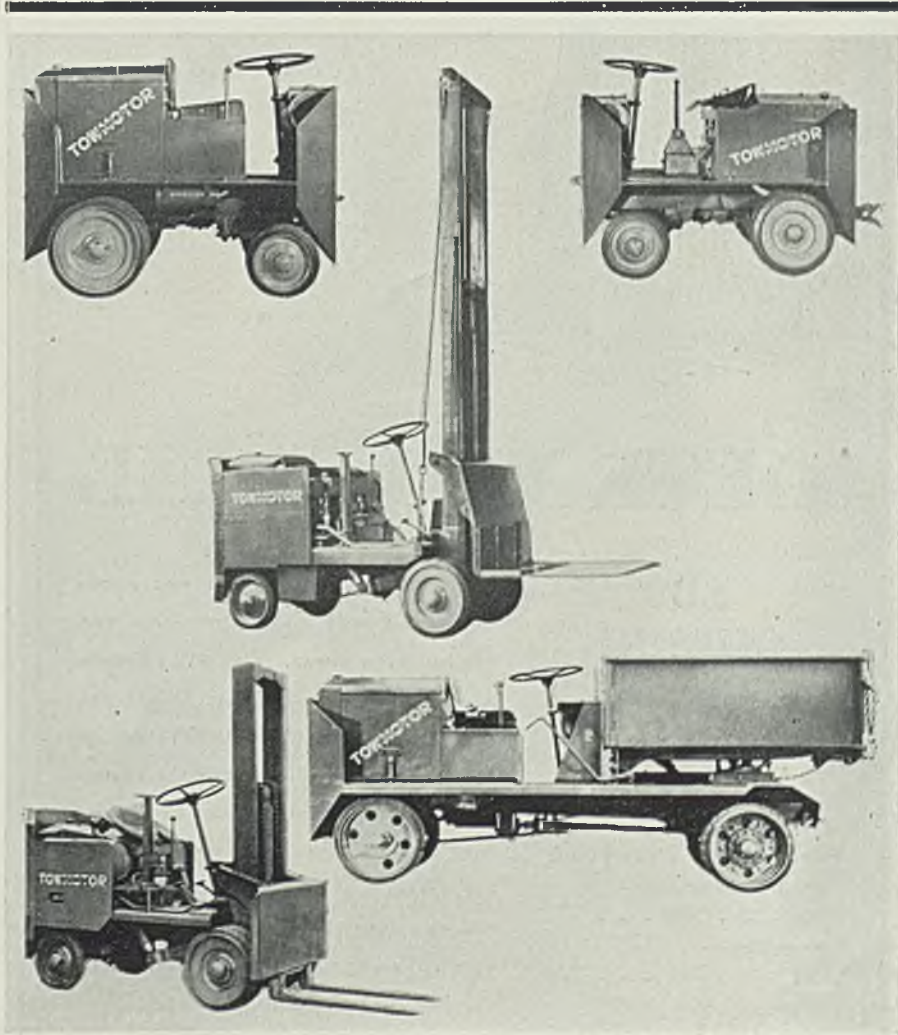
Chicago—With sheet mills booked four to five weeks ahead, producers are reluctant to accept additional business at current prices. Consumption is holding fairly well among most users, but sheet orders have been bolstered by speculative buying. While automotive sheet

consumption lately has been heavier than was expected 30 days ago, requirements will be off sharply by the end of this month.

Cleveland — General speculative buying has not been felt. There is possibility of many producers not being able to complete shipments this month, on orders taken at current prices. No large tonnages have recently been placed. A body maker will soon be in the market for a large tonnage for 1937 models.

New York—Sheet demand is leveling off, although with some sellers definitely indicating that they will

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accept tonnage at current prices until the end of this month, a further good volume of business is expected. Where the deadline has been extended, some mills specify delivery must be made not later than July 31, but other sellers stipulate that tonnage taken will be for delivery at their convenience. Some mills have booked so far ahead on some grades of cold-finished steel that they will no longer accept tonnage on the current basis.

Philadelphia — Sheet buying is brisk and some sellers are booked so far ahead on some grades that they are scrutinizing inquiries closely and

referring lists to home offices. Buyers may have to do considerable shopping on some grades if they defer action on protection much longer, it is indicated.

Buffalo—Hand mills here continue to operate at 85 per cent of capacity and will continue at this rate throughout the month. Meanwhile operations in the new strip mill here are climbing steadily and the next quarter is likely to see it in full operation.

Youngstown, O.—Sheet mills continued operations at a higher rate this week and more new business

continued to seek a place on producers' books. Such a volume of bookings has been accumulated that doubts are being expressed whether mills will be able to ship by midnight June 30 much additional tonnage, to be placed later. More galvanized sheet business is appearing but some local makers are loath to take additional business for second quarter delivery.

Cincinnati—Some sheet deliveries may be made next month on bookings at current price levels, but indications are this tonnage will not be heavy. Rolling schedules are pegged near capacity to meet the demand.

Birmingham, Ala. — Activity of sheet mills, which has attracted attention for more than a year and a half, continues. Agricultural interests have been in the market during the last few weeks for considerable of this product.

Pipe

Pipe Prices, Page 77

Pittsburgh—Production was started last week by National Tube Co., Jones & Laughlin Steel Corp., and Spang, Chalfant & Co. Inc., all of Pittsburgh, against their recent shares of the 25,000-ton order for 8½, 10, and 12-inch line pipe for the Shell Union Oil Corp. line in California, amounting in aggregate to about 17,000 tons of seamless which will be shipped via rail-water to California. Columbia Natural Gas Co. will build an 8-inch gas pipe line encased in concrete across the Kiskiminetas river near Pittsburgh.

Chicago—Cast pipe is quieter following the placing of several large tonnages. Part of the 2827 tons for Chicago, on which bids were taken recently, remain to be placed. Milwaukee closed on 1000 tons of various sizes. Shipments remain fairly heavy, and while producers still have moderate backlogs, reasonably good deliveries can be effected.

New York — The 8000-ton order for six-inch steel pipe noted in last week's issue as having been placed by the Socony-Vacuum Oil Co. for a gasoline line for its White Eagle division, was placed with National Tube Co., Pittsburgh.

New York—No new cast pipe lettings of size have developed, and the only inquiry of importance is one for 180 tons of 30-inch. Eastern pipe foundries, however, continue busy producing against old orders. Prices are unchanged.

Youngstown, O. — A satisfactory volume of new orders for both butt and lap-welded is being received by the mills in this district. Youngstown Sheet & Tube Co. last week re-



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40c . . . 50c . . . 75c

Dinners—

75c . . . \$1 . . . \$1.25

From the moment you enter our doors you will know that here you are indeed a *guest*. You will appreciate the courteous, cheerful, but *unobtrusive* service for which the Leland is noted. You will revel in the luxury you have a right to expect in a hotel that's as modern as tomorrow's motor car. You will like the superbly convenient downtown location. We hope you will accept our invitation to make the Leland your home in Detroit.

GARAGE IN CONNECTION

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DETROIT

sumed operating its electric-welded pipe plant at Brier Hill. It is working on eight and ten inch pipe.

Birmingham, Ala.—Several lettings for cast pipe were distributed during the past week, and considerable tonnage will be produced in the Birmingham district. The central West and the far West were the big tonnage purchasers, while numerous small-lot orders were placed by firms and projects in southern territory.

San Francisco—No cast pipe lettings of importance have been placed. Bids are being taken on 13,000 tons of 6 to 24-inch pipe for Los Angeles. Santa Barbara, Calif., has called for bids on 227 tons of 8-inch, and Oakland, Calif., will open bids on June 24 for 1130 tons of 4 to 16-inch.

Seattle—Awards totaled 750 tons, of which United States Pipe & Foundry Co., Burlington, N. J., through Hugh C. Purcell, Seattle, took 500 tons, of which 225 tons of 4 to 8 inches is for King county, Wash., and the balance, 6 to 12 inches for Portland, Oreg. The latter award was divided, a portion going to Florence Foundry Co., Philadelphia.

Cast Pipe Placed

1072 tons, 8, 12 and 16-inch class C, Milwaukee, to United States Pipe & Foundry Co., Burlington, N. J.
1000 tons, various sizes, Milwaukee, to United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

8000 tons, 6-inch gasoline pipe line, 178 miles long, from Augusta, Kans., to Kansas City, for White Eagle Oil Co., subsidiary of Socony-Vacuum Oil Co. Inc., New York, to National Tube Co., Pittsburgh.

Cast Pipe Pending

13,000 tons, 6 to 24-inch, Los Angeles; bids opened.
1120 tons, 4 to 16-inch, East Bay municipal utility district, Oakland, Calif.; bids June 24.
227 tons, 8-inch, Santa Barbara, Calif.; bids being taken.
180 tons, 30-inch, procurement division, United States treasury department, New York, for Freeport, N. Y.
125 tons, 6 and 8-inch, for new waterworks, Random Lake, Wis.; American Cast Iron Pipe Co., Birmingham, Ala., low.

Strip Steel

Strip Prices, Page 77

Pittsburgh—Due to their heavy backlogs, some strip producers last week set closing dates for the receipt of any more business at the second-quarter price on hot-rolled strip. Deadline dates reported in various instances were June 20 and June 25. On the other hand, some

strip producers still will accept business at the present market through June 30, so that July will be given over largely to cleanup on second-quarter balances.

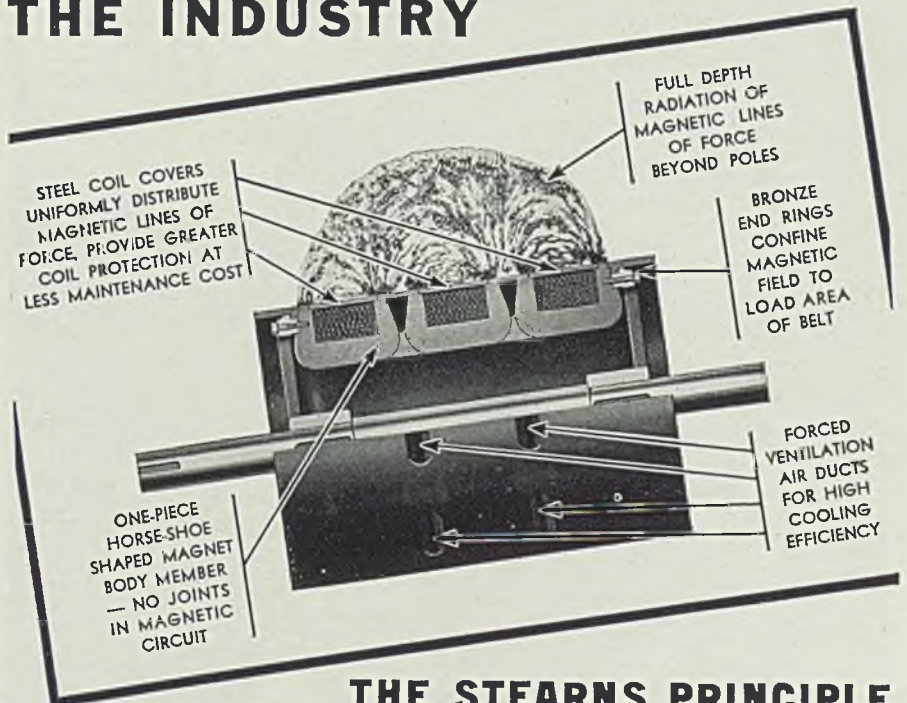
Cleveland—Specifications for cold-rolled are not so strong as for hot-rolled. No price change has been announced for cold-rolled, due to keen competition with sheet producers. Speculative buying of hot-rolled is noticeable among small consumers but is not yet felt among larger concerns.

Chicago—Strip producers continue active in shipments against contracts,

but are unable to reduce backlogs. Speculative buying of hot-rolled strip has been sufficient to extend deliveries well into July and producers are wary of booking additional orders at current prices. Cold-rolled strip, which is not affected by price changes, remains in steady demand, though automotive requirements are declining.

New York—Narrow hot strip, on which an increase of \$2 a ton is soon to become effective, is moving in good volume. No advance is scheduled in cold-finished strip, but consumption has been brisk and this in turn has

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been a stimulating factor also in hot strip.

Youngstown, O.—Steel stripmakers continue at near-capacity operating rates while consumers offer new business in increasing volume, in cold-rolled and hot-rolled. Negotiations for third quarter are being resumed with important users.

Tin Plate

Tin Plate Prices, Page 76

Pittsburgh — Though fewer tin plate mills last week were schedul-

ing more than 16 operating turns weekly, the average of production continued for the sixth successive week at 100 per cent of capacity. Indications are now that first half of 1936 will show tin plate specifications 15 to 18 per cent ahead of the first half of 1935, approaching an all-time record for tin plate consumption. Owing to a marked vogue among tin plate users for specifying cold reduced plate, mill deliveries are falling further in arrears. The same condition is true to a less extent in hot-rolled plate. Contrary to some earlier reports that tin mill

sizes of black sheets would be advanced for third quarter, this market will remain unchanged at 2.75c, base, Pittsburgh, for 28 gage, although long ternes will be advanced \$2 a ton to 3.50c, base, Pittsburgh, for No. 24 unassorted.

New York—Tin plate specifications continue brisk, with little lessening in sight over the next few weeks. Some producers expect operations to be maintained at a high rate well into September. In some quarters a record-breaking year in tin plate is being predicted.

Wire

Wire Prices, Page 77

Pittsburgh—In spite of absence of change in prices on wire products or in extras a moderately heavy demand for wire products continues. This is especially true in manufacturing wire inasmuch as a number of automotive parts manufacturers have begun to specify material for 1937 models. A firmer price situation appears to be gaining ground.

Cleveland—Automobile and agricultural tonnages are holding up well and the expected seasonal slump has not occurred. Farmers' late start brings them into the market for fence material later than usual.

Chicago—Steel wire demand continues to exceed expectations. Orders are well maintained, predicated on actual needs of consumers since extension of present prices into third quarter removes the speculative factor. Forward buying is light, most for early shipment.

Youngstown, O.—Steady inflow of wire business is keeping mills steadily employed. There is no increase in third quarter prices, buying is evidently not being driven in by the fear of an advance.

Bolts, Nuts and Rivets

Bolt, Nut, Rivet Prices, Page 77

Producers of bolts and nuts are expecting to record the best month of 1936 during June. This is partially due to some stocking going on among consumers as against the higher market for third quarter, and it is also due to normal and immediate requirements. Heavier outdoor building work, industrial repairs, jobbers' requirements and some heavy specifications from car building shops have been a chief support to the bolt, nut and rivet market at present. Some producers report their June business running from 10 to 15 per cent over May and expect this will continue over the last ten days of June.



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Shapes

Structural Shape Prices, Page 76

New York—Placing of the general contract for the new bridge at Port Arthur, Texas, is the principal development in the market. Taylor-Fichter Steel Construction Co. shortly will award some 10,000 tons for the superstructure. Another contract placed involves 4700 tons for an elevated highway extension here. Actual awards have been restricted to less than 1000 tons. Numerous projects, however, are moving to the contracting stage, and quite a few of them are expected to be closed prior to the \$2 price advance on structural steel scheduled for July 1. In the meantime, the market on plain material continues at 1.90c base, Bethlehem, Pa.

Pittsburgh — Levinson Steel Co. has been awarded 2000 tons of fabricated shapes for the cold coil storage building and continuous pickling building of the Jones & Laughlin Steel Corp.'s new strip mill expansion on South Side. Jones & Laughlin has also placed about 7800 tons in addition between Fort Pitt Bridge Works and its own fabricating shops, completing the award of structural steel required for this expansion. Bids on 622 tons of fabricated steel for Jefferson county, Pennsylvania, and 111 tons for Berks county are asked by the state highway department, Harrisburg, Pa., July 3. J. C. Devine Construction Co., Meadville, Pa., low on a plate girder bridge for Crawford county, Pennsylvania, in the June 12 letting, will require 767 tons of shapes. Baldwin Bros. Paving Co., Cleveland, low on Erie county work in the same letting, will require 113 tons of fabricated shapes.

Chicago — Chicago sanitary district will take bids June 30 on the Chicago river lock and water diversion project, involving 5000 tons of piling and 450 tons of structurals. Awards of fabricated material have been light recently and somewhat below the rate of shipments. Mills

are able to give better delivery on plain material, following a period of congestion due to additional specifications requested by fabricators.

Philadelphia—Inquiry is featured by 5200 tons for a vocational school here. A leading award involves 2600 tons for a local school placed through McCloskey & Co. with American Steel Engineering Co. Other awards included 1150 tons for a plant for the Viscose Co., Nitro, W. Va., placed with Belmont Iron Works, Eddystone, Pa. Pending shapes have considerable volume and

show promise of holding strength of the market.

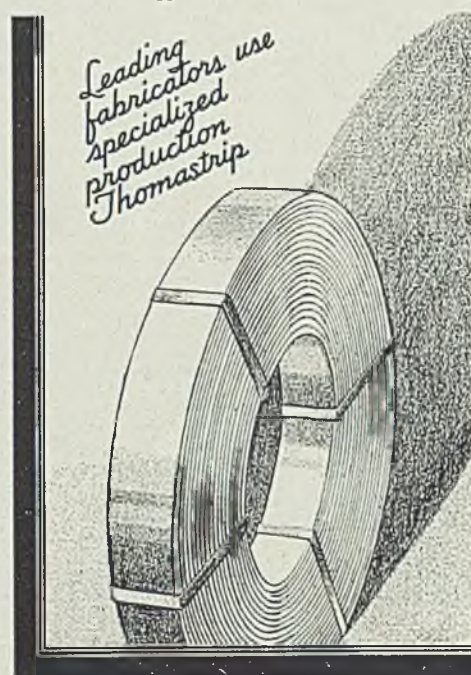
Cincinnati—Steel interests are waiting for specifications from Washington on a proposed new federal building here, bids to be taken on the general contract July 21. Two Kentucky colleges are building this summer, combined steel requirements being 300 tons. The Cincinnati Chemical Co. plans a manufacturing building which will take 200 tons of structural steel.

Birmingham, Ala. — Some fabricating shops, structural steel in par-

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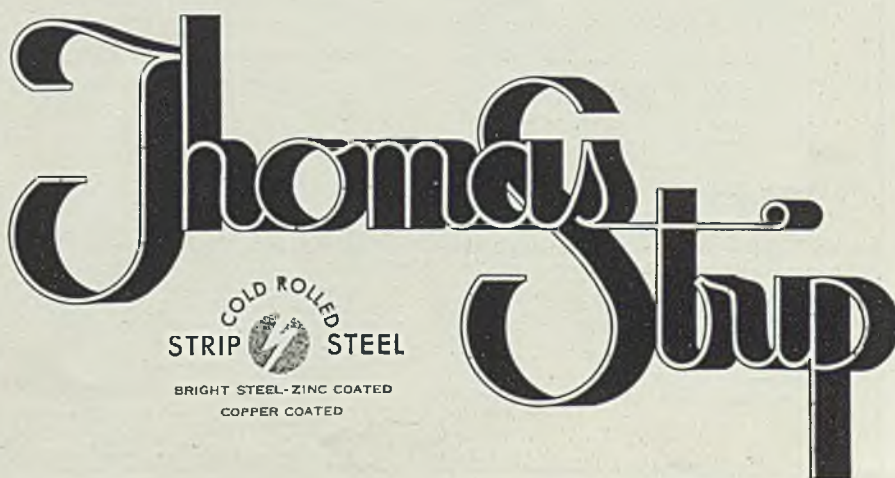
Year after year Thomas Steel has the privilege of proving to an increasing number of metal fabricators that better products, better service and better profits result from the use of Thomastrip. Thomas specialized production provides exclusive attention and concentration on the proper specification, exacting manufacture and dependable delivery of one product—cold rolled strip steel. The experience, the modern facilities, and the engineering resourcefulness of this specialized organization assures to each individual customer that complete dependability of material and service which progressive management demands. It will pay you to investigate Thomastrip for your product.

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Shape Awards Compared

	Tons
Week ended June 19	27,480
Week ended June 12	18,215
Week ended June 5	16,001
This week, 1935	32,891
Weekly average, 1935	17,081
Weekly average, 1936	19,880
Weekly average, May	20,117
Total to date, 1935	365,924
Total to date, 1936	497,009



ticular, have been operating on day and night schedule while others are active on five and even six days per week.

San Francisco — The market was active, 3976 tons having been placed, bringing the total for the year to 76,784 tons, compared with 44,517 tons for the same period a year ago. Bethlehem Steel Co. took 370 tons of sheet steel piling for the bureau of reclamation, Potholes, Calif.

Seattle—Inquiry for larger ton-nages is increasing, with awards of less than 100 tons in considerable volume. Several important projects

are pending, including 458 tons for a state bridge in Park county, Wyoming, bids opened June 9.

Shape Contracts Placed

7800 tons, various mill buildings to house new continuous sheet mill, South Side, Pittsburgh, for Jones & Laughlin Steel Corp.; divided between Fort Pitt Bridge Works, Pittsburgh, and Keystone fabricating division of Jones & Laughlin Steel Corp., Pittsburgh.

2600 tons, school, Twenty-fourth and Masters streets, Philadelphia, to American Steel Engineering Co., Philadelphia.

2000 tons, coil storage building and continuous pickling building in connection with continuous sheet mill, South Side, Pittsburgh, for Jones & Laughlin Steel Corp., to Levinson Steel Co., Pittsburgh.

1350 tons, two bridges, Washington, over Baltimore & Ohio tracks, for District of Columbia, to Bethlehem Steel Co., Bethlehem, Pa.

1185 tons, plant addition, Viscose Co., Nitro, W. Va., to Belmont Iron Works, Eddystone, Pa.

955 tons, overpass, Orleans parish, Louisiana, to Jones & Laughlin Steel Corp., Pittsburgh.

900 tons, 4 1/4-inch bridge flooring for Homestead high level bridge, Homestead, Pa., to Carnegie-Illinois Steel Corp., Pittsburgh.

820 tons, highway bridge, Okmulgee county, Oklahoma, to J. B. Klein Iron Foundry Co., Oklahoma City, Okla.

790 tons, factory building for United Aircraft Corp., East Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

680 tons, oven bins and conveyer system for Ford Motor Co., Dearborn, Mich., to Whitehead & Kales Co., Detroit.

635 tons, cement pipe manufacturing building, Manville, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, foundation girders for press shop, Chrysler Corp., Detroit, to R. C. Mahon Co., Detroit.

505 tons, bridge, Benton county, Missouri, to Wisconsin Bridge & Iron Co., Milwaukee.

470 tons, bridge, Central Vermont railroad, Northfield, Mass., to American Bridge Co., Pittsburgh.

410 tons, state highway bridge, Hornell, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

410 tons, foundry building, Quincy, Ill., to Michelmann Steel Construction Co., Quincy.

370 tons, sheet piling, bureau of reclamation, Invitation A-42,014-A, Potholes, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

325 tons, highway bridge, Newark, Del., to Bethlehem Steel Co., Bethlehem, Pa.

310 tons, state highway bridge, Scotia, N. Y., to Phoenix Bridge Co., Phoenixville, Pa., through Collins Bros., Mechanicsville, N. Y.

285 tons, plant extension, Buick Motor Co., Flint, Mich., to Flint Structural Steel Co., Flint.

280 tons, highway bridge, Oregon City, Oreg., to Poole & McGonigle, Seattle.

270 tons, high school, Ansonia, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

265 tons, state viaduct, Jansen, Nebr., to Omaha Steel Works, Omaha, Nebr.

255 tons, bridge, Bozeman, Mont., to American Bridge Co., Pittsburgh.

255 tons, Boulder dam hand rail, Boulder Dam, Nev., to Crane-O'Fallon Co., Chicago.

250 tons, bridge, Montana division, Northern Pacific railroad, to American Bridge Co., Pittsburgh.

240 tons, oil refinery building, Decatur, Ill., to Mississippi Valley Structural Steel Co., Decatur.

220 tons, stock house for Cumberland Brewing Co., Cumberland, Md., to Bethlehem Steel Co., Bethlehem, Pa.

220 tons, bridge, St. Tammany parish, Louisiana, to Jones & Laughlin Steel Corp., Pittsburgh.

Behind the Scenes with STEEL

Bathtub Deluxe

IF YOUR mind runs to streamlining, you can now buy a streamlined, citrine-colored bathtub answering to the name of Neuvoque. Styled by Henry Dreyfuss, built by Crane, it will be shown at a plumbing convention in Buffalo this week.

William R. Harshe of Chicago tells us about the tub and also vouchsafes the information that some 120,000 persons were injured last year by slipping on the soap in old-style tubs. The new streamliner has more room than regular tubs, and also is equipped with a comfortable side seat (sort of a rumble seat) as an aid in bathing and dressing.

Psychologists helped Mr. Dreyfuss figure out a color. Told him there's nothing like citrine in bathrooms, so citrine it became. A further innovation is the elimination of the words "hot" and "cold" from the faucets. They use colors instead—red for the hot and blue for the cold.

Picture if you can the ineffable delights of lolling on the side seat of a citrine-colored streamlined bathtub called Neuvoque, the toes of one foot idly toying with the blue faucet, the voice raised to a joyful pitch above the splashing water. Hot dog!

Flies in Zoup

DO YOU know that a fema'e fly lays, on an average, 120 eggs at a time; that her daughters soon grow up and in turn are capable of laying an equal number; that there is no race suicide in the fly family?

Well, that's the dope, our authority being the Conper & Brass Research association. These people suggest that you put a lot of nice bronze screens in your windows and instruct Mrs. Fly to lay her eggs on the outside.

If you still have trouble, let us know, and we will tell you where to buy some nice flyswatters made of steel wire.

Badgered

WE ARE pleased to report that this department has been awarded the signal honor of being named an "official reporter" in the "Scoop" Ward News of Youth club, through courtesy of Ward's Soft Bun bread and an admirer in Fall River, Mass., who addresses us most delightfully — "Dear Quacks:—"

Enclosed with his communication

was a handsome stamped brass shield which we at once pinned to our vest just below our fraternity pin, valedictorian medal, class pin, Hi-Y pin and Chicken Inspector badge. Now for the old class pipe and ring, a freshman cap and the R.O.T.C. dummy rifle!

Ah, youth—sweet, evanescent youth!

INQUISITIVE CAMERA DEPT.—VII



ERLE F. ROSS, associate editor of STEEL since 1919, ardent Purdue alumnus, recently chairman of the Cleveland Chapter of the American Society for Metals, and faithful annotator of Rabelaisian anecdotes.

Shake

WELCOME to the ranks of behind-the-scenes commentators is hereby extended to the worthy individual who conducts that new department, "Keeping Posted", in our bulky contemporary, the *Saturday Evening Post*. Plans for a national convention of rear-view department conductors are under way; it will probably be held in the third sub-basement at Radio City.

Clammy

GELETT BURGESS, author and humorist, addressed the Gourmet Society in New York the other day and, among other things, recited the following quatrain, which of course has nothing whatever to do with the production, processing, distribution or use of steel:

*A Blueprint said to some little necks:
"Oh, don't you sometimes long for sex,
"I'm afraid we are missing some fun
in this,*

"Sticking to parthenogenesis."

—STURDI V

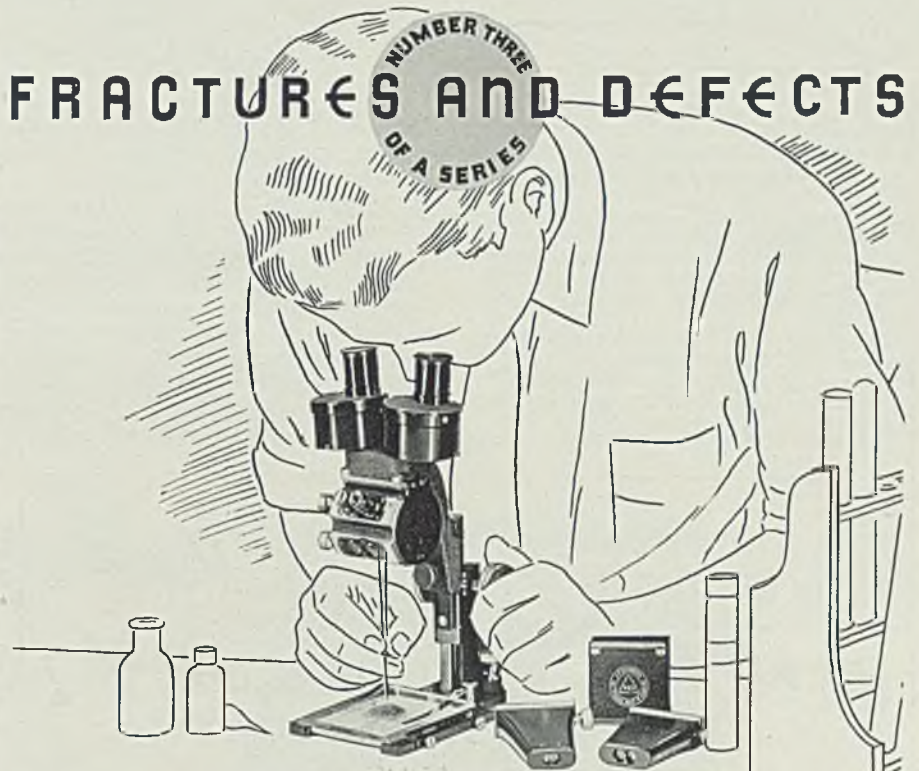
- 205 tons, bridge, Ramsey county, Minnesota, to Lakeside Bridge & Steel Co., Milwaukee.
- 200 tons, liberal arts building, Franklin and Marshall college, Lancaster, Pa., to A. B. Rote & Co., Lancaster.
- 190 tons, School of the Good Shepherd, Brooklyn, N. Y., to Joseph T. Ryerson & Son Inc., Chicago.
- 170 tons, girder span, Elk Fork river, Wyoming, to Wisconsin Bridge & Iron Co., Milwaukee.
- 175 tons, towers, Boulder dam, Nevada, to International Derrick & Equipment Co., division of International-Stacey Corp., Columbus, O.
- 175 tons, junior high school, Manitowoc, Wis., to Mississippi Valley Structural Steel Co., Melrose Park, Ill.
- 155 tons, girder span, Shoshone river, Wyoming, to Wisconsin Bridge & Iron Co., Milwaukee.
- 130 tons, dam, Taylor Park, Colo., to John W. Beam.
- 110 tons, plant building trestle for Farrell-Birmingham Co., Ansonia, Conn., to American Bridge Co., Pittsburgh.
- 110 tons, beam trestle, Ansonia, Conn., to American Bridge Co., Pittsburgh.
- 105 tons, bridge, Isanti county, Minnesota, to Minneapolis-Moline Power Implement Co., Minneapolis.
- 100 tons, building, 52 West Thirty-ninth street, New York, to Grand Iron Works Inc., New York.

- 1500 tons, transmission towers, Calhoun, Tenn., for Tennessee Valley authority, Knoxville, Tenn.
- 1100 tons, two railroad bridges, New Hampshire, for Boston & Maine railroad.
- 1085 tons, various navy yards, Pennsylvania; bids through Washington, June 26. Included 700 tons rivets.
- 800 tons, grade separation, New Orleans.
- 768 tons, plate girder bridge and through truss bridge, Woodcock and Hayfield townships, Crawford county, Pennsylvania; J. C. Devine Construction Co., Meadville, Pa., low bidder at \$193,479 on June 12 opening.
- 675 tons, state highway bridges, various locations, New York.

- 650 tons, state highway bridge, Detroit.
- 650 tons, grade separation, Michigan.
- 650 tons, assembly plant addition, Chevrolet Motor Co., Atlanta, Ga.
- 622 tons, deck girder I-beam bridge, Punxsutawney borough, Jefferson county, Pennsylvania; bids to state highway department, Harrisburg, Pa., July 3.
- 600 tons, Hudson mid-town tunnel, ventilating building; general contract to George Colon Contracting Corp., New York.
- 600 tons, rotary kilns, Mosher, Mo.
- 600 tons, Nisqually river state bridge, Washington; bids not yet called.
- 500 tons, building, Starcor Realty Co., 55-15 Grand street, Long Island City.

Shape Contracts Pending

- 40,000 tons, mainly fabricated structural steel, but including reinforcing steel, piling, castings, etc., for construction of the following locks and dams on the upper Mississippi and Illinois rivers before Jan. 1, 1937: Lock No. 24, bids to St. Louis engineers, June 23; Peoria lock, Illinois river, bids to Chicago engineers, July 1; structural steel gates, Gunthersville locks, bids to Tennessee Valley authority, Knoxville, Tenn., July 3; dam No. 9, Lynxville, Wis., bids to St. Paul engineers, July 7; dam No. 21, Quincy, Ill., bids to Rock Island, Ill., engineers, July 21; dam No. 12, Bellevue, Iowa, bids to Rock Island engineers, Aug. 4; dam No. 3, Red Wing, Minn., bids to St. Paul engineers, Sept. 1; dam No. 22, Saverton, Mo., bids to Rock Island engineers, Aug. 18; LaGrange locks, Illinois river, bids to Chicago engineers, July 9; and Peoria dam, Illinois river, bids to Chicago engineers, Sept. 1.
- 10,000 tons, bridge, superstructure, Port Arthur, Tex.; general contract to Taylor-Fichter Steel Construction Co., New York.
- 9750 tons, cantilever bridge, Natches, Tex.; Lowenstein Construction Co., New York, low.
- 5450 tons, including 5000 tons of piling, Chicago river lock and water diversion project; bids to Chicago sanitary district, June 30.
- 5170 tons, including 2600 tons of piling, 506 tons of castings, forgings and special analysis steel, Mississippi river dam, Quincy, Ill.; bids to United States engineer, Rock Island, Ill., July 21.
- 4700 tons, west side elevated highway extension, 111th to 121st streets, New York, general contract to James Stewart & Co., New York.
- 3900 tons, including 2300 tons of piling, 317 tons of castings, forging and special analysis steel; Mississippi river dam, Lynxville, Wis.; bids to United States engineer, St. Paul, July 7.



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N. Y.; plans revised.
 500 tons, plant, Detroit, Borg-Warner Corp.
 490 tons, state highway bridge, Lake Forest, Ill.
 485 tons, grade separation, Lake Forest, Ill.; American Bridge Co., Pittsburgh, low.
 458 tons, state bridge, Park county, Wyoming; bids in.
 400 tons, plant addition, Doehler Die Casting Co., Pottstown, Pa.
 400 tons, plant, Sayreville, N. J., for Titanium Pigment Co.
 280 tons, state bridge, Pasco, Wash.; bids June 30.
 275 tons, building, St. Bernard, O., for Cincinnati Chemical Co.
 242 tons, crossing near La Salle, Wild county, Colorado; bids June 22.
 200 tons, plant, Boston, for Boston Automatic Fire Alarm Co.
 200 tons, manufacturing building, Cincinnati Chemical Co., Cincinnati; bidding on general contract.
 200 tons, grade separation, Sugar Grove, Ill.; Worden-Allen Co., Milwaukee, low.
 200 tons (including steel piling) state spans at Seattle and Centralia, Wash.; bids June 30 at Olympia, Wash.
 163 tons, plate girder underpass bridge, Springfield township, Erie county, Pennsylvania; Baldwin Bros. Paving Co., Cleveland, low bidder at \$112,761.52; includes 36 tons of plain steel bars.
 161 tons, plate girder overpass, Berks county, Pennsylvania; bids to state highway department, Harrisburg, Pa., July 3. Included, 23 tons of plain bars.
 150 tons, bridge No. 168, Dunn county,

Wisconsin; L. G. Arnold Inc., Eau Claire, Wis., low on general contract.
 113 tons, crossing, Centralia, Lewis county, Washington; bids June 30.
 100 tons, engineering school building, University of Kentucky, Lexington, Ky.
 Unstated tonnage, Wisconsin avenue bridge, Oshkosh, Wis.; bids about Oct. 1.

base, Pittsburgh, for cut lengths in carload lots, but concessions for large and attractive jobs are still prevalent.

Cleveland—Demand is holding up exceptionally well, with the result that mills are working overtime. No new inquiries of any consequence came up last week and the majority of individual orders placed were relatively small.

Chicago—Inquiries have been increased by requests for bids on river locks and dams. The Chicago river lock and water diversion works will take 1800 tons, while bids close next month on two Mississippi river locks requiring 1014 tons. Orders are confined principally to individual lots of less than 100 tons and are principally for public projects. State highway work is proceeding slowly and awards lately have been light, though one producer has booked 250 tons for various sections. Prices, while not rigidly held to quoted levels, are slightly firmer.

Philadelphia—The outstanding inquiry is for 1500 tons of bars for a vocational school on Lehigh avenue; 700 tons rail steel bars for another school, placed through McCloskey & Co. with American Steel Engineering Co.; 200 tons will be required for the state bridge in Jefferson county, bids for which are opening July 3. Considerable small work is active.

San Francisco—Few awards were reported and the aggregate was slightly less than 1000 tons. The largest letting went to Soule Steel Co. and called for 340 tons for a filtration plant at Sacramento, Calif.

Seattle—Local mills are active with considerable work ahead. Recent placements have been in small tonnages but the aggregate has been considerable. Bethlehem Steel Co. has booked 208 tons, including 145 tons for a state bridge at Plummer, Idaho. Washington state will open bids June 30 for five road projects involving a total of 700 tons. Columbia Construction Co., Bonneville, Oreg., has been awarded contract for completing the Grays Harbor jetty, a United States engineer

Reinforcing

Reinforcing Bar Prices, Page 77

New York—Lettings were restricted to one lot of 350 tons. Otherwise business involved small lots making up a negligible total. Early action, however, is expected on several thousand tons. Prices are unchanged at around 1.95c to 2.05c base, Pittsburgh, for bars rolled from new billets.

Pittsburgh—J. C. Devine Construction Co., Meadville, Pa., low in the June 12 letting on a Crawford county, Pennsylvania, bridge, will require 123 tons of plain steel bars for this project. Among inquiries is one for 155 tons for state highway work in Jefferson county, Pennsylvania, bids to be taken July 3. The market as quoted by distributors is 2.05c,

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Concrete Awards Compared

	Tons
Week ended June 19	1,556
Week ended June 12.....	3,195
Week ended June 5	4,315
This week, 1935	1,990
Weekly average, 1935	6,862
Weekly average, 1936	5,921
Weekly average, May	6,368
Total to date, 1935	119,054
Total to date, 1936	148,034

project, including 176 tons of bolts and spikes, and miscellaneous items.

Reinforcing Steel Awards

- 350 tons, west side elevated highway extension, Ninety-fourth to Ninety-eighth streets, New York, to Concrete Steel Co., New York, through P. T. Cox Contracting Co., New York.
- 340 tons, filtration plant, Sacramento, Calif., to Soule Steel Co., San Francisco.
- 250 tons, road work, Illinois, to Calumet Steel Co., Chicago.
- 208 tons, recitation building, Western State Teachers college, Bowling Green, Ky., to Truscon Steel Co., Youngstown, O., through Stuck Construction Co., general contractors, Louisville, Ky.
- 208 tons, state spans at Pasco, Wash., and Plummer, Idaho, to Bethlehem Steel Co., Seattle.

Reinforcing Steel Pending

- 1800 tons, Chicago river lock and water diversion works; bids to Chicago sanitary district, June 30.
- 900 tons, superstructure, Harlem housing project, New York; Cauldwell-Wingate Co., New York, low.
- 650 tons, Mississippi river lock, Quincy, Ill.; bids to United States engineer, Rock Island, Ill., July 21.
- 642 tons, hospital, Northport, N. Y.; Irwin & Leighton Co., New York, low.
- 600 tons, Wieholdt department store, Chicago.
- 364 tons, Mississippi river lock, Lynxville, Wis.; bids to United States engineer, St. Paul, July 7.
- 350 tons, specification 689, spillway, Horse Mesa dam, Salt River project, Phoenix, Ariz.; bids July 3.
- 335 tons, Ross Island bridge, Multnomah county, Oregon; bids June 26.
- 245 tons, City street bridge, Seattle; bids June 30.
- 245 tons, state bridge Cowen park, Seattle; bids at Olympia, Wash., June 30.
- 230 tons, state bridges in Spokane, Clallam and Lewis counties, Washington; bids at Olympia, Wash., June 30.
- 228 tons, state bridge, Pasco, Wash.; bids at Olympia, Wash., June 30.
- 176 tons, bolts, spikes and miscellaneous for Grays Harbor jetty project, Seattle; Columbia Construction Co., Bonneville, Oreg., general contractor.
- 156 tons, deck girder I-beam bridge, Punxsutawney borough, Jefferson county, Pennsylvania; bids to state highway department, Harrisburg, Pa., July 3.
- 123 tons, plate girder bridge and through truss bridge, Woodcock and Hayfield townships, Crawford county, Pennsylvania; J. C. Devine Construction Co., Meadville, Pa., low bidder at \$193,479 on June 12 opening.
- 100 tons or more, state crossing at Bliss, Idaho; Hoops Construction Co., Twin Falls, Idaho, general contractor.
- 100 tons, bridge, Essex county park commission, Newark, N. J.; bids postponed to June 21.
- Unstated, 120 stop logs for Bonneville dam, Oregon; Collins Concrete & Steel Pipe Co., Portland, Oreg., low.
- Unstated, three state crossings and viaducts, Multnomah county, Oregon; bids at Portland, Oreg., June 26.
- Unstated, state bridge at Roundup, Mont.; W. P. Roscoe, Billings, Mont., general contractor.
- Unstated, state bridge in Montana; Collision & Dolven, Billings, Mont., general contractor.

Pig Iron

Pig Iron Prices, Page 78

Pittsburgh—Foundries of steel mill equipment builders are probably the outstanding pig iron consumers at present, in view of the fact that jobbing foundries are on poor to fair schedules and that scrap is satisfying several nonintegrated steel producers here. In spite of a slightly better rate of shipments so far in June as against May, the market still lacks outstanding contracts from the standpoint of individual size.

Cleveland—Automobile demand is holding up better than expected, probably due to some extent to the stimulation of automobile sales in anticipation of buying following the recent bonus payment. Farm equipment demand is strong. Prices are firm. Shipments to railroad equipment and machinery builders are good.

Philadelphia—Pig iron buying rate is unchanged, at a moderate level with no change in prices.

New York—Little variation in pig iron demand is noted, and while buying continues largely hand-to-mouth, there has been some buying for early third quarter, with a contract for

4000 tons of foundry and malleable iron for delivery over the next three months to several plants expected to be placed momentarily.

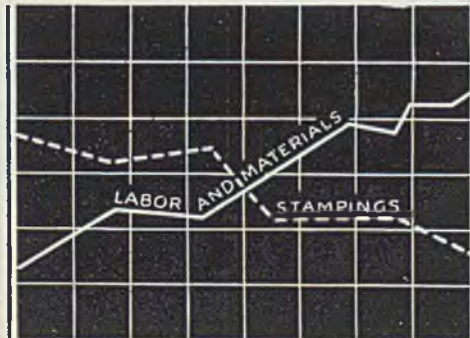
Chicago—New business continues to increase, and bookings so far this month are three times as heavy as during the corresponding period prior to the second quarter. While foundry operations are tending downward in some instances, the average is close to the active rate of the past several months.

Buffalo—Demand for pig iron is good, especially from foundries dealing with railroad trades and producers of heating equipment. Heavy shipments by canal still fail to build up producers' stocks because much iron is going to consumers. Ten furnaces continue in production here.

Cincinnati—Current buying of pig iron, all in small lots, indicates some moderation in the foundry melt. This is particularly apparent in castings for stoves and automobiles, whereas foundries catering to machine tool manufacture are busy. Melters show slight interest in contracting for third quarter requirements.

St. Louis—Buying of pig iron continues on a spot basis, while shipments are well maintained. Stove foundries in the Belleville district curtailed operations last week to five

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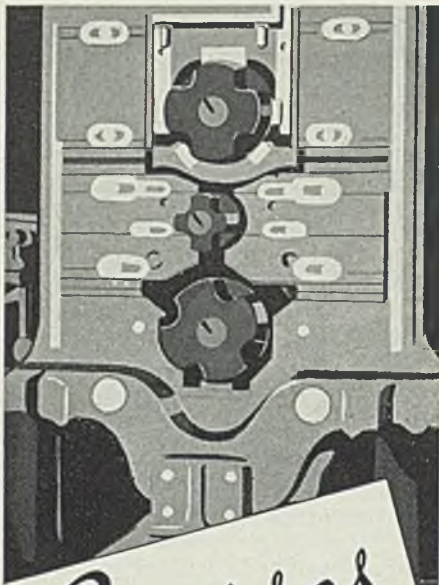
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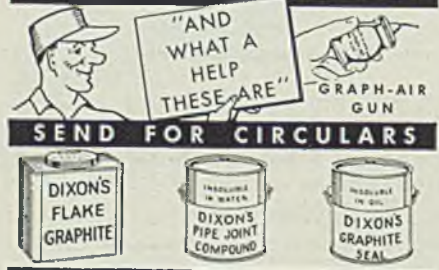
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DIXON'S GRAPHITE PRODUCTIONS



days a week, due to hot weather. American Steel Foundries, East St. Louis, Ill., idle since September, 1934, will resume operations in one furnace this week.

Birmingham, Ala.—A slightly better movement of pig iron is noted, but new business continues on a spot basis. Production is scheduled for a slight decrease this week. Preparations are being made to blow in two blast furnaces next month as two furnaces other than the two scheduled for this week go out. Surplus iron on yards will care for any emergency.

Scrap

Scrap Prices, Page 79

Pittsburgh—On the basis of a fairly sizable purchase of No. 1 railroad heavy melting steel by a district independent at \$14.50, this grade of heavy melting steel has advanced 25 cents a ton to a quotation of \$14 to \$14.50 for local delivery. The purchase resulted in a mixed after-effect on the ordinary No. 1 market, finding no mill purchase price higher than \$13.50 with the result that this grade holds unchanged at \$13.25 to \$13.75. By and large, the slightly better sentiment in the market seems to be generated by brokers who forecast higher mill purchasing prices on scrap before the market goes lower.

Chicago—Scrap is quiet in new sales to mills despite heavy consumption. Sellers are reducing orders but still find it necessary to pay more than the nominal consumers' market in covering contracts. Prices remain fairly steady throughout the list and fail to disclose a trend. Scrap sales by railroads are heavier, in some instances being considerably larger than the tonnages indicated on regular lists.

Boston—A slightly easier tone is noted in iron and steel scrap. This is reflected mostly in lower prices which brokers now are offering for several grades. Export prices are unchanged and considerable tonnage is being loaded. Buying by consumers is limited and prices delivered at New England consuming points are unchanged.

New York — A somewhat firmer tone is reflected in iron and steel scrap. Brokers have raised their f.o.b. New York buying prices on machine shop turnings by about 50 cents a ton. There is a good demand for heavy breakable cast on old orders and brokers' prices range from \$8.75 to \$9, an advance of at least 25 cents. Because of lack of demand for No. 1 machinery cast brokers are shipping this grade as heavy breakable cast to steel mills.

Brokers are also paying 25 to 50 cents higher for cast iron borings for shipment to the Pittsburgh district. Demand for scrap for export has taken a spurt as a result of the placing of large new orders by Japanese interests, principally for No. 1 heavy melting steel and No. 2 or auto steel.

Philadelphia—Prices of steel and iron scrap appear to be steadier, although the minimum on No. 1 heavy melting steel is off 25 cents to \$11.50, delivered, on buying for Bethlehem Steel Co. The top price of \$12 is unchanged with the Claymont, Del., consumer recently closing on a few hundred tons at this price. Other prices are unchanged. In the Baltimore district heavy tonnage of No. 1 heavy melting steel was bought for Sparrows Point, Md., at \$11, which is 50 cents lower than previous purchases.

Buffalo—Scrap has been depressed further by lower offers from large consumers. However the market is strictly nominal as nobody will sell at prices now quoted. Local melters offer \$12 to \$12.50 for No. 1 heavy melting steel with large tonnage necessary to command the top. Dealers confine activity to shipping on contracts and predict a strong market after July 1. They have plenty of business on hand to last them well into the third quarter.

Detroit—A 50-cent per ton decline in No. 2 heavy melting steel has occurred here the past week, reflecting a lower dealers' buying range based on a recent sale at Youngstown. Judging from present indicators, there is little basis for a material change in scrap prices over the next three to four weeks.

Cincinnati — The iron and steel scrap market, in the absence of fresh mill buying, is unusually sensitive to conditions in nearby districts with no general agreement on the immediate price trends. Tonnage on consumer contracts has been steadily reduced during a period of high steelworks operations. Total of foundry purchasing is reduced.

St. Louis — Smaller receipts of steel and iron scrap from country dealers has given the market more firmness, accented by absence of railroad lists. Railroad spring and specialties are 25 cents higher and rails for rolling and short rails 50 cents up. Buying is light.

Birmingham, Ala. — There has been no improvement in the iron and steel scrap, Birmingham dealers reporting no change in the listless market of the past few weeks.

Seattle—The market is quiet and unchanged. Exporting interests are marking time as Japan has withdrawn. Domestic demand continues steady, mills paying \$10 per gross ton for No. 1. Tidewater stocks are light as shippers are not attracted by

present prices and anticipate a rise. Recent sales include two steel steamers to Dulien Steel Products Inc., Seattle, for scrapping.

Warehouse

Warehouse Prices, Page 80

Pittsburgh — No later than June 25 local jobbers indicate they will announce higher warehouse prices for effect July 1 and thereafter. Orders for shipment out of local warehouse appear to be larger individually, and also are more numerous, with the result that June business is ahead of the previous 1936 record established in May.

Cleveland — Shipments on plate material tend to predominate during the last week, but the general diversification is gratifying. There has been no apparent speculation in anticipation of price increase.

Chicago—Sales remain near the year's peak and considerably ahead of the 1935 rate, but some summer decline is noted in a slight letdown from early June. Price increases are to be effective July 1.

New York—Demand for finished rolled products continues at a high rate, averaging higher than the May rate, which had been high for this year. With the exception of foreign shapes, bars and, occasionally, some other products, the market is uneventful as far as prices go.

Philadelphia — Warehouses are expected to announce price increases shortly, for effect July 1. June business is expected to top May.

Detroit — Early this week jobbers will announce prices for third quarter. Demand for warehouse steel products is continuing at a high rate, which is measurably ahead of May.

Cincinnati — Steel jobbers so far have withheld announcement of third quarter prices, almost certain to be advanced as a sequel of mill increases. Sales are a shade better than in May, both industrial and building demand showing vitality.

Seattle—Business is fair but has receded from a month ago. Puget Sound navy yard and Alaska railroad are distributing considerable business among wholesalers. Lack of federal buying and industrial construction is affecting the situation.

Cold Finished

Cold Finished Prices, Page 77

Pittsburgh—Replacing the present lull in automotive buying of cold-finished steel bars has come a vast range of specifications from makers of office equipment, farm implements, textile machinery, lawn mow-

ers and bicycles. The net effect has been that the market is on a considerably higher level than in May from the standpoint of specifications and shipments. Cold-drawn bar producers will continue to accept specifications at 2.10c, Pittsburgh, base until June 30. Inasmuch as shipments will then proceed over the balance of July, the \$3 second-quarter advance will begin to carry significance about Aug. 1.

Steel in Europe

Foreign Steel Prices, Page 80

London—(By Cable)—Extreme activity continues in the steel and iron market in Great Britain. Pig iron is somewhat more plentiful but still far short of needs of melters. Some steel products are much oversold and deliveries are extended. The Scottish tube trade is affected least by the heavy demand.

Imports of steel and iron products were 117,481 gross tons in May, compared with 120,773 tons in April, a decline of 3292 tons. Exports in May were 204,090 tons, an increase of 26,571 tons from the 177,519 tons exported in April.

Strikes in France and Belgium have caused business disruption. The French strikes over recent legislation for the 40-hour week, higher pay and paid holidays will increase production costs. Strikes in Belgium are still in progress.

Germany reports export trade is quiet and the outlook unfavorable.

Coke By-Products


Coke By-Product Prices, Page 77

New York—Demand for coal tar distillates continues heavy, making it difficult for shippers to take care of their customers. The shortage of toluol and xylol is acute. Naphthalene and phenol also are hard to get because of the extent to which demand exceeds the supply. Shipments of sulphate of ammonia have dropped off for seasonal reasons but are due to be heavy in July and August. All prices are firm and unchanged.

Semifinished

Semifinished Prices, Page 77

As first quarter wire rod specifications continue to be worked out, the present method of quoting three base prices at \$38, \$40 and \$42 per ton is carrying more effect. Some wire rod producers are falling in arrears on deliveries in view of the continued heavy demand for a number of



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finished wire products. Other semi-finished steel such as rerolling billets, sheet bars and slabs have been considerably improved in volume over the past week to ten days and represent efforts of a number of consumers to increase stocks moderately. Until the higher third quarter market becomes effective, rerolling billets, sheet bars, slabs and blooms are quoted \$28 per gross ton, f.o.b. Pittsburgh.

Metallurgical Coke

Coke Prices, Page 77

Beehive coke demand in the Western Pennsylvania district continues brisk and prices are firm. Standard furnace coke holds at about \$3.50 to \$3.65, with the maximum of this spread being done consistently on small lot business for prompt shipment. The foundry trade is an active buyer of common foundry grade at around \$4.25 to \$4.35, also f.o.b. Connellsville, Pa., ovens, and is testing the premium foundry coke market at \$5.35 to \$5.50 on the same basis.

Shipments in the Chicago district continue at the prevailing rate of the past several weeks, with prospects for continuance. Prices are steady. In the Cincinnati district some reduction

in shipments is noted as foundries make a lighter melt.

Ferroalloys

Ferroalloy Prices, Page 78

New York—With books opened for third quarter at unchanged prices, sellers of ferromanganese are now entering routine contracts. Meanwhile, specifications are brisk. The movement this month should be one of the best this year, according to leading sellers. The market is \$75, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, reaffirmed for next quarter at \$26, Palmerton, Pa., on lots up to 50 tons, and \$24 on 50 tons and over, is moving at a good rate.

Quicksilver

New York—Quicksilver prices are somewhat steadier this week but demand continues to lag and is confined to scattered small lot sales. Prices are unchanged at \$74.50 to \$75 virgin flask of 76 pounds in lots of 15 to 25 flasks. Current prices are not high enough to stimulate production in the West, so supplies in the market here are still limited

but sufficient for present market demands.

Nonferrous Metals

Nonferrous Metal Prices, Page 78

New York—Uncertainty over stability of the zinc price structure during the early part of the week was followed by a five point decline Friday to 4.858c East St. Louis, for prime western. Tin established new lows for the current downward movement while other major nonferrous metals held unchanged.

Copper—Buoyant sentiment in the copper market was supported by the strong statistical position of the industry. Electrolytic held at 9.50c, Connecticut.

Lead—Sales were light to moderate with all first hands holding at 4.45c, East St. Louis. Total refined lead stocks increased 8418 tons during May to 229,409, the highest recorded since July, 1935.

Zinc—Disquieting market factors included issuance of a revised sales report showing 500 tons of prime western were sold during the week ended June 13 at five points under the quoted market for the period and continued low prices of zinc in London which were under New York parity. Smelters lowered prices to the basis of 4.85c, East St. Louis, for prime western.

Tin—Prices were unsettled during the early part of the week with a low of 41.10c on Straits spot recorded Thursday. The market later rose to 41.50c due to higher prices in London.

Antimony—Steadiness prevailed despite restricted buying. Chinese spot was nominally 13.00c, duty paid New York, for spot while American spot held at 11.50c, New York.

Canada Makes More Cars

Canadian automobile factories produced 24,951 cars and trucks during April, the highest monthly output since May, 1929, a 38 per cent increase over the March total of 18,021 cars and a gain of 3.4 per cent over the April, 1935, total of 24,123. The month's output included 20,247 passenger cars and 4704 commercial vehicles.

Imports amounted to 1163 units, compared with 804 in March and 520 in April of last year, and exports to 3740 as against 7613 in March and 6371 in April, 1935. For the four months ending with April production totaled 69,542, a decline from the 74,819 cars and trucks produced during the corresponding period of 1935. Imports rose from 1700 to 2774, and exports showed little change, amounting to 22,558, compared with 22,206.

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Foreign Machine Tool Orders Flow To U. S. as British Industry Recovers

BECAUSE builders of machine tools in England are unable to give deliveries short of a year, output being absorbed by domestic needs, tool builders in the United States are taking over export markets usually supplied by Great Britain.

With this prospective export business added to sharply increasing demand, in the United States, deliveries in this country are likely to become deferred, perhaps several months, in the opinion of Charles J. Stilwell, vice-president, Warner & Swasey Co., Cleveland, builder of machine tools and precision instruments and machinery.

Mr. Stilwell departed last week on a trip to England and the Continent for his company.

"In England," Mr. Stilwell said, "buyers of machine tools cannot obtain promise of delivery short of a year. English machine tool builders are operating virtually at capacity and their output is being almost entirely absorbed by the domestic market. England has been going through a great period of revival in industrial trade and building activity. Plant modernization is at an unprecedented rate.

"It is interesting to note that plant modernization in England is being reflected in increased business and employment in machine tool plants in the United States.

Export Markets Are Large

"Active foreign markets point to a period of good business for the machine tool industry in this country. Exports are bread and butter for domestic machine tool builders, who have always placed great reliance on their foreign business.

"Even before the World war," he continued, "American exports of machine tools absorbed a large share of the industry's production. At one time 60 per cent of the business of Warner & Swasey came from abroad. The proportion in post-war days was smaller, but still substantial.

"In the 1926-30 period exports of industrial machinery, as reported by the department of commerce, averaged \$216,000,000 in value a year. The depression cut this total to a small fraction, and yet even during the worst depression years exports constituted 29 per cent of the business of American machine-tool builders." In 1935, when domestic sales leaped upward, exports still accounted for 24 per cent of the machine-tool production of this country.

"Our own export business in 1936

will be the biggest in 20 years, with a total more than double that of 1935."

Pig Iron Imports Grow; Difficult To Meet Prices

INCREASING flow of foreign pig iron into the United States at prices domestic producers find it impossible to meet is causing considerable concern, especially to sellers whose markets are close to tidewater.

Imports of foreign iron in the first ten days of June at Philadelphia and Bridgeport, Conn., alone total 5751 tons, of which 2960 tons of Royal Dutch iron came in at Bridgeport, and 989 tons of the same iron at Philadelphia. The remainder was composed of 1000 tons of low phosphorus iron from England and 802 tons of various grades from British India, both lots arriving at Philadelphia.

In the first four months of 1936

a total of 65,418 tons arrived in this country from abroad, compared with 23,729 tons in the corresponding period last year, an increase of 41,689 tons.

April importations amounted to 11,982 tons, compared with 8247 tons in April last year. The declared valuation (less freight, duty and insurance) averaged \$12.87 a ton, against \$16.61 per ton in April a year ago.

The average declared valuation of iron for a given period depends largely upon the point of origin. Nevertheless, the difference of \$3.74 in the average valuation of iron arriving in April and that of a year ago appears to support trade opinion that the gap in domestic and foreign prices has been constantly broadening.

Last November there was an increase of \$1 a ton on most grades of domestic iron, a change that was not followed by all foreign sellers.

Although Holland has been a leading exporter of pig iron to this country, shipments from Russia have been increasing. In April, of the 11,982 tons brought in, 4000 tons arrived from Russia and 1500 tons from the Netherlands, with the remainder from British India and possibly other points.



The Handicap OF TRADITION

The *Continuous Flow Principle* is the most revolutionary concept that has entered into industrial thinking in fifty years. But despite its almost sensational application in some industries many others remain so traditionally minded that they have failed to see how universally applicable this principle is. There is no mill, foundry, or shop in the metal trades which cannot be made more efficient by adapting this basic principle of handling materials. Investigate. Ask for the book "Problems Solved with Mathews Conveyer Systems."

MATHEWS CONVEYER COMPANY
San Francisco, Calif. ELLWOOD CITY, PENNA. Port Hope, Ont., Can.

Allegheny-West Leechburg Merger Meeting July 27

July 27 has been set for the meeting of stockholders of both Allegheny Steel Co. and West Leechburg Steel Co. to approve the merger recommended by directors of both concerns. Terms of exchange remain the same as in the original plan, for which a stockholders' meeting had been called May 20, but adjourned owing to legal requirements.

One change has been made, in the number of directors. The resulting company will have 11, seven of them to be present directors of Allegheny Steel Co., and the additional four to be elected by the seven directors to serve a term until the next stockholders' meeting for the election of directors.

Equipment

New York — Increasing demand from abroad is the principal new feature in the machine tool market here. The extent of buying by the British government in connection with munitions manufacture prevents British machine tool manufacturers in many cases from taking care of customers in the normal way, with the result that much of this business is being diverted to American builders.

Domestic buying of machine tools and allied equipment continues at high level. Manufacturers of aircraft have been good buyers, including Wright Aeronautical Corp., Paterson, N. J.; and United Aircraft

Corp., East Hartford, Conn. Lycoming Foundry & Machine Co., Williamsport, Pa., has bought some equipment for manufacture of airplane motors.

Pittsburgh — Carnegie - Illinois Steel Corp. has placed orders with United Engineering & Foundry Co. for a complete installation of pressure meters for the new continuous 100-inch plate mill now being built by the Carnegie company at its Homestead works. The pressure meters, recently placed on the market by United Engineering (STEEL, May 25, p. 70), indicate rolling loads on each housing on all of the major mill stands in the train.

Chicago — Supported by a fairly large number of small-lot orders and inquiries, activity in various equip-

ment and machinery markets is well sustained here at close to the best rate for the year to date. Miscellaneous metalworking companies are furnishing the bulk of business, though railroads are becoming slightly more active in the purchase of new equipment. Small tool buying is holding well, indicative of but little letdown in operations of most metalworking plants.

Seattle — Machinery houses report a strong tone in the equipment market, demand being active for both new and used items. Manufacturing plants and dealers in road machinery are having an active season. Alaskan interests are buying heavily, while canning and pulp plants are likewise busy and making improvements.

Construction and Enterprise

Ohio

AKRON, O. — Twentieth Century Heating & Ventilating Co., Edison avenue, was damaged by fire recently. John Kerch is president and general manager.

BARNESVILLE, O. — Warren township trustees, Thomas Holdren clerk, asks bids until July 3 for furnishing a crawler type tractor of sufficient power to pull a township grader. McCormick-Deering tractor is to be traded.

CANTON, O. — Everhard Mfg. Co., maker of water heaters, metal frame screens, and air deflectors, plans an addition to the plant at Camden and Seventh avenues.

CARROLLTON, O. — Carrollton Metal Products Co., die maker and manufacturer of decorated tinware, plans to construct a 1-story addition. F. E. Pfeferkorn is president.

CLEVELAND — Meriam Co., 1955 West 112 street, has awarded Truscon Steel Co., 6100 Truscon avenue, the general contract for erection of a \$9500 machine shop.

CLEVELAND — Gas Machinery Co., 16100 Waterloo road, maker of gas works machinery and industrial furnaces, plans to construct a 1-story addition.

CLEVELAND — Sheffield Forge & Machine Co., G. J. Raemer president, has leased 4000 square feet of space at 900 East Sixty-First street, and will manufacture automobile parts.

CLEVELAND — West End Laundry Co., 10610 Madison avenue, plans to install coal handling equipment, and a 150 horsepower boiler at a total cost of \$30,000. H. M. Morse, 823 Prospect avenue, is architect for the boiler house.

CLEVELAND — American Coach & Body Co., 3809 Clark avenue, South west, has purchased part of the plant of the former Peerless Motor Car Co. President James Holan, Coach & Body company, manufacturer of derricks and power winches and other equipment, announces that plant will be remodeled and new equipment installed.

DAYTON, O. — Inland Mfg. Co., 15 Coleman street, division of General Motors Corp., plans to spend \$75,000 to add one story to present plant. Equipment is to be purchased.

DAYTON, O. — Chrysler Corp., 341 Massachusetts avenue, Detroit, has let a general contract to H. R. Blagg Co., 1229 East Third street, Dayton, for remodeling the old Maxwell plant here. Plans for a power plant may mature in 1937. K. T. Keller, Detroit, is in charge.

DEFIANCE, O. — Defiance Pressed Steel Co. was damaged extensively by fire June 13. H. F. Hadley is plant superintendent.

EAST LIVERPOOL, O. — City council is seeking a fund of \$1,500,000 for a

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—Construction and Enterprise—

new municipal electric light and power plant. Peter F. Loftus, Oliver building, Pittsburgh, is engineer.

FINDLAY, O. — National Refining Co., G. F. Arnold superintendent, plans to spend \$200,000 for a plant addition and equipment at the refinery here.

GREENFIELD, O. — City has revised plans for purchasing a 1000 kilowatt turbogenerator for the municipal power and water plants. W. I. Barrows, Reibold building, Dayton, O., is engineer.

HARRISON, O. — George H. Frederick Distilleries Inc. plans to construct a power house, machine shop, and other mechanical departments, on property recently acquired near here. New plant is to be erected.

HEBRON, O. — Village board of trustees, Mary Rosebaugh clerk, will consider bids received by June 25 for furnishing and erecting a 100,000 gallon elevated steel tank.

MASSILLON, O. — Eaton Detroit Metal Mfg. Co., 9771 French street, Detroit, maker of automobile parts and refrigerator accessories, plans to occupy old factory of the Bean Spring Co. here. Joseph L. Shanahan is vice president and general manager.

PORT CLINTON, O. — Fred Slauterbeck, mayor, may submit a bond issue to the voters in November for improvements in the light plant. Engineer has not been selected.

SABINA, O. — City council has authorized a \$30,000 bond issue for new municipal power plant equipment, including a diesel engine, and a generator unit. (Noted STEEL June 8).

SPRINGFIELD, O. — Sealdrok Corp. of Ohio, P. O. box 665, is in the market for a 40 to 50 ton, used locomotive crane, McMyler type is preferred.

SPRINGFIELD, O. — William Bayley & Co., West Warder street, manufacturer of pressed steel sash, suffered damages to plant by fire recently.

STRYKER, O. — Village, R. W. Diltz clerk, will receive bids until June 26 for furnishing equipment for a distribution line estimated to cost \$2000. George Champe & associates, Nicholas building, Toledo, O., is consulting engineer.

TOLEDO, O. — City Auto Stamping Co., Lint avenue, plans to spend \$75,000 for a 1-story addition. Amos Lint is president.

TOLEDO, O. — Libby-Owen-Ford Glass Co. plans to spend \$100,000 to improve the steam power house at the east Toledo plant.

Michigan

DETROIT—Detroit Forging Co., 3564 Toledo avenue, expects to construct a new plant.

DETROIT — Safety Cushion Bumper & Mfg. Co., recently organized, soon will start production on bumpers at the Lafayette boulevard plant. Samuel Collier is secretary-treasurer.

DETROIT — Difco Laboratories Inc., 920 Henry street, will make additions to its boiler plant at a cost of \$30,000. Donaldson & Meier, Washington boulevard, is architect.

ESCANABA, MICH. — Escanaba Paper Co. will proceed soon to extend and improve power plant at a cost of approximately \$150,000.

KALAMAZOO, MICH.—Clarage Fan

Co. proposes to erect a 1-story, 130 x 160 feet, addition to its present plant. Stewart-Kingscott Co., Kalamazoo, is architect.

LANSING, MICH. — Motor Wheel Co., maker of heavy steel stampings, and steel automobile wheels, is spending \$70,000 for a 1-story addition. Equipment is to be purchased.

LANSING, MICH. — Board of water and electric light commission has ordered preparations for preparing detailed plans for construction of a new electric power plant combined with a steam heating station to be built at a total cost of approximately \$2,700,000.

SAGINAW, MICH.—Saginaw Malleable Iron division of General Motors Corp., General Motors building, Detroit, will construct two additions to the local plant.

YPSILANTI, MICH.—United Stove Co. plans to erect a 1-story, 80 x 250 feet, factory building. R. S. Gerganoff, Ypsilanti, is architect.

Illinois

CHICAGO—Howard Foundry Co., 111 West Washington street, has been incorporated by James H. Cronin, Harry A. Quinn, David Jetzinger, with Jetzinger & Quinn, 111 West Washington street, as correspondent.

CHICAGO — Acme Industrial Co., 413 North Carpenter street, considers building a 1-story plant at Lake and Union streets at a cost of \$100,000.

CHICAGO — Master Metal Strip Co., 1720 North Kilbourn avenue, has plans for a factory to cost approximately \$8000.

CHICAGO — Standard Oil Co. of Indiana Inc., 910 South Michigan avenue, plans to spend \$10,000,000 for expanding and improving oil refineries in south and middle western districts.

CHICAGO — Columbia Ventilating & Air Conditioning Corp., 809 West Lake street, has been incorporated to manu-

facture, sell and install sheet metal for ventilating and air conditioning. Bertha J. Weiner, Ida J. Weiner, are the incorporators, and Allen H. Schultz, 134 North LaSalle street, is correspondent.

PEORIA, ILL. — Shovan Brass Corp., 211 Fulton street, has been incorporated by J. B. Olwin, Carl M. Seipt, Phillip Z. Horton and Edward T. Van Arsdell, to operate a general foundry. W. D. Evans, 210 South Adams street, is correspondent.

Indiana

COLUMBIA CITY, IND. — Whitley County Rural Electrification Corp., is arranging \$500,000 financing through the federal government for construction of a power substation and transmission and distribution facilities for parts of Whitley county.

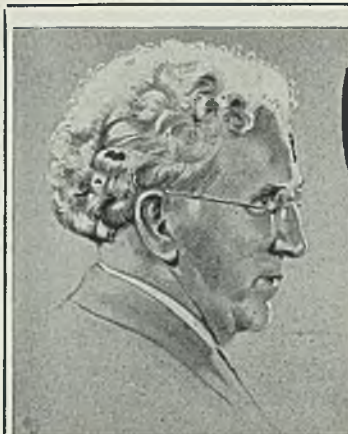
INDIANAPOLIS — State board of education expects to construct a power plant at a school near Ft. Wayne, Ind. Boiler and pumping machinery is included in this \$100,000 project. Pohlmeier & Pohlmeier, Central building, Ft. Wayne, is architect.

JEFFERSONVILLE, IND. — Contracting officer, quartermaster corps, will receive bids until July 6 for furnishing a power shovel, capacity 3-8 yards, mounted on a truck, and operated by gasoline drive, on circular 313; and until June 24 for furnishing 3, ½-horsepower electric drills; 2, 1-horsepower tool grinders; 4 electric drills; 1, 1000-gallon storage tank, on circular 316.

Pennsylvania

BESSEMER, PA. — Borough will receive bids until July 8 for erection, construction, and equipment of a part of the local water supply system. Turbine pumps with auxiliaries included. Charles B. Nord is borough secretary. Note new bid date. (Noted STEEL May 25).

DAISYTOWN, PA. — Borough receives bids until June 30 for construction of a waterworks system, including



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pumping equipment. Mrs. Marie B. Lintner, R. F. D. No. 2, Johnstown, Pa., is secretary of borough, and O. P. Thomas, 502 Main street, Johnstown, is engineer. PWA docket No. 1394.

ERIE, PA.—Borough of North East will receive bids until June 26 for furnishing a 35-40 horsepower bulldozer tractor, a 20 horsepower caterpillar tractor with winch, used steam shovel, used ten-ton steam roller, gate valves, and miscellaneous building materials for improvement of North East water works. Hill & Hill, North East, Pa., is engineer.

FORBELL, PA. — Franklin township school board, W. J. Nevin secretary, accepts bids until July 5 for drilling a well and installing a pump.

FRANKLIN, PA. — Board of education, Michael Berzonsky, secretary, 135 Spring Alley, Franklin borough, Conemaugh, Pa., receives bids until July 6 for one driver drill press.

JOHNSTOWN, PA. — Directors of Johnstown schools will receive until June 29 bids for furnishing supplies for plumbing, sheet metal and machine shops. George B. Hunter, 201 Central High School building, is secretary.

PHILADELPHIA — Frankford arsenal, accepts bids until June 29 for an automatic motor starter, inventory 314-36-548.

PITTSBURGH — Waverly Oil Works Co., Fifty-Fourth street, expects to ask bids soon on a power plant at a refinery here. Rust Engineering Co., Clark building, is engineer.

Maine

BRADLEY, ME. — Town board of selectmen, H. A. Moulton chairman, has plans to spend \$36,000 for a water supply system.

New Hampshire

HOOKSETT, N. H. — Board of select-

men, E. Allen chairman, is considering expenditure of \$90,000 for constructing a water supply system.

New York

BROOKLYN, N. Y. — American Mfg. Co., West and Noble streets, plans to install a water pumping and sprinkler system at a cost of \$37,000. Plans were drawn by W. Higginson, 101 Park avenue.

BROOKLYN, N. Y. — Jerome Sherman, 245 Putnam avenue, is asking bids for constructing a pumphouse, for furnishing tanks, and other equipment in a \$312,000 building program.

BROOKLYN, N. Y. — Coney Island hospital, Ocean parkway, S. S. Goldwater, medical doctor and commissioner, asks bids until June 25 for constructing an addition and making alterations to boiler plant. A \$48,000 project to be financed by PWA.

BUFFALO — Trico Products Corp., manufacturer of automobile accessories, 817 Washington street, has under way construction work that is estimated to cost \$250,000

JAMESTOWN, N. Y. — W. F. Endress Inc., Foote avenue and Harrison street, proposes to install three 500-gallon steel tanks, an electric pump, and an air compressor.

NEW YORK—L. C. Stanhope Co., dealer, 101 West Thirty-first street, is in the market for two 125-horsepower, three-phase, 60 cycle, 2200 volts, 720 revolutions per minute, slip ring motors.

NEW YORK — Consolidated Edison Co., 140 East Fifteenth street, plans to spend \$50,000 on coke handling equipment and improvements in the East 110th street plant. George Cortelyou is president.

WESTFIELD, N. Y. — E. F. Allen, 161 West Main street, expects to purchase soon gas engines, multiple power pumping unit, winch, rod pulling ma-

chine for use in oil fields in Warren county, Pa.

New Jersey

RARITAN ARSENAL, N. J.—Raritan arsenal will receive bids until July 6, circular 6, one 14-inch tool room lathe, one radial drill, one 21-inch drilling and tapping machine, and two 6-inch floor or pedestal grinders.

Alabama

BIRMINGHAM, ALA.—W. M. Smith & Co., dealer, First avenue. North, is in the market for a Landis threader or head, a friction metal saw, a 36 x 48 jaw crusher, a 42 x 60 jaw crusher, a five horsepower, single phase, 1800 revolutions per minute, 110-volt alternating current motor, and a 52-inch or larger lifting magnet.

Maryland

BALTIMORE — Holabird quartermaster depot, Maj. E. S. Van Deusen purchasing and contracting officer, asks bids until June 27 for hand and machine tools and shop and garage equipment, on inventory 398-36-173.

HAVRE de GRACE, MD. — City probably will ask for bids on July 22 for construction of a waterworks system. J. Spence Howard, 20 East Lexington street, Baltimore, is engineer.

District of Columbia

WASHINGTON — United States engineer, Navy building, will receive bids until June 23 for furnishing one motor-driven rotary, vacuum pumping unit, schedule 93.

WASHINGTON — Navy department, bureau of supplies and accounts, asks bids until June 23 for a motor generator set and three brushes for generator, schedule 8126, delivered Brooklyn, N. Y.; until June 26 for a motor-driven rotary shear, schedule 8139, delivered San Diego, Calif.

WASHINGTON — Navy department, bureau of supplies and accounts, asks bids until June 23 for miscellaneous emergency feed pumps delivered at Brooklyn, N. Y., schedule 9152; until June 26 for one heavy duty, vertical boring and turning mill delivered at Philadelphia, schedule 8169; one motor driven turret lathe delivered at Brooklyn, schedule 8171; one motor driven turret lathe delivered at Charleston, S. C., schedule 8200; one motor driven rotary shear delivered at San Diego, Calif., schedule 8139; and one hydraulic arbor press delivered at San Diego, schedule 8144.

Kentucky

LOUISVILLE, KY. — Mission Springs Distilling Co. Inc., 406 Republic building, expects to spend \$175,000 at Vine Grove, Ky., for a steam power plant.

Florida

MARIANNA, FLA. — Mount Vernon Inc., P. O. box 484, is in the market through G. A. Weaver, president, for steam shovels.

Georgia

LOUISVILLE, GA. — Russell Smith and William Lee Josey, both of Bartow, Ga., are constructing an oil plant here, to include installation of tanks.

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Louisiana

IDA, LA. — Rodessa Gasoline Co., J. H. Gwin president, 923 East King highway, Shreveport, La., plans to construct a gasoline extraction plant at a cost of \$120,000. Herbert E. Dickard & Co., Monroe, La., is designing and consulting engineer.

NEW ORLEANS — Hart Enterprise Electric Co., 832 Barome street, expects to make repairs to fire damaged plant.

NEW ORLEANS — Superintendent of maintenance, inland waterways, 211 Camp street, accepts bids until June 25 for furnishing a pair of twin 1500 horsepower vertical reciprocating marine steam engines for use in river tow boats.

Mississippi

LEXINGTON, MISS. — Board of aldermen asks bids until July 7 for equipment for the pumping plant of the local waterworks system.

MARKS, MISS. — Town plans to issue \$12,000 worth of bonds with which to finance drilling of a deep well and installation of the necessary pumps.

TUPELO, MISS. — City has authorized expenditure of \$30,000 for improvements to light and power plant damaged by recent tornado. J. P. Nanney is mayor.

North Carolina

CANTON, N. C.—T. E. King, dealer, South Main street, is in the market for a 40-horsepower high pressure used locomotive type boiler, injector fitted, together with necessary fixtures and stick; used, single drum, 15-horsepower twin hoisting engines, without boilers; a 25-horsepower, center crank, with flywheel governor, automatic steam engine; and hydraulic pumps for cotton gin presses.

ELM CITY, N. C. — Town will issue \$7500 in bonds to finance construction of a 75,000 elevated steel tank.

FARMVILLE, N. C. — Local government commission, Raleigh, N. C., has sold \$19,000 worth of water and sewer bonds, and \$100,000 worth of electric light system bonds.

HIGH POINT, N. C. — Dermont Construction Co., through Elmer D. Hedrick, 110 College street, is in the market for new or used hoisting and drum equipment.

LANDIS, N. C. — G. H. Clark, mayor, has applied to PWA for a loan and grant of \$173,000 for waterworks and sewage system.

MONROE, N. C. — Henderson Roller mills has under consideration plans for rebuilding at an estimated cost of \$37,000 a four-story factory.

OAKBORO, N. C. — C. L. Austin mayor has applied to PWA for a loan and grant of \$50,000 for a waterworks and sewage system.

PIKESVILLE, N. C. — Town has filed an application with PWA for a loan and grant of \$40,000 with which to construct sewage and waterworks systems.

SALEMSBURG, N. C. — Application for a loan and grant of \$40,000 for waterworks and sewage systems has been filed with PWA by town authorities.

SMITHFIELD, N. C. — Johnson County Electric Membership Corp. has received tentatively an allotment of

\$80,000 to begin construction of 76 miles of distribution lines in Wake, Harnett, and Johnson counties. Dudley Bagly, Raleigh, N. C., is director of rural electrification projects in North Carolina.

TABOR CITY, N. C. — Town is asking a loan and grant of \$103,000 from PWA for construction of sewage and waterworks systems.

TARBORO, N. C. — Edgecombe Electric Membership Corp. has secured \$32,000 with which to construct 35 miles of distribution lines to serve 165 customers in Edgecombe and Martin counties.

WAXHAM, N. C. — Town is seeking a loan and grant of \$38,000 from PWA to finance proposed water and sewage projects.

WILSON, N. C. — Wilson County Membership Corp. has a loan of \$161,000, and expects to go ahead on plans to construct 129 miles of distribution lines serving 660 families.

WINTERVILLE, N. C. — Town has applied to PWA for a loan and grant of \$60,500 with which to finance construction of a municipal water system.

Tennessee

CHATTANOOGA, TENN. — Grant of \$1,948,000 towards \$4,330,000 power distribution system here, has been approved by Harold L. Ickes, secretary of the interior, Washington.

KNOXVILLE, TENN. — Harold L. Ickes, secretary of interior, Washington, has approved grant of \$90,000 to be added to an additional \$110,000 for improvement of local power facilities.

MEMPHIS, TENN. — Secretary of interior Harold L. Ickes, Washington, has approved a grant of \$3,029,000 toward a proposed expenditure of \$6,872,000 for an electrical distribution system, here.

PARIS, TENN.—City has authorized expenditure of \$300,000 for construction

of an electric distribution system and power substation facilities. J. S. Watkins, Citizens Bank building, Lexington, Tenn., is engineer. W. H. Dudley is city treasurer.

West Virginia

CHARLESTON, W. VA. — Taylor-Smith Power Engine Co. has been incorporated by George E. Thomas, and Eugene H. Smith, 1417 Quarrier street.

HUNTINGTON, W. VA. — Huntington Forge & Machine Co.'s plant at 535 Second avenue was damaged by fire, June 14. Alvin P. Martin is president.

WHEELING, W. VA. — Wheeling Electric Co. has received a permit to construct a \$9000 substation at Sixteenth and Warwood streets.

Virginia

DANVILLE, VA. — City will spend \$100,000 to revamp and improve present steam operated electric plant.

NORFOLK, VA. — Henry Walke Co., 407 Union street, is in the market for a used lathe with an 11-inch bed, and 3 to 4 feet long.

PORTSMOUTH, VA. — City, E. B. Hawks city manager, has authorized surveys to determine feasibility of constructing a municipal electric plant.

Missouri

KANSAS CITY, MO. — Sterling Machinery Co., Southwest boulevard and Broadway, will construct a 1-story addition to connect old plant with a 2-story building recently acquired.

KANSAS CITY, MO. — Dart Truck Co., Twenty-Seven and Oak streets, plans to erect a 2-story addition at a cost of \$20,000 to serve as a factory. Work will start this autumn.

PLATTSBURG, MO. — City plans to construct an \$85,000 light plant. E. T.

(Please turn to Page 101)

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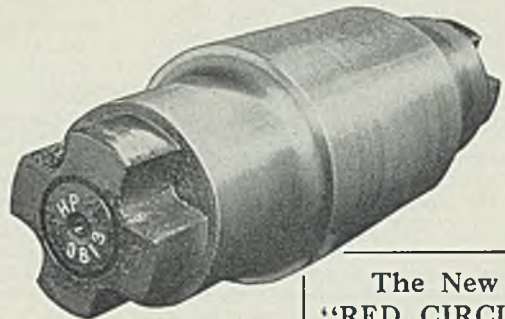
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K-6

(Concluded from Page 99)

Archer & Co., 609 New England building, Kansas City, Mo., is architect.

Texas

DAWSON, TEX. — W. P. Johnson, mayor, asks bids until July 1 for a waterworks system. Dalton Westoreland is city secretary; Hawley, Freese & Nichols, 407 Capps building, Fort Worth, Tex., is engineer.

GALENA PARK, TEX. — City proposes to spend \$100,000 on waterworks and sewage system improvements, including a 100,000 gallon tank. Garrett Engineering Co., Box 1726, Houston, Tex., is consulting engineer.

HOUSTON, TEX. — Houston Machinery Co., 3119 Navigation boulevard, is in the market for a 15 kilowatt Engberg or General Electric marine type steam engine, and a 125 volt, direct current generating unit.

ITALY, TEX. — Texas Power & Light Co., Dallas, Tex., proposes to construct a rural electric line to serve two communities south of here.

TEMPLE, TEX. — City may vote on bonds to finance construction of a light and power plant at a cost of \$800,000. Garrett Engineering Co., Box 1726, Houston, Tex., is consulting engineer.

Wisconsin

BELOIT, WIS.—Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago, is making additions to its plant here. Cost is estimated at \$100,000.

CEDARBURG, WIS. — City, A. W. Robke, chairman, plans to purchase a 500 or 750 kilowatt diesel light and power plant engine.

MADISON, WIS. — Board of public works is asking bids until June 26 for furnishing boiler equipment.

MILWAUKEE—Allis-Chalmers Mfg. Co., 1126 South Seventieth street, has plans underway for enlarging the light tractor shops at West Allis. William Watson is vice president in charge of plant engineering for this \$400,000 project.

Minnesota

FARIBAULT, MINN.—Local woolen mills, through Ralph W. Richardson, New York building, St. Paul, consulting engineer, plans to install a 200 horsepower high pressure boiler for the steam power plant.

LONG PRAIRIE, MINN. — City is being surveyed and estimates being made to determine feasibility of constructing a municipal light and power plant. Burlingame & Hitchcock, Sexton building, Minneapolis, consulting engineer.

MINNEAPOLIS — Minneapolis-Moline Power Implement Co., Minnehaha avenue, expects to spend \$125,000 for three boilers and other equipment for a steam power plant at Hopkins, Minn.

ST. PAUL — United States engineer, 615 Commerce street, extended closing date for bids until June 24 for furnishing two or four generating sets and one or two full diesel, dredging pumps. (Noted STEEL June 15).

TWO HARBORS, MINN. — Co-operative Light & Power Association of Lake County Inc. proposes to construct additional electric lines in Lake county.

Rural electrification administration, Washington, has allotted \$60,000 to corporation.

Kansas

KANSAS CITY, KANS.—D. T. McCombs, mayor, accepts bids until July 1 for furnishing a new generating unit for municipal power plant. Burns & McDonnell, 107 West Linwood boulevard, Kansas City, Mo., is consulting engineer; and until July 8 for furnishing and erecting one 30,000 kilowatt turbine and one condenser having 40,000 square feet. Burns & McDonnell also is consulting on this \$500,000 project.

WASHINGTON, KANS. — Municipality, through E. T. Archer, New England building, Kansas City, Mo., consulting engineer, plans to purchase a diesel engine in a \$100,000 plant program.

Iowa

DES MOINES, IOWA — New Monarch Machine & Stamping Co., Tenth street, plans to construct a 1-story unit at a cost of \$45,000.

GLIDDEN, IOWA — Carroll county proposes to construct 55 miles of rural electrification lines on an allotment of \$55,000.

MUSCATINE, IOWA — Muscatine County Rural Electric Co-operative proposes to construct 69 miles of distribution lines in Muscatine, Cedar, Louisiana and Johnson counties. Preliminary allotment is \$70,000.

ROCKWELL CITY, IOWA — City council has authorized an election on June 24 for passing on issuance of \$175,000 worth of bonds for equipment and improvement of local light and power plant.

VILLISCA, IOWA — City will issue new call for bids for a \$150,000 program of improvement of local electric plant. Two diesel engines are to be purchased. Burns & McDonnell, 107 West Linwood avenue, Kansas City, Mo., is consulting engineer.

Nebraska

COLUMBUS, NEBR. — Loup river public power district, C. B. Friske, 2307 Thirteenth street, president, will ask soon for bids for constructing 305 miles of distribution lines, and 49 miles of transmission lines, with substations, and transformers. This is a \$400,000 PWA project.

Colorado

CANON CITY, COLO.—State Prison board, Denver, is considering adding to facilities of the hydroelectric station at the state penitentiary here.

GRAND JUNCTION, COLO. — Public Service Co. of Colorado is considering extending facilities of the Valmont plant to create a reserve of 34,000 horsepower. Cost approximately \$1,200,000.

Wyoming

BUFFALO, WYO. — City is considering acting favorably on estimates now being prepared to determine feasibility of establishing a municipal power plant.

Montana

BILLINGS, MONT. — City proposes to construct a booster pumping station. Black & Veatch, 4706 Broadway, Kansas City, Mo., engineer.

FORT PECK, MONT. — United States engineer asks bids until June 25 for a power drill, inventory 631-36-663; and until June 26 for cutter blades, inventory 631-36-662.

Arizona

PRESCOTT, ARIZ. — Columbia Metal Mines Co. proposes to purchase a 250 horsepower motor, a dragline shovel, and other equipment for a new 500-ton capacity gold reduction mill.

Pacific Coast

LOS ANGELES — Fruehauf Trailer Co., 1094 Harper street, Detroit, has purchased Bunnell-Kirksey Co. plant at East Twenty-Fifth street here, at a cost of \$250,000, and plans to spend another \$250,000 for improvements. S. A. Holmes is Pacific coast regional manager.

LOS ANGELES—Southern California Telephone Co., 740 South Oliver street, will install switchboards and related equipment at a cost of \$115,000 in a new plant at 14612 Ventura boulevard, Van Nuys, Calif., near here. K. D. Schwab is division manager with offices at 14538 Friar street, Van Nuys.

LOS ANGELES — Lockheed Aircraft Corp., West San Fernando, Burbank, Calif., has an option on nine acres of land adjacent to Union Air terminal, and is planning to construct a new factory with 100,000 square feet of floor space. Robert E. Gross is president.

NEWPORT BEACH, CALIF.—City, R. L. Patterson city engineer, plans to spend \$160,000 for a sewage disposal plant.

SAN FRANCISCO — San Francisco Exposition Inc. may construct a pumping station on Embarcadero, N. A. Eckart, utilities commission, 425 Mason street, is chief engineer.

SAN RAPHAEL, CALIF.—Contracting quartermaster, Hamilton field, expects to take bids soon for furnishing a 500-gallon-per-minute vertical sewage pump powered with a 15 horsepower gasoline engine, in the sewage pumping station.

WOODLAND, CALIF. — Spreckels Sugar Co., 2 Pine street, San Jose, Calif., is taking contracts for a power plant, and other buildings in a \$1,500,000 program. G. Kelham, 315 Montgomery street, is architect.

BELLINGHAM, WASH. — Wash-Fee Corp., manufacturer of meter and weighing machinery, has leased a local building to be used as a manufacturing plant.

HOQUIAM, WASH. — Grays Harbor Pulp & Paper Co. plans to spend \$50,000 on the boiler plant here.

MARYSVILLE, WASH. — Board of education will open bids June 25 for a school addition program that includes boilers, fuel conveyors, and a heating system.

Canada

DAUPHIN, MAN. — Voters will pass on spending \$75,000 to make additions to the municipal power plant. R. Fagen is clerk.

HAMILTON, ONT. — Tope Construction Co., 945 Main street, has been awarded a \$375,000 contract for an addition to the plant of McKinnon Industries, Canadian subsidiary of General Motors at St. Catharines, Ont.

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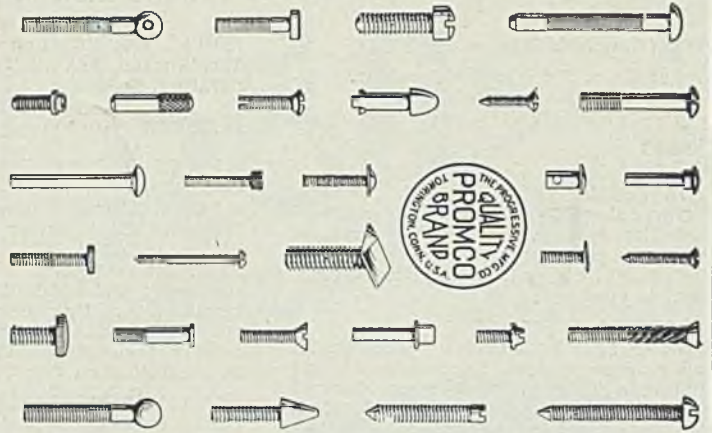
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