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STEEL

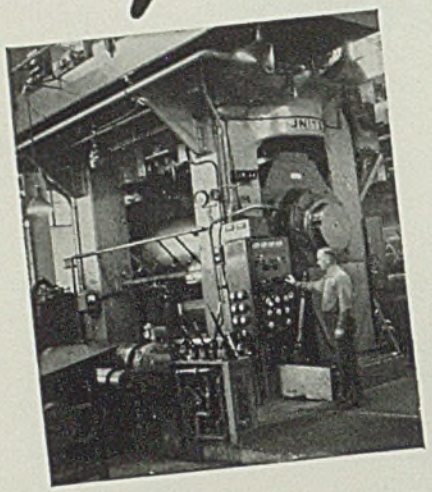
ESTABLISHED 1882

Contents

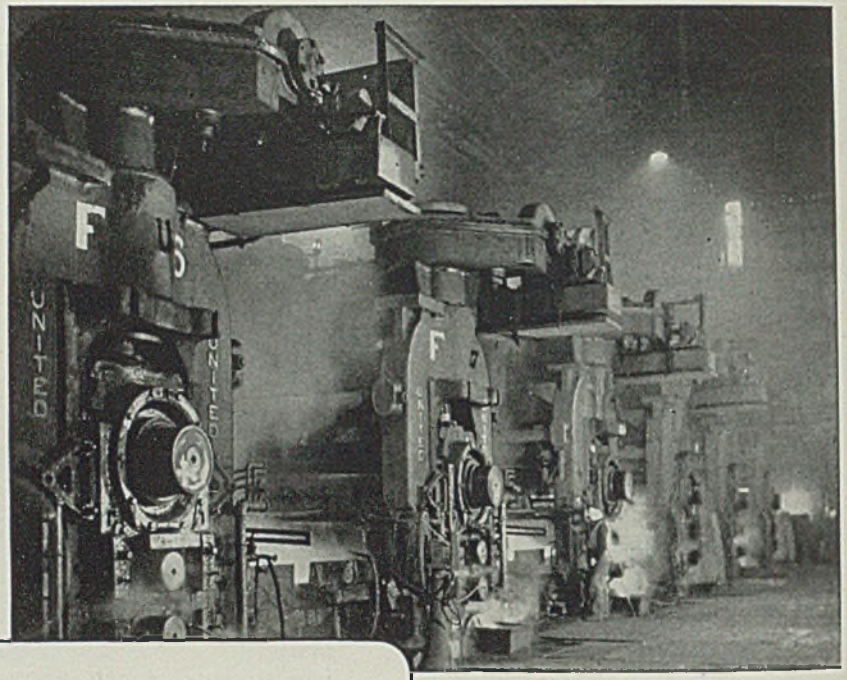
Volume 107—No. 12 **September 16, 1940**

PRODUCTION · PROCESSING · DISTRIBUTION · USE

Record run

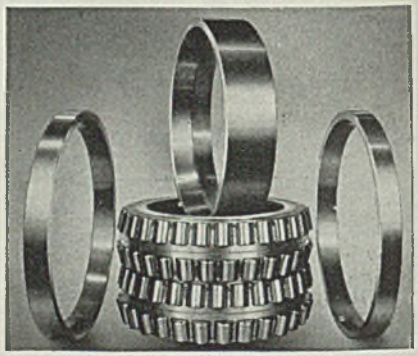


(*Above*) On the work rolls of this cold strip mill, Bantam Straight Roller Bearings (13" I.D., 17¼" O.D., 10" long) are used.



(*Above*) Both work rolls, and back-up rolls of this continuous hot strip mill use Bantam 4-row Tapered Roller Bearings.

NEW TONNAGE PEAK SET WITH BANTAM-BEARING-EQUIPPED ROLLS



(*Right*) A single large 4-row tapered roller bearing designed by Bantam for heavy duty mill service. Bantam has made many of the largest bearings ever built.

ALL-TIME tonnage high for an 8-hour run on a continuous cold strip mill was the record recently established at the plant of one of the country's leading steel producers. And the work rolls of the mills on which this record run was made are equipped with Bantam Bearings.

This is but one of the places in this modern plant where Bantam Bearings are helping to set new standards of steel mill performance. On the continuous hot strip mill are 4-row Tapered Roller Bearings also designed and built by Bantam. Bearings with a 35½" O. D. and 18" long are used on the back-up rolls of this mill. Work rolls are also equipped with Bantam Bearings of the same type, measuring 13" I.D., 17¼" O.D., 10" long.

These bearings are a typical illustration of Bantam's ability to meet unusual requirements with anti-friction bearings. Straight roller, tapered roller, or ball bearings—Bantam makes them all—is ready to supply the size and type needed for any service requirement. And the comprehensiveness of Bantam's line of bearings gives added value to Bantam's engineering counsel. With a background of years of experience in the design, manufacture, and application of every bearing type, Bantam engineers give unbiased, authoritative advice on bearing selection. For bearings that will give long, low-maintenance service under the severest conditions—TURN TO BANTAM.

BANTAM BEARINGS CORPORATION • SOUTH BEND, INDIANA

BANTAM BEARINGS

STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

HIGHLIGHTING THIS ISSUE

■ STEEL production last week (p. 35) averaged 93 per cent of ingot capacity, peak rate so far this year. Demand is broadening (p. 157) and although deliveries in general are moderately good, many consumers are exerting more pressure on the mills. This results from fears that increasing requirements, particularly in connection with the armament program, will bring a priority system of some sort. Pressure for bars, plates and shapes is strongest. Shipments of sheets are extremely active. Demand for pipe and wire has improved. British steel purchases here continue heavy. . . . Early action is expected at Washington (p. 30) with respect to exports of iron and steel scrap.

• • •

Col. Ayres reports (p. 41) that the armament program in 1940 is proceeding at one-twenty-eighth the speed of the 1917 effort. Nevertheless last week's list of government awards (p. 32) was impressive. There is to be large-scale expansion at shipyards which (p. 29) will build the 200 warships awarded last week. These, incidentally, will require 725,000 tons of steel. The plan for a government-owned chain of munitions plants is to be expanded. The country's heavy forging facilities (p. 30) are due for vast enlargement. Much other industrial construction, mainly in connection with the defense program, (pp. 30 and 42), is under way or projected.

To Expand Shipyards

• • •

Congress has modified (p. 31) the draft industry provision of the compulsory military training bill. The government must pay a "fair and just" rental for conscripted plants and owners would have the right to sue the government if compensation is inadequate. Congress voted favorably (p. 38) on railroad relief bill. . . The President announces an export licensing system (p.31) for equipment for producing aviation fuel and for airplane engines and designs. . . . John A. Penton, founder and chairman of the Penton Publishing Co., and for many years STEEL's leading protagonist (p. 47), died Sept. 8. . . . Large attendance is expected at the Iron and Steel Engineers' convention and show to be held (p. 77) at Chicago, Sept. 24-27.

"Fair and Just Rent"

• • •

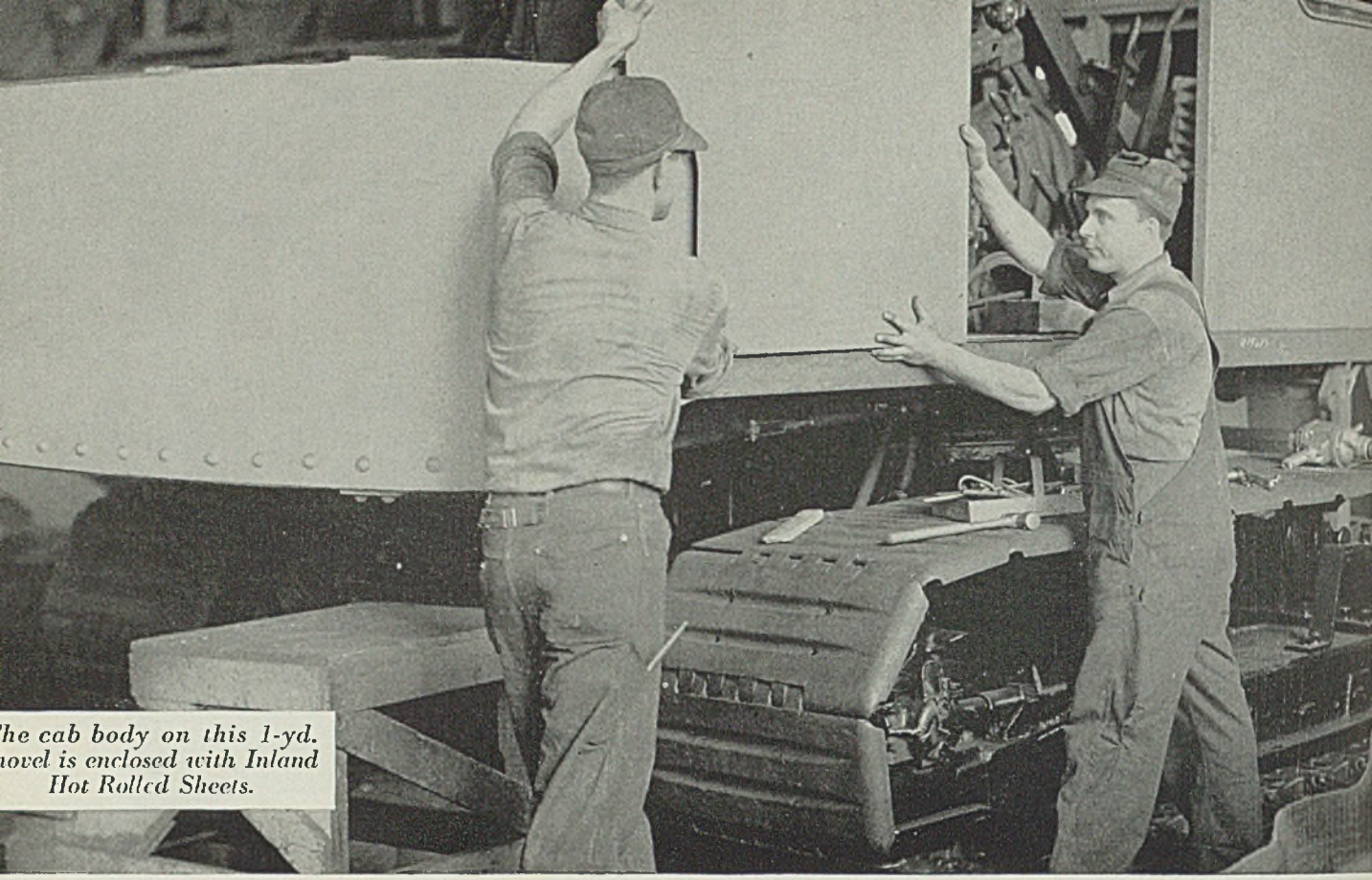
Commercial value of zirconium is due largely to a unique combination of high corrosion resistance at low temperatures and the ability to absorb large quantities of certain gases at high temperatures. Recent investigations disclose (p. 54) that ductile zirconium has important possibilities, particularly because it can be deformed severely as well as welded. New possibilities also are revealed for titanium. . . . At Michipicoten Harbor in Canada where the tonnage handled is comparatively small, a belt conveyor system (p. 64) has proved its worth in transferring iron ore from railroad cars to boats. . . . Fine brass gauze (p. 130) can be tinned successfully by electrodeposition.

Tinning Brass Gauze

• • •

Installation of additional potentiometers on skin pass mills, says C. P. Croco (p. 68), has resulted in great increases in mill speeds. He discusses use of both indicating and regulating types. . . . Wherever arc blow is found, says Harold Lawrence (p. 121), welding with alternating current improves weld quality and permits faster and easier welding. It is especially suitable for gapped welds, deep grooves and corners. . . . Electric induction equipment designed for high production (p. 126) enables a drill chuck manufacturer to harden up to 600 parts per hour to extreme accuracy and uniformity. . . . New rubber compounds have high electrical conductivity (p. 153); synthetic rubber solutions have special characteristics.

New Rubber Compounds



The cab body on this 1-yd. shovel is enclosed with Inland Hot Rolled Sheets.

THERE IS PROFIT in Selecting the Right Steel

HOW long has it been since you have looked for profits hidden by buying habits that do not keep pace with engineering design and consumer preference? Many leading manufacturers, now customers of Inland, are keeping buying habits abreast of every move made by their engineers—and they find it profitable.

A case in point is the shovel cab, shown above. This cab is now enclosed with Inland Hot Rolled Sheets. These sheets, rolled on Inland continuous mills, are true to gauge, have excellent forming qualities and a smooth, flat surface. They meet every requirement of workability and finish. This change to Inland Hot Rolled Sheets is a good example of co-ordinating engineering design, consumer preference and buying practice.

The most effective way to check buying habits is to call in an Inland engineer. If he finds ways to improve your finished products, or to reduce the cost of manufacture, you gain by his efforts. His services are yours without obligation.

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Government May Enlarge Arms Plant Construction Program

Greater Aid to Canada, Britain To Require Expansion.

200 Warships, To Require 725,000 Tons of Steel, Are Awarded.

United States Plants To Make 100,000,000 Shells in 1941.

More Strict Control of Scrap Exports Appears Imminent.

Treasury Opposed to Senate Changes in Excess Profits Bill.

■ ORIGINAL plan for a chain of government-owned munition plants may be expanded and more money will be asked to finance such plants, according to persons close to defense officials.

Present appropriations afford $700,000,000 for erection of plants with federal funds; current reports are that this will be increased by $300,000,000 in order that large establishments may be constructed.

Proposed new program would meet the requirements of a standing army of 1,200,000 men.

Original plans called for construction of 60 munition plants throughout the country; these plans are said to have been changed. It has not been indicated, however, whether more plants are to be added, or whether larger individual facilities will be built.

The new expansion could be attributed to the policy of sending more equipment to Canada and Great Britain.

It was said also that by turning over existing materials to the British and Canadians there would be available to United States forces later types of equipment. Only this week it was pointed out that tanks could be made available for export. Other ordnance believed to be included in the class of "nonessentials" are quantities of anti-aircraft weapons, heavy machine guns, trucks and old 75s now being replaced.

Authoritative sources said the original list of "nonessential" war materials certified by the war department has been completely cleared. In view of this, it was said, another survey has indicated that more supplies can be made available for sale abroad. Quantities of various ordnance to be released, however, were not revealed, pending a final tabulation.

Navy, Private Shipyards To Be Expanded

■ BUILDING the 200 warships for which contracts were awarded last week will require large-scale expansion in government and private shipyards and in plant capacity for turbines and auxiliary equipment.

Navy yard expansion already planned is estimated to cost $31,653,500. An equal or greater amount will be spent in private yards and some estimates of the total range up to $90,000,000, most of which will be provided by the government.

The second navy program also will require a tremendous expansion in plant capacity for making marine boilers, turbines and other equipment. Details of this expansion are expected to be announced shortly.

The ships awarded last week, immediately after the five billion-dollar defense bill was signed, are estimated to cost $3,861,053,312, including the cost of armor and, in the case of submarines, government furnished machinery. It is estimated they will require 725,000 tons of steel. When completed, the navy will have 688 combat ships with an aggregate tonnage of 3,049,480. Tonnage of the latest program is 1,325,000.

■ Following table shows the present fleet, the number now building and those for which contracts have just been awarded:

Type	In Service	Building	Last Week's Awards	Total
Battleships	15	10	7	32
Aircraft carriers	6	4	8	18
Cruisers	37	21	27	85
Destroyers	*197	56	115	368
Submarines	103	39	43	185
Totals	358	130	200	688

*Does not include 50 destroyers recently traded to Great Britain.

Ships awarded last week:

Four aircraft carriers and six cruisers to Bethlehem Steel Co., Fore River yard, Quincy, Mass.; Four cruisers and 18 destroyers to Bethlehem's Union plant, San Francisco; six destroyers to San Pedro

plant, Los Angeles; ten destroyers to Staten Island plant, New York.

Ten cruisers to New York Shipbuilding Corp., Camden, N. J.

Five cruisers and 17 destroyers to Federal Shipbuilding & Dry Dock Co., Kearny, N. J.

Twenty destroyers to Seattle Tacoma Shipbuilding Co., Seattle.

Twelve destroyers to Consolidated Steel Corp. Ltd., Orange, Tex.

Eleven destroyers, Bath Iron Works, Bath, Me.

Twenty-five submarines to Electric Boat Co., Groton, Conn.

Ten submarines to Manitowoc Shipbuilding Co., Manitowoc, Wis.

Four destroyers to Gulf Shipbuilding Corp., Chickasaw, Ala.

One repair ship to Los Angeles Shipbuilding & Dry Dock Co., Los Angeles.

Four aircraft carriers and two cruisers to Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

Two battleships to New York navy yard.

Three battleships to Philadelphia navy yard.

Two battleships to Norfolk navy yard.

Six destroyers to Boston navy yard.

Five destroyers to Charleston navy yard.

Six destroyers to Puget Sound navy yard.

Six submarines to Portsmouth navy yard.

Two submarines to Mare Island navy yard.

Awards for propelling machinery for the 43 submarines have been made as follows: General Motors Corp., Cleveland Diesel Engine division, Cleveland, for 24 complete sets of propelling machinery for $19,800,000; Fairbanks, Morse & Co., Chicago, for 11 complete sets of propelling machinery for $10,307,088; and the Hooven, Owens, Rentschler Co., Hamilton, O., for eight complete sets of propelling machinery for the sum of $7,617,048.

War department has announced the award of contract for airplanes as follows: Bell Aircraft Corp., Buffalo, 120 pursuit planes with spare parts, $4,962,220.

This contract was cleared through the national defense advisory commission. This award brings the total under the 1940-41 appropriations to 2797 out of 4247 airplanes authorized. Of the 2797 airplanes, 963 are of combat type.

Navy department is proceeding with negotiations for 2400 planes to cost about $108,000,000.

Government To Spend $40,000,000 To Increase Forging Capacity

■ PLANS for a $40,000,000 plant expansion program in the nation's heavy forging facilities was announced last week by Edward R. Stettinius Jr., in charge of the industrial materials division of the national defense advisory commission.

"Definite plans have been formulated in conjunction with representatives of the army and navy for expanding the country's existing heavy forging facilities to the point where they will be adequate to fulfill all requirements of the army, navy and maritime commission," Mr. Stettinius stated.

Mr. Stettinius said the national defense program required huge amounts of heavy forgings of various types used in the construction of battleships, cruisers, airplane carriers, destroyers, submarines, tankers and freighters, as well as for large naval guns and heavy artillery, and projectiles and shells. An extensive study of the available supply of heavy forgings in relation to the needs of industry and of the army, navy and maritime commission has been made by the navy department and the defense commission with the full co-operation of the manufacturers of these products.

Principal problem was to ascertain the location and capacity of existing facilities and the extent to which new facilities will be required. This study disclosed that there was adequate plant capacity for certain types of forgings, but decided shortage for other vitally necessary types.

In addition to the contemplated plans for expanding the heavy forging facilities in various steel plants adapted for this work, the government intends to install additional forging facilities for shafting at the naval ordnance plant at South Charleston, W. Va. Navy department proposes to acquire a 14,000-ton press and intensifier and several small presses which it will lease to one of the steel companies so as to increase its forging capacity.

In some instances the government is planning to advance the capital necessary for the additional facilities and in others, the individual companies are contemplating furnishing their own capital under the standard form of government contract.

Ground Broken for New Chrysler Tank Plant

■ Expenditure of over $100,000 on preliminary studies incident to mass production of 25-ton tanks has been made by Chrysler Corp., K. T. Keller, president, revealed at a preview of new Chrysler, Dodge and De Soto models in Detroit, Sept. 12. Speaking before 300 newspaper and magazine representatives, he said the corporation had kept a staff of 197 engineers busy for 4½ weeks on this preliminary work.

Ground already has been broken in Detroit for Chrysler's new $20,000,000 tank plant where production is anticipated in about one year of five tanks every eight hours, with single-shift employment of 6000 men. Should the demand develop, it may be possible to produce 14 tanks a day, on three-shift operations, Keller stated.

He pointed out that manufacture of these tanks is a highly complicated production problem, involving mechanisms ranging all the way from those used in a locomotive to those used in the finest watches. In the transmission alone, he said, 1000 hours of productive labor per unit is involved.

Referring to the tank project, Mr. Keller said, "Co-operation in this great national effort, in my view, is the first order of business for our industry. We recognize it not only as a patriotic duty but as a great opportunity for this industry to demonstrate both its military and its civilian usefulness.

"The automobile industry's most substantial contribution to national defense grows out of its experience in developing the mass production technique necessary today in building for national security. Automobile plants do not become defense equipment plants over night, but men experienced in automobile production know how to assemble the men, the materials and the machines that defense equipment manufacture on a volume basis requires."

More Strict Control of Scrap Exports Likely

■ Some action will be taken by the administration in connection with iron and steel scrap exports one way or another within the next few days.

National defense advisory commission is reported to have recommended the present executive order which necessitates the obtaining of a license to export No. 1 scrap be extended to cover all classes of scrap.

Two stories are heard in Washington. One is that the present li-

censing system will be extended to all grades of scrap, and the other one is that the administration will put a complete embargo on scrap.

Stories which cannot be confirmed officially in Washington are to the effect that no one who has requested a license to export No. 1 scrap has been turned down.

The President said last Friday that he was not yet ready to take any further action. He said he has received many suggestions from many people, including a scrap-gathering campaign. Experts advise, he added, that this is not yet necessary.

Mr. Roosevelt said he had issued a proclamation requiring licenses for exports of equipment for the production of aviation fuel and for airplane engines and designs.

Conferees Agree on Modified "Draft Industry" Amendment

■ CONFEREES of the house and senate reached an agreement last week on the draft industry amendment to the compulsory military training bill, under which the government could take over plants refusing defense orders. The government must, however, pay a "fair and just" rental for use of plant and machinery and the owner is entitled to sue the United States if compensation is inadequate.

It will be recalled that the senate provided that the President could occupy and operate plants in cases where no satisfactory agreement could be reached with the owner, compensation to be awarded later by federal courts under condemnation procedure. This would result in the permanent acquisition of title to the plants by the government.

As the bill passed the house, the plan proposed by Representative Smith, Connecticut, was accepted under which the plants in such cases would be occupied and operated by the government under lease, the terms of which would be determined by the President, while the offending heads of the organization would be deemed guilty of felony and could be punished by three years in prison and a fine of $50,000. Under this amendment the plants would revert to the original owners at the end of the emergency.

Conferees first wrote into the bill a section requiring the President to declare an "extreme and imperative" emergency and a "public danger, immediate, imminent and impending" before he could draft plants refusing to comply on defense orders. After the President's campaign speech Sept. 11, in which he called for broad powers to conscript industry, the conferees rewrote the section, eliminating the above language.

Treasury Opposes Changes in Excess Profits Bill by Senate

■ OVER opposition of treasury officials, senate finance committee last week favorably reported out a rewritten excess profits tax bill, which is now under consideration on the floor of the upper house.

Tax bill as approved by the house had the treasury's indorsement, but it underwent major revisions in the senate finance committee.

Chairman Harrison of the committee asked Secretary Morgenthau to appear before the committee. It was reported the secretary had to listen to severe criticism of the department's attitude from committee members.

The sections of the bill that provide for five-year amortization of new plant facilities built for national defense and suspension of profit limitations on ship and aircraft contracts received the department's approval.

But the treasury—in a report the secretary presented to the committee—opposed the bill's method of levying excess profits taxes. Under the department's estimate, the bill would yield for current year only $355,000,000 gross. On the other hand, congressional experts estimated the yield at $482,500,000.

According to the treasury figures, the excess profits levy will yield only $115,000,000, and the 3.1 per cent increase in the normal corporation tax will make up the remaining $240,000,000. Because of the adverse effect the tax will have on other sources of income, the net yield is estimated at $305,000,000.

But congressional experts calculated the yield from the excess profits tax at $250,000,000; from normal tax increase at $232,000,000, and net yield at $432,000,000. It was estimated that a selected list of 27 corporations alone would pay $102,000,000 in excess profits taxes this year.

For 1941, the congressional experts estimated a gross yield of $882,000,000; Senator Harrison said it would reach $1,000,000,000.

As the bill now stands, excess profits of the taxpaying corporation will be calculated either by comparing income for the taxable year with average income for the four-year base period, 1936-39, or by comparing ratio of earnings to invested capital for the taxable year, to that for the base period. However, if the taxable year's earnings do not exceed 8 per cent of invested capital, no excess profits tax would be paid.

The treasury has been urging the "invested capital" method as against the "average income" method, on the grounds that the latter would permit many large income corporations to escape.

Special penalties were recommended for those corporations choosing the "average earnings" method. The house approved these penalties, but after the senate committee knocked them out, the treasury decided to withdraw its support of the bill.

It is understood the treasury also did not approve of the 3.1 per cent increase in the normal corporation tax, which the senate committee added to the bill in order to bolster its yield.

NAVY BUYS RISDON PLANT OF COLUMBIA STEEL CO.

The navy department last week purchased the Risdon plant of the Columbia Steel Co., San Francisco, West coast subsidiary of United States Steel Corp., for $1,900,000. Plant will be converted for shipbuilding facilities to be used by the adjacent Union Iron Works of Bethlehem Steel Co. which last week was awarded contracts for 18 destroyers and four cruisers. The Risdon plant was used for shipbuilding during the World war.

SAVAGE ARMS TO EQUIP MACHINE GUN FACTORY

War department has announced the award of a contract on a cost-plus-fixed-fee basis to the Savage Arms Corp., Utica, N. Y., for equipping a machine gun plant at an approximate cost of $17,600,000.

Upon completion of the tooling, which is to be accomplished within 15 months, the Savage Arms Corp. will operate the facilities for the war department under production orders to be announced later. Title to equipment will remain with the government.

Army, Navy Awards $40,062,294; Start $1,251,000,000 Plane Orders

■ UNITED STATES war department last week authorized 21 leading aircraft and engine manufacturers to proceed with procurement of jigs, dies, fixtures and materials for the army aircraft program, although contract details are still unsettled. Program covers 14,394 planes costing about $817,000,000; 28,282 engines costing $377,000,000 and propellers and blades amounting to $57,000,000.

War department last week announced award of the following contracts:

Medical Corps Awards

Acme Shear Co., Bridgeport, Conn., scissors, $14,900.
American Sterilizer Co., New York, sterilizing outfits, $5890.
General Fireproofing Co., Washington, office chairs, $6089.40.
Kelley-Koett Mfg. Co. Inc., New York, X-ray machines, $16,000.
Ritter Dental Mfg. Co. Inc., Rochester, N. Y., dental engines, $17,013.
Servel Inc., New York, refrigerators, $6895.20.
White, S. S., Dental Mfg. Co., Brooklyn, N. Y., dental operating chairs, $26,754.

Signal Corps Awards

Cardwell Allen D., Mfg. Corp., Brooklyn, N. Y., parts for frequency meter sets, telegraph sets, $337,989.50.
General Electric Co., Schenectady, N. Y., radio equipment, $5,297,775.

Ordnance Department Awards

Atwater Mfg. Co., Plantsville, Conn., ammunition components, $24,526.50.
American Car & Foundry Co. Berwick, Pa., drive sprockets, $23,923.20.
Art Wire & Stamping Co., Newark, N. J., ammunition components, $1024.48.
Atlas Powder Co., Wilmington, Del., ammunition components, $24,750.
Auto-Ordnance Corp., New York, small arms $506,812.31.
Barnes, W. F., & John, Co., Rockford, Ill., special tools, $30,365.
Baldwin Locomotive Works, Baldwin Southwark division, East Eddystone, Pa., autographic recorders, $1335.
Brown & Sharpe Mfg. Co., Providence, R. I., milling machines, $40,819.50.
Gurley, W. & L. E., Troy, N. Y., bore inspection equipment, $5000.
Continental Motors Co., Muskegon, Mich., engines, $1,370,311.
Diamond T. Motor Car Co., Chicago, personnel carriers, $8900.
Essley, E. L., Machinery Co., Rockford, Ill., honing, lapping machines, $88,786.
General Steel Casting Co., Eddystone, Pa., armor plate, $11,000.
Goodrich, B. F., Co., Akron, O., segmented tracks, $6500.
Goodyear Tire & Rubber Co. Inc., Akron, O., bushings, blocks, $3014.85.
Hercules Powder Co., Kenvil, N. J., smokeless powder, $545,000.
Triumph Explosives Inc., Elkton, Md., ammunition components, $67,410.
Hudson Motor Car Co., Detroit, ammunition components, $143,824.
Hemp & Co., Macomb, Ill., ammunition components, $76,959.14.
Kilgore Mfg. Co., International Flare-Signal division, Tippecanoe City, O., blinker signals, $105,700.
Kingsbury Machine Tool Corp., Keene, N. H., milling machines, $27,398.
Landis Machine Co. Inc., Waynesboro, Pa., threading machines, $1621.18.
Mathews Mfg. Co., Worcester, Mass., ammunition components, $14,766.35.
National Pneumatic Co., New York, ammunition components, $120,597.
Norris Stamping & Mfg. Co., Los Angeles, ammunition components, $187,842.
New York Thread Grinding Corp., New York, gages, $3755.
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., gages, lathes, $8225.45.
Oliver Farm Equipment Co., Springfield, O., metal packing crates, $764,000.
Precise Tool & Mfg. Co., Farmington, Mich., gages, $3632.
Prentiss, Henry, & Co. Inc., New York, drilling machines, grinders, $20,418.
Star Machine & Tool Co., Cleveland, gages, $4287.
Thorrez & Maes Mfg. Co., Jackson, Mich., ammunition components, $161,250.
Timken Detroit Axle Co., Detroit, parts for artillery carriages, $4513.
Tredegar Co., Richmond, Va., ammunition components, $5317.20.
Ulmer, J. C., Co. Cleveland, gages, $4799.
Vinco Corp., Detroit, gages, $2290.
Vilter Mfg. Co., Milwaukee, artillery weapons, $398,280.33.

Corps of Engineers Awards

Boston & Lockport Block Co., New York, steel blocks, $19,804.12.
Brunswick-Balke-Callender Co., Chicago, chests, $67,359.66.
Collins Co., Washington, machetes, $21,947.85.
Dietzgen, Eugene, Co., Washington, brass alidades, $23,187.50.
DuPont, E. I., De Nemours Co., Wilmington, Del., blasting machines, $10,583.60.
Factory & Yard Supply Co., New York, linemen's belts, climbers, $6354.95.
Keuffel & Esser Co., Hoboken, N. J., mapping equipment, $16,963.
Kilby Steel Co., Anniston, Ala., screw posts, $95,268.14.
Leschens, A. & Sons Rope Co., St. Louis, wire rope, $15,812.
McLane How Co., New York, tools, $9834.05.
Porter, H. K. Inc., Everett, Mass., wire cutters, $25,651.50.
Q-O-S Corp., New York, stereoscopes, $27,832.
Youngstown Sheet & Tube Co., Youngstown, O., wire netting and steel wire, $111,650.

Air Corps Awards

Aero Spark Plug Co., New York, spark plugs $31,569.68.
Air Associates Inc., Garden City, N. Y., electric motors, $59,125.
Allison Engineering Co., Indianapolis, engine parts, $206,955.75.
Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., supercharger and distributor assemblies, meters, $698,448.55.
B. G. Corp., New York, spark plugs, $335,785.40.
Champion Spark Plug Co., Toledo, O., spark plugs, $80,225.02.
Curtiss-Wright Corp., Curtiss Aeroplane division, Buffalo, airplane parts, $97,748.62.
Fairchild Aviation Corp., Jamaica, N. Y., computer assemblies, $98,890.
Jaeger Watch Co. Inc., New York, clock and tachometer assemblies, $105,699.50.
Longines Wittnauer Watch Co. Inc., New York, clock and tachometer assemblies, $72,108.75.
Mallory, P. R., & Co. Inc., Indianapolis, airplane parts, $86,400.
Martin, Glenn L., Co., Baltimore, airplane accessories, $738,555.
North American Aviation Inc., Inglewood, Calif., airplane parts, $270,191.72.
Philadelphia Air Transport Co., Norristown, Pa., roll film dryers, $57,412.
Pump Engineering Service Corp., Cleveland, pumps, parts, $244,226.40.
United Aircraft Corp., Hamilton Standard Propellers division, East Hartford, Conn., propeller assemblies and controls $525,092.80.
Weston Electrical Instrument Corp., Newark, N. J., indicator assemblies, $79,440.

Quartermasters Corps Awards

Bennett, Jos. E., Boston, temporary buildings, Ft. Constitution, N. H., $42,925.
Bridge Metal Products Co. Inc., Brooklyn, N. Y., field safes, $5900.
Browning, C. L. Jr., San Antonio, Tex., recruit reception center, Ft. Sam Houston, Tex., $232,575.
Boestflug, J. C., Miles City, Montana, temporary buildings, Chanute Field, Ill., $1,510,000.
Chicago Bridge & Iron Works, Chicago, elevated steel water tank, Chanute field, Ill., $43,510.
Equitable Equipment Co., New Orleans, steel barges, $37,250.
Federal Motor Truck Co., Detroit, tractor-trucks, $7042.16.
General Motors Corp., Chevrolet division, Detroit, tractor-trucks, trucks, $340,701.82.
Gramm Motor Truck Corp., Delphos, O., semi-trailers, $56,706.21.
Dorsey Bros., Elba, Ala., semi-trailers, $37,684.92.
Highway Trailer Co., Edgerton, Wis., semi-trailers, $5190.
Hill & Combs, San Antonio, Tex., temporary buildings, advanced flying field, San Angelo, Tex., $397,400.
Jacobson Construction Co., Salt Lake City, Utah, air corps hangar and utilities, Salt Lake municipal airport, Utah, $117,347.
Jones, A. Berney, Montgomery, Ala., fire and guard house, Southeast air depot, Mobile, Ala., $63,180.
Kewitt, Peter, Omaha, Neb., temporary buildings, Salt Lake municipal airport, Utah, $279,600.
Lavine Gear Co., Milwaukee, trailers, $988,738.80.
Ley Construction Co., Springfield, Mass., utility buildings, Westover Field, Mass., $12,500.
McCrary, J. B., Engineering Corp.; A. K. Adams & Co., and W. C. Shepherd, Atlanta, Ga., tent camp and utilities at Camp Savannah, Ga., $5,140,122.
McCarthy Bros. Const. Co., St. Louis, barracks, Howard Field, C. Z., $353,470.
McNerney, Harris, Jackson, Mich., electric distribution system, Camp Custer, Mich., $30,920.84.
Miller Auto Cruiser Trailer Co., Sarasota, Fla., recruiting trailers, $23,588.91.
Packard Motor Car Co., Detroit, cars, $39,599.75.
Palmer-Scott Co., New Bedford, Mass., mine yawls, $21,440.
Pease, J. N., Charlotte, N. C., and T. A. Loving & Co., Goldsboro, N. C., temporary buildings and utilities, Ft. Bragg, N. C., $7,786,420.
Pittsburgh Des Moines Steel Co., Pittsburgh, elevated steel water tanks, Camp Custer, Mich., $49,300.
Stettler, Ernest, & Sons Const. Co., Logan, Utah, water distribution system, Hill Field, Ogden, Utah, $63,792.07.
Southwest Boat Corp., Southwest Harbor, Maine, mine yawls, $22,384.
Watt & Sinclair of Florida Inc., Palm Beach, Fla., temporary buildings, Orlando municipal airport, $253,400.
Weddle, Dewey G., & Co., Norfolk, Va., temporary housing, Ft. Eustis, Va., $389,000.
Wheeler Shipyard Inc., Brooklyn, N. Y., mine yawls, $41,250.

(*Please turn to Page* 33)

Purchases Under Walsh-Healey Act

(In week ended August 31)

Iron and Steel Products

	Commodity	Amount
Air Associates Inc., Garden City, N. Y.	Bolts, steel	$25,881.39
Aluminum Co. of America, Washington	Forgings	20,690.87
Aluminum Cooking Utensil Co., New Kensington, Pa.	Field range parts	358,785.55
Astrup Co., Cleveland	Tent slips	12,715.72
Bethlehem Steel Co., Bethlehem, Pa., San Francisco	Forgings, nuts	48,505.90
Carnegie-Illinois Steel Corp., Pittsburgh	Steel	154,047.08
Combustion Engineering Co. Inc., New York	Acid equipment	376,000.00
Crane-O'Fallon Co., Denver	Air-inlet piping	27,000.00
Crucible Steel Co. of America, New York	Tube forgings	40,587.75
Dzus Fastener Co. Inc., Babylon, N. Y.	Fasteners	28,616.15
Foundry Equipment Co., Cleveland	Core, mold ovens	26,400.00
General Drop Forge Co. Inc., Buffalo	Forgings	20,017.68
Harrisburg Steel Corp., Harrisburg, Pa.	Gas cylinders	36,116.06
Hibbard Spencer Bartlett & Co., Chicago	Hardware, plumbing	10,747.61
International Chain & Mfg. Co., York, Pa.	Ventilator assemblies	15,150.52
Judson Steel Corp., Oakland, Calif.	Reinforcement bars	44,756.00
Lansdowne Steel & Iron Co., Morton, Pa.	Shell forgings,	133,518.24
Morris, Wheeler & Co. Inc., Philadelphia	Steel sheet	120,514.31
National Forge & Ordnance Co., Irvine, Pa.	Tube forgings	39,685.80
National Tube Co., New York	Steel tubing	*52,235.50
Oliver Iron & Steel Corp., Pittsburgh	Lifting plugs	16,727.53
Peco Mfg. Corp., Philadelphia	Forgings, machining	295,000.00
Peden Iron & Steel Co., Houston, Tex.	Reinforcement bars	13,723.60
Rainear, C. J., & Co. Inc., Philadelphia	Wrought iron pipe	101,264.26
Ryerson, Joseph T., & Son, Chicago, Cambridge, Mass.	Carbon steel	*79,290.00
Stearns-Roger Mfg. Co., Denver	Pier plates	12,365.00
Struthers Wells-Titusville Corp., Titusville, Pa.	Tube forgings	36,078.00
Timken Roller Bearing Co., Canton, O.	Alloy bar steel	40,939.63
Treadwell Construction Co., Midland, Pa.	Gates, hoisting equip.	39,192.00
Truscon Steel Co., Los Angeles	Reinforcing bars	31,420.00
Vacuum Can Co., Chicago	Vacuum carriers	62,560.00
Weatherhead Co., Cleveland	Couplings, valves	20,583.25
Weirton Steel Co., Weirton, W. Va.	Steel sheets	17,840.51
Wire Rope Corp. of America Inc., New Haven, Conn.	Wire steel rope	*9,651.60
Young & Greenawalt, Chicago	Pipe, bands	20,423.95

Nonferrous Metals and Alloys

Aluminum Co. of America, Washington	Alloys, shapes	$93,698.39
American Brass Co., Waterbury, Conn.	Metals, tubing, cups	429,232.43
Bridgeport Brass Co., Bridgeport, Conn.	Seamless pipe	16,512.50
Caswell, Strauss & Co. Inc., New York	Pig tin	258,150.00
Electro Metallurgical Sales Corp., New York	Ferro-vanadium	14,000.00
Mueller Brass Co., Port Huron, Mich.	Rolled brass	156,423.84
Revere Copper & Brass Inc., Baltimore	Brass copper	31,516.30
Reynolds Metals Co., Louisville, Ky.	Aluminum-alloy	15,265.97
Scovill Mfg. Co., Waterbury, Conn.	Welding rods	13,258.75
Shenango-Penn Mold Co., Dover, O.	Propeller sleeves	15,372.96
Sherwin Williams Co., Washington	Paint cans	15,034.99
Wright Aeronautical Corp., Paterson, N. J.	Alu. alloy, bronze	125,568.60

Machinery and Other Equipment

Allen, H. F., Co. Inc., New York	Hydraulic planer	$13,300.00
Allis-Chalmers Mfg. Co., Milwaukee	Turbine	*969,000.00
Bay City Shovel Co., Bay City, Mich.	Truck shovel	13,386.00
Benrus Watch Co. Inc., New York	Gears	33,000.00
Brown & Sharpe Mfg. Co., Providence, R. I.	Milling machines	27,850.78
Bucyrus-Erie Co., Milwaukee	Shovels	115,370.00
Davenport Machine Tool Co. Inc., Rochester, N. Y.	Screw machines	34,863.00
Euclid Road Machinery Co., Cleveland	Hauling equipment	154,000.00
Ex-Cell-O Corp., Detroit	Drilling machines	12,217.00
General Machinery Corp., Hamilton, O.	Bed sections	19,695.00
Gould & Eberhardt, Newark, N. J.	Gear-cutting mach.	21,953.00
Gray, G. A., Co., Cincinnati	Open-side planer	27,258.00
Hanson-Whitney Machine Co., Hartford, Conn.	Milling machines	11,420.00
Harris, R. L., Inc., Knoxville, Tenn.	Tournapulls,	102,400.00
Illinois Tool Works, Chicago	Gear meas. mach.	10,406.50
Ingersoll-Rand Co., Knoxville, Tenn.	Air compressors	14,190.00
Jones & Lamson Machine Co., Springfield, Vt.	Automatic lathes	11,277.00
Kearney & Trecker Corp., Milwaukee	Milling machines	29,002.00
Lapointe Machine Tool Co., Hudson, Mass.	Broaching equip.	73,657.50
Lidgerwood Mfg. Co., Elizabeth, N. J.	Windlass, steer. gr.	105,991.00
Lynch, Edward A., Machinery Co., Philadelphia	Drilling machines	17,065.20
Machinery Sales Co., San Francisco	Metal planer	12,500.00
Manufacturers' Supply Co., Washington	Air cond. units	*12,587.00
Marshall & Huschart Mach. Co. of Ind., Indianapolis	Millers, shapers	245,753.10
McKiernan-Terry Corp., Dover, N. J.	Putteeing mach.	23,710.00
Monarch Machine Tool Co., Sidney, O.	Lathes	17,615.76
Moore Machinery Co., San Francisco	Mill. mach., drill	19,113.00
Morton Mfg. Co., Muskegon Heights, Mich.	Profiling machines	113,000.00
National Acme Co., Cleveland	Machine tools	42,178,00
Niles-Bement-Pond Co., Hartford, Conn.	Machinery	51,211.00
North Brothers Mfg. Co., Philadelphia	Hand drill	16,950.00
Prentiss, Henry, & Co. Inc., New York	Grinding machines	13,986.00
Sellers, William, & Co. Inc., Philadelphia	Drilling machine	35,805.00
Sullivan Machinery Co., Knoxville, Tenn.	Air compressors	45,000.00
Thompson Grinder Co., Springfield, O.	Grinding machines	46,200.00
Vickers Inc., Detroit	Hydraulic pumps	185,754.80
Warner & Swasey Co., Cleveland	Turret lathes	17,112.00
Western Machine Tool Works, Holland, Mich.	Shapers	16,173.00
GRAND TOTAL		$6,179,696.83

*Estimated.

Army, Navy Awards

(*Continued from Page* 32)

United States navy department last week announced the following contract awards:

American Brass Co., Waterbury, Conn., spur grommets, $26,892.84.

General Fire-proofing Co., Washington, aluminum chairs, $40,717.

Hager, C., & Sons Hinge Mfg. Co., St. Louis, hinge hasps, $7115.85.

Kennecott Sales Corp., New York, ingot copper, $44,200.

National Supply Co., Holmesburg, Philadelphia, diesel engines, $274,585.15.

Sargent & Co., New Haven, Conn., bolts and hooks, $16,800.97.

Bureau of Yards and Docks Awards

Marboefer Jr., E. H., Co., Chicago, heating plant, barracks and subsistence building at naval training station, Great Lakes, Ill., $147,990.

Bureau of Supplies and Accounts Awards

Baldt Anchor Chain & Forge Corp., Chester, Pa., steel anchors, $95,100.

Brown & Sharpe Mfg. Co., Providence, R. I., grinder machines, $14,736.10.

Buffalo Bolt Co., North Tonawanda, N. Y., bolts, $10,140.35.

Chambersburg Engineering Co., Chambersburg, Pa., air hammers, $10,590.

Commercial Acetylene Supply Co. Inc., New York, acetylene cylinders, $9000.

Continental Machines Inc., Minneapolis, metal cutting machines, $8107.55.

Curtiss Wright Corp., Curtiss Aeroplane division, Buffalo, airplanes, $11,476,633.60.

Dravo Corp., Neville Island branch, Pittsburgh, open lighters, $176,455.

Edison, Thomas A., Inc., West Orange, N. J., thermometer indicators, $27,540.

Electric Auto-Lite Co., American Wire division, Port Huron, Mich., magnet wire, $14,668.06.

Frick-Gallagher Mfg. Co., Wellston, O., metal shelving, $5394.08.

Gary Steel Products Corp., Norfolk, Va., mooring buoys, $15,990.

General Electric Co., West Lynn, Mass., tachometer generators, $352,030.

General Motors Corp., Cleveland diesel engine division, Cleveland, crankcase, $6000.

Gibbs Gas Engine Co. of Fla., Jacksonville, Fla., boats, $79,200.

Gould & Eberhardt, Newark, N. J., shapers, $5393.

Hoover Ball & Bearing Co., Ann Arbor, Mich., ball bearings, $8491.58.

Ingersoll-Rand Co., Phillipsburg, N. J., air compressors, $720,765.

Interior Steel Equipment Co., Washington, steel shelving, $8995.50.

J. K. Welding Co. Inc., Long Island City, N. Y., covered lighter, $21,600.

Kearney & Trecker Corp., Milwaukee, milling machines, $46,535.60.

Kidde, Walter, & Co. Inc., New York, steel cylinders, $31,334.31.

Kollsman Instrument division of Square D Co. Inc., Elmhurst, N. Y., tachometer generators, $52,250.

Lidgerwood Mfg. Co., Elizabeth, N. J., steering gear, $846,756.

Lindberg Engineering Co., Chicago, electric furnaces, $11,320.

Link-Belt Speeder Corp., Cedar Rapids, Iowa, crawler type cranes, $19,378.

Mine Safety Appliances Co., Pittsburgh, masks and refills, $47,498.50.

Nathan Mfg. Co., New York, water-gage-glass fittings, $11,212.50.

National Machine Products Co., Detroit, brass nuts, $21,504.28.

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., jig borer machines, $19,440.

Pacific Car & Foundry Co., Seattle, covered lighter, $40,500.
Pacific Dry Dock & Repair Co., San Francisco, covered lighter, $43,868.
Palo-Myers Inc., New York, boiler-water testers, $8193.48.
Pioneer Instrument division of Bendix Aviation Corp., Bendix, N. J., tachometer generators, $51,000.
Radium Chemical Co. Inc., New York, radium element, $10,000.
Reed & Prince Mfg. Co., Worcester, Mass., wood screws, $23,616.44.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., bolts and nuts, $52,911.46.
Schutte & Koerting Co., Philadelphia, water-jet pumps, $24,772.
Seattle Chain & Mfg. Co., Seattle, boat chains, $6707.20.
Sellers, William, & Co. Inc., Philadelphia, boring, drilling and milling machines, $54,646.
Shipley, W. E., Machinery Co., Philadelphia, bench lathes, $5997.50.
Standard Nut & Bolt Co., Valley Falls, R. I., bolts, $13,664.24.
Taylor-Wharton Iron & Steel Co., Easton, Pa., gas cylinders, $21,167.
Thew Shovel Co., Lorain, O., crane truck, $13,730.
United States Pipe & Foundry Co., Bessemer, Ala., water pipe, $89,837.86.
Wadell Engineering Co., Newark, N. J., rod boring fixtures, $11,193,47.
Warner & Swasey Co., Cleveland, turret lathe, $6259.
Weston Electrical Instrument Corp., Newark, N. J., thermometer indicators, $27,150.

Canadian Contracts for Week Total $9,750,352

TORONTO, ONT.

■ Contracts totaling $9,750,352 were awarded in the week ended Sept. 10, according to C. D. Howe, minister of munitions and supply, Ottawa. Ontario Hughes-Owens Co. Ltd., Ottawa, received a $1,102,439 contract for aircraft supplies; Anaconda American Brass Ltd., an order for $1,076,582 worth of munitions. Other orders include:

Mechanical Transport: General Supply Co., Ottawa, $13,173; General Motors Products of Canada, Oshawa, $13,723; Chrysler Corp. of Canada Ltd., Windsor, Ont. $27,247; Gar Wood Industries Ltd., Windsor, $34,384.

Aircraft Supplies: Canadian General Electric Co. Ltd., Ottawa, $41,489; Instruments Ltd., Ottawa, $359,000; Auto Electric Service Co. Ltd., Toronto, $9173; Gutta Percha & Rubber Co. Ltd., Toronto, $12,109.

Machinery & Tools: Hugh Carson Co., Ottawa, $6300; Miss-Can-Ada Mfg. Co., Ottawa, $19,323; Sutton Horsley Co., Toronto, $64,200.

Electrical Equipment: Northern Electric Co. Ltd., Ottawa, $18,302; Burlee Ltd., Scarboro Jct., Ont., $5129; L. A. Wilmot, Toronto, $15,092.

Miscellaneous: General Steel Wares Ltd., Ottawa, $14,000; National research council, Ottawa, $14,000.

Construction: Dibble Construction Co., Ottawa, $24,050; Ontario Construction Co., St. Catharines, Ont., $117,520; Stewart Construction Co. Ltd., Sherbrooke, N. S., $334,248; Howard A. Keddy, Liverpool, N. S., $32,250; Dessereau Ltd., Montreal, $227,149; Victoria Pile Driving Co. Ltd., Victoria B. C., $100,500; Latimer Construction Co. Ltd., Vancouver, B. C., $175,000; Smith Bros. & Wilson Ltd., Vancouver, $65,040; Maxwell Construction Co. Ltd., Vancouver, $124,956; P. W. Graham & Sons Ltd., Moose Jaw, Sask., $345,000; Claydon Co. Ltd., Winnipeg, $532,000; Carter-Halls-Aldinger Co. Ltd., Vancouver, $12,000; Komo Construction Co., Quebec, $242,500; John F. Flood & Sons, St. John, N. B., $125,500; E. A. Jones, Leaside, Ont. $64,500; Northern Construction Co. and J. W. Stewart Ltd., Vancouver, $181,000; Ryan Construction Ltd., Toronto, $102,500; Atlas Construction Co. Ltd., Montreal, $955,000.

Defense Commission Outlines Principles Governing Awards

■ PRESIDENT Roosevelt last week sent a message to congress outlining principles adopted by the defense commission governing letting of defense contracts and statement of labor requirements. Said the commission:

"The essence of the preparedness program is the getting of an adequate supply of materials of the proper quality in the shortest space of time possible. Considerations of price alone are highly important, but in the emergency are not governing."

Principles set forth:

"1.—Speed of delivery of all items on the defense program is essential. This means: (a) That orders should be placed in such a manner as to insure the most efficient use of each particular facility from the point of view of the program as a whole; (b) that proper consideration should be given to contributory industries, such as the machine tool industry, to avoid creating underlying bottlenecks; (c) that once delivery dates are fixed, assurance be given that they will be met by the supplier.

"2.—Proper quality is also of prime importance. It is therefore necessary to determine first of all whether or not the supplier can meet the quality requirements as specified. There should be a willingness on the part of both the army and navy, on the one hand, and of the supplier on the other, to adjust specifications on a co-operative basis in order that such specifications may come as near as possible to meeting commercial standards while at the same time filling the military requirements.

"3.—Price, while not the sole consideration, is of outstanding significance and every effort must be made to secure a fair price. This must take recognition, among other things, of determination of proper cost factors.

"4.—The impact of the defense program upon the consumers must be recognized. This relates to such factors as: (a) due regard to the necessity of protecting civilian needs and morale; (b) proper health and housing conditions among employes; (c) consideration to possible off-season production in order to dovetail the military program into production for civilian requirements.

"5.—Adequate consideration must be given to labor. This means compliance with the principles on this subject stated by the commission in its release of Aug. 31, (STEEL, Sept. 9, p. 31).

"6.—Undue geographic concentration of orders should be avoided, both as to procurement districts and as to industrial sections.

"7.—Financial responsibility of the supplier should be examined. Ability to post a bond does not necessarily dispose of this problem. The probability should exist that the supplier will be able to continue in business, at least long enough to complete his contract satisfactorily.

"8.—The avoidance of congestion of transportation facilities should be sought. The same applies to warehousing facilities.

"9.—Due consideration should be given to the adequacy of power facilities, particularly where furnished by public utilities.

"10.—A general preference should be given to firms having experience with educational orders.

"11.—The moral responsibility of the supplier is important, and in some respects, fundamental.

"12.—The commission recognizes that competitive bidding is the better procedure in certain types of industry and circumstances. However, it is often impossible to make sure that the principles outlined above are followed when contracts are placed on the basis of price alone and are let to the lowest bidder. Therefore, in cases where competitive bidding will not fulfill the above stated needs of national defense, the commission recommends that the use of the negotiated contract be authorized where necessary."

U. S. To Make Hundred Million Shells In 1941

■ One hundred million shells of various sizes will be produced in the United States next year, according to Lieut. Col. A. B. Johnson, United States army, office of the assistant secretary of war. American manufacturers may expect orders soon for their share of this program, he stated, in presiding at a meeting devoted to shell manufacture held in Pittsburgh Sept. 11 under the auspices of the Pittsburgh section, American Society of Mechanical Engineers.

Col. B. O. Lewis, assistant to the chief of ordnance, war department,

said the national defense program is just getting under way. Currently, demand for forging presses and for machine tools necessary for the various machining operations far exceeds the ability of machine tool builders to produce. However, according to Colonel Lewis, shell manufacture in large quantity is expected by the end of the first quarter of 1941. Chief difficulty facing American industry is the fact that British defense orders as well as American are being unloaded on manufacturers, with varying specifications and as a result co-ordination is difficult.

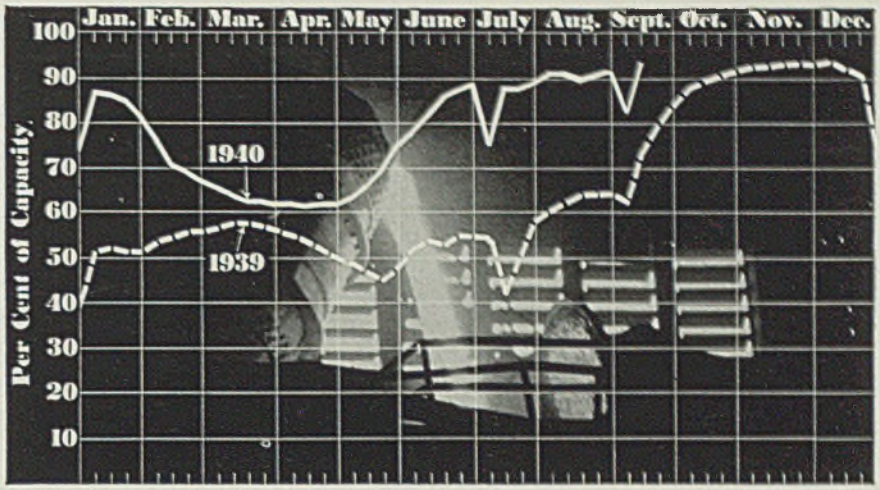
Hydraulic and mechanical methods of producing shell forgings were outlined by Frederick G. Schranz, general manager, Baldwin-Southwark division, Baldwin Locomotive Works. Presses of various types were described, their needs and capacities. J. H. Friedman, vice president, National Machinery Co., Tiffin, O., described operation of that company's forging machines in shell manufacture and evoked considerable discussion.

R. S. Marthens, manager, gearing division, Westinghouse Electric & Mfg. Co., Pittsburgh, outlined some of the work that company has been doing in shell manufacture as well as indicating the percentage of Westinghouse capacity which has been turned over to national defense purposes.

Maj. E. C. Bomar, United States army, Frankford arsenal, showed motion pictures of the complete process of shell manufacture at the arsenal and described each step in detail.

"Modern Methods of Shell Machining", a resume of his observations of shell manufacture in European countries in 1938, was given by E. P. Blanchard, sales manager, The Bullard Co., Bridgeport, Conn. Mr. Blanchard emphasized the necessity for heavier, more rugged machine tools to stand the pace of high speed shell manufacture. He complimented the army ordnance designers on their work, comparing the ease of attaining high speed production on American shells with some of the difficulties met with in making British shells. The extent to which German machine tools dominated the European munitions scene was also stressed by Mr. Blanchard. Discussion on this paper was led by J. D. Cartin, New York Air Brake Co., Watertown, N. Y.

Eric Oberg, editor, *Machinery*, was chairman of a round table conference held in the evening. Opening discussion subject was "Should Shell Cavities Be Forge Finished?", prepared by Lucien I. Yeomans, Lucien I. Yeomans Inc., and presented by Donald L. Derrom, vice president, Apex Electric Mfg. Co., Cleveland.



PRODUCTION... Up

■ STEELWORKS operations last week snapped back vigorously to 93 per cent, 11 points above the preceding week when production was reduced during Labor day. Nine districts advanced; two were unchanged; one reduced. One year ago the rate was 79 per cent; two years ago, 48.

Pittsburgh—Rebounded to 87 per cent, an increase of 15 points. No substantial changes are indicated.

Wheeling—Advanced 18 points to average 98 per cent.

Chicago—Averaged 97.5 per cent, up 13 points from Labor day week.

Interlake Iron Corp. relighted B stack of its Federal group last Thursday. This stack was idle several months.

Cleveland—Regained 8 points to average 89 per cent, with indications of a higher rate this week.

Central eastern seaboard—Up 11.5 points to 90½ per cent, with higher schedule considered likely before end of month.

Youngstown, O.—Up 11 points to 86 per cent, with three bessemers and 65 open hearths active. Republic Steel Corp. took off two open hearths last Friday, with indications of a drop to 84 per cent this week.

St. Louis—Unchanged at 80 per cent for the third consecutive week, 20 out of 28 open hearths active.

Detroit—Up 1 point to 95 per cent, with 25 of 26 open hearths in production. No slackening from this rate is in prospect.

Birmingham, Ala.—Gained 5 points to 93 per cent, as Republic Steel Corp. put its eighth and last furnace in operation at Gadsden, making a total of 22 open hearths active.

Buffalo—Unchanged at 90½ per cent with 39 open hearths active. Bethlehem Steel Co.'s Lackawanna plant has 28 open hearths active. The River road plant of Wickwire Spencer Steel Co. is expected to have its fourth and only inactive furnace ready for operation within the week.

Cincinnati—Gained 14 points to 82 per cent, 19 open hearths producing.

New England—Down ten to 75, more open hearths off for repairs.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Sept. 14	Change	Same week 1939	Same week 1938
Pittsburgh	87	+15	70	36
Chicago	97.5	+13	67	41.5
Eastern Pa.	90.5	+11.5	57	33
Youngstown	86.0	+11	75	46
Wheeling	98	+18	86	56
Cleveland	89	+ 8	83	48.5
Buffalo	90.5	None	67	49
Birmingham	93	+ 5	80	57
New England	75	−10	75	60
Cincinnati	82	+14	68	65
St. Louis	80	None	62	42
Detroit	95	+ 1	99	67
Average	93	+11	74	46

Pittsburgh Steel Making New Tubular Railway Axle

■ Pittsburgh Steel Co., Pittsburgh, has announced a new tubular railroad axle said to weigh 30 per cent less than corresponding solid axles. Axle is interchangeable with solid types and is claimed to possess increased loading capacity with a greater factor of safety.

Tubular axle is said to have a fatigue strength 25 per cent greater than that of a corresponding 5½ × 10-inch solid axle. On a four-axle freight car, reduction in truck weight is claimed to be about 1000 pounds and on a pullman-type car, 1500 pounds.

What We Pay For Social Security

11 Per Cent of Total Taxes; $32 Per Shareholder; $66 Per Employe

■ SOCIAL security taxes paid by 180 representative American corporations last year constituted 11 per cent of their total tax bill, according to an analysis by American Federation of Investors Inc., Chicago.

The total old age benefit and unemployment compensation taxes assessed against the 180 companies was $218,185,297, equal to 32 cents for each share of stock issued, and an average of $32 for each stockholder. Average cost per employe was $66.

These figures include only the social security taxes paid by the companies and do not include those paid by employes.

Accompanying tabulation shows the wide spread in the ratio of social security taxes to total taxes —from more than 50 per cent to less than 1 per cent. Various factors account for the variations between companies, such as difference in the state rate for unemployment compensation, the experience or merit rating provided in some states where employers are given special incentive to keep unemployment at a minimum, and the railroad retirement tax paid by the carriers.

Will Reach Maximum Rate in 1949

Old age benefit taxes will increase as the years pass. From the present minimum, 1 per cent each on employer and employe, the rate will increase to 3 per cent on each in 1949, or treble the present rate. By 1943, the rate will be double.

The heavy increase in taxes paid by industry during recent years is due in increasing part to the payroll taxes. For example, the 1939 report of the Western Union Telegraph Co. points out that 1939 taxes chargeable to operations amounted to an increase of 75 per cent over 1935, the year before social security taxes. Payroll levies now constitute nearly 40 per cent of the company's total tax bill.

Social security taxes paid by the companies listed last year amounted to 20.7 per cent of the amount paid to common stockhold-

(*Please turn to Page* 37)

Name of Company	Old-Age Benefit and Unemployment TAXES for 1939	Per Cent of Company's Total Taxes	Average Cost per Share	Average Cost per Stockholder	Average Cost per Employe
Acme Steel Company	$ 185,948	24.7%	$ .57	$ 54	$ 62
Air Reduction Company, Inc.	297,762	16.1	.12	23	75
Allegheny Ludlum Steel Corp.	455,742	36.8	.35	47	65
Allis-Chalmers Mfg. Co.	983,465	28.7	.55	54	75
American Bosch Corporation	70,593	49.2	.10	59	67
American Can Company	1,304,343	15.0	.45	37	60
American Cyanamid Company	602,966	24.4	.20	29	65
Amer. Rad. & Std. Sanitary Corp.	1,017,100	29.9	.10	19	63
American Rolling Mill Co.	1,160,207	38.1	.35	27	75
Amer. Smelting & Refining Co.	707,000	9.8	.26	25	25
American Steel Foundries	301,256	28.7	.25	28	63
American Tel. & Tel. Co.*	19,090,544	12.0	.96	27	73
American Tobacco Company	726,311	0.5	.14	12	37
Am. Wat. Wks. & Elec. Co., Inc.*	597,820	7.3	.24	32	68
Amer. Zinc, Lead & Smelt. Co.*	80,712	36.2	.11	15	57
Armour and Company	2,959,531	34.2	.57	36	58
Armstrong Cork Company	584,657	27.3	.40	63	60
Atlantic Refining Company	846,002	2.6†	.30	25	69
Atlas Powder Company	175,552	26.9	.55	39	67
Baldwin Locomotive Works*	491,810	20.4	.45	36	72
Baltimore and Ohio Railroad Co.	4,217,819	38.4	1.34	107	113
Beatrice Creamery Company	352,073	26.0	.74	48	61
Bendix Aviation Corporation	644,127	33.8	.31	29	67
Bethlehem Steel Corporation	6,299,196‡	29.7	1.30	86	66
Borden Company	1,792,500	26.7	.41	38	64
Borg-Warner Corporation	731,858	26.4	.31	42	71
Bristol-Myers Company	56,728	6.0	.08	4	138
Brunswick-Balke-Collender Co.	156,749	18.6	.33	66	63
Bucyrus-Erie Company	178,284	23.2	.14	17	74
Burroughs Adding Machine Co.	697,645	28.1	.14	40	69
Butler Brothers	362,176	33.2	.26	21	60
Case (J. I.) Company	300,495	33.1	1.01	82	62
Caterpillar Tractor Co.	767,082	31.9	.41	46	72
Celanese Corporation of America	492,754	19.5	.37	52	49
Certain-Teed Products Corp.	163,590	44.9	.23	24	60
Chi. and North Western Ry. Co.	2,790,309	45.1	1.54	165	110
Chrysler Corporation	4,167,554	13.5	.96	85	69
Cities Service Company*	1,492,288	8.2	.33	2	62
City Ice & Fuel Company	311,000	18.3	.23	25	78
Colgate-Palmolive-Peet Company	509,178	6.3	.24	34	48
Columbia Gas & Electric Corp.*	790,570	6.2	.06	11	54
Commercial Solvents Corporation	85,168	.4†	.03	3	73
Commonwealth Edison Co.*	1,168,523	4.4	.11	13	70
Condé Nast Publications Inc.*	136,903	57.2	.42	137	86
Consol. Edison Co. of N.Y., Inc.*	2,990,736	5.5	.22	23	81
Continental Baking Company	861,305	28.6	.32	43	69
Continental Can Company, Inc.	818,737	25.0	.27	22	54
Continental Motors Corporation*	100,681	45.3	.04	4	72
Corn Products Refining Company	373,199	10.7	.13	18	81
Crane Co.	900,000	24.9	.35	75	54
Crown Cork & Seal Co., Inc.	275,236	27.1	.37	38	60
Crown Zellerbach Corporation	422,858	15.4	.15	19	53
Curtis Publishing Company	384,571	29.8†	.16	22	101
Cutler-Hammer, Inc.	206,034	39.7	.31	69	66
Detroit Edison Company	636,229	7.3	.50	43	97
Devoe & Raynolds Co., Inc.*	77,001	36.3	.45	36	45
Diamond Match Company	265,601	18.9	.20	30	49
Douglas Aircraft Company, Inc.	528,122	30.7	.88	81	70
Du Pont (E.I.) de Nemours & Co.*	3,673,000	16.8	.29	47	83
Eastman Kodak Company	1,763,867	20.6	.70	43	69
Electric Auto-Lite Company	699,734	28.4	.58	54	58
Electric Storage Battery Company	300,612	20.3	.33	21	63
Firestone Tire & Rubber Co.*	1,569,000	12.1	.65	55	53
First National Stores Inc.	621,763	31.0	.76	67	46
Food Machinery Corporation	92,442	20.6	.21	30	62
General Foods Corporation	842,759¶	15.2	.16	12	76
General Mills, Inc.	562,091	18.2	.63	57	77
General Motors Corporation*	15,322,000	15.0	.34	40	79
General Theatres Equip. Corp.*	64,106	25.7	.11	11	75
General Tire & Rubber Co.	217,780	11.3	.40	81	65
Gillette Safety Razor Company	74,908	2.6	.03	3	22
Grant (W. T.) Company	512,941	13.8	.33	118	28
Hat Corporation of America	161,842	41.9	.33	68	60
Holland Furnace Company	185,439	29.0	.41	69	37
Houdaille-Hershey Corporation	249,301	27.9	.26	26	50
Hudson Motor Car Company	625,391	20.9	.39	61	70
Illinois Central Railroad Co.	2,939,301‡	28.9	1.90	164	103
Inland Steel Company	1,258,238	24.4	.77	171	73
Interlake Iron Corporation	114,649	23.5	.06	15	65
International Shoe Co.	1,273,981	38.4	.38	169	42
Jewel Tea Co., Inc.	196,637	17.3	.70	42	54
Johns-Manville Corporation	651,750	30.8	.70	82	59
Kelsey-Hayes Wheel Company	237,170	42.2	.43	62	75
Kennecott Copper Corporation	1,012,971	8.4	.09	13	39
Kimberly-Clark Corporation	214,958	16.2	.37	81	43
Kresge (S. S.) Company	977,885	12.9	.18	42	32
Kress (S. H.) & Company	433,136	10.5	.14	104	33
Kroger Grocery & Baking Co.	1,355,256	10.2†	.74	54	62
Lehigh Valley Coal Corporation	395,702	25.0	.28	29	56
Libbey-Owens-Ford Glass Co.	451,127	17.8	.18	32	68
Libby, McNeill & Libby	430,421	21.1	.12	35	40
Liquid Carbonic Corporation	225,731	35.7	.32	31	75
Long-Bell Lumber Company	267,487	44.9	.80	35	54
Loose-Wiles Biscuit Company	523,641	41.7	.93	87	55

Name of Company	Old-Age Benefit and Unemployment TAXES for 1939	Per Cent of Company's Total Taxes	Average Cost per Share	Average Cost per Stock-holder	Average Cost per Employe
Louisville and Nashville R.R. Co.	$ 2,434,021	29.9 %	$ 2.08	$ 339	$ 104
McCall Corporation	150,253	34.7	.28	35	74
McCrory Stores Corporation	254,913	17.7	.25	90	25
McGraw-Hill Publishing Co., Inc.	132,756	28.3	.22	88	96
McLellan Stores Company	149,032	32.2	.20	55	25
Mead Corporation	200,764	31.6	.29	48	49
Mengel Company	133,235	45.4	.28	27	34
Mesta Machine Company	43,823	3.7	.04	7	18
Minneapolis-Honeywell Reg. Co.	152,265	19.3	.23	35	47
Missouri Pacific Railroad Co.	2,303,825	40.7	1.49	268	105
Mohawk Carpet Mills, Inc.	218,577	25.0	.40	65	46
Monsanto Chemical Company	418,420	16.7	.31	35	67
Montgomery Ward and Co., Inc.	2,417,672	19.0	.45	41	49
Motor Wheel Corporation	181,558	24.8	.21	21	71
Mullins Manufacturing Corp.	119,447	52.8	.21	49	59
Nash-Kelvinator Corporation	169,295	5.3†	.04	4	14
National Biscuit Company	1,067,000	15.4	.16	19	56
National Cash Register Company	716,754	40.2	.44	38	39
National Dairy Products Corp.	2,547,589	30.1	.40	35	70
National Gypsum Company	140,044	25.7	.11	20	58
National Supply Company	462,762	32.3	.27	77	71
Natomas Company	23,672	6.2	.02	8	75
Neisner Brothers, Inc.	120,012	10.5	.53	96	28
New York Central Railroad Co.	9,721,849	30.2	1.51	157	111
Niagara Hudson Power Corp.	799,074	5.1	.08	10	70
North American Company*	1,018,585	5.2	.10	14	55
Ohio Oil Company, Inc.	324,000	3.2†	.05	9	57
Otis Elevator Company	515,181	35.2	.25	41	43
Owens-Illinois Glass Company	949,068	26.2	.36	96	62
Pacific Gas and Electric Co.	941,000	5.2	.08	10	74
Packard Motor Car Company	811,148	22.8	.05	7	72
Penney (J. C.) Company	1,192,639	16.8	.47	68	29
Pennsylvania Railroad Company	5,823,316	14.5	.44	28	58
Peoples Gas Light and Coke Co.	359,731	6.6	.55	26	77
Phelps Dodge Corporation	686,841	12.4	.14	37	62
Phoenix Hosiery Company	100,315	28.4	.49	120	30
Pillsbury Flour Mills Company	232,000	24.2	.42	39	73
Pittsburgh Screw and Bolt Corp.	109,201	33.8	.07	10	67
Public Service Corp. of N.J.*	1,442,377	5.9	.20	17	70
Pullman Incorporated*	2,109,054	41.0	.55	61	79
Quaker Oats Company	243,142	14.2	.28	31	59
Radio Corporation of America	1,511,413	31.6	.10	6	73
Real Silk Hosiery Mills, Inc.	59,594	16.9	.31	35	17
Republic Steel Corporation	3,283,000	34.3	.53	54	66
Revere Copper and Brass Inc.	426,426	35.6	.48	104	65
Ruberoid Co.	163,369	38.4	.41	121	58
Rustless Iron and Steel Corp.	54,544	14.8	.06	6	77
Sears, Roebuck and Co.	3,789,753	20.1	.67	72	66§
Servel, Inc.	224,145	11.2	.13	18	68
Shattuck (Frank G.) Company	326,518	32.7	.26	47	47
Sheaffer (W. A.) Pen Company	74,039	28.5	.46	32	65
Shell Union Oil Corporation*	2,260,539	2.8†	.17	111	90
Silver King Coalition Mines Co.	20,992	15.0	.02	8	44
Socony-Vacuum Oil Co., Inc.	3,042,904	2.6†	.10	27	53
Southern Calif. Edison Co. Ltd.*	313,214	3.9	.05	3	73
Spiegel, Inc.	210,879	24.7	.15	31	41
Standard Brands Incorporated	693,762	8.8	.05	6	67
Standard Oil Company (Ind.)*	2,393,217	2.3†	.16	24	77
Standard Oil Company (N.J.)	4,074,381	3.4†	.15	31	83
Stewart-Warner Corporation	318,455	30.0	.26	19	59
Sun Oil Company*	1,198,041	3.3†	.50	155	77
Swift & Company	3,619,625	36.5	.61	61	60
Texas Corporation	2,032,225	1.9†	.19	23	65
Texas Gulf Sulphur Company	70,000	2.4	.02	2	100
Tide Water Associated Oil Co.	840,120	2.5†	.12	28	78
Timken-Detroit Axle Company	269,600	21.3	.27	29	80
Transcont'l & Western Air, Inc.	124,478	53.2	.15	5	80
Union Bag & Paper Corp.	190,919	35.6	.15	59	49
Union Oil Company of Calif.	669,000	4.1†	.14	24	74
Union Pacific Railroad Co.	3,940,410	22.8	1.22	79	113
United Carbon Company	46,692	5.6	.12	12	65
United Drug, Inc.	690,511	41.3	.51	37	45
United Gas Improvement Co.	776,714‡	4.8	.03	6	61
United States Rubber Company	2,186,751	12.0†	.92	111	57
United States Steel Corporation	14,818,056	22.1	1.20	68	66
Van Raalte Company, Inc.	164,675	38.8	1.13	135	39
Walgreen Company*	502,274	16.2	.36	46	40
Western Union Tele. Co., Inc.	2,212,000	37.2	2.12	76	51
Westinghouse Air Brake Co.	361,300	25.8	.11	16	64
Westinghouse Electric & Mfg. Co.	3,125,226	30.1	1.17	72	71
White Motor Company	253,117	25.2	.41	46	74
Woolworth (F. W.) Co.	2,111,586	17.5	.22	33	31
Worth'g't'n Pump & Mach. Corp.	300,991	44.9	.76	57	70
Yellow Truck & Coach Mfg. Co.	113,490	4.3	.04	9	19
Young (L.A.) Spr'g & Wire Corp.	250,925	45.8	.61	76	56
Youngstown Sheet & Tube Co.	1,494,000	34.8	.82	122	70
TOTAL for 180 Companies	$218,185,297				
Average per Company		10.9%	$ .32	$ 32	$ 66

*Includes subsidiaries. †Total tax figure used included excise taxes amounting to more than 50 per cent of total. ‡Includes railroad retirement taxes. §Approximately. ‡Does not include Social Security taxes charged to accounts other than operating. §Based on number of regular employes; $52 per employe when 15,317 extra employes are included. NOTE: Old-age insurance taxes shown in this tabulation do not include the portion paid by workers under the law.

Cost of Social Security

(*Concluded from Page 36*)

ers as wages for their capital. In many cases the percentage is much higher. Republic Steel Corp., for example, paid nearly as much in social security taxes as in all dividends.

Average dividend per common share for the 180 companies was $1.64. Average social security tax per common share was 34 cents, and for both common and preferred, 32 cents. Each common stockholder's portion of these taxes averaged $36, while the average for common and preferred stockholders was $32.

Steel producers' payments per employe are near or slightly above the average for all companies.

Republic Steel Corp. Announces Appointments

■ Harry J. Sweeney has been appointed chief metallurgist, Youngstown, O., district, Republic Steel Corp., Cleveland. Prior to joining Republic in 1936 he was assistant superintendent, open-hearth department, Carnegie-Illinois Steel Corp.

E. A. Schwartz, the past 17 years open-hearth superintendent, Brier Hill plant of Youngstown Sheet & Tube Co., has been named full-time chairman of Republic's open-hearth committee.

Walter S. Scott, heretofore assistant superintendent of Republic's electric weld tube mill, has become superintendent, Bessemer department, Youngstown.

Clayton W. Morehead has been made assistant superintendent of the open-hearth, 40-inch, 21 and 18-inch mills, Youngstown district. He joined the corporation in 1933 and in 1934 was named turn foreman, electric weld tube mill.

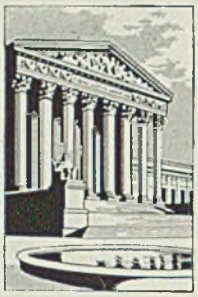
Wade R. Weaver, since last February superintendent of open-hearth blooming mills, Youngstown, has become assistant superintendent, open-hearth furnaces.

Central Properties Sold To Associated Metals

■ Purchase of coal and iron ore properties, a blast furnace and a by-products plant from the Central Iron & Coal Co., Holt, Ala., by Associated Metals & Minerals Corp., 40 Rector street, New York, has been confirmed by federal district court, according to dispatches from Birmingham. Central has been in general equity receivership since Jan. 1.

Associated Metals is reported to be the American subsidiary of Lissauer & Co., formerly of Cologne, Germany, and more recently of Amsterdam and London.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

Congress Completes Action on "Railroad Relief" Bill. May Locate New Tin Smelting Industry in New Jersey. Senate Approves Increase in Bank's Lending Authority. President Nominates Jones Secretary of Commerce.

WASHINGTON

■ CONGRESS completed legislative action last week on the so-called railroad relief bill, S.2009, when senate adopted the revised conference report previously approved by the house.

As finally agreed upon the bill amends parts I (railroads) and II (motor carriers) of the interstate commerce act and adds part III, regulating water carriers. A third title embraces three miscellaneous matters.

First of these provides for a board of investigation and research composed of three members appointed by the President and confirmed by the senate. Board would investigate: Relative economy and fitness of the three types of carriers; extent of public subsidies to each; extent of taxes on such carriers; any other matter "which it may deem important . . . to effectuate the national transportation policy."

The board would be required to submit a preliminary report to congress on or before May 1, 1941. Its tenure would be for two years from date of enactment of the law, unless extended by the President for not more than two additional years.

This study parallels somewhat a transportation study now being made by the national resources planning board, directed by Owen D. Young, former General Electric Co. head. Latter study is concerned largely with analyzing information already available.

Principal objective of the so-called Young study is wise and fullest development of the nation's natural and human resources. A recent progress report mentioned among transportation problems: Public policy, competition, rates and service.

The bill's third title also repeals land grant rates (except for official transportation of military and naval property and personnel) and amends the Reconstruction Finance Corp. act liberalizing loans to railroads. It repeals specific requirements for bids in connection with all governmental procurement of transportation services.

♦

America's new tin industry, to be financed by the federal government in interest of national defense, will be located on the eastern seaboard, probably in New Jersey, it is said.

Senator Barbour, New Jersey, who has communicated with national defense commission members and the smelting industry, expressed the opinion tin smelters through which it is hoped to make United States independent of supplies now obtained from Dutch East Indies will be located in that state. He disclosed he had strongly urged this in a communication to Edward R. Stettinius Jr., in charge of raw materials for the commission.

"I believe New Jersey to be the logical location for the new American tin industry," Senator Barbour wrote. "Its transportation facilities, ports, proximity to steel centers and chemical plants, and the fact it is now the smelting center of the eastern industrial region and that smelting is its leading industry, all constitute excellent reasons for establishing the new industry there. . . .

"That Bolivian tin is only carried in vessels docking in New York harbor or at New Jersey ports is a further argument for building the smelters there."

An effort was made by private American capital to establish a tin smelting industry in this country during the first World war, but failed because of East Indies competition. Uncertainty as to regularity with which tin supplies may be obtained in the future led to the government's decision to sponsor the industry in United States, using Bolivian ore as a source of supply.

JULY STEEL INVENTORIES' INDEX VALUE AT 119

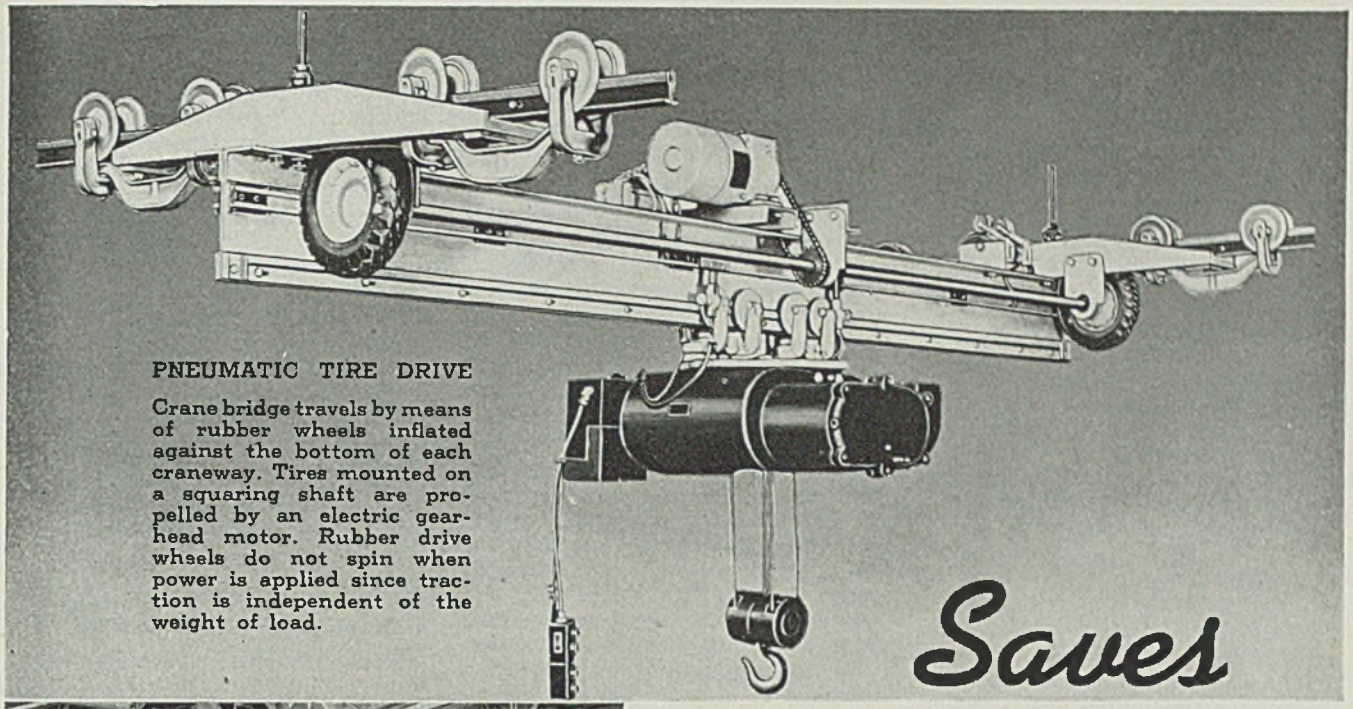
July inventories' index value of iron and steel and their products was 119, compared with 116.3 in June and 100.8 in July last year, according to foreign and domestic commerce bureau's industry survey. Index is based on Dec. 31, 1938, as 100.

Index value of new orders received by iron and steel mills in July, with January 1939 as 100, was 152 and compared with 161.3 in June and 97.1 in July last year.

Taking January 1939 at 100, iron and steel index value of manufacturers' shipments in July was 147.1, compared with 152 in June and 106.9 in July, 1939.

Unfilled orders began to move up in May and have increased at an accelerating rate since, despite coincident expansion in manufacturing production. Increase of almost 13 per cent in unfilled orders during July brought the total backlog to a higher figure than at peak of the boomlet last fall.

New orders placed with manufacturing concerns also continued in high volume. Incoming business in July, although slightly below the

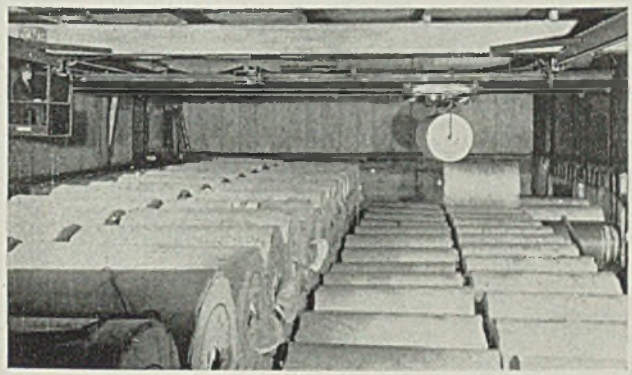


PNEUMATIC TIRE DRIVE

Crane bridge travels by means of rubber wheels inflated against the bottom of each craneway. Tires mounted on a squaring shaft are propelled by an electric gearhead motor. Rubber drive wheels do not spin when power is applied since traction is independent of the weight of load.

Saves handling cost

A single 1½ H. P. motor drives a 62 ft. crane.



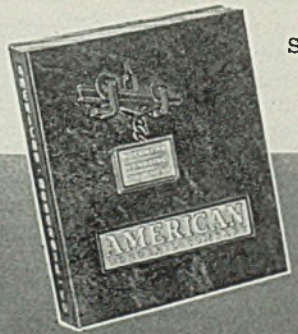
Crane requires little headroom for high piling.

Nearly every application of American MonoRail Cranes, whether hand or power operated, reduces the cost of handling heavy or cumbersome loads.

Cranes equipped with the American MonoTractor drive start immediately because traction is independent of the load. They move at variable speeds with lowest possible power cost. Horizontal or vertical movement can be controlled from floor or cab.

With the structural design greatly simplified, dead weight of the crane bridge is kept at the lowest point consistent with strength. This provides maximum live load capacity and requires less effort to move the crane. Elimination of friction at all points by the scientific use of proper bearings make American MonoRail cranes the easiest of all to handle.

You make no mistake in selecting an American MonoRail Crane. Let an experienced materials handling engineer consult with you on your next problem and offer definite recommendations.



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exceptional June total, was more than 20 per cent above July, 1939. Durable goods industries recorded an appreciable increase from June with volume of new orders remaining well in excess of shipments.

Shipments declined in both durable and nondurable goods industries, aggregate decrease being about 6.5 per cent from the June total. Seasonal factors were chiefly responsible; July shipments maintained approximately the same margin of gain over 1939 as was recorded in June. Shipments of durable goods dropped off somewhat more sharply from June than did those of nondurables, but the former maintained a larger margin of gain over 1939. Durable goods index for July was about one-fourth above July, 1939, while index for nondurables showed a gain of approximately one-twentieth.

Manufacturers' inventories rose approximately 0.5 per cent in July—first increase in stock holdings since the production upturn. Total holdings July 31 were approximately same as on April 30.

BILL INCREASING BANKS' LENDING AUTHORITY PASSED

Senate last week passed S.4204 which provides for increasing lending authority of the Export-Import bank. Similar bill has already been passed by the house. However, the house bill provided for increasing Reconstruction Finance Corp.'s capital $500,000,000, a provision stricken out by the senate. The bill has therefore been returned to the house, and if that body refuses to accept the senate amendments, it must go to conference.

The bill extends life of the bank from June 30, 1941, to Jan. 22, 1947, and increases its lending authority from $200,000,000 to $700,000,000. One section of the bill authorizes the bank to make loans to any governments, or their central banks, when guaranteed by any such government. These loans are to be made only upon written request by the federal loan administrator, with approval of the President. The bill is designed to facilitate loans to South American nations.

JESSE JONES NOMINATED SECRETARY OF COMMERCE

Jesse Jones, federal loan administrator, was nominated United States secretary of commerce by President Roosevelt late last week. Nomination was sent to the senate for confirmation Sept. 13.

Senate and the house had passed a joint resolution earlier last week authorizing Mr. Jones to occupy both offices. Congressional action of that nature, most unusual and probably unprecedented, is considered tantamount to the regular senate confirmation.

EMERGENCY HOUSING PLAN APPROVED IN CONGRESS

House last week passed legislation authorizing expenditure of $150,000,000 for an emergency housing program for defense workers.

The bill authorizes the federal works administrator to provide housing units in any area where the President finds "an acute shortage of housing exists or impends which would impede national defense activities."

Dwellings would be available for housing workers in essential defense industries and civilian employes of the federal government assigned to duty at military or naval posts and bases.

Legislation was requested by the national defense commission, which reported housing shortages are developing in several Atlantic coast cities where shipyards are operating at full capacity.

Average cost of houses constructed under the bill would be limited to $3000 per family dwelling unit in continental United States and $4000 in American possessions and territories.

The bill would permit construction of dwellings for army and navy enlisted men, but it is reported bulk of the fund would be used for housing industrial workers.

AUTHORIZE INCREASED PRODUCTION FACILITIES

Letters authorizing increased production facilities for ordnance were sent to nine manufacturers last week by the war department. The department said the letters were issued with the approval of the national defense advisory commission to enable manufacturers to proceed without delay while unsettled details of formal contracts are being completed. Approximately $170,000,000 was involved in the projects. Companies to whom letters were sent were:

General Motors Corp., for tooling three machine gun plants in company buildings at Saginaw Gear Works, Saginaw, Mich.; A C Spark Plug Co., Flint, Mich., and Frigidaire division, Dayton, O.

Western Cartridge Co., St. Louis, for construction of a small arms and ammunition plant on a site to be selected.

Remington Arms Co., Bridgeport, Conn., for a small arms plant construction, site to be selected.

E. I. du Pont de Nemours & Co., Wilmington, Del., for addition to smokeless powder plant at Charlestown, Ind., for which original contract has already been let; TNT plant on site to be selected; ammonia plant on site to be selected; bag loading plant at Charlestown, Ind.; tetraethyl plant on site to be selected.

Atlas Powder Co., Wilmington, Del., TNT production facilities, site to be selected.

Humble Oil & Refining Co., Houston, Tex., toluol plant, site to be selected.

Allied Chemical & Die Co., New York, ammonia plant, site to be selected.

Hercules Powder Co., Wilmington, Del., addition to smokeless powder plant at Radford, Va., and for bag loading plant, site to be selected.

Saderson & Porter, New York, ammunition loading plant, site to be selected.

PROPOSE ADDITIONAL LOANS FOR MINERAL DEVELOPMENT

House of representatives last week passed H.R.9996 authorizing RFC to make loans for developing deposits of strategic and critical materials which, in the corporation's opinion, would be of value to United States in time of war. The bill also authorizes RFC to make more adequate loans for mineral developmental purposes.

Under current law maximum loan RFC is authorized to make to any corporation for mineral developmental purposes is $20,000. The present bill would enable the corporation to make additional loans, not in excess of $20,000, to any corporation which had previously obtained such a loan from the RFC and which had spent that money so as to justify an additional loan.

OPENING DATE FOR BIDS ON MINESWEEPERS POSTPONED

Opening date for bids on construction of eight mine sweepers in lots of two, three or four has been extended by the navy department until Oct. 20.

Supplementary data changing characteristics of these vessels will be furnished prospective bidders by the navy department.

STETTINIUS APPOINTS AIDES

Edward R. Stettinius Jr., national defense advisory commission member in charge of the industrial materials division, announced the following appointments to his staff: D. C. Everest, president, Marathon Paper Mills Co., Rothschild, Wis., and former president, American Paper and Pulp association, as group executive of the pulp and paper section; and Charles W. Boyce, vice president, Northwest Paper Co., Cloquet, Minn., as assistant group executive, pulp and paper section.

Aviation Expansion Totals $52,445,255 in 10 Months

■ Aviation industry completed plant expansions and installations of new equipment costing $52,445,255 between Sept. 8, 1939 and July 10, 1940, according to Aeronautical Chamber of Commerce of America Inc., Washington. Only $11,388,917 worth or 27.7 per cent is classed as normal expansion, "which would be used by the industry after the national emergency has passed."

Survey showed that $34,732,113, or about 66.5 per cent was spent for expanding engine and propeller facilities; $13.089,655, or 25 per cent, for plane production capacity and $4,623.487, or 8.5 per cent for accessories and instruments.

Practically all the investment for plane, accessories and instruments expansions was privately financed. Government contributed 35 per cent of total engine and propeller investment.

Continental Can Plans $25,000,000 Improvements

■ Directors of Continental Can Co. Inc., New York, meeting at Chicago last week approved a 3-year expansion and improvement program to cost approximately $25,000,000, according to J. F. Hartlieb, president.

Reports indicate enlargement of research, engineering and can manufacturing facilities of several of the company's 58 plants in United States, Canada and Cuba is contemplated. Construction of a 4-story addition, 140 x 200 feet, to the company's South Ashland avenue plant in Chicago was announced last July. Its cost was said to be $200.000.

Headed by Carle C. Conway, chairman, and Mr. Hartlieb, the company directors and other officials conducted a 2-day inspection tour of Continental's Chicago plants, visiting seven. Directors' meetings have heretofore been held in New York.

Spencer Lens Builds $1,250,000 Addition

■ Spencer Lens Co., Buffalo, has authorized additions totaling 130.000 square feet, and costing $1,250,000, to its 102,000-square foot plant completed less than a year ago. Additions, which will become an integral part of the original, will include a 1-story 210 x 400-foot factory section, with a 2-story section 40 feet deep on two sides; a 40 x 210-foot section, in part three stories high, connecting the new unit with the original; a 1-story 30 x 180-foot section to provide expansion for mechanical parts.

Construction will be steel, concrete and shale brick. Gillmore, Carmichael, Olson Co., industrial builders of Cleveland and Buffalo, have the general contract.

Spencer Lens Co. estimates it will spend $750,000 for new equipment.

U. S. Steel To Present Executives at Luncheons

■ Business and civic leaders of Pittsburgh, Chicago and Birmingham, Ala., have been invited to luncheons in their respective cities by B. F. Fairless, president. United States Steel Corp., New York, to meet Irvin S. Olds, recently elected chairman, and other corporation executives.

Mr. Olds will be accompanied by Mr. Fairless and 11 directors of the corporation. The group's itinerary will include one-day visits to the corporation's operations in each of the three cities.

Luncheon at Pittsburgh will be Sept. 18, at the William Penn hotel, after which the executives will tour Carnegie-Illinois Steel Corp.'s Edgar Thomson and Irvin Works. The Chicago luncheon will be given Sept. 19 at the Blackstone hotel. Carnegie-Illinois' South Chicago mills will be toured the same day.

Gear Sales in August Increase 35.5 Per Cent

■ Gear sales in August, with the comparative index figure at 191, were 35.5 per cent greater than in July and 99 per cent more than in August last year. Total sales in first eight months were 46 per cent above the corresponding period in 1939, according to American Gear Manufacturers association, Wilkinsburg, Pa.

Monthly average index, through August this year, was 134. In the 1939 period it was 92. Comparative index figures, based upon 1928 as 100:

	1940	1939
August	191	96
July	141	89
June	129	90
May	133	93
April	128	88
March	114	104
February	116	86
January	123	91

McKeesport Sells Tin Plate Division to J & L

■ McKeesport Tin Plate Corp. last week announced sale of fixed assets and good will of its tin plate division, McKeesport, Pa., to Jones & Laughlin Steel Corp., Pittsburgh. McKeesport corporation will concentrate on operations and expansion of its National Can division, which has can manufacturing plants at Maspeth, N. Y., Baltimore, Hamilton, O., and Boston. It will continue to operate its lithographing division at McKeesport.

Capacity of the mills sold is 180,000 tons of black plate for tinning, 174,000 tons of hot-reduced tin plate and 6000 tons of terne plate annually.

The division includes: 12 Chapman gas producers, 44 sheet and 44 pair furnaces, 14 standard box annealing furnaces, 1 normalizing furnace, 6 Mesta pickling machines, 34 tinning pots, 44 two-high hot bake plate mills and 40 two-high cold sizing-finishing mills.

Defense Effort Slower Than in 1917—Ayres

■ This nation's preparedness drive is proceeding at a much slower pace in 1940 than in 1917, according to Col. Leonard P. Ayres, vice president, Cleveland Trust Co. and head of the statistical division of the American forces during World war I.

Colonel Ayres contends actual military expenditures are much better guides for comparing the relative progress of defense efforts in 1917 and 1940 than the reports of appropriations made or contracts placed.

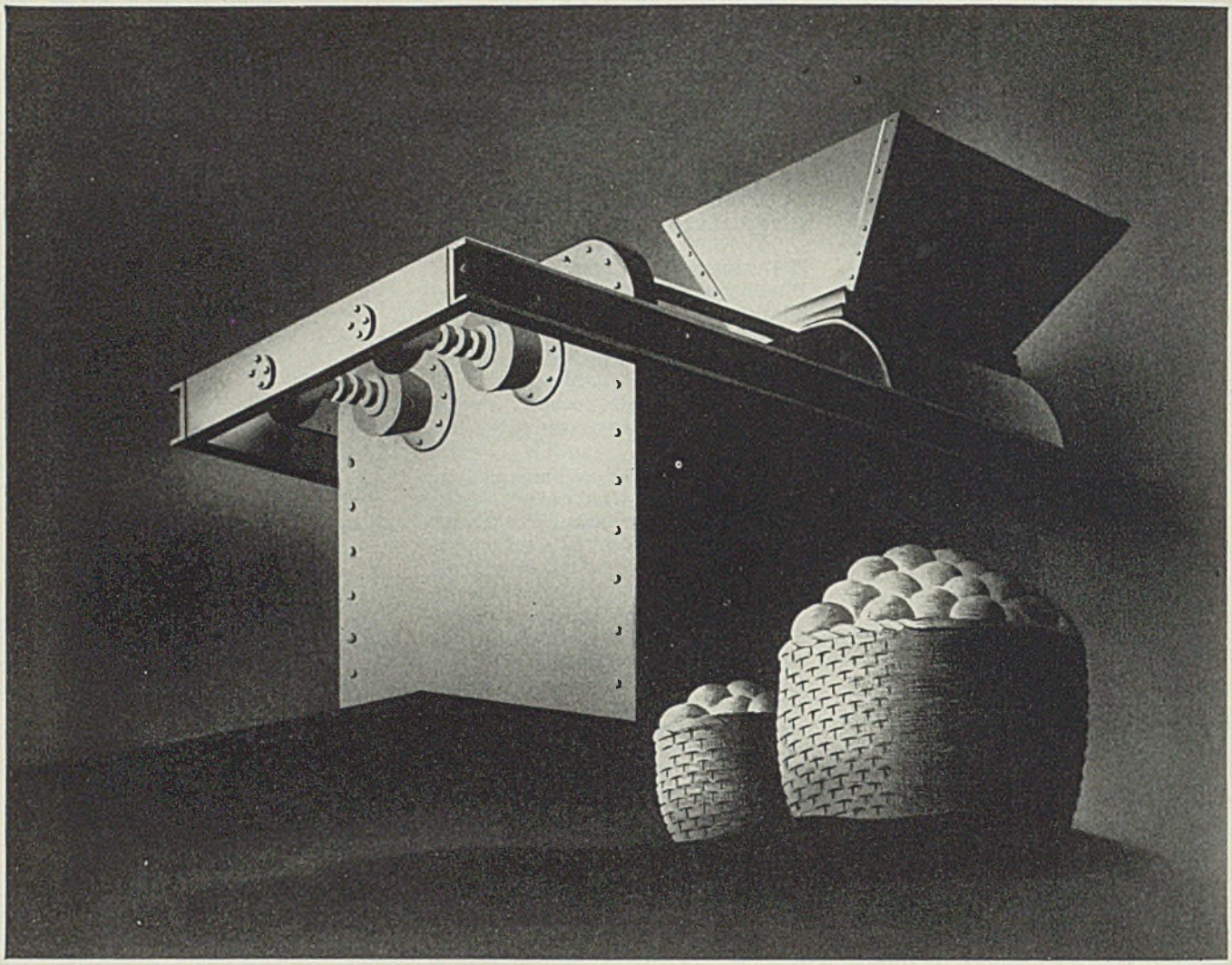
"If we consider the average monthly expenditures of the army during the first quarter of 1917 and in the first quarter of 1940 as being in each case equal to 100, we can make a tabular comparison showing how the two efforts gathered increasing momentum in the two periods. The comparison is as follows:

	1917	1940
First quarter	100	100
April	190	103
May	231	112
June	690	108
July	587	132
August	1,559	153

"These figures mean," Colonel Ayres continued, "that in the first five months of our preparedness effort in 1917 the acceleration in army expenditures was 28 times as fast as it has been in the corresponding months of 1940."

Asserting it is a truism that modern wars are won not merely by armies and navies but by whole peoples, Colonel Ayres emphasized the need for general and spontaneous public co-operation in the defense program.

"Clearly if we are to retain public interest and restore public co-operation, we need to have far fuller and more detailed information given out in Washington about the progress of preparedness than we have been getting so far."



MEETING A THREE-WAY DEMAND

A large fruit juice extractor looks so simple that there would not appear to be any special problems in the selection of materials for its parts. Yet, the screw must stand high pressures, and tramp iron can cause serious trouble. Ripe fruit won't wait for machine repairs.

Because it meets all three demands of the service so well one manufacturer of extractors now uses nothing but cast Carbon-Molybdenum steel for the screws. The steel (1) develops the requisite strength and toughness when normalized; (2) is comparatively inexpensive and (3) permits easy reconditioning when it is finally required — the worn spots being built up by welding and re-machined to original dimensions.

Here, then, is another case where the use of modern materials has economically achieved a distinct product benefit. There may be similar opportunities in your own product. Our book, "Molybdenum in Steel", which is sent free on request will help you find them.

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MOLY

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Chevrolet Produces 5000 Motors on Third Day.

Trouble with Labor Unions Appearing Again.

Ford Making 150 Tractors Daily.

1941 Bumpers are Wider, Stronger, of Thinner Steel.

Chrysler Corp. Begins Work on $20,000,000 Tank Plant.

DETROIT

■ ONE day last month officials of a leading aircraft manufacturing plant were inspecting the Chevrolet motor plant in Flint which was not yet in operation on 1941 schedules but preparing to get under way. One of the visitors asked the superintendent when he planned to start and he was told the first motors were slated to be assembled on the following Monday.

"And how soon will you be up to your contemplated daily production of 5000 units?" the visitor inquired. On the same Monday, the answer came back.

Thinking his question had been misunderstood the visitor said he wanted to know how many weeks or months it would take to build up to the 5000-daily rate. Still the answer: On Monday. Convinced the superintendent was either crazy or a first-class prevaricator, the guest pursued the questions no further.

However, on the Monday in question, this Chevrolet plant turned out 4905 motors, and on the next day 4978 and on the following day more than 5000.

Insight into how their enormous production is geared up and started for a new model program was given by M. E. Coyle, Chevrolet general manager, speaking at the press preview of 1941 models last week in Detroit. The company's plants are divided into three types—primary, secondary and final assembly. The first group includes foundries, forge and sheet metal shops where motor blocks, flywheels, transmission cases, cylinder heads, gear blanks, crankshafts, camshafts, fenders, small stampings and the like are shaped from raw iron and steel. Secondary plants are those which assemble output of the primary plants into completed motors, transmissions, axle units and such. And the third group includes those plants which fit the subassemblies of the secondary plants into finished cars.

Chevrolet primary plants were started Aug. 3; secondary plants Aug. 19, and assembly plants Sept. 3. First week's assemblies totaled, day by day, 400, 800, 1200, 1400, and on last Monday 2200 were completed. This figure will mount steadily, barring unforeseen complications, until the 5000 per day level is reached. Production will be held at the latter point until stocks of new cars in the field, together with used cars in dealers' hands, indicate need for a slowing down in the assembly rate.

Foresees Labor Trouble

On the outlook for the coming year, Mr. Coyle outlined four factors which will exert major influence on car sales: 1. The war and its duration; 2. Amount of defense material to be ordered in the immediate future; 3. The political situation and its outcome in November; and 4. Labor. He offered no particular comment on the first three beyond acknowledging the importance of their effect. As far as labor is concerned he said that already minor difficulties are arising. Last week 300 men in the sheet metal department of a Chevrolet plant in Flint walked out, reportedly because the management would not allow a union bargaining committee to enter the plant in company with the men.

Mr. Coyle repeated what is all too apparent as far as the automobile union is concerned—that trouble must be fomented continually to keep dues rolling into the treasury, that members' interest will wane and their pocketbooks close if some grounds for disputes cannot be discovered from time to time.

Buick plants were idle a couple of days last week because of a union squabble at a Fisher body plant in Flint, apparently the outgrowth of differences between the UAW-CIO and a few UAW-AFL members. One workman with a spray gun let it go full force on another man, nicely coating him with Ludington green, and the battle was on. A settlement was made shortly and work resumed, not, however, until some valuable production time had been lost.

Chevrolet has sounded off for another banner year, according to its officials. Sales of 1940 model passenger cars and trucks were close to 1,000,000 and a 10 per cent increase has been established as the goal for 1941. To do this it is figured used car sales will have to reach 2,200,000, which brings total retail orders expected to the staggering total of 3,300,000.

As far as the product is concerned, quite a number of changes have been introduced to attract buyers. Wheelbase has been lengthened 2½ inches to 116. Engine horsepower has been stepped up from 85 to 90 by changes in carburetion.

Bodies now are 2 inches wider; all have concealed running boards. Front fenders and hood sides are one-piece stampings. Rear-end styling is the modified Torpedo design. Twenty per cent of output will be in two-tone body coloring, three combinations being offered.

Two unusual accessories were

shown at the preview celebration. One was a steel foot-scraper strip attached to the underside of running boards and extending about 2 inches out from the boards which of course, are covered by the lower edge of the door when it is closed. The added strips are in the form of a narrow grid on which a muddy foot can be scraped and the scrapings fall through. The other gadget is a rubber tube with fittings which can be attached to the spare tire in the trunk compartment and to a small hole drilled in the rear body just under one tail-light, permitting the spare tire to be inflated or its air pressure checked without opening rear compartment.

Preview of Ford models for 1941 also was held last week and confirmation was given to comment published here three weeks ago that the 6-cylinder engine will not be introduced at the show this fall. Belief now is that it may be offered as optional in one of the two regular Ford models some time after Jan. 1. Models shown last week featured longer wheelbases, wider bodies, longer springs and semi-concealed running boards. Public showing of the Lincoln line is scheduled for Sept. 20, with Ford and Mercury models appearing a week later.

Production of Ford tractors has been resumed after a shutdown of several months and assemblies are now running at around 150 per day. It appears industrial applications for these units are in the ascendancy. One lot of several hundred recently was sold to the Canadian government for airport field work. Another consignment was shipped to New York for use in dock haulage operations.

Originally introduced as purely farm equipment, design changes have been effected to facilitate industrial applications. One type, it is reported, will carry a special winch at the rear.

■ WHEN you are bumped by a 1941 model this fall, there is going to be no mistaking the impact, for bumper designs of nearly all builders have been completely reworked to provide larger, wider and stronger bumpers, both front and rear. Likewise, bumper guards have been increased in size and number. Some of the new designs carry provision for mounting the license plates in the bumper assembly itself. Others have ends flared out sharply to protect expensive fenders from impacts. Gravel shields have been placed horizontally between bumpers and car bodies to prevent flying stones from marring painted and plated surfaces.

Bumpers usually are supplied to automobile builders by outside manufacturers, there being about a half-dozen leading suppliers. Formerly it was the practice of these manufacturers to buy a standard hot rolled bumper section of S.A.E. 1035 steel from mills, then to form the ends, heat treat, pickle, clean and plate. This year a change has been made in a number of designs which precludes the use of a standard section, so fabricators are buying hot rolled strip which is put through a complicated series of forming operations, then heat treated, cleaned and chrome plated. Thicknesses of bumper stock have been gradually decreasing, some designs now using steel as thin as 0.125-inch, about one-half the thickness required not so many years ago. Standard thickness this year is 0.140-inch. Of course, with the frontal area of bumpers now two or three times what it used to be, the decreasing thickness has not meant any great loss in weight of steel required.

At least one type of bumper is now fabricated from a cold-rolled high-tensile low-alloy steel, heat treated in a controlled atmosphere furnace. This material, while costing somewhat more than 1085 steel, is more easily formed and finished and provides greater strength in service. Heat treating in atmospherically controlled furnaces brings the material out bright and clean; being cold-rolled material, it can almost be plated at once without preliminary surface preparation.

Steel authorities suggest that a general switch to low-alloy high-tensile steels for bumper stock may be the next move.

Difficulties encountered in deep drawing front fenders which incorporate hood sides, shrouds, lamp openings and the like all in one stamping have been numerous. In making the Buick fender stamping, for example, the steel first is formed to the general contour of the fender, then the nose is heated over a gas burner to a cherry red and the lamp opening drawn while the metal is still hot. One method of overcoming these stamping troubles is to design the fender in sections, the crown and hood side being one section, the nose another and possibly the skirt a third. These sections then are spot welded together and the joint covered up with a bright metal molding. Particularly where front fenders are large, such as on Oldsmobile models, is this system practiced effectively.

The pieced fender has the added advantage of being more easily repaired should one section be dented. The damaged portion is cut away with a torch and a new piece welded into place, without disturbing the remaining sections.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.....	226,952	356,692	449,492
Feb.....	202,597	317,520	422,225
March...	238,447	389,495	440,232
April....	237,929	354,266	452,433
May.....	210,174	313,248	412,492
June	189,402	324,253	362,566
July.....	150,450	218,494	246,171
7 mos....	1,455,951	2,274,348	2,785,611
Aug.....	96,946	103,343	.....
Sept.....	89,623	192,678	.....
Oct.....	215,286	324,688	.....
Nov.....	390,405	368,541	.....
Dec.....	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

Estimated by Ward's Reports

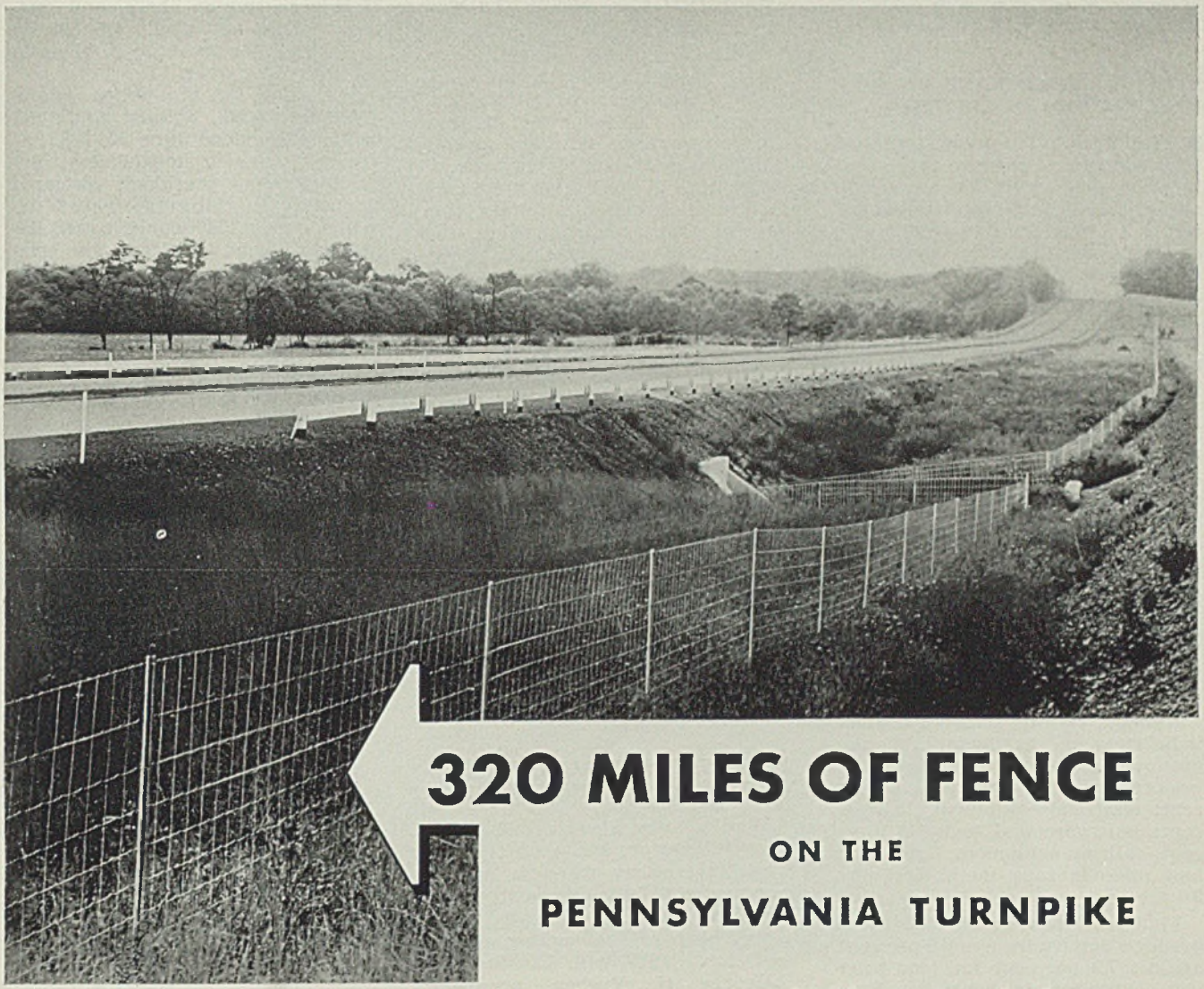
Week ended:	1940	1939†
Aug. 17	20,475	15,105
Aug. 24	23,732	18,365
Aug. 31	27,645	25,240
Sept. 7	39,665	26,865
Sept. 14	66,615	41,245

†Comparable week.

■ GROUND was broken Wednesday for the $20,000,000 tank plant being erected here by Chrysler Corp. Lieut. Col. H. W. Rehm, war department; Maj. R. Z. Crane, army executive officer of the Detroit ordnance district; K. T. Keller, Chrysler president; Herman L. Weckler, vice president and general manager; Fred M. Zeder, vice chairman of the board and chief engineer; E. J. Hunt, who will operate the plant, and H. S. Wells, chief plant engineer, participated in the ceremonies.

Construction of the plant buildings will begin as soon as the ground has been cleared. Layout, developed by Albert Kahn Associated Architects and Engineers, will comprise principally a large one-story monitor-type building, with more than 700,000 square feet of floor space, a two-story office building and a boiler plant. In connection with the buildings there will be a large area to handle employe parking, in addition to a special tank testing track. Together with equipment, the plant is expected to be ready for production in about a year.

Questions as to how Olds and Pontiac can install either a six or eight-cylinder engine in the same chassis are answered by the explanation that the rear anchorage is fixed at the same point for both engines, so that transmission, propeller shaft and running gear are identical for both. Forward mounting naturally is different, support for the six being back several inches from the eight mounting.



320 MILES OF FENCE

ON THE PENNSYLVANIA TURNPIKE

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An exceptionally heavy coating is required to insure corrosion resistance over a long period of time.

Unusual ductility was imperative to provide adherence of this heavy coating in the fence forming operations.

These service requirements made the selection of HORSE HEAD SPECIAL ZINC necessary.

THE NEW JERSEY ZINC COMPANY, 160 FRONT ST., NEW YORK, N. Y.

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

FINANCIAL

STEEL'S 4-YEAR RATE OF RETURN AMONG LOWEST

■ FIFTY-EIGHT leading iron and steel companies' average rate of return on net worth for the 4-year period 1936-39 inclusive was 3.9 per cent. Average return on net worth of 1440 manufacturing companies, including iron and steel, was 8.6 per cent, according to a compilation by the National City Bank of New York. The iron and steel companies' earnings rate was among the lowest in the bank's compilation.

Automobile builders averaged 16.9 per cent net profit, and auto equipment manufacturers 11.9 per cent. Fabricators of office equipment earned an average of 14.2 per cent, highest for the metal products group, excluding automobile builders and suppliers.

Aircraft and parts makers were second, averaging 11.9 per cent. Manufacturers of household equipment were next, with 11.2 per cent, while 114 machinery builders averaged 10.4 per cent.

Average rate of return for other industries in the metal products group: Agricultural implements, 9.2 per cent; building equipment, 6.5 per cent; electrical equipment, 10.8 per cent; hardware and tools, 11.1 per cent; railway equipment, 3 per cent, and miscellaneous metal products, 9.3 per cent.

Four-year average for 525 metal products companies was 6.8 per cent, against 7.2 per cent for food products, 22 per cent for beverages, 5 per cent for textiles, 12.7 per cent for chemicals and 8.7 per cent for stone, clay and glass industry.

Average rates of return were based on: Net profits as reported after depreciation, interest, taxes and other charges and reserves, but before dividends; and net worth, including book value of outstanding common and preferred stock and surplus account at the beginning of each year.

COLORADO FUEL & IRON CORP. REPORTS $1,744,869 NET PROFIT

Colorado Fuel & Iron Corp., Denver, reports consolidated net income for the fiscal year ended June 30 was $1,744,869, after provisions for depreciation and depletion, taxes, interest and other charges totaling $1,374,692. Profit for the year was equal to $3.10 per share on the company's capital stock, and compared with net earnings of $57,564 or 10 cents per share in the preceding period.

Sales of rails and rail accessories in the year totaled 291,729 tons, highest since 1930 when sales aggregated 429,820 tons, and compared with 162,832 tons sold in the year ended June 30, 1939.

In their report to stockholders, Arthur Roeder, chairman, and W. A. Maxwell Jr., president, pointed out progress in Colorado Fuel & Iron Corp.'s program of sales diversification was shown by the sale of 308,478 tons of steel other than railroad steel. It was the largest tonnage of that class shipped in any year by the company or its predecessor.

Coal, coke and by-product sales aggregated $2,960,670, an 18 per cent increase over preceding year.

The corporation's steel operating rate averaged 72.1 per cent, compared with 42.5 per cent in the fiscal year 1939. Employes averaged 8584, against 6578 in the earlier period.

Total of $1,146,969 was expended during the year for modernization and extension of properties. In the preceding period expenditures for these purposes totaled $688,651.

In addition to pig iron and semi-finished steels, Colorado Fuel & Iron manufactures bar, structural, bolt and wire mill products, pipe, railroad products, special steels and coke and its by-products.

WESTINGHOUSE AUGUST ORDERS AT ALL-TIME HIGH

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reported last week that orders taken in August aggregated $57,352,054, greatest volume for any month in the company's history. Previous record was in October, 1917, with $50,000,000.

George H. Bucher, president, stated last month's business was 68.8 per cent greater than in July. Gain through August this year over the period in 1939 was reported to be 67.1 per cent, with orders totaling $226,513,813 against $135,542,968.

Nearly $36,000,000 of the business taken last month represents emergency orders for the government's preparedness program, said Mr. Bucher, and was taken at a "very moderate profit." Even without emergency orders, the remaining peacetime business would be comparable to the best peacetime months, which did not exceed $25,000,000 even in 1929.

More than 52,300 were employed by Westinghouse at the beginning of August. This was an increase of about 9000 over the period last year.

VANADIUM-ALLOYS' NET PROFIT TOTALS $855,210

Vanadium-Alloys Steel Co., Latrobe, Pa., reports consolidated net income for the year ended June 30 was $855,210, after provision for depreciation, depletion, taxes and other charges. This was equal to $4.29 per common share, and compared with net profit of $90,890 or 45 cents per share on common in the preceding year.

Net sales for the period aggregated $5,374,847, against $2,822,292 in the year ended June 30, 1939.

In his letter to stockholders, Roy C. McKenna, president, declared shipments in third quarter of the calendar year 1940 would exceed the first and second quarters. The company, he said, was justified in predicting a continuance of increased sales for at least the rest of the year.

McKEE REPORTS 85 PER CENT INCREASE IN BUSINESS

Arthur G. McKee & Co., Cleveland, last week reported the dollar volume of new contracts taken to Sept. 6 this year was nearly 85 per cent greater than the total in 1939. Inquiries on hand for new construction were said to be "in considerable volume."

Contracts taken by the company this year have been nearly equally divided between its iron and steel and oil refinery divisions, it was reported. More than four-fifths of 1940 business has been for construction in United States.

The company reports, as of Sept. 6, cash and receivables totaling $1,381,868; payables, including federal taxes payable later this year, aggregate $463,961. Cash does not include small balances held in foreign currencies.

A regular dividend of 25 cents and extra of 50 cents per share was declared on the company's class B stock, payable Oct. 1 to record of Sept. 20. With this fourth quarterly dividend, payments to date this year will have totaled $3 per share.

LARGE INVESTMENTS TO EASE STEEL'S EXCESS PROFITS TAX

"Because of large invested capital positions, any excess profits tax similar to that now proposed should not fall as heavily upon the steel industry as upon some other capital goods industries," say Fenner & Beane, New York brokers, in their August survey of the steel industry.

"However, in order to duplicate their 1937 earnings records, leading companies would have to earn 10 to 20 per cent more than in 1937."

DIVIDENDS DECLARED

National Steel Corp., Pittsburgh, regular quarterly of 75 cents per share on capital stock, payable Sept. 30 to record of Sept. 20. This dividend represents an increase of 25 cents per share per quarter over the previous rate.

General Electric Co., Schenectady, N. Y., 35 cents a share, payable Oct. 25 to record of Sept. 20.

JOHN AUGUSTUS PENTON

1862-1940

■ JOHN AUGUSTUS PENTON, founder and chairman of the board, Penton Publishing Co., Cleveland, publisher of STEEL and other business publications, died at his home in Santa Barbara, Calif., Sept. 8. He was 78 years old.

Although Mr. Penton's principal interest was in the publishing field, in his younger days he also was active in industry and was largely responsible for the organization of several leading trade associations.

He was born in Paris, Ont., May 12, 1862, the son of Thomas and Anna Penton. His father was a prosperous lumberman but suffered business reverses which made it necessary for his son to fend for himself. The son attended public schools at Sarnia, Ont., and then learned the trades of machinist and molder. He worked at the latter trade for a number of years in Canada and the United States. He moved to Detroit in 1883.

While working as a molder he was active in founding the Brotherhood of Machinery Molders and served that organization as president from 1886 to 1892. One of his accomplishments during that period was the establishment of a small publication, the *Machinery Molders' Journal*, of which he was editor.

In 1892, Mr. Penton recognized the need of the foundry industry for a trade and technical publication. He gave up his union activities to start *The Foundry*. The first issue appeared in Detroit in September of that year, with Mr. Penton as editor, publisher, circulation manager, business manager, and, in fact, the entire staff.

From its inception, *The Foundry* took the lead in advocating improvement of shop operation, efficiency and quality of production. In line with the magazine's program, Mr. Penton conceived the idea of a technical association covering the entire industry.

Small local groups, such as the Western Foundrymen's association and the Philadelphia Foundrymen's association, already were carrying on technical work. Acting as intermediary and with the active co-operation of the Philadelphia group, Mr. Penton supplied the names and conducted the preliminary work which led to the organization of the American Foundrymen's association. He was elected first secretary and served four years.

For this service he was recognized in a resolution recording the association's "enduring esteem and appreciation" adopted by the association's board of directors in 1934.

In 1898, Mr. Penton was active in

organizing the National Founders' association, one of the first employers' associations in the country. It was designed to settle labor difficulties and Mr. Penton was secretary and commissioner from its start until 1903.

Applying the experience gained through organization of the National Founders' group, Mr. Penton was active in forming the National Metal Trades association, an organization of employers of machinists, boilermakers, blacksmiths and others engaged in metalworking. Mr. Penton was elected secretary at the group's first meeting in New York in 1899.

While devoting considerable time to organization and association work, Mr. Penton continued to progress in his publishing venture. On March 1, 1901, he moved the offices of *The Foundry* from Detroit to Cleveland and affiliated with the publishers of the *Iron Trade Review*, now STEEL, to form the Iron & Steel Press Co. Three years later he purchased control of the firm, changed its name to the Penton Publishing Co., and became president.

He continued as president until 1924 when he became chairman of the board. The early years of the century witnessed, under Mr. Penton, the expansion of his company to the largest business paper publishing house west of New York.

Acquired Other Papers

During his period as president of the Penton Publishing Co., the Marine Review Publishing Co. was purchased in 1904 and united with Penton Publishing Co. In 1905 *Power Boating* was established, devoted to the interests of operators and owners of power workboats, as well as to the sport of power boating. In 1909 Mr. Penton established *Daily Metal Trade*, designed to meet the demands for a daily newspaper devoted to the iron, steel and metal working industries of the United States and Canada.

Abrasive Industry was added to the group of publications in 1920. This paper dealt with all phases of grinding and abrasive methods as applied to industry.

Other publications added in recent years were *Machine Design* and *New Equipment Digest*.

Mr. Penton helped to organize the American Malleable Castings association and was its first secretary, acting from 1890 to 1901. He was president in 1921-22 and since that time held the title of honorary president.

Another organization in which Mr. Penton played a prominent part was the Merchant Marine league formed in 1904 and active through 1905, 1906 and 1907.

In 1904 Mr. Penton organized the American Pig Iron association and served as secretary and manager from 1904 until 1928 when the organization was disbanded.

In addition to activities bearing directly upon the welfare of the industries which center about the various Penton publications, Mr. Penton was a prominent figure in national affairs. He served as director of the National Industrial Conference board from 1920-28. He was appointed by President Harding as a member of the national employment conference held in Washington in 1921. He was a member of the American Iron and Steel institute since its inception. He also was a member of the Iron and Steel Institute of Great Britain.

In 1918 he was elected a director of the Wellman, Seaver, Morgan Co., Cleveland, now Wellman Engineering Co., and was elected chairman of the board in 1927.

In 1919 he was decorated by the French government with the insignia of the Order of Reconnaissance, Fancais, Premier Classe; was made a chevalier of the Legion of Honor in 1921 and an officer of the Legion of Honor in 1926. These honors from France were bestowed in recognition of a diplomatic service during the World war.

He was active in civic affairs in his own city, a patron of music and arts, a collector of rare books, antique silver and Oriental rugs. He encouraged the work of local artists through medals and awards presented through the Cleveland Museum of Art.

Mr. Penton was a member of the Union club, Cleveland club, Rowfant, all of Cleveland, and of the Lotus club, New York.

He was married in 1916 to Adah Nell, daughter of John C. Whelan, a lumberman of Minnesota.

Funeral services were held Sept. 11 in the Church of All Saints by the Sea, Montecito, Calif., a Santa Barbara suburb. Burial was in Forest Lawn cemetery, Los Angeles.

♦

"Man of Industry and Culture"

" . . . . Few, if any, wielded greater influence in the business of processing metals and manufacturing metal products. Not only did his numerous publications provide a voice for the trades in whose interests they were founded, but Mr. Penton himself took an active personal part in organizing and guiding the associations through which the individual industries co-operated for the common improvement of their methods and advancement of their cause.

"Mr. Penton was able to make himself the more useful in this respect because he had come up from the ranks, having met first-hand the technical problems of the metal business as a machinist and iron molder, and as one of the founders and president of the Brotherhood of Machinery Molders.

"Yet, unlike too many American business executives of the early 20th century, he balanced his knowledge of industrial problems with a keen interest in music and the other arts. He was thus able to contribute perhaps as much to Cleveland's cultural life as to its purely utilitarian interests."

Cleveland Plain Dealer

"Industry's Able Counsellor"

" . . . . Dynamic he was, and shrewd, and far-sighted. But those words hide his simplicity and his amiable heartiness . . . .

"He made his papers the authorities for the iron, steel and shipping trades. He was more than just a publisher. He became a thinker and speaker for the heavy industries, and they will never have a more able counsellor . . . .

"For years he worked on plans for an annual industrial fair in this Midwestern center, which would surpass the great fairs of Europe at which so much business, invention and trade revival is started.

"Some day Cleveland will have such an exposition, housed perhaps in its own great buildings. It may not come soon, but it will eventually; and when it does come, there ought to be a niche in it for a statue of John A. Penton."

Cleveland News

"Like Gary, Schwab"

"The industrial era that produced steel masters like Elbert H. Gary and Charles Schwab also brought forth John A. Penton, whose publications chronicling the iron and steel trade became big business in their own right . . . .

"His publications were successful from the start because the publisher knew steel from the mining of ore to the shipment of the finished product. He hired men to report and edit the news who also knew the industry.

"Mr. Penton's achievements in the publishing field did not prevent his giving freely of his time and energy to civic enterprises."

Cleveland Press

■ Production of electricity in United States in the week ended Sept. 7 was 2,462,622,000 kilowatt hours, according to the Edison Electric institute, New York. Lowest since the week ended July 6, the total weekly output was 7.5 per cent greater than in the period last year. Production in the preceding week aggregated 2,601,127,000 kilowatt hours.

MEN of INDUSTRY

■ W. E. SARGENT, assistant treasurer and assistant secretary, has been elected treasurer, Cutler-Hammer Inc., Milwaukee. He succeeds Henry F. Vogt, who will devote full time to responsibilities as vice president in charge of manufacturing and other executive phases of the business. Mr. Sargent has been identified with Cutler-Hammer 38 years and continues as assistant secretary.

♦

R. D. MacCart, chief engineer, Brewster Aeronautical Corp., New York, has been elected vice president in charge of engineering.

♦

Roy Ratliff, formerly assistant to vice president and general manager, Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has been promoted to general manager.

♦

E. W. Headford, formerly associated with Headford Bros. & Hitchins Foundry Co., Waterloo, Iowa, has joined Vilter Mfg. Co., Milwaukee, as assistant to foundry superintendent.

♦

Horace R. Riggs has been placed in charge of the Lima, O., branch of Crane Co., Chicago. He has been associated with the company's Indianapolis branch several years.

♦

B. L. Waters has been elected chairman of the board, Lyon Metal Products Inc., Aurora, Ill. He succeeds H. A. Gardner, general counsel, who has resigned. Mr. Waters, former president and founder of the Lyon company, has announced his intention of retiring from active participation in the every-day affairs of the company. He has been succeeded as president by Earl D. Power, heretofore vice president and general manager. Mr. Power joined Lyon 12 years ago as manager of one of the sales divisions. Prior to that he was with White Motor Co., Cleveland, as assistant to the vice president and general manager.

♦

G. Sinding Larsen has been elected a director, Pittsburgh Piping & Equipment Co., Pittsburgh. He joined the company in 1924 and was appointed chief engineer in 1938.

♦

J. B. Baumann, formerly on the engineering staff of Taylorcraft Co., Alliance, O., airplane manufacturer, has been elected president, Mercury Aircraft Co. Inc., Menominee, Mich. Other officers are: Frank L. Betts, vice president in charge of sales; Richard D. Smith, vice president and general manager; W. W. Rittamel, secretary-treasurer. Mr. Baumann will also be plane designer and chief engineer for Mercury.

♦

Myron C. Taylor, former chairman of the United States Steel Corp., and personal envoy of President Roosevelt to the Vatican, arrived in New York, Sept. 6 on the EXCALIBUR from Lisbon.

♦

John E. Garlent, associated with Motor Wheel Corp., Lansing, Mich., since its formation in 1920, has been elected executive vice president. He will retain his position of vice president in charge of manufacturing, a post he has held the past six years.

♦

George M. Class, formerly chief engineer, Gisholt Machine Co., Madison, Wis., has been promoted to vice president in charge of engineering. He has been associated with the Gisholt organization 16 years. Frederick L. Chapman, heretofore assistant sales manager, has been named sales manager.

B. L. Waters

Earl D. Power

♦

Alberto J. Ubbelohde, dealer and importer of steel and metals in the Argentine and Uruguay, is in the United States on a business trip for several weeks. He is making his office with Jules Dierckz, New York, who is directly associated with Alberto Ubbelohde & Co.

♦

B. A. Dollens, superintendent of plant No. 6 of Delco-Remy division of General Motors Corp., Anderson, Ind., has been named superintendent of the new aluminum foundry which is being built as a large addition to be used in the national defense program. Everett Vinson has been named his successor.

♦

H. E. Ardahl, formerly chief metallurgist, John Deere Tractor Co., Waterloo, Iowa, has been named assistant to the vice president, Michiana Products Corp., Michigan City, Ind., producer of heat, corrosion and abrasion-resistant alloy castings.

LeRue P. Bensing has been appointed representative in the Cleveland territory for Michiana Products, with headquarters at 2036 East Twenty-second street, Cleveland.

♦

Edward P. Hayes has joined C. A. Olsen Mfg. Co., Elyria, O., as vice president. Mr. Hayes and C. A. Olsen, head of the company, formerly were associated with the Fox Furnace division of American Radiator & Standard Sanitary Corp., of which Mr. Olsen was president and Mr. Hayes was in charge of sales promotion and sales.

♦

Charles F. Dickinson has been appointed manager, sheet and strip bureau, metallurgical division, Carnegie-Illinois Steel Corp., Chicago. He succeeds Maurice B. Sunderland, who has been transferred to Pittsburgh as metallurgical engineer, handling sheet and strip. Paul R. Lawrence has become assistant to general superintendent, Gary sheet and tin mills, succeeding Mr. Dickinson. Charles H. Jackman becomes manager, structural and plate bureau, metallurgical division, Chicago, the position former-

(*Please turn to Page* 131)

His Life an Inspiration

■ IN THE sudden passing of John A. Penton, Sunday, Sept. 8, at his home in Santa Barbara, Calif., this publishing company lost its founder, and STEEL its most ardent protagonist.

• • •

Thinking back over the events in more than a score of years of close association with him, this writer believes that his zeal in championing any enterprise of his own creation was more characteristic of the real John A. Penton than many of his other qualities. For such projects he had intense enthusiasm and sublime faith.

If we of the present generation will try to orient this quality of overwhelming confidence in an undertaking to the conditions existing in the world of American business at the turn of the century, we will gain an understanding of the driving force, not only of Mr. Penton, but of many other dynamic business leaders of his day.

• • •

They were individualists. They had strong convictions. A thing was all right or all wrong; there was no middle ground. They worked hard, putting so much of themselves into their respective business undertakings that in that period—more than is possible today—there was much point to Emerson's statement that "an institution is the lengthened shadow of one man."

The overpowering confidence which was so characteristic of John A. Penton and his contemporaries inspired another trait that has been misunderstood in recent years. These individualists of the mauve decade were incurable optimists. They gained the major part of their experience during a period when American institutions were growing by leaps and bounds. Consequently, they, perhaps more than any other group in this nation, found it exceedingly difficult to adjust their ingrained optimistic outlook to the recurring descending curves of industrial activity during the decade of the thirties.

• • •

But of all the contributions of these stalwart men, the most precious heritage is the quality of confidence in one's self and in one's work.

Mr. Penton had developed it to a marked degree in his career as a publisher of business papers. Cyrus H. K. Curtis and Adolph Ochs possessed it in a broader field of journalism. Charles M. Schwab and others employed it in their march to success as industrialists.

• • •

Confidence was their watchword. Would that in a world so fraught with indecision and defeatism, we could rekindle more of that spirit in the minds of men today.

E. L. Shaner

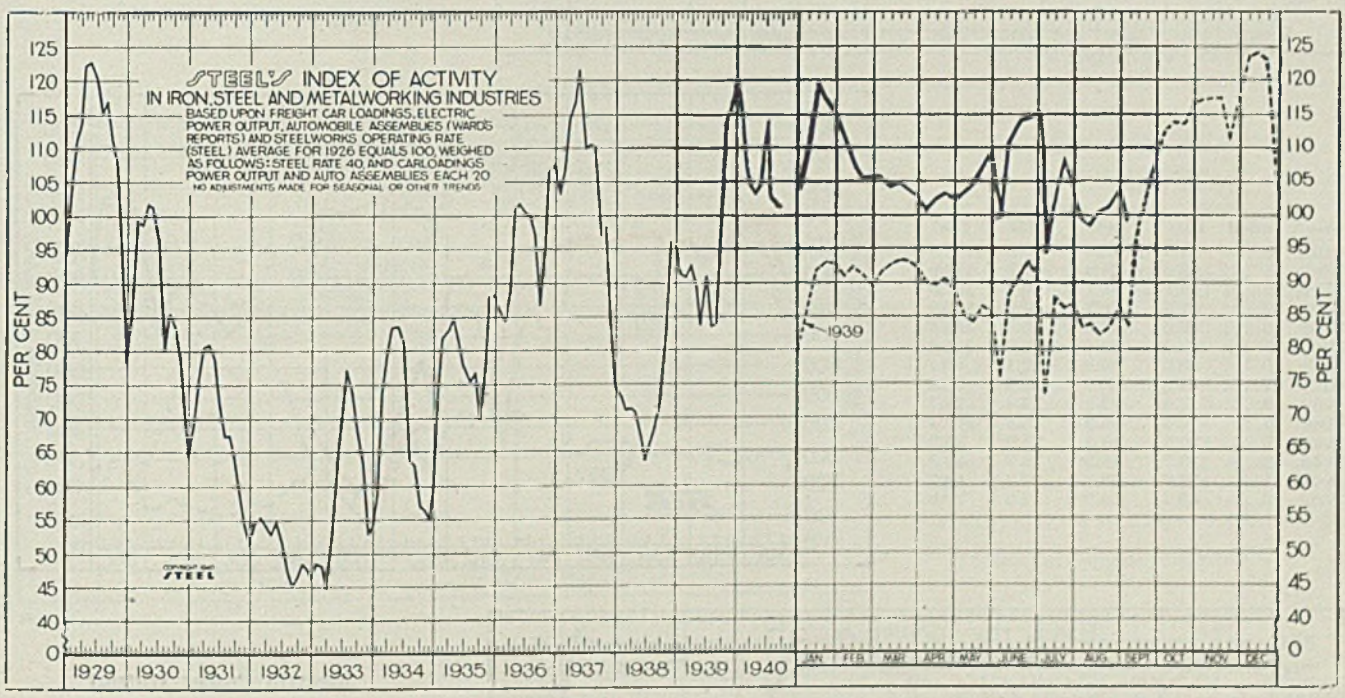
The BUSINESS TREND

Activity Index Reflects Holiday Interruption

■ REFLECTING the interruption due to the observance of Labor day, most industrial indicators declined during the week ended Sept. 7. However, in most instances the temporary recession was less than of seasonal proportions.

Outlook for industrial activity over the coming months is particularly encouraging, despite the uncertainties abroad. Prospects are for continued business expansion as the rearmament program gains momentum. This will be reflected in increased activity in the steel, aircraft, heavy equipment, machine tool, shipbuilding and construction industries.

For the holiday week ended Sept. 7, STEEL'S index of activity declined 4.8 points to 98.7, reflecting moderate declines in three or four business indicators composing the index. During the comparable periods of 1939, 1938 and 1937, STEEL'S index declined 2.6 points, 5.5 points and 10.5 points respectively. Indications point to a sharp rebound in the index for the week ended Sept. 14 and a continuation of the general upturn through the weeks immediately ahead.



STEEL'S index of activity declined 4.8 points to 98.7 in the week ended Sept. 7.

Week Ended	1940	1939
June 29	115.3	91.0
July 6	94.2	73.4
July 13	108.5	87.8
July 20	106.0	86.0
July 27	103.4	86.8
Aug. 3	99.7	83.5
Aug. 10	98.5	83.9
Aug. 17	100.8	82.2
Aug. 24	101.4	83.4
Aug. 31	103.5†	86.3
Sept. 7	98.7	83.7

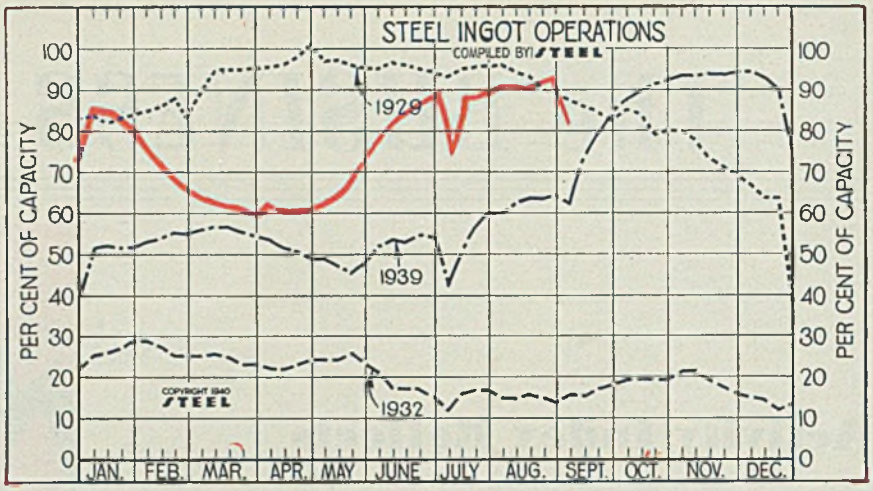
†Revised.

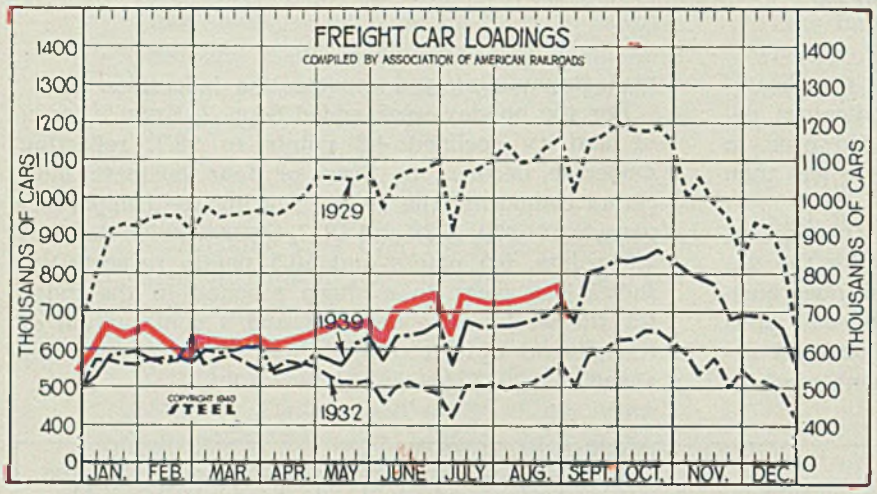
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	101.0	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	.....	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	.....	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	.....	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
June 8....	81.5	53.5	25.5	74.0
June 15...	86.0	52.5	27.0	75.5
June 22....	88.0	54.5	28.0	74.0
June 29....	89.0	54.0	28.0	77.5
July 6....	75.0	42.0	24.0	74.0
July 13....	88.0	50.5	32.0	82.0
July 20....	88.0	56.5	36.0	81.0
July 27....	89.5	60.0	37.0	84.0
Aug. 3....	90.5	60.0	40.0	84.5
Aug. 10....	90.5	62.0	40.0	84.0
Aug. 17....	90.0	63.5	41.5	81.0
Aug. 24....	90.5	63.5	43.5	83.0
Aug. 31....	91.5	64.0	44.5	83.0
Sept. 7....	82.0	62.0	41.5	72.0





Freight Car Loadings

(1000 Cars)

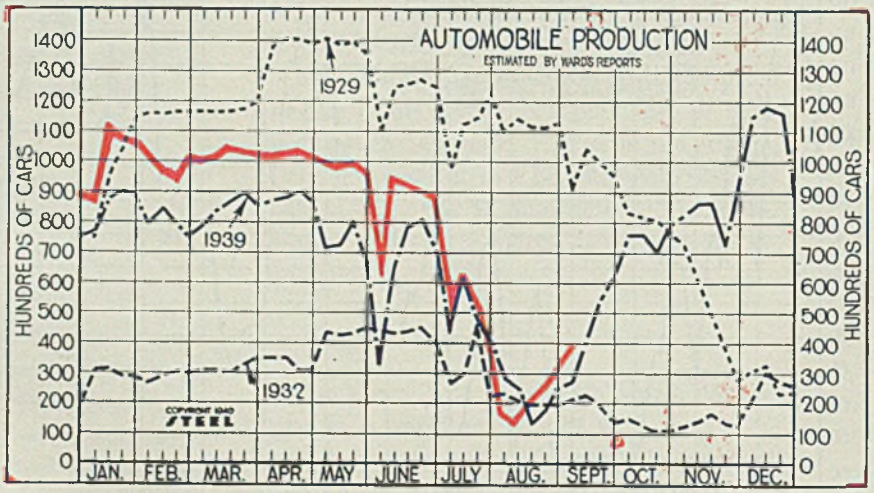
Week ended	1940	1939	1938	1937
June 8.....	703	635	554	754
June 15.....	712	638	556	756
June 22.....	728	643	559	774
June 29.....	752	666	589	806
July 6.....	637	559	501	682
July 13.....	740	674	602	770
July 20.....	730	656	581	771
July 27.....	718	660	589	783
Aug. 3.....	718	661	584	770
Aug. 10.....	727	665	590	777
Aug. 17.....	743	674	598	781
Aug. 24.....	761	688	621	787
Aug. 31.....	769†	722	648	805
Sept. 7.....	695	667	569	711

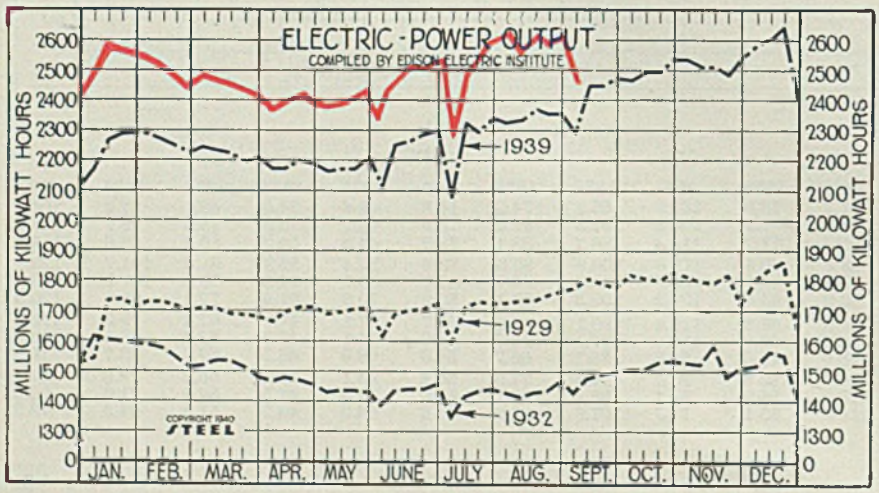
†Revised.

Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
June 8....	95.6	65.3	40.2	118.8
June 15....	93.6	78.3	41.8	111.6
June 22....	90.1	81.1	40.9	121.0
June 29....	87.6	70.7	40.9	122.9
July 6....	52.0	42.8	25.4	101.0
July 13....	62.2	61.6	42.0	115.4
July 20....	53.0	47.4	32.1	88.1
July 27....	34.8	40.6	30.4	86.4
Aug. 3....	17.4	28.3	14.8	78.7
Aug. 10....	12.6	24.9	13.8	103.3
Aug. 17....	20.5	13.0	23.9	93.3
Aug. 24....	23.7	17.5	18.7	83.3
Aug. 31....	27.6	25.2	22.2	64.2
Sept. 7....	39.7	26.9	17.5	59.0

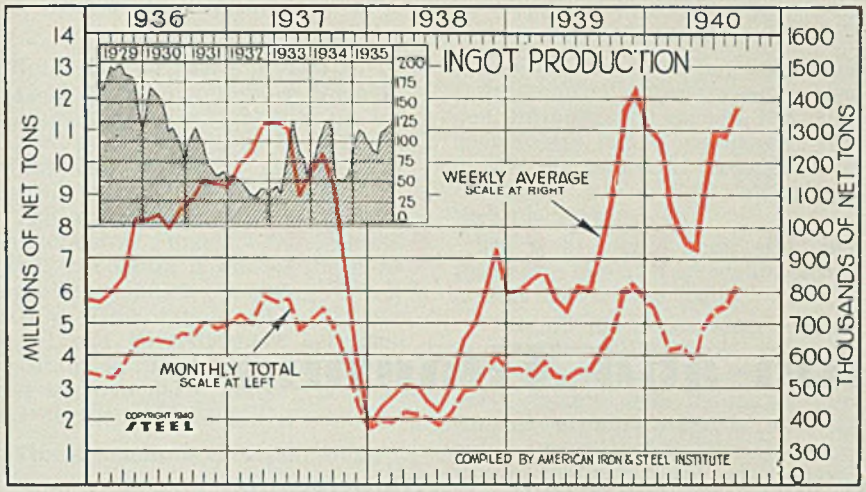




Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
June 8...	2,453	2,257	1,992	2,214
June 15...	2,516	2,265	1,991	2,214
June 22...	2,509	2,285	2,019	2,238
June 29...	2,514	2,300	2,015	2,238
July 6...	2,265	2,088	1,881	2,096
July 13...	2,483	2,324	2,084	2,298
July 20...	2,524	2,295	2,085	2,259
July 27...	2,601	2,342	2,094	2,256
Aug. 3...	2,605	2,325	2,116	2,262
Aug. 10...	2,589	2,333	2,134	2,301
Aug. 17...	2,606	2,368	2,139	2,304
Aug. 24...	2,571	2,354	2,134	2,295
Aug. 31...	2,601	2,357	2,149	2,321
Sept. 7...	2,463	2,290	2,048	2,154



Steel Ingot Production

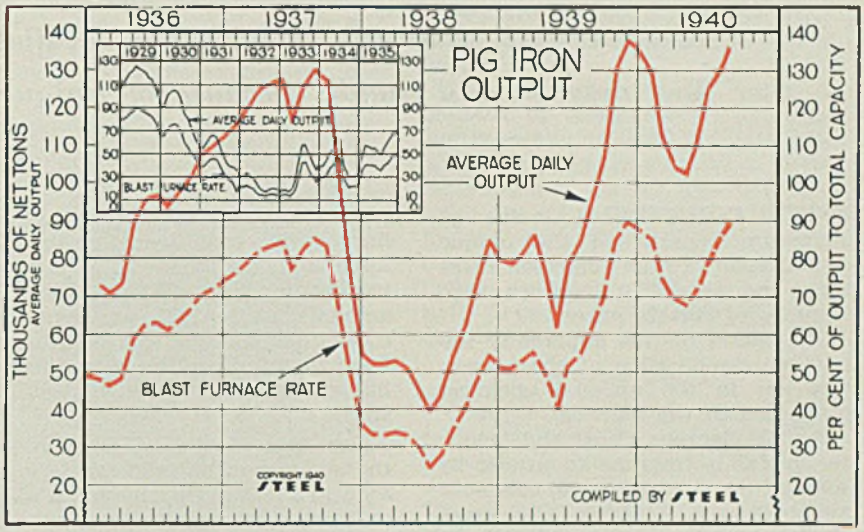
(Unit 100 Net Tons)

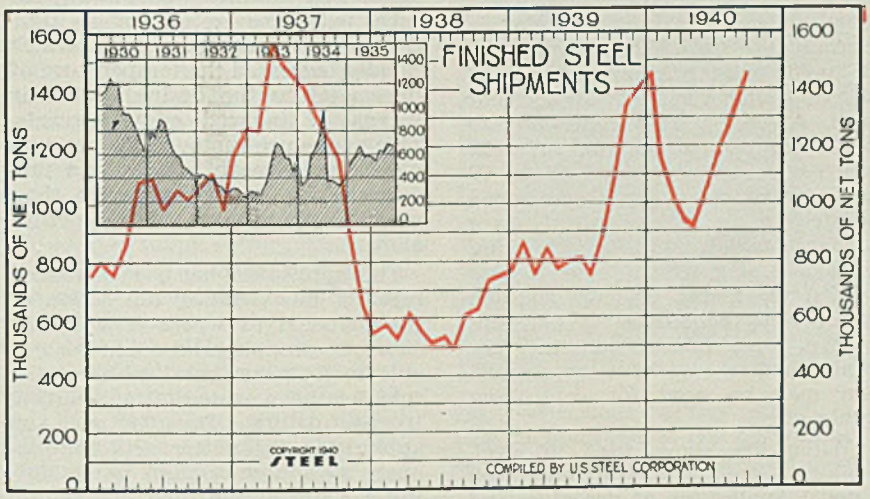
	Monthly Total		Weekly Average	
	1940	1939	1940	1939
Jan.	5,655.3	3,578.9	1,276.6	807.9
Feb.	4,409.0	3,368.9	1,065.0	842.2
Mar.	4,264.8	3,839.1	962.7	866.6
Apr.	3,974.7	3,352.8	926.5	781.5
May	4,841.4	3,295.2	1,092.9	743.8
June	5,532.9	3,523.9	1,289.7	821.4
July	5,595.1	3,564.8	1,265.9	806.5
Aug.	6,033.0	4,242.0	1,361.9	957.6
Sept.	.....	4,769.5	.....	1,114.4
Oct.	.....	6,080.2	.....	1,372.5
Nov.	.....	6,147.8	.....	1,433.0
Dec.	.....	5,822.0	.....	1,317.2
Total	.....	51,585.0	.....	989.4†

†Weekly average.

Pig Iron Production

	Daily average —Net Tons—			Blast furnace —Rate (%)—		
	1940	1939	1938	1940	1939	1938
Jan.	129,825	78,596	52,201	85.4	51.0	33.6
Feb.	113,943	82,407	52,254	75.0	53.5	33.6
Mar.	105,502	86,465	53,117	69.5	56.1	34.2
Apr.	104,635	76,732	51,819	68.9	49.8	33.4
May	112,811	62,052	45,556	74.2	40.2	29.4
June	127,103	79,125	39,601	83.6	51.4	25.5
July	130,984	85,121	43,827	86.1	55.0	28.2
Aug.	136,599	96,122	54,031	89.9	62.4	34.8
Sept.	.....	107,298	62,835	....	69.7	40.5
Oct.	.....	131,053	74,697	....	85.2	48.0
Nov.	.....	138,883	85,369	....	90.3	55.0
Dec.	.....	136,119	79,943	....	88.5	51.4
Av.	.....	86,375	51,752	....	62.6	37.3





Finished Steel Shipments

U. S. Steel Corp.

(Unit 1000 Net Tons)

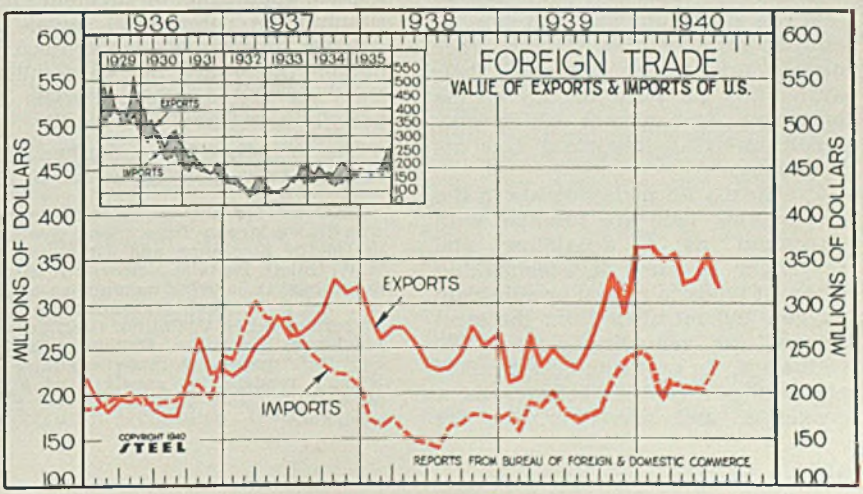
	1940	1939	1938	1937	1936
Jan.	1145.6	870.9	570.3	1268.4	795.2
Feb.	1009.3	747.4	522.4	1252.8	747.4
Mar.	931.9	845.1	627.0	1563.1	863.9
Apr.	907.9	771.8	550.5	1485.2	1080.7
May	1084.1	795.7	509.8	1443.5	1087.4
June	1209.7	807.6	525.0	1405.1	978.0
July	1296.9	745.4	484.6	1315.3	1050.1
Aug.	1455.6	885.6	615.5	1225.9	1019.9
Sept.	.....	1086.7	635.6	1161.1	1060.7
Oct.	.....	1345.9	730.3	876.0	1109.0
Nov.	.....	1406.2	749.3	648.7	947.3
Dec.	.....	1444.0	765.9	539.5	1178.6
Total†	...	11707.3	7315.5	14097.7	11905.0

†After year-end adjustments.

United States Foreign Trade

(Unit: $1,000,000)

	Exports		Imports	
	1940	1939	1940	1939
Jan.	$368.6	$212.9	$241.9	$178.2
Feb.	347.0	218.6	199.8	158.0
Mar.	352.3	267.8	216.7	190.5
April	324.0	231.0	212.2	186.3
May	325.3	249.5	211.4	202.5
June	350.2	236.1	211.4	178.9
July	317.0	229.6	232.3	168.9
Aug.	.....	250.8	.....	175.8
Sept.	.....	288.6	.....	181.5
Oct.	.....	332.1	.....	215.3
Nov.	.....	292.7	.....	235.4
Dec.	.....	367.8	.....	247.0
Total	.....	$3,177.0	.....	$2,318.3



D U C T I L E

Zirconium and Titanium

Recent investigations disclose important possibilities of zirconium and titanium, metals now available in ductile form. Use may expand rapidly because of unique chemical properties

■ THE COMMERCIAL value of zirconium consists of the unique combination of high corrosion resistance and the ability to absorb large volumes of certain gases.

The secret of this apparently impossible combination of characteristics lies in the unusual chemical properties of the material.

At 100 degrees Cent. and below, the metal is immune to attack by some of the most powerful corrosive agents known. At 500 to 860 degrees Cent., zirconium is capable of absorbing enormous amounts of hydrogen. Above the transition point of hydrogen (from the alpha to the beta form) it is also capable of absorbing oxygen, nitrogen, carbon monoxide, carbon dioxide, etc.

These properties mean that zirconium and titanium (which have similar characteristics as ductile metals) are valuable in handling various chemicals and in a large number of chemical processes. On the other hand, zirconium either in powder form or as a ductile metal, is particularly well suited for use as a "getter" in vacuum tubes and in chemical processes, where its ability to absorb large amounts of gases is utilized to improve and maintain the high vacuum required.

While zirconium and titanium in powder form or alloyed with other metals are fairly common, their availability as pure ductile metals is a new development which may result in many important new applications.

Practically all metallurgists in the steelmaking field are familiar with zirconium as a deoxidizer and scavenger of steel in steelmaking where it tends to reduce or eliminate oxygen and nitrogen from the steel as well as removing nonmetallic inclusions. In amounts between 0.05 and 0.10 per cent, it behaves as a deoxidizer and scavenger. In the range from 0.08 to 0.10 per cent, a fine grain steel usually results. Zirconium additions help prevent tearing in rolling. When present in amounts above 0.15 per cent zirconium combines with the sulfur to form zirconium sulfide, thus producing a better surface on high-sulfur steel.

For steel of high silicon content, the addition often is in the form of a 12 to 15 per cent zirconium alloy in which silicon ranges from 39 to 43 per cent and iron 40 to 55 per cent. Low silicon steel may employ a zirconium alloy addition containing 35 to 40 per cent zirconium, 47 to 52 per cent silicon and 6 to 10 per cent iron. A ternary alloy containing 20 to 24 per cent zirconium, 10 to 12 per cent manganese and 58 to 62 per cent silicon is sometimes added to steel in the ladle where it has a strong deoxidizing action, forming a fusible slag which tends to rise out of the metal. A ladle addition of an alloy containing 45 per cent silicon, 7 per cent aluminum, 7 per cent vanadium and 7 per cent zirconium may be used for controlling grain size.

While the above uses in steelmaking are comparatively well known, application of zirconium and titanium as commercial metals in powder form and as a massive ductile metal are not so familiar. Data on the ductile materials especially are scarce.

Use in radio tubes and other high-vacuum tubes possibly is one of the most important applications. In the manufacture of high-vacuum tubes, various metals are used chemically to absorb or "fix" gases which may be present, thus shortening pumping times. These so-called "getters" are especially important in the manufacture of receiving and transmitting tubes for radio work. In the early years of the radio industry, magnesium was used chiefly for this purpose. After the tubes had been evacuated to a certain pressure, the metal was volatilized by placing the tube with the getter in a high-frequency magnetic field which rapidly increased the temperature of the metal to the desired point by means of induced eddy currents. This procedure removed the residual gases much more rapidly and produced a lower final pressure than was possible by high-vacuum pumps alone.

This application has been advanced recently to extending the action of the material to where it not only shortens pumping time but also is able to fix gases released after the tube has been sealed off and during its useful life. Thus in such an application the getter acts continuously as a high-vacuum pump during the life of the tube. Zirconium satisfies this requirement extremely well, provided it is introduced at such a spot that it attains a suitable temperature during functioning of the tube. This is accomplished by placing the getter material in such a position that the heater element of the tube maintains the metal at the required temperature. The most favorable temperature for absorption of hydrogen is 300 to 400 degrees Cent. and 1000 to 1600 degrees Cent. for other gases.

Since oxygen, nitrogen, hydrogen, carbon dioxide, carbon monoxide and water vapor may also be liberated, the metal must have great

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Material for this correlated abstract was drawn largely from "Some Features of Ductile Zirconium and Titanium," by H. W. Gillett, Battelle Memorial Institute, Columbus, O., and "Zirconium as a Getter," by J. D. Fast, Natuurkundig Laboratorium der N. V. Philips' Gloeilampenfabrieken, Eindhoven, Holland. This recent information is made available to STEEL'S readers by courtesy of Foote Mineral Co., 1609 Summer street, Philadelphia.

affinity for all these if it is to be a good getter and remove them in a short time. Thus, in looking for a good getter, one looks for a metal which can easily be corroded by gases.

The remarkable fact is that at temperatures under 200 degrees Cent., zirconium is one of the most corrosion-resistant metals in existence. How it is possible that one metal can be extremely corrosion resistant in one temperature range and a particularly active getter in another is interesting.

The Reaction of Gases on Metal

If only the thermodynamic side of the problem is considered, no metal is completely corrosion resistant in contact with the air. Even precious metals oxidize at room temperature and so should in time oxidize completely when in contact with the air.

However another factor enters. If the metal is in the form of a monoatomic layer, such complete oxidation actually does take place spontaneously at not too low temperatures. In the case of compact metals, the reaction comes to a standstill in a very short period after the formation of an extremely thin and often invisible oxidized film. Further reaction then demands a diffusion of at least one of the reacting substances through the film already formed. In many cases, such a transfer of matter in a solid state does not take place to any extent.

It is evident the resistance of the metal to corrosion does not depend on the affinity between the metal and the gas under consideration but on the protection against further corrosion offered by the oxide film already present. Corrosion-resistant metals therefore are usually metals with a good protective oxide film. On the other hand, getters generally are metals whose oxide film offers little or no protection. Among the relatively corrosion-resistant metals, there are also metals such as aluminum, chromium, titanium, zirconium and tantalum of which the high heats of formation of the oxides would lead one to expect high corrodability by oxygen in the air.

At a high temperature an oxide film protects a metal much less effectively against further corrosion although it does have a retarding effect which is greater, the thicker the layer. Gas does not diffuse through the already existing layer to react on the metal under it as formerly supposed, but the metal atoms, split into ions and electrons, diffuse through the metal compound to the outside and react there with the metalloid. If pieces of iron or copper are wound with platinum wire, the latter is completely enclosed by the growing oxide layers during oxidation.

It follows from the above that a good getter must not only have a great affinity for oxygen, hydrogen, nitrogen and carbon, but must develop no dense, compact layers during reaction with these gases on the metal which would delay further reaction.

There are two cases of oxide formation in which no sealing layers are formed on the metal.

With alkali metals such as lithium, sodium, potassium, rubidium and caesium and with the alkaline earth metals such as magnesium, calcium, strontium and barium, the volume of the oxide is smaller than that of the metal, so a porous layer is formed. Gas reaches the metal through the pores and cracks so protection against oxidation does not increase as the oxide layer becomes thicker. The melting points of alkali metals are too low for their use as getters, however, and the vapor pressures except those of lithium are too high. On the other hand, the alkaline earth metals often are used as getters with chemical activity increasing in the following order: Magnesium, caesium, strontium and barium.

Fig. 1—Zirconium "getters" make possible high vacuum at low cost—an essential for modern radio receiver tubes

Magnesium is found to function practically only during process of evaporation while barium absorbs the gas in the solid state and is therefore used on a large scale in high-vacuum technique. Because of its great chemical activity, however it is unstable in air and consequently is often introduced enclosed in a jacket of, for instance, copper or nickel. Upon heating, the barium is liberated from this jacket in a high vacuum tube as a vapor and condenses on the glass wall as a mirror. Objections to this are that the metal may condense at places where its presence is not desired and the mirror reduces heat radiation.

On heating titanium and zirconium, no sealing layers are formed at a high temperature because the solubility of oxygen and nitrogen in these metals is extremely high. At the same time, good protective oxide layers are formed at low temperatures, making these metals stable in air.

This accounts for the apparent paradox of being extremely corrosion-resistant at low temperatures and highly gas-absorbent at high temperatures. At the high temperatures, the oxide film dissolves in the metal, which thus becomes active. During absorption of gases, the metal surface maintains its activity because each freshly absorbed quantity diffuses toward the interior.

Is Best Getter

Chemical activity in the fourth main group of the periodic system increases in the order: Titanium, zirconium, hafnium and thorium. This would lead one to expect the best getter characteristics from thorium. However, thorium does not dissolve oxygen and nitrogen to an appreciable extent, and also the volume of oxide is greater than that of the metal so sealing layers are formed which considerably delay absorption of gases, even at high temperatures. Hafnium also is too expensive. So in this series, zirconium remains the most suitable material for a getter. Thus its increased use is accounted for, especially in high-vacuum transmitting tubes.

Oxygen, particularly, is extremely soluble in zirconium. The oxygen and nitrogen atoms are absorbed in the interstices of the metal lattice. Oxygen atoms in particular have great mobility in the zirconium lattice at high temperatures. At high temperatures and under the influence of an electric field, the oxygen atoms or ions move toward the anode from interstice to interstice through the lattice. Homogeneous solutions of oxygen in zirconium at high temperatures can be obtained either by allowing the metal to absorb oxygen directly from the gas phase or by letting it react with zirconium oxide.

The gas pressure for saturated solutions of oxygen or nitrogen in zirconium are too low for direct measurement. Even at a temperature of 1500 degrees Cent., the saturation pressure is less than 10-

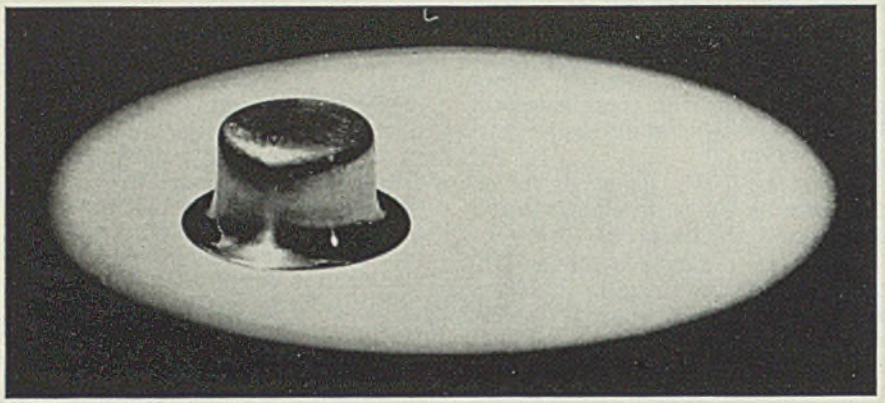


Fig. 2—Typical application in processing industries is this rayon spinneret cup of zirconium

atmosphere. The result is that when zirconium is heated to a high temperature in a closed space in an atmosphere of oxygen, nitrogen or mixtures of these gases, the gas is absorbed completely with the exception of immeasurably small quantities, provided there is a sufficiently large surplus of the metal. A better vacuum is produced than can be obtained with the best high vacuum pumps. This same characteristic makes it impossible to free zirconium containing oxygen or nitrogen in a solid solution of such gas by heating it in a high vacuum.

Zirconium also can absorb large quantities of hydrogen in solid solution. While the hydrogen is liberated again to a large extent at high temperatures by establishment of an equilibrium pressure, it is possible to profit fully by the great affinity of zirconium with various gases due to the fact that a protective film is lacking at high temperatures.

In many cases the "getter" effect of zirconium can be combined with other characteristics desired. For instance, transmitting tube grids often are covered with zirconium to cut down the amount of secondary electron emission.

Ductile zirconium can be used to combine its getter action with structural purposes in supporting portions of the inner structure of the tube. Transmitting tubes, for instance, contain a grid in which spirals of zirconium wire form the connection between the grid wire proper which is made of molybdenum and the supporting rods of the grid. The availability of ductile zirconium enables use of parts to fit the metal into the tube at those points where it will reach the most favorable temperature for absorption of gases.

In addition to the high efficiency zirconium shows as a getter, its great corrosion resistance and other characteristics at low temperatures indicate possibilities of many advantageous applications. With the practical development of methods for producing ductile zirconium and possibility of fabricating structures by electric spot welds or resistance butt welding, a number of commercial applications of sheet, tubing and wire are suggested. Foremost among these are in chemical equipment since zirconium as well as titanium is resistant to many strongly corrosive acids and alkalis. In fact, the only reagent that readily attacks these metals is hydrofluoric acid and fluosilicic acid. General corrosion resistance is similar to tantalum whose virtues have already been recognized for chemical equipment.

Experiments to compare the corrosion resistance of zirconium and titanium in ductile sheet form with commercial 18-8 stainless have been made. Titanium is attacked by concentrated hydrochloric acid at 100 degrees Cent. while zirconium is not. Titanium also is much less affected by 50 per cent sodium hydroxide at 100 degrees Cent. than 18-8 stainless, but much more than zirconium. A 20 per cent solution of sodium chloride at 100 degrees Cent. attacked 18-8 slowly but had only a slight tarnishing effect on titanium and zirconium.

Immune to Strong Acids

Zirconium is not attacked by concentrated nitric acid at 100 degrees Cent. or aqua regia at room temperature, nor does dilute silver nitrate (lunar caustic) affect it at room temperature. In strong hot mineral acids, the behavior of zirconium is about what one would expect of zirconium oxide. Metal samples were abraded on No. 0000 emery paper, then degreased until only the normal air-formed oxide film was present, yet this film seems to govern the behavior in corrosion. Concentrated sulfuric acid at 100 degrees Cent. attacked the oxide quite rapidly, whereas tantalum is but slightly attacked. A 75 per cent solution of orthophosphoric acid at 100 Cent. shows excessive attack. However, 50 per cent sulfuric acid at 100 degrees Cent. does not attack zirconium.

Behavior in caustic solutions differentiated zirconium and tantalum sharply. Tantalum is attacked by 10 per cent sodium hydroxide at 100 degrees Cent. while zirconium is not, and withstood even 50 per cent sodium hydroxide for four days at this temperature with an indicated attack of only 0.00017-inch per year, which is negligible.

Zirconium is not affected by wet or dry chlorine gas at room temperature nor by concentrated hydrochloric acid at 100 degrees Cent. nor dilute hydrochloric acid plus zinc chloride (soldering flux) at 100 degrees Cent. (which material is active on 18-8 stainless). A 20 per cent sodium chloride brine at 100 degrees Cent. was also without any but a slight tarnishing effect.

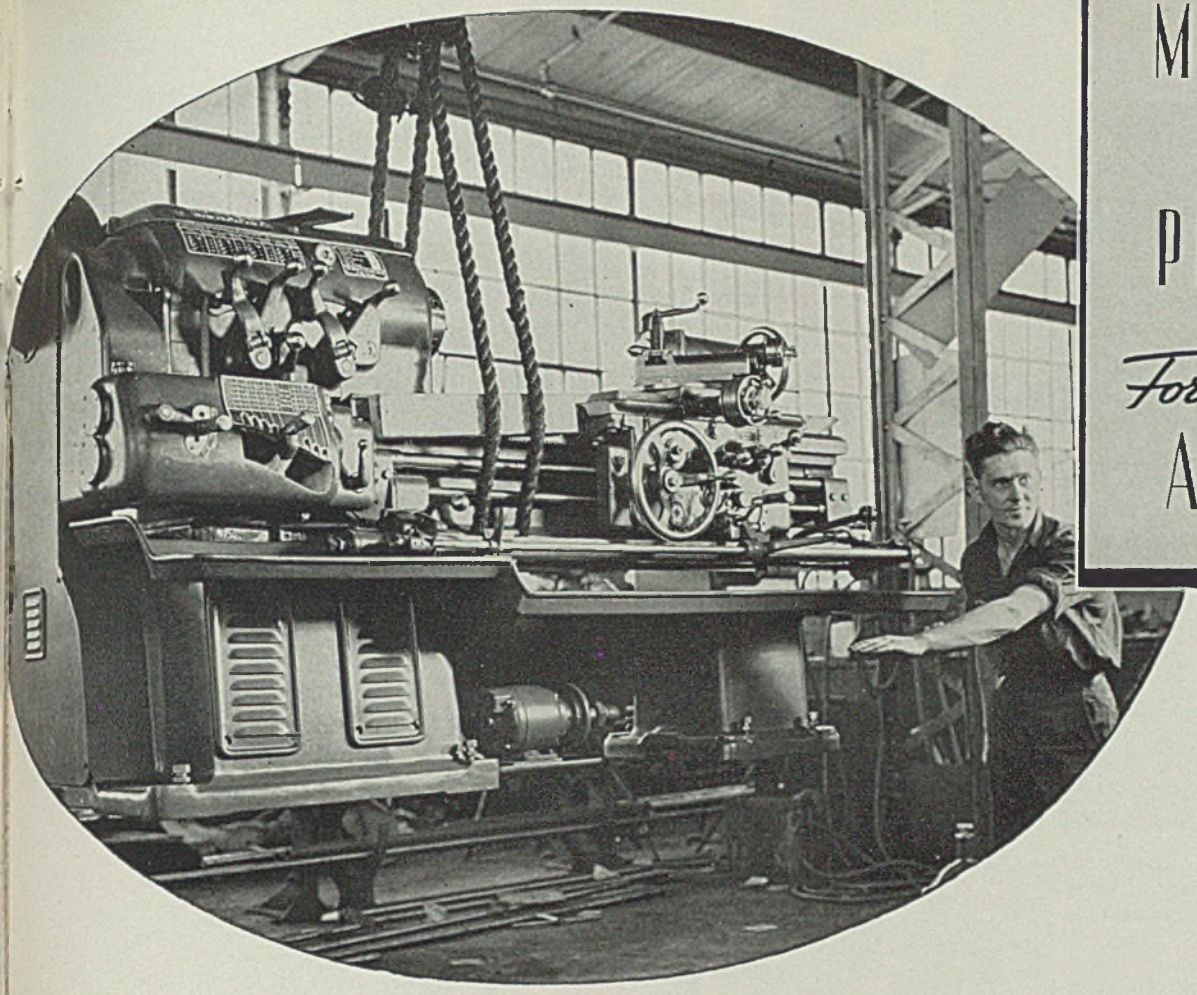
Both zirconium and titanium retain their bright luster in air for many years and appear unaffected by hydrogen sulfide or alkalic sulfides and so are classed as "nontarnishable." Organic acids are not expected to attack them. A 10 per cent oxalic solution at 100 degrees Cent. which attacks 18-8 stainless had no effect on zirconium in a 5-day test.

Zirconium thus exhibits extremely good acid resistance except to hydrofluoric acid, extremely concentrated hot sulfuric acid or phosphoric acid. Solutions of chlorine water and ferric chloride (molysite) are to be avoided in spite of the resistance to hot brine and hot concentrated hydrochloric acid (hydrogen chloride). Zirconium exhibits noteworthy resistance to alkali. On the whole, zirconium is a decidedly interesting material for corrosion resistance and chemical uses.

Its similarity to tantalum raises a question as to whether it also has the peculiar property possessed by tantalum of dropwise condensation, now utilized in heat exchange applications especially where corrosive chemicals are concerned.

Condensation of vapors in the condenser may occur in discrete drops, as a continuous film or as a combination of these two. The first method gives the most efficient heat transfer. Overall heat transfer coefficients may be increased as much as five times by changing from film to dropwise condensation—thus its extreme importance. It has been stated that the steam side film coefficient of heat transfer as distinguished from the overall coefficient can be increased as much as 20 times by dropwise condensation.

Dropwise condensation can usually be induced by polishing the condenser surface and coating with an oily film of some sort. This method, however, is not always suitable, especially in corrosive vapors. Some metals appear to have a natural film which induces dropwise condensation. Tantalum is one of these metals. In one case, 1 square foot



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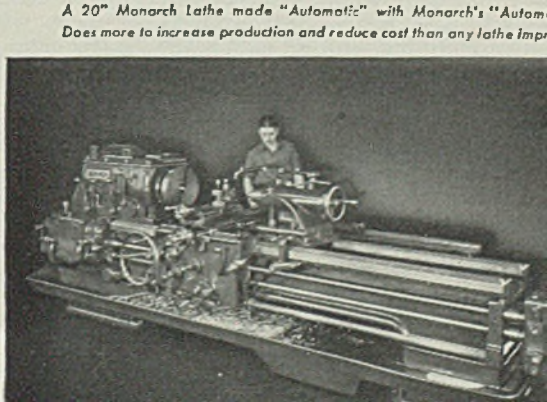

MONARCH LATHES

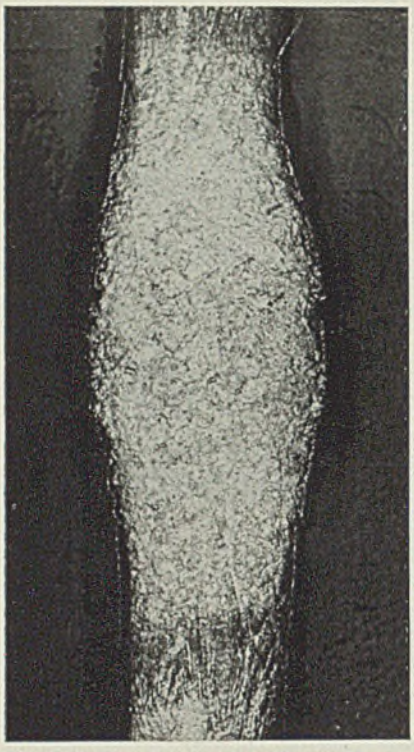

Fig. 3—Enlarged section of electric butt weld of swaged zirconium rod, etched in 5 per cent hydrofluoric acid

of tantalum was found equivalent to 18 square feet of lead in condensing vapors from mixtures of hydrogen chloride and sulfuric acid. While this increase was partly due to a superior heat transfer coefficient, a major degree was from dropwise condensation.

Experiments to determine dropwise characteristics of zirconium show that zirconium is probably as good as tantalum for use in such corrosive vapors as hydrogen chloride and nitric acid. Also there is a slight indication that under some conditions, zirconium can maintain dropwise condensation where tantalum cannot.

Thus zirconium appears to promote dropwise condensation and should be a good material from which to make condensers with the same advantages as are obtained from the use of tantalum.

Zirconium is rather new to the chemical field, although spinnerets for rayon and the like have been used satisfactorily as also have those of tantalum, but neither seems to have made much headway against platinum with its high scrap value. The availability of tantalum for such use, however, is good insurance in case of a platinum shortage.

Zirconium for corrosion resistance and general potential chemical applications appears on a plane with tantalum.

A unique property shared by zirconium and titanium affords an unusual industrial application. An attempt to scratch glass with a piece of ductile zirconium or titanium results in a brilliant metallic streak being left on the glass. The streak is silvery in appearance and can be buffed to a high luster. Since these metals are not tarnished in air nor attacked by alkali solutions, the streaks cannot be removed by vigorous scrubbing with soap and hot water. This affords a method of putting silver-bright decorations on glass and glazed ceramic ware. Such decorations now are applied by hand using platinum compounds which are reduced to the metal during a special firing operation. Equally attractive decoration with a cheaper raw material, avoidance of excessive hand labor and the added operation of firing are important advantages accompanying the use of zirconium.

This peculiar seizure of the metals to glass seems capable of application commercially as coatings of good appearance are obtained with application of only 1 gram of titanium for 5500 square centimeters of surface or 1 gram of zirconium for 4500 square centimeters of surface. The glass can be rubbed against the metal or the metal on the glass. An artist might sketch on glass with these materials as readily as with a pencil on paper.

While such seizure properties have been a nuisance in connection with diamond drawing dies, slight preoxidation of the metal or plating with iron and copper, later removed with acid, permit drawing easily.

Another possible application is use of an adherent metal surface of zirconium or titanium (or some other metal electroplated upon these adherent coatings) upon glass or glazed ceramic ware in the form of a gasket in a glass-to-glass seal.

Working Properties of Ductile Zirconium. An extremely important matter in connection with use of zirconium is its weldability. As will be detailed, the raw ductile zirconium is available in comparatively small masses, which means that for structures of any size a method must be available to join these portions effectively. In view of the gas sensitivity of these metals at high temperatures, welding might be expected to be difficult. However, electric spot welds have been made with standard spot-welding technique and equipment without difficulty. Zirconium foil, 0.002-inch thick has been welded easily to itself or to nickel. Likewise, zirconium rod swaged to 0.12-inch diameter was electrically butt welded to itself without difficulty. Fig. 3 shows such a weld etched in 5 per cent hydrofluoric acid and photographed at 10 diameters. Electric pressure welding under the control possible with modern equipment

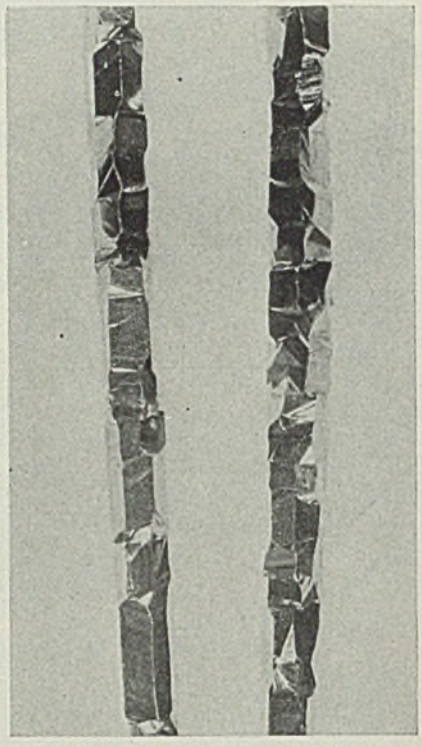

Fig. 4—Zirconium rods showing large crystals as "grown" during vapor phase decomposition process

should make fabrication of the metal by welding entirely practical.

Electric resistivity of pure zirconium appears about 0.41 x 10^{-4} and that for titanium about 0.48 x 16^{-4} against about 1.7 x 10^{-6} for copper. Thus they have relatively high resistance.

Coefficient of thermal expansion per degree Cent. for zirconium appears around 6 x 10^{-6} at room temperature, rising to about 8 at 500 degrees Cent. Titanium is about 8 x 10^{-6} at room temperature and 11 at 500 degrees Cent., whereas that for steel is 11 to 12 at room temperature and about 16 at 500 degrees Cent.

The melting point of zirconium is around 1850 degrees Cent. with titanium melting at about 1725 degrees Cent. However, the gas sensitivity of these metals limits their applications above 500 degrees Cent. as has been pointed out above, except on the applications where gas-absorbing properties are utilized.

Zirconium exists in two forms. One is a white, metallic, crystalline form which takes a high luster like nickel. The other is a bluish-black amorphous powder. Zirconium does not appear free in nature, being commonly found as a silicate or oxide. While it is widely distributed, large workable deposits are rare. The oxide form has been used to replace lime in carbide lamps, to make highly refractory ware such as crucibles and muffles and as an opacifying agent in

(*Please turn to Page* 150)

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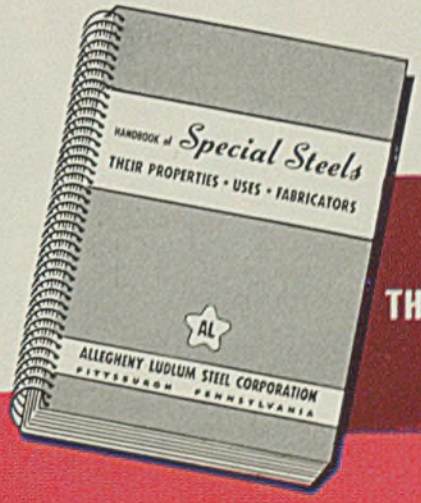

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Welding Set Eliminates Warpage, Saves Time

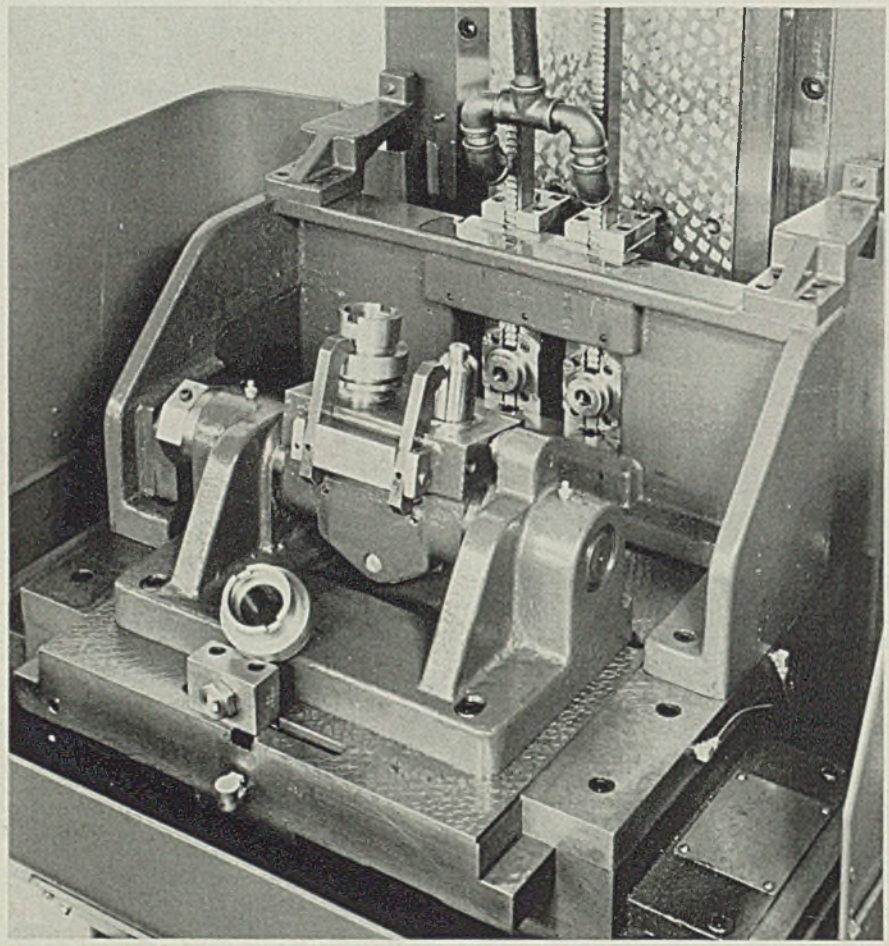
■ Black spots appearing in vitreous enamel over welds on light-gage steel refrigerator cabinets have been reduced by 90 per cent through use of an alternating-current electric welding set developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. In addition, it has eliminated warpage entirely.

Formerly in joining the cross members to the sides of refrigerator cabinets considerable difficulty was encountered. Due to the heat developed, the light 20-gage steel would warp out of shape, giving rise to large numbers of production rejects. Another problem encountered was welding the ends in the food compartment liners. As these were finished on the inside with white vitreous enamel, they had to be welded on the outside. During the welding, after the enamel was applied, black spots often were found over the welded portions. This meant that these spots had to be re-enameled in order to pass finish inspections. Besides eliminating both of these undesirable conditions, the welding set has brought about a saving in welding time. The total time now required, including handling, welding and weld cleaning averages 60-65 seconds per man hour of 50 cabinets.

Flashlight Battery

■ Ideal Commutator Dresser Co., Sycamore, Ill., has introduced a rechargeable flashlight battery similar in principle to the automobile battery. It is small in size to fit all popular two-cell 1¼-inch size-D flashlight cases. The arrangement of the chamber and vent, plus semi-fixation of the electrolyte, makes it spill-proof. The plates are over ¼-inch thick and connected to terminals by reinforced electrodes. The case is of transparent Lucite. A small charger consisting of transformer and rectifier plates makes it easy to keep the battery charged. It may be plugged into a 110-volt, 60-cycle wall socket.

Hub Slots Cut at Rate Of Four Per Minute



■ AN example of improved tooling in the automotive industry is shown in the accompanying illustration. The part in the foreground is a gear for a 1941 semiautomatic transmission. The operation is cutting slots across the hub. These slots must be held within the limits of 0.003-inch for size and 0.002-inch to center of bore.

The work is done by using dual broaches of floating construction. These are pulled through broach guides and work by broach pullers connected with the ram in the base of the machine. Fixtures which locate the part also serve as guides for the broaches so any weaving or distortion below or above has no effect on the actual cutting.

The broach guides incorporate a pilot for locating the parts, thereby assuring accuracy of the machined slots in relation to the bore. To facilitate loading, the fixture table is of the receding or shuttling type while the fixture on which the parts are loaded is of trunnion or "tilting" construction.

In operation, two parts are placed over studs on the fixture while it is in the position shown. Just before the ram starts down, the fixture table moves in toward the broach guides. Thereupon the fixture tilts forward and as the table finishes its forward movement, bores of the two parts are located above the pilots in the broach guide.

At this point the ram starts down. Broach pullers—permanently connected to the broaches—pull the tools through the guides, thus roughing and finishing the slots at one time. At the end of the down stroke, the fixture table automatically shuttles backward out of the way. At the same time the fixture tilts backward. Ram now moves upward to starting position while operator removes two finished parts and drops two unfinished ones over the fixture studs.

Two fingers are provided to hold the parts in place on the tilting fixture until they have been locked against the work pilots in the broach guides. This eliminates manual chucking of the parts.

Cutting speed is 30 feet per minute with a return stroke of 60 feet per minute, giving a production of approximately 240 pieces per hour, two parts being finished at each cycle of the machine. The 5-ton 42-inch single-ram machine with special fixtures and broaches was designed and built by Colonial Broach Co., 147 Jos. Campau street, Detroit.

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The comfort, safety, convenience of almost every moment of our day depends on steel. We enjoy food delicacies from all over the world that could never reach us except for steel cans made of tin plate. Our food is cooked on a steel range, in sanitary enameled steel utensils. We work at steel machines, steel typewriters, or steel desks in buildings made safer by steel framework. We travel by automobile, train, ship or plane made of steel. Our clothing, newspapers, movies are made by steel equipment. And at the end of the day we bathe in a steel tub, and sleep in a bed made comfortable by steel springs.

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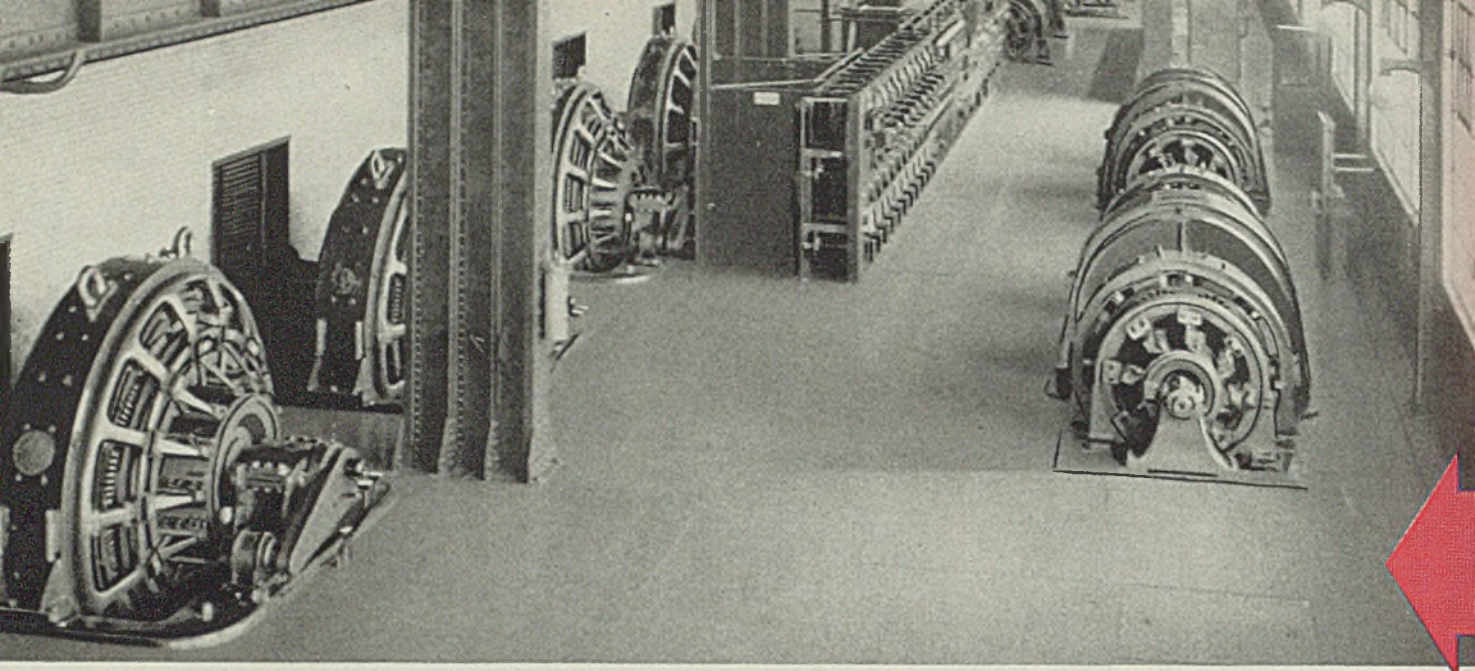

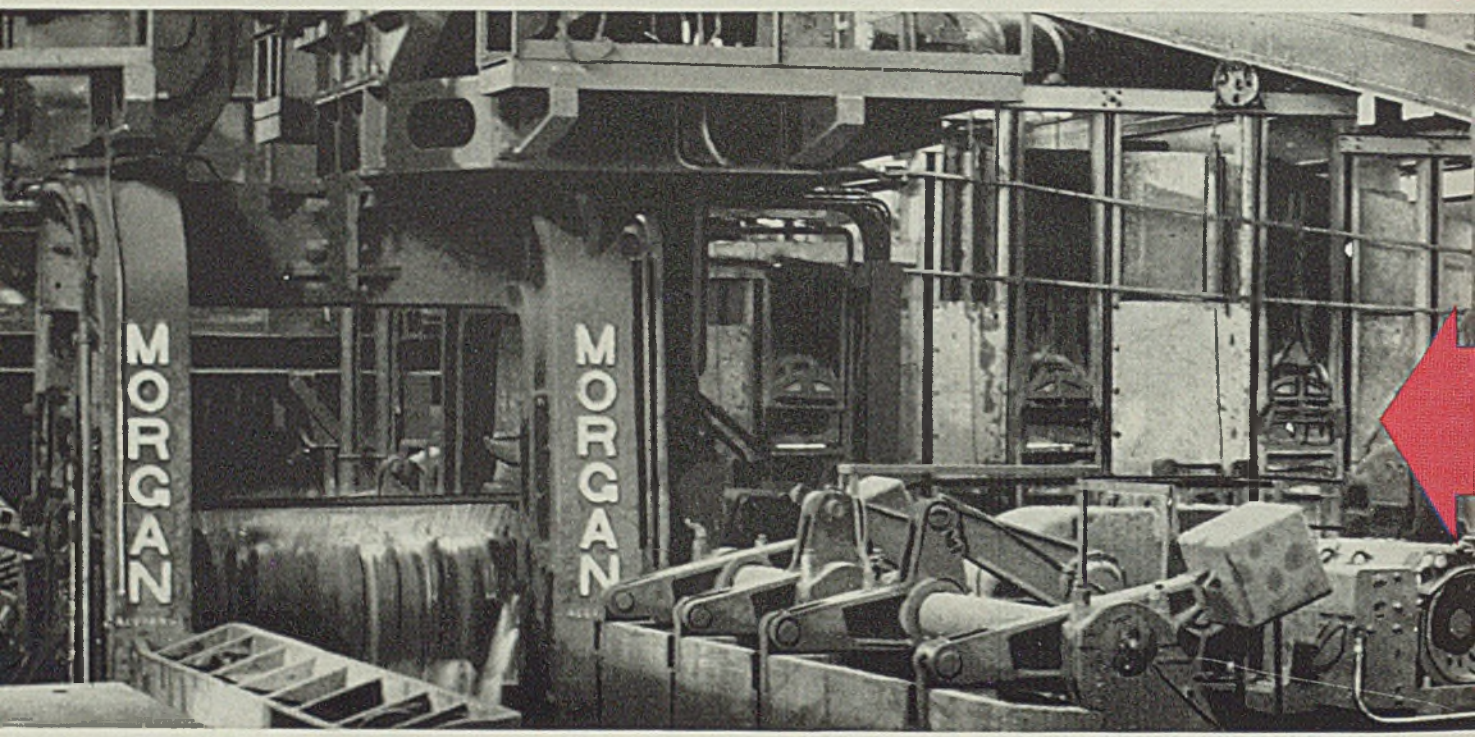
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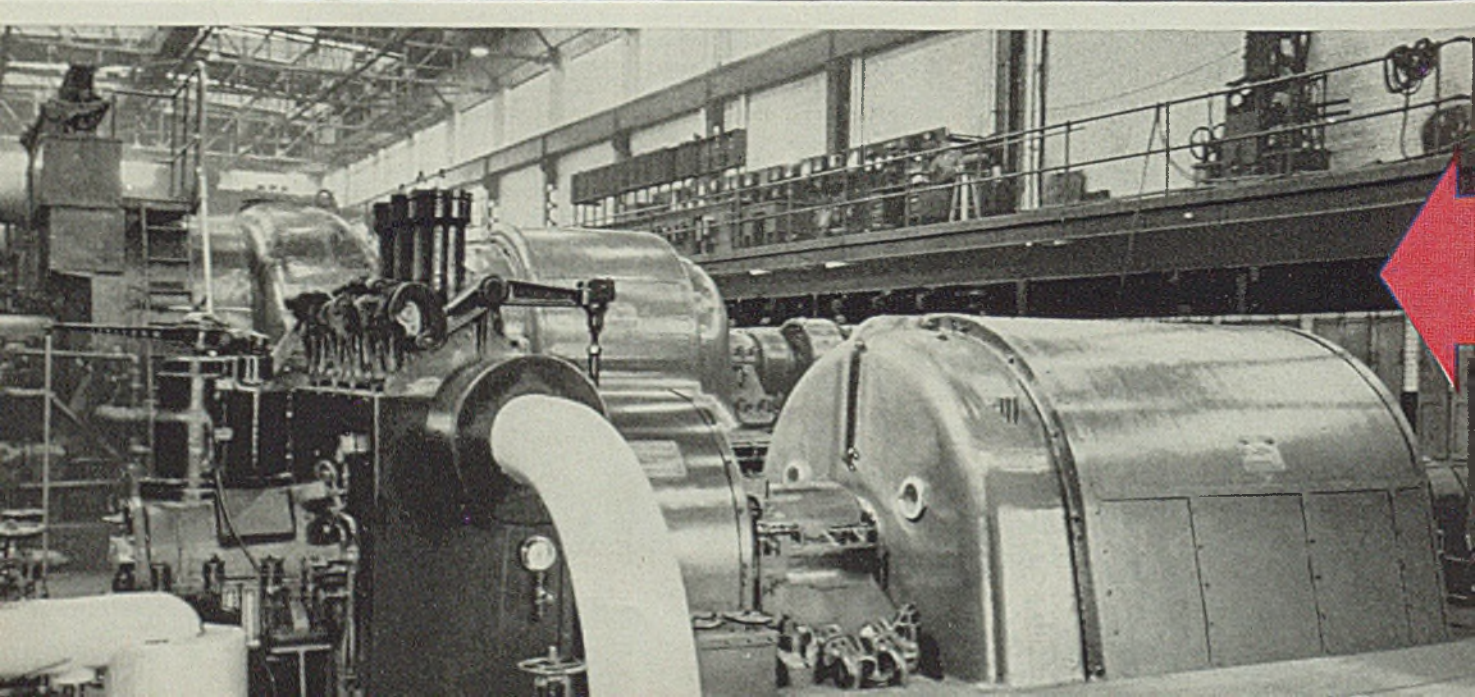

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THE G-E EQUIPPED 48-INCH HOT-STRIP MILL

One of the very first continuous wide-hot-strip mills. It helped to inaugurate the present era of high-speed, high-tonnage strip-steel production. Ever since the start of operations in 1926, the G-E motors, motor-generator sets, and control—some of which you see here in the motor room—have given faithful, dependable service. Still young for its years, much of this equipment, with new G-E apparatus added, will continue to furnish brains and brawn for this mill, which is soon to be modernized and enlarged.

THE G-E EQUIPPED 35-INCH ROUGHING STRUCTURAL MILL

The first structural mill to have adjustable-voltage control of principal auxiliaries. Installation of this control was part of a modernization program in 1939, when new equipment was successfully combined with that of the original mill, in service since 1930. The new system makes possible very fast, yet smooth, acceleration, high operating speeds with full loads on the motors, and stalling without damage to either electrical or mechanical equipment. It eliminates resistors—the source of considerable power losses—and reduces the expense of mechanical and electrical maintenance.

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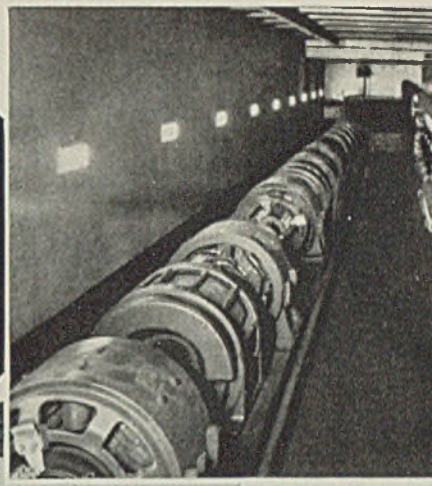
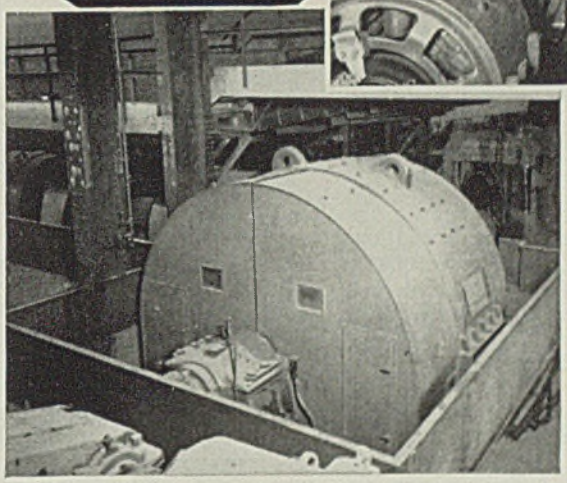
The steel industry's first "superposed" turbine-generator. Has generated 328,880,000 kw-hr in its four years of operation. Record month was October, 1939, when it generated 8,741,000 kw-hr during 741 hours of operation. Only one repair—and that a minor one—has been necessary since installation in June, 1936.

HERE'S NEW G-E EQUIPMENT IN THE 35/28-INCH STRUCTURAL MILL





Here in the basem mill are the motor-g and the control for able-voltage contro aries. Here, also, is set and the control the 4000-hp motor the left.

The 4000-hp, 50/1 reversing motor drivi inch roughing mill. right out in the mill possible by enclosin and using a recircul lating system, includ surface air cooler.

WHEREVER steel history is being made, you' G-E engineering and equipment playing a part. You'll find them at Weirton, for example, contri to the forward march of this leader of steel progress.

As the steel industry continues to improve its produc its methods and to produce more economically, G Electric keeps pace electrically—furnishing equipmer systems to meet the most exacting demands of bot builder and steel maker.

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Low-Cost Ore Loading

Unusual setup of four belt conveyors loads ore into ships at rate of 1200 gross tons per hour yet capital cost bears reasonable relation to comparatively low tonnage handled per season

■ A RATHER unusual conveyor system to transfer iron ore from railroad cars to ore boats recently installed at Michipicoten Harbour at the northeastern end of Lake Superior in Canada illustrates the possibilities of comparatively low-cost ore-handling equipment.

When the Algoma Central & Hudson Bay Railway Co. contracted to provide for the prompt loading of 300,000 gross tons of sintered ore per navigation season and as much as 600,000 gross tons per season at a later date when required, it was necessary to develop some mechanical system of handling ore which would not be as costly as the pocket type docks in operation at United States ports at the head of Lake Superior which handle many millions of tons each navigation season.

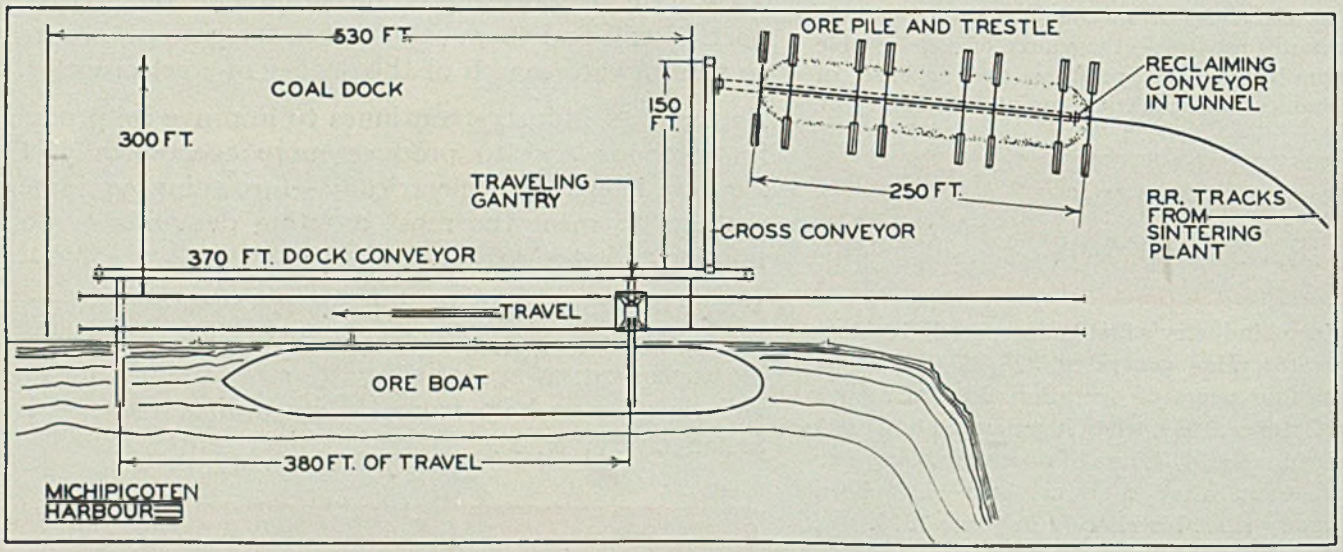
It was desired here to develop facilities capable of loading ships with dispatch but at a capital cost bearing a reasonable relation to the tonnage handled per season—the 300,000 gross tons per season or about 6500 tons each 4½ days. Equipment should be capable of loading ships at about the same rate as the more costly coal handling bridges but at much less outlay for equipment.

As actually installed, the facilities are capable of loading some 6500 gross tons into a ship's hold in 5½ to 6 hours time. This includes the time lost in moving the loading gantry from hatch to hatch of the ship. Thus on a basis of handling 300,000 gross tons per season, their conveyor equipment need be used only about 5 hours each 4½ days.

In determining the type of equipment most suitable for loading the ore, many installations were inspected by the railway officials and much attention was paid to the various types of loading equipment available. It was decided to construct the belt conveyor system described here, specially designed and manufactured by Link-Belt Ltd., Toronto, to suit the requirements.

Last year Canada imported 2,174,559 tons of iron ore of which 65 per cent came from the United States. Canada had produced no iron ore since 1924 until the new Helen located 145 miles north of Sault Ste. Marie and 12 miles in from Michipicoten Harbour came into production last year. Early in the century, the old Helen over a period of 18 years had produced 2,823,000 tons of hematite ore from a hematite deposit located ¼-mile west of the siderite deposit now being mined. The hematite was worked out.

Instead of the present 300,000 tons of finished product per year, the steel corporation already has a production of 400,000 tons in mind with the possibility of later stepping up the capacity to as much as 600,000 tons. At, say, 400,000 tons per annum, the mine would be good for more than 150 years, based on known tonnage. What further ton-



Layout diagram showing arrangement of ore pile, reclaiming tunnel, reclaiming conveyor, cross conveyor, dock conveyor and gantry conveyor handling ore in the sequence given at rates up to 1200 gross tons per hour

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Exide Batteries of Canada, Limited, Toronto

View of 470-foot dock conveyor with tripper mechanism causing discharge of ore to gantry at extreme right with gantry at any point along the dock conveyor. Illustrations courtesy Link-Belt Co., 307 North Michigan avenue, Chicago

nage lies beyond can only be conjectured but it is presumed to be large.

The 35-per-cent siderite low-grade ore is put through a sintering process to burn off some of the waste and most of the sulphur so the finished product will match the 51.5-per-cent iron ore that is standard on the American side of Lake Superior. This sintering plant is located on the Michipicoten branch of the Algoma Central railway at Wawa, 8 miles from the harbor. The sinter is bulkier than the average iron ore because of its porous structure, averaging about 80 pounds to the cubic foot—about 28 cubic feet to the gross ton—almost double the volume of United States iron ores. This, of course, affects the design of the belt conveyor.

In planning the layout, it was decided to load the ships at the face of the existing coal dock shown in accompanying layout diagram. This was done by moving the coal bridge to the south end of the dock and allowing use of all the remainder of it for loading sintered ore. The railway line from the mine and sintering plant was extended into the harbor area at an elevation of some 45 feet above the dock level on a steel trestle from which the ore cars are bottom dumped to the loading bin in upper right of accompanying diagram.

A reinforced concrete tunnel, 250 feet long, 10 feet wide, 7 feet high, extends underneath the trestle and ore pile, and houses an antifriction belt conveyor which reclaims the ore through 3-foot-square hatches located at 10-foot intervals the entire length of the tunnel.

A basin to hold 12,000 gross tons of ore was made over the tunnel by building up the sides with gravel and facing the top of this fill with railway ties to produce a large hopper, the bottom of which is the top of the tunnel housing the reclaiming conveyor.

The belt conveyor in the reclaiming tunnel is 48 inches wide and is operated by a 75-horsepower motor It is loaded by means of a single loading hopper, moved from hatch to hatch by an individual 3-horsepower motor. As the hopper comes under a hatch, the hatch gate is engaged and opened to the extent desired, the gate as well as the loading hopper being operated electrically. Baffles in the hopper provide a uniform feed of ore to the conveyor belt.

The tunnel conveyor extends about 40 feet beyond the tunnel mouth as shown in the layout diagram. At the end of the tunnel conveyor, the ore is transferred to a cross conveyor 150 feet long carrying the ore to the 470-foot dock conveyor. Belt of this cross transfer conveyor is 48 inches wide and operates on an incline of about 8 degrees from the horizontal. It is equipped with conveyor scales to weigh the ore in transit as it carries the ore to the third 48-inch belt which extends 470 feet along the face of the dock. A 75-horsepower motor drives the cross belt conveyor, and two 75-horsepower motors operate the 470-foot dock conveyor.

This long conveyor is equipped with a traveling tripper to permit discharge of the ore at any point along the entire length of the conveyor. This tripper discharges ore from the dock conveyor to the receiving hopper of a 48-inch wide belt conveyor mounted on an electrically operated gantry which travels on tracks alongside the dock conveyor to transfer the ore from the dock conveyor to the ship being loaded. Discharge end of this gantry conveyor is mounted on a hinged boom which is lowered or raised above the hold of the ship by a 7½-horsepower motor. The gantry is propelled along T-rail track by a 15-horsepower motor, and the gantry belt conveyor is driven by a 75-horsepower motor.

As soon as the desired amount of ore has been deposited in one hatch of the ship, loading of the belt in the reclaiming tunnel is stopped, quickly shutting off the supply of ore at the ship so the gantry can be moved along its track until opposite the next hatch. Such a move requires only about 2 minutes. The dock conveyor tripper is connected mechanically and electrically to the gantry and moves with it automatically.

The entire conveyor system is controlled from an operator's cab mounted on the steel framework of the traveling gantry. Belts operate with time delay switches. The gantry belt starts first, followed in 15 seconds by the dock belt which in turn is followed, at the same time intervals, by the cross belt and the tunnel belt.

Automatic Safety Controls

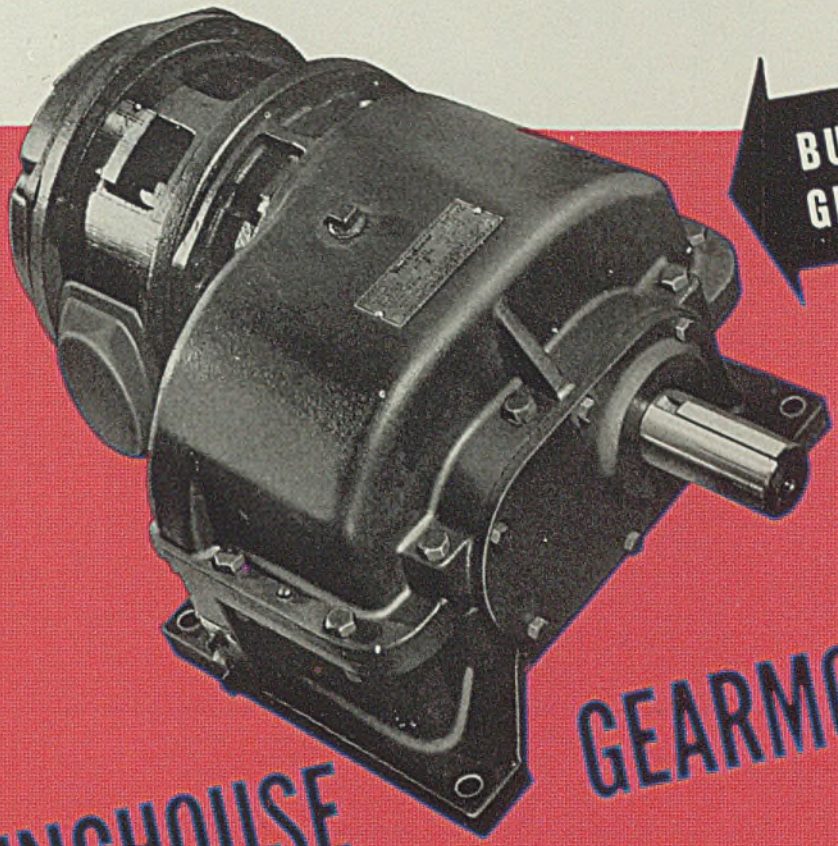
In stopping the conveyor system, all motors are disconnected simultaneously by the operator in the gantry. Any conveyor can be stopped, however, at its motor control panel which automatically stops all preceding motors.

Also the conveyor in the reclaiming tunnel can be stopped at any time from any point in the tunnel by the operator on the hopper feeder. This is an esential safety feature for the operator.

An electric signal system connecting the operator's cab on the gantry with the tunnel permits definite control of loading operation at all times.

The belts carry an average load of 1400 gross tons of ore per hour with peaks up to 2400 gross tons per hour. Material varies in size from dust to pieces 24 x 8 x 8

(*Please turn to Page* 153)



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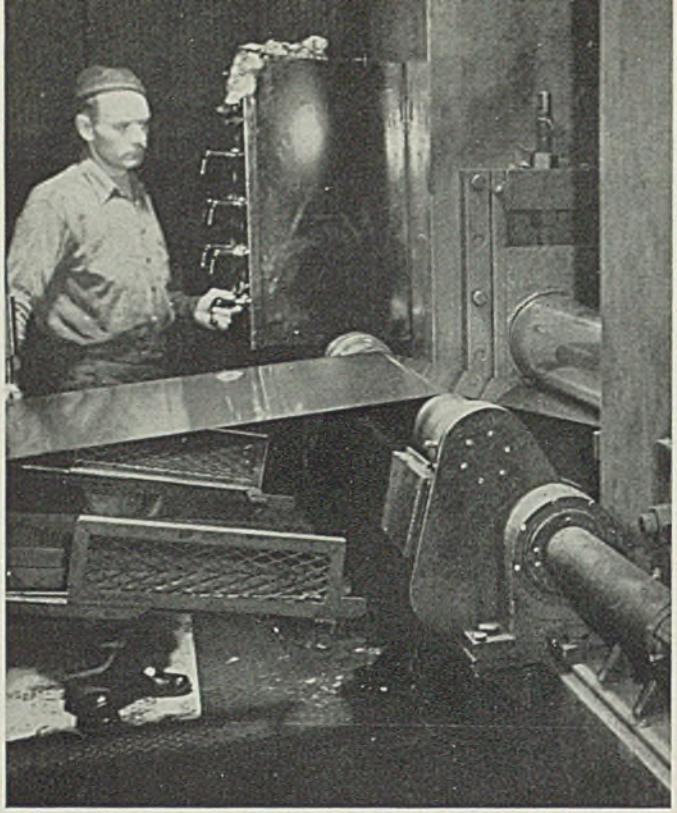

An installation of a tensiometer between stands on a skin pass mill

TENSION CONTROL for Skin Pass Mills

By C. P. CROCO
Industrial Engineer
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

■ EARLY ATTEMPTS to roll thin-gage strip, such as tin plate, on tandem mills were unsatisfactory unless tension was maintained between stands. The primary purpose of this tension was to make the strip track through the mill. This could not be accomplished with guides because the strip was too thin. With the proper roll shape and tension, not only did the strip track through the several stands, but at the same time the bearing pressures for a given reduction were reduced.

Tandem mills rolling heavy-gage strip, rolled with tension between stands, depended upon the inherent speed regulation of the direct-current driving motors for regulating the tension. On the relatively heavy-gage material and at the slow speeds of these mills, this type of regulation gave satisfactory results.

In 1928, the idea of taking hot rolled strip 0.072 x 36 inches wide, and rolling it down to 0.0089 to 0.011-inch in a 4-stand tandem mill, was conceived. It was apparent that the inherent regulation of direct-current motors available at that time would not be sufficient to maintain tension between stands and, at the same time, not tear the light-gage tin plate. The first tandem tin plate mill was a 4-stand 4-high mill with each stand driven by a 235-horsepower direct-current motor. Power for the motors was taken from the 230-volt constant-potential power system. A common armature shunt was provided for all four motors for obtaining a slow threading speed. Power for the tension reel was furnished from a generator driven by the fourth stand motor. Current regulators were furnished for each stand motor, as well as for the reel motor. Tin plate was successfully rolled on this mill up to speeds of 190 feet per minute. This mill operated for several years before being replaced with a higher speed 5-stand mill.

An early attempt was made to obtain a test on this mill to determine the amount of tension between stands. A crew of several men was stationed to take simultaneous readings of load and speed of each stand. Readings were taken as the mill was being threaded, accelerated up to speed, running at full speed, and decelerating to the reading speed. Four days were spent in taking a series of readings, and when they were analyzed it was still impossible to tell what tensions were being used. While the use of current regulators made it possible to roll tin plate, it was felt that some other method should be developed which would measure and regulate the tension between stands and at the same time be absolutely independent of rolling load, friction load, and accelerating and decelerating loads.

Several methods for doing this were conceived, but most of them (as an example, the idea of pivoting the mill housing) were abandoned because they meant a complete redesign of the mill.

A simpler method, using an idler roll which would push against the strip with a force to give a constant tension in the strip, seemed to offer less objections from the design of

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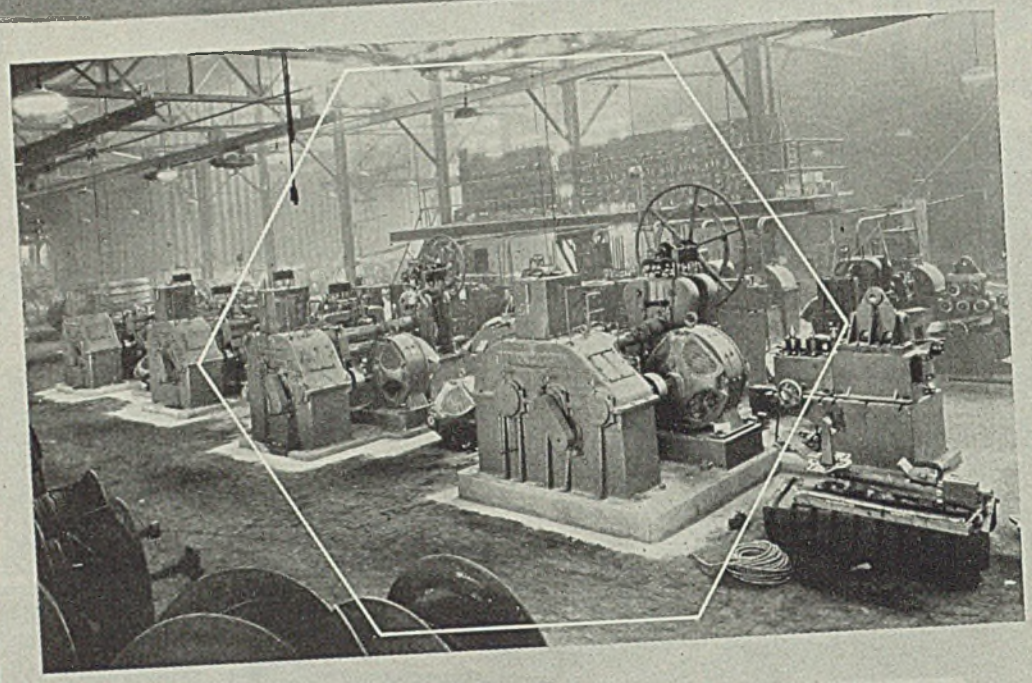

FOR over ninety-two years—since the start of the business in 1845—R B & W has continually progressed in the development of increased plant and equipment, improved workmanship and production, better quality and service.

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Through bad times and good, traditional policies of confidence and progressiveness have ever kept EMPIRE Bolts, Nuts and Rivets the standard of excellence. This means that R B & W *believes* in American Industry—that now, as always, we are looking ahead *into the future.*

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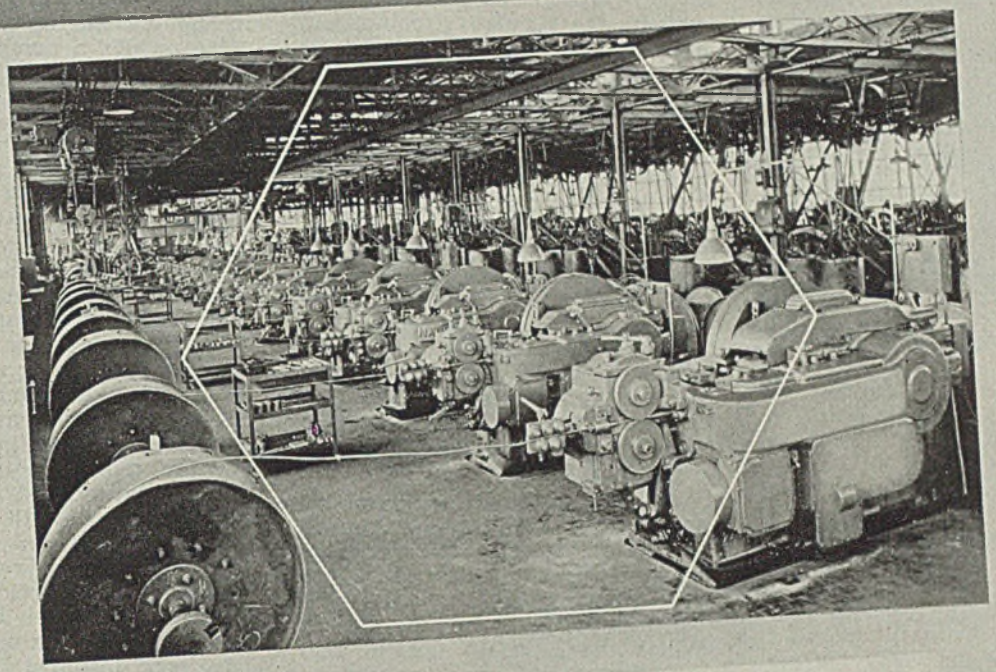
Then we expanded by developing new machinery, purchasing equipment and improving production—regardless of slack conditions.

BOLTS EMPIRE NUTS-RIVETS

RUSSELL, BURDSALL & WARD

CONFIDENCE AND PROGRESSIVENESS



OPTIMISM in the future of American Industry and improvement in product for American Industry have been traditional policies since 1845 in the manufacture of EMPIRE Bolts, Nuts and Rivets. This same confidence and progressiveness was as much a part of EMPIRE policy in 1937 as during any of our 92 years in business. It will continue during 1938.

For instance, the picture above shows a line of the newest and most modern "headers" recently installed in our Rock Falls plant—and this represents less than one-seventh of our expansion program during the year. Other new equipment such as furnaces, slotters, threaders, trimmers, etc., was also added in this as well as in our other plants.

To American Industry this means that R B & W believes in the future—ever demanding the best in skill and machinery to protect quality, improve product, insure service and continue leadership.

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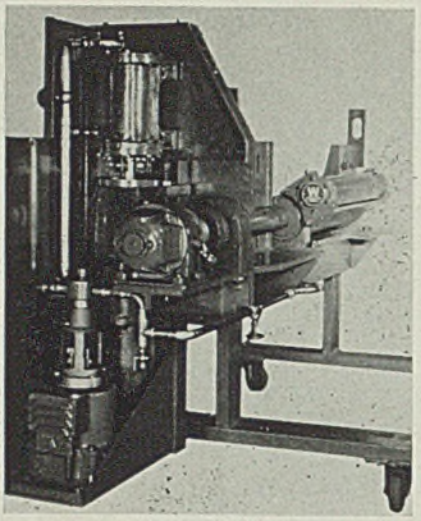


Construction view of the first tensiometer used on skin pass mills

the mill and from the operating crew. In order to obtain force that could be regulated, it was apparent that the idler roll would have to move the strip several inches, either above or below the pass line, and hold the tension constant from 2 to 3 inches above or below the pass line to at least 4 to 5 inches above or below. This would give a loop in the strip of sufficient length to regulate the speed of the driving motors on the main stands.

With the idler roller midway between stands the force acting on the strip must vary as the sine of the angle between the strip and the pass line in order to maintain constant tension in the strip. Placing the tension roll in any other than the central position does not change the problem but only introduces a sine of two angles instead of one.

Several methods of obtaining a force that varied in the correct proportion to maintain constant tension were available. However, the first tensiometer built was designed and placed in operation on a small mill in the Westinghouse research laboratories. The force for operating the tensiometer was a direct-current torque motor. The torque was transmitted through a rack and pinion to the tension roll. The field of torque was excited through a rheostat geared to rotate with the torque motor. The field then varied as the sine of the angle between the strip and the pass line; that is, the flux in the torque motor varied as the sine of the angle. Since the torque of the motor was a product of the armature current and the flux, a constant armature current and varying flux as the rider changed position, maintained a constant tension in the strip. A regulator attached to the tensiometer changed the field of one mill stand driving motor so as to maintain the rider in a given position. This tensiometer gave fairly satisfactory operation. By varying the armature current, the tension in the strip could be varied over a wide range. Because of the high inertia of the armature, this method was not used on later tensiometers, but this type, without the regulating equipment, has been suggested for use as loopers on hot strip mills.

With the experience obtained on the research model, it was decided that a full size tensiometer should be built and tried on a tandem mill. The design of the tensiometer was entirely different from the experimental one. A counterweighted arm was used on this device. The angle between the rider roll arm and the counterweight arm was selected so that over a range of 3 inches to 6 inches above the pass line, the tension in the strip would be constant to within 1 per cent. A motor moved the counterweight back and forth to change the value of tension.

A regulator, moved by the motion of the tensiometer, changed the field of one of the mill drive motors to maintain the rider in a constant position. The tensiometer was placed between the third and the fourth stands of a 4-stand tandem mill equipped with current regulators. The operation of the tensiometer in conjunction with current regulators was not satisfactory. However, it did show that a tensiometer could be made to operate.

An interesting observation when this tensiometer was in service was the great variation in the rollers' ideas as to correct tension. The mill was operating with 5000 pounds tension when the operating crews changed. The new roller immediately asked for more tension. When the mill was finally re-adjusted to his satisfaction, the tension between stands had been raised to 17,000 pounds.

The next tensiometer built had an air cylinder instead of a counterweight. The use of an air cylinder and pressure regulating valve, gave low inertia as well as an easy means of changing the tension.

Meanwhile, a number of tandem mills had been placed in operation, using current regulators. After several years of operation, all of these mills are being operated without the current regulators. As soon as a crew learned to roll with current regulators, an analysis of rolling conditions using current regulators, showed that better results could be obtained without them.

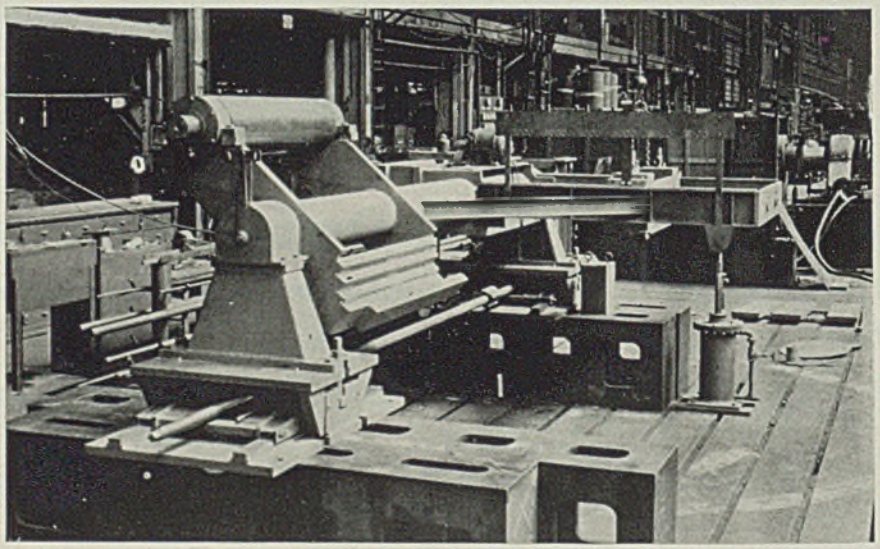
Meanwhile, improvement in operation of tandem mills was being obtained by the proper selection of the drive motors. By using drive motors having low inertia and so selected as to give balanced inertia throughout the mill, smooth acceleration and deceleration of the mills has been obtained. With the introduction of IR drop compensation, it was felt that operation was so improved that regulating tensiometers would not be required even at 2700 feet per minute. However, a number of mills have been installed with indicating tensiometers which aid the operator to know how much tension is used.

It is felt that future mills equipped with IR drop compensation, balanced low-inertia drives and indicating tensiometers should be so arranged that the tensiometers could be made regulating if desired. Some type of gage regulation may be used in the future and at that time it may be necessary to operate such a device in conjunction with a regulating tensiometer.

Meanwhile, the skin pass mill for

(*Please turn to Page* 149)

Construction view of first full-sized tensiometer showing idler roll and counterweight which moved back and forth by means of a motor. The cylinder was for a damper piston



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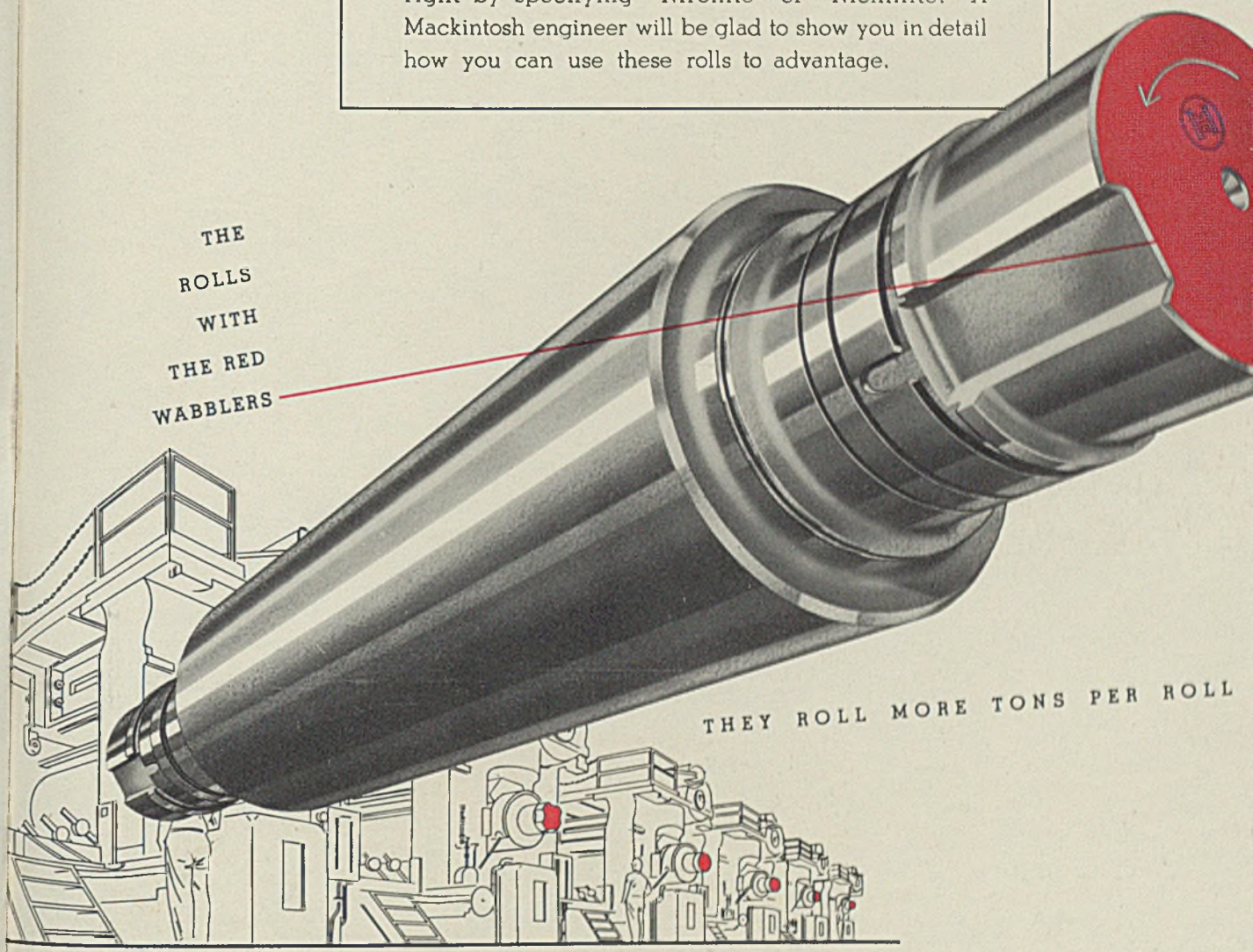

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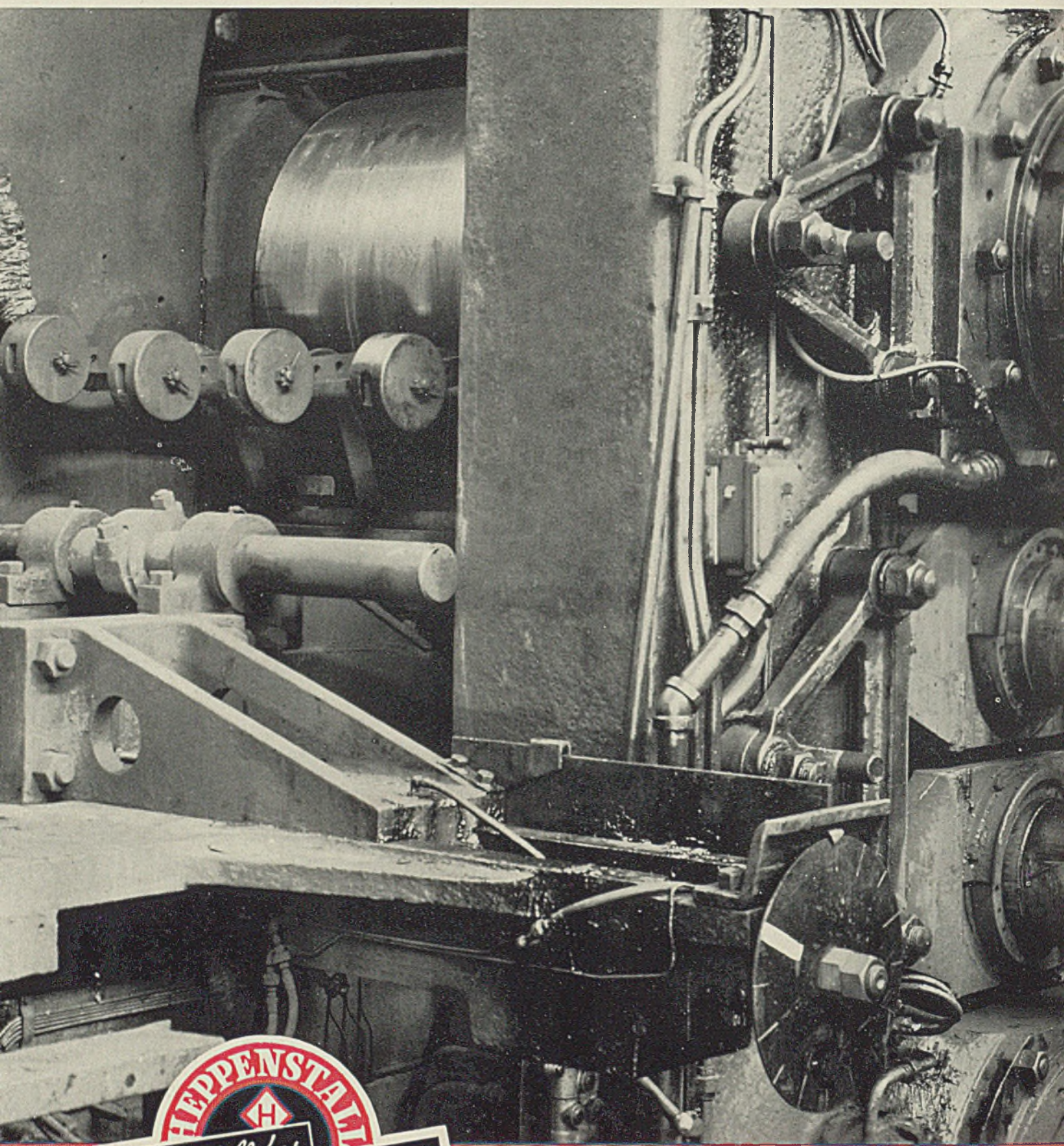

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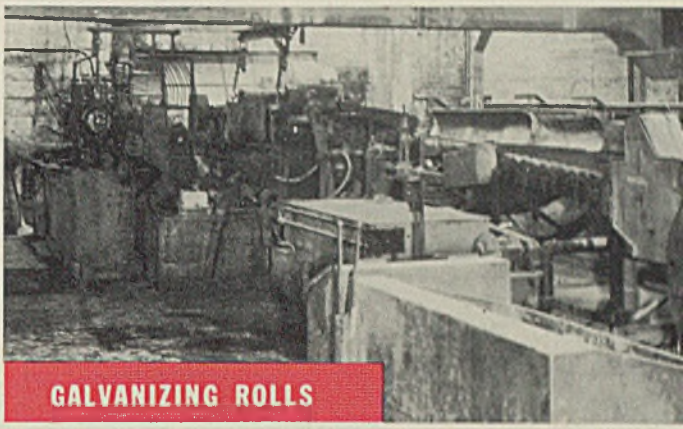

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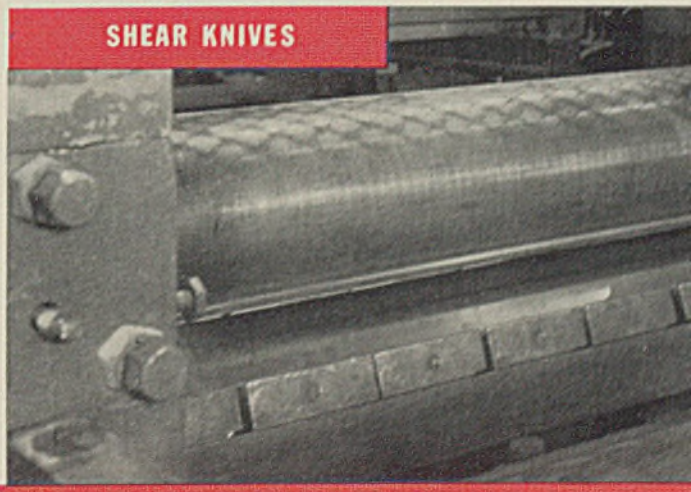

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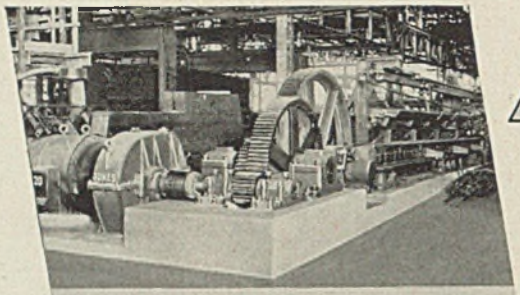
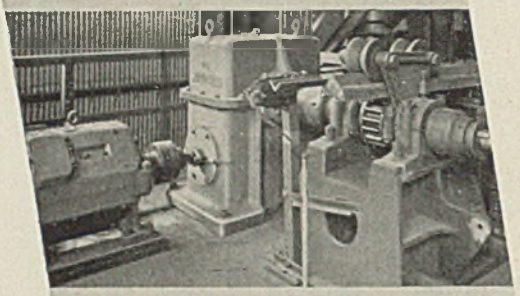
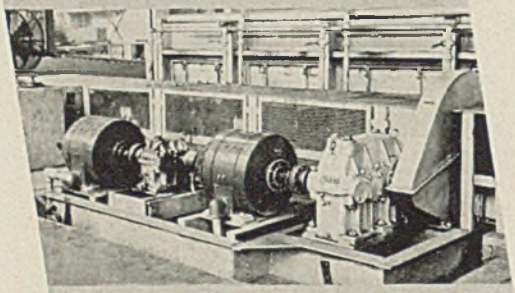


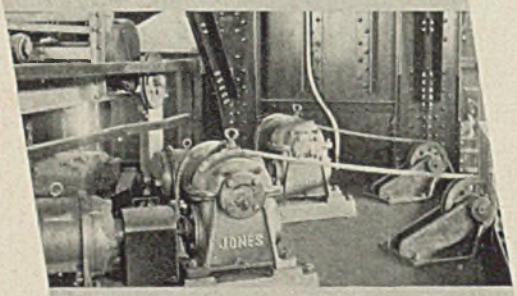
Jones Herringbone Speed Reducer driving steel tube mill draw bench. Gear casings removed to show proportions of spur gear drive to head shaft.



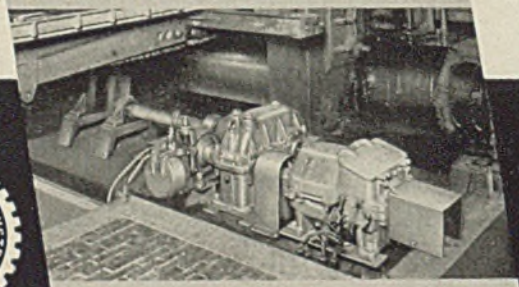
Jones Worm Gear Speed Reducer operating cover of warming pit in steel mill.



Jones Herringbone Reducers operating furnace in steel mill. Drive consists of two motors with single type and double type reducers coupled in series in order to obtain two widely varying speeds.



Two of a battery of 10 Jones Worm Gear Door Hoists for operating open hearth furnace doors.



Jones Herringbone Reducer operating sheet mill tilting drive on feeder table.

IN every phase of the steel business today, whether it is production or fabrication, the cry is "keep going". Whether it's for the augmented industrial needs or whether for the speeded up requirements of national defense, wheels must be kept turning.

The Jones organization too, is busy manufacturing the various types of speed reducers and other transmission products that are so essential for drives in every type of plant—drives that are so necessary in maintaining peak production.

We picture here some typical Jones drives that have seen years of service in the steel industry. They have been called upon to take a lot of punishment and they will stand the gaff for a good many years to come.

Listed below are the Jones catalogs that present detailed information on Jones transmission products and their applications. These catalogs will help you with the solution of almost any drive problem that may come up. We shall be pleased to send you any, or all, of them.

ANY, OR ALL, OF THESE JONES CATALOGS WILL BE SENT ON REQUEST

No. 70—Jones Herringbone Speed Reducers
No. 71—Jones Cut and Molded Tooth Gears
No. 75—Jones Worm Helical Speed Reducers
No. 55—Jones Spur Gear Speed Reducer Units
No. 68—Jones Worm Gear Speed Reducers
No. 60—Jones Lemley Friction Clutches
No. 58B and 76—Jones V-Belt Sheaves
No. 78—Jones Flexible Couplings
No. 56—Jones Roller Bearing Pillow Blocks
No. 69—Jones Cast Iron Pulleys
No. 61—Jones Power Transmission Equipment

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Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES
ANTI-FRICTION PILLOW BLOCKS • PULLEYS
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THIRTY-SIXTH

ANNUAL CONVENTION AND

EXPOSITION, ASSOCIATION OF

IRON & STEEL ENGINEERS

Stevens Hotel

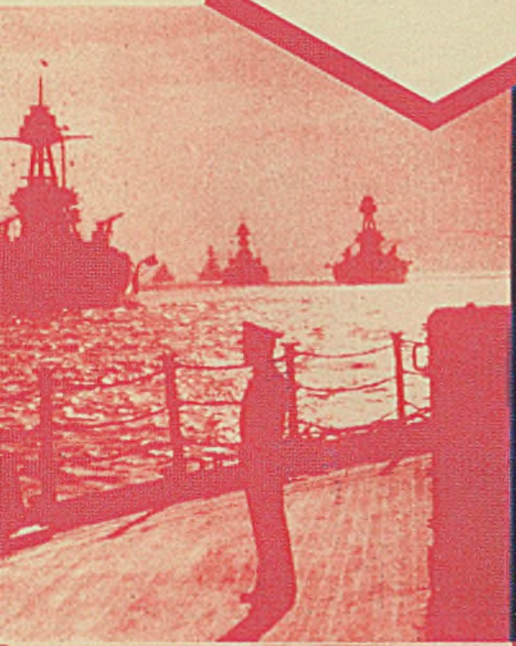
Chicago

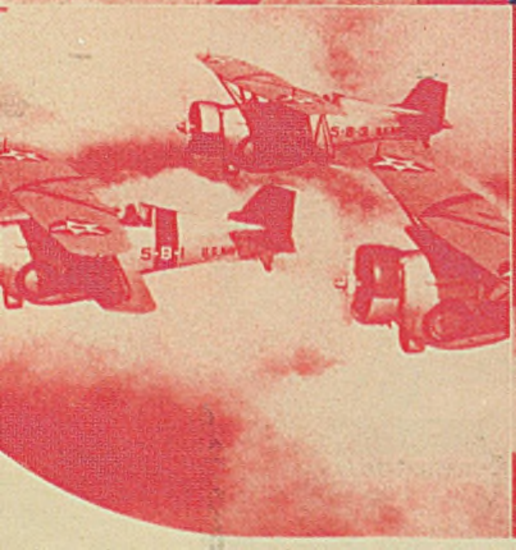
Sept. 24-27, 1940

Nav

SPEED U

● Armor plate, aeroplane parts, shells, cartridge cases, bombs, gun barrels and mounts—the numerous component parts used in tractors, tanks, trucks, etc., in fact, every metallic item used for defense and all equipment used in their fabrication require Heat Treating.

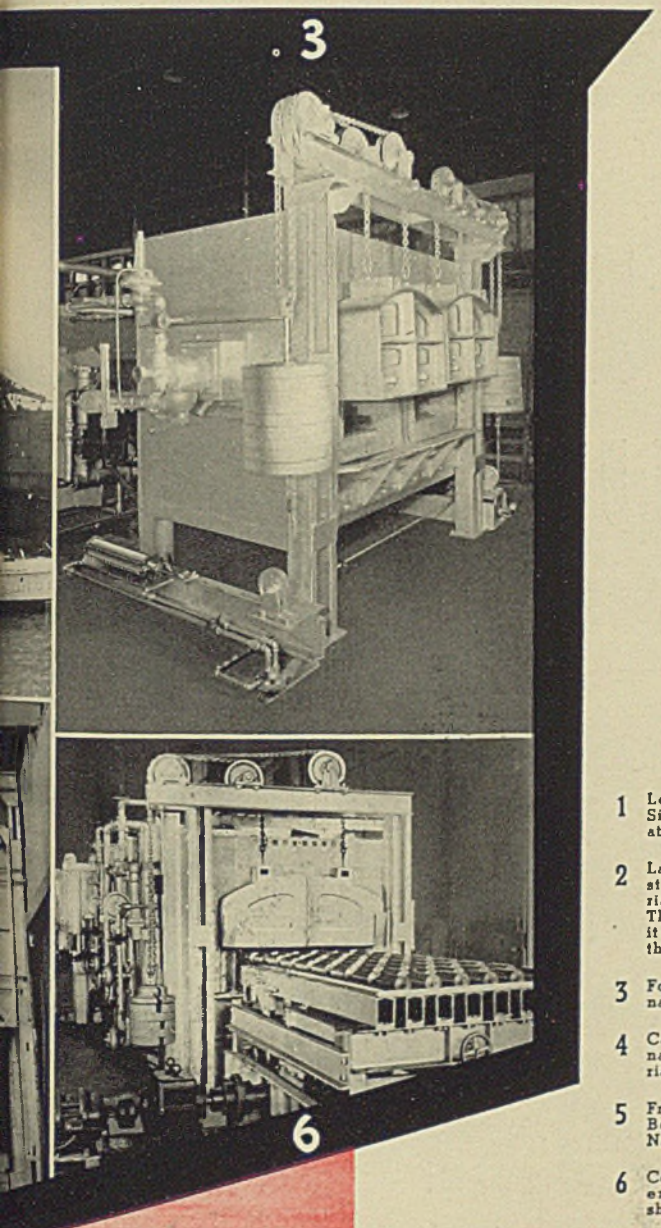




Yards and Arsenals

NATIONAL DEFENSE...

WITH SC FURNACES



● Working closely with Government arsenals and navy yards, Surface Combustion has been instrumental in perfecting furnaces for the heating and heat treating of ordnance items. At the same time, Surface Combustion has secured a wealth of valuable experience and is prepared to pass this knowledge on to industry cooperating with the Government in these critical times.

Since practically every metallic part must be heat treated, modern furnaces are a vital part of the national defense program in which mass production is essential. The modern furnace is vastly different from its World War predecessor. Perhaps in no other metal processing machine has there been so many outstanding improvements in the last 22 years.

This is no idle statement for it was during the years of 1917-1918 that the continuous furnaces first came into prominence. Far-reaching developments have since taken place . . . in temperature distribution, automatic control (both of temperature and mechanisms), heat resisting alloy mechanisms, methods of heat transfer, and furnace atmosphere for control over both scale and decarburization.

1 Looking down into SC Furnace. Similar SC Furnace is also installed at Philadelphia Navy Yard.

2 Large Recirculated Air Furnace for stress relieving welded gun carriages at the Brooklyn Navy Yard. The parts treated are so large that it is necessary to remove the roof of the furnace for charging.

3 Forge Furnace at Rock Island Arsenal. Maximum temperature 2700°F.

4 Car Bottom Recirculated Air Furnace for stress relieving gun carriages at Washington Navy Yard.

5 Front view of Recirculated Air Car Bottom Furnace at Washington Navy Yard.

6 Completely automatic unit for hardening, quenching, and drawing shells at Frankfort Arsenal.

For speeding up the national defense program, Surface Combustion today offers industry the benefits of experience accumulated during and since the World War . . . gained through cooperation with the arsenals and navy yards, the steel, automotive, agriculture, aircraft, non-ferrous and allied industries.

No matter what national defense item you are manufacturing . . . armor plate, shells, cartridge cases, bombs, gun barrels or mounts, any metallic part, tractors, tanks, trucks, aeroplane, or other ordnance vehicles . . . Surface Combustion has the facilities, ability, and experience to help you produce better heat treated parts, faster and at lower costs. Write to

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WHEREVER HEAT IS USED IN INDUSTRY

SURFACE SC COMBUSTION

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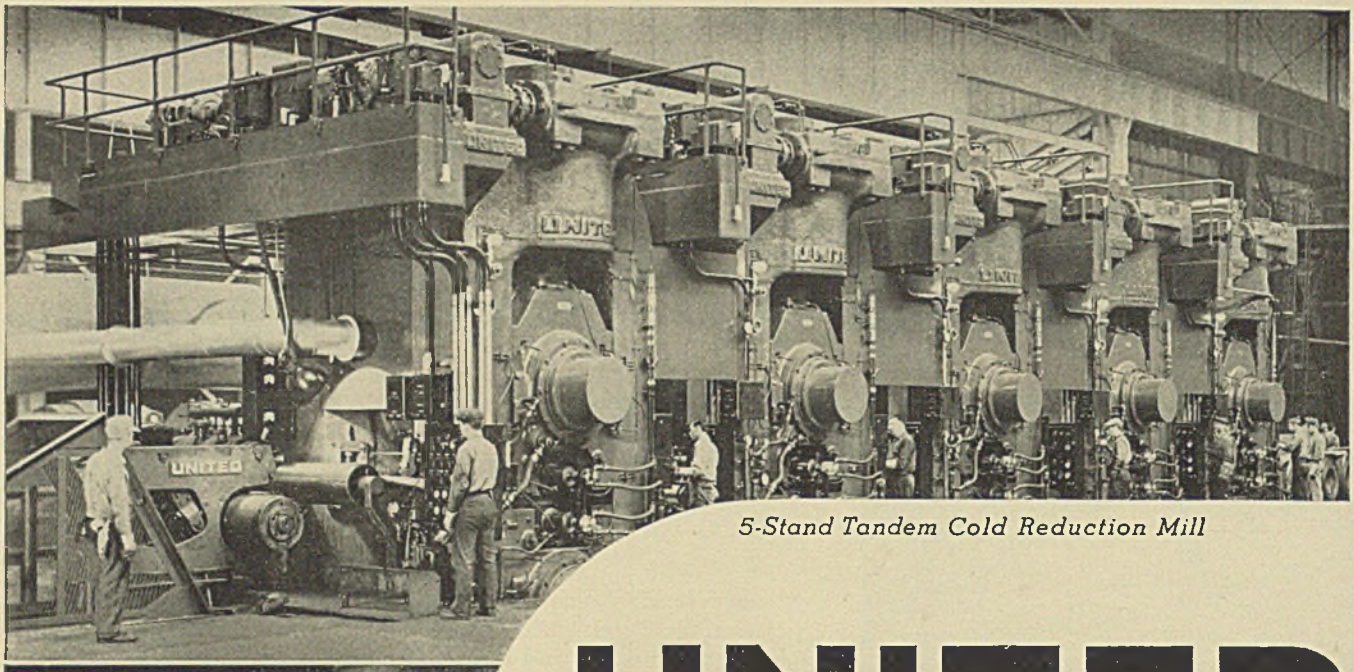
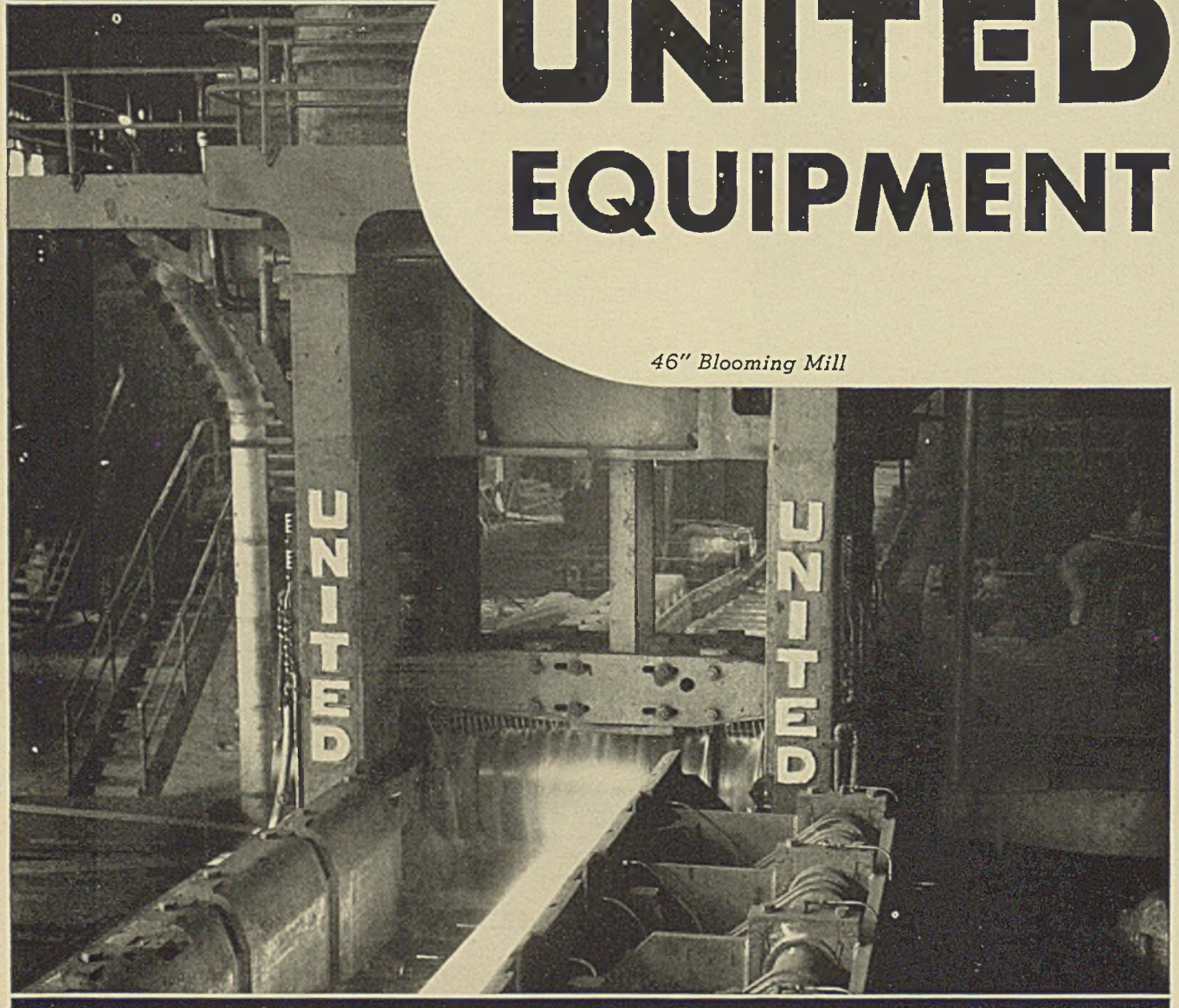
MANUFACTURERS OF INDUSTRIAL FURNACES • JANITROL GAS-FIRED SPACE HEATING EQUIPMENT • AND BATHABAR AIR CONDITIONING SYSTEMS



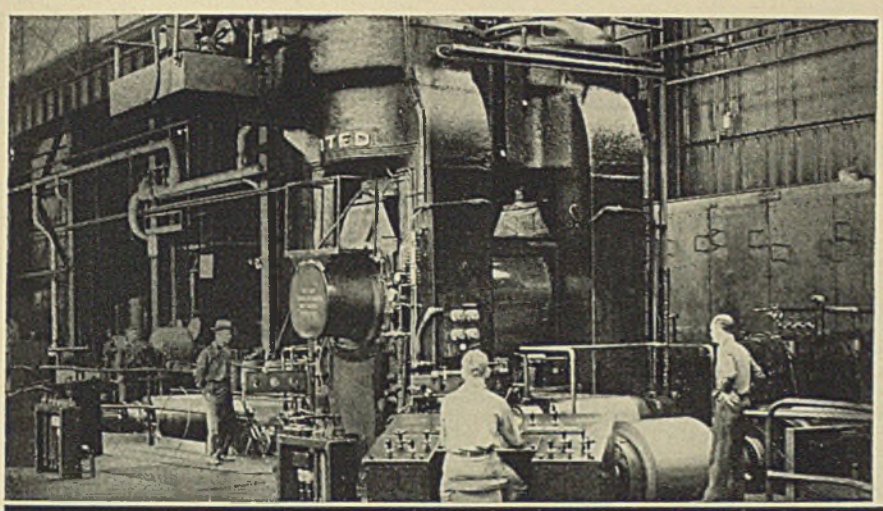
5-Stand Tandem Cold Reduction Mill

UNITED EQUIPMENT

46" Blooming Mill



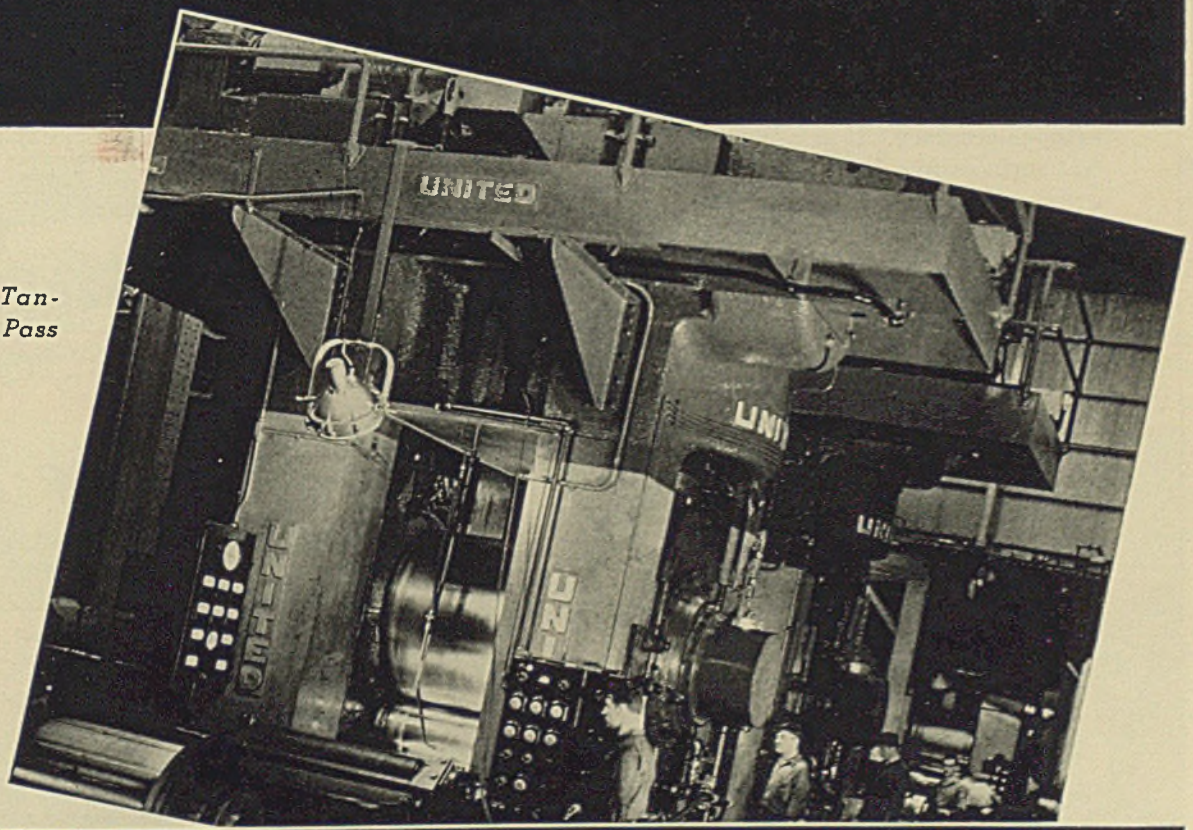
UNITED ENGINEERING *and* FOUNDRY COMPANY
Pittsburgh · Pennsylvania



18" & 49" x 42"
4-High Reversing
Cold Mill

in YOUNGSTOWN SHEET AND TUBE COMPANY

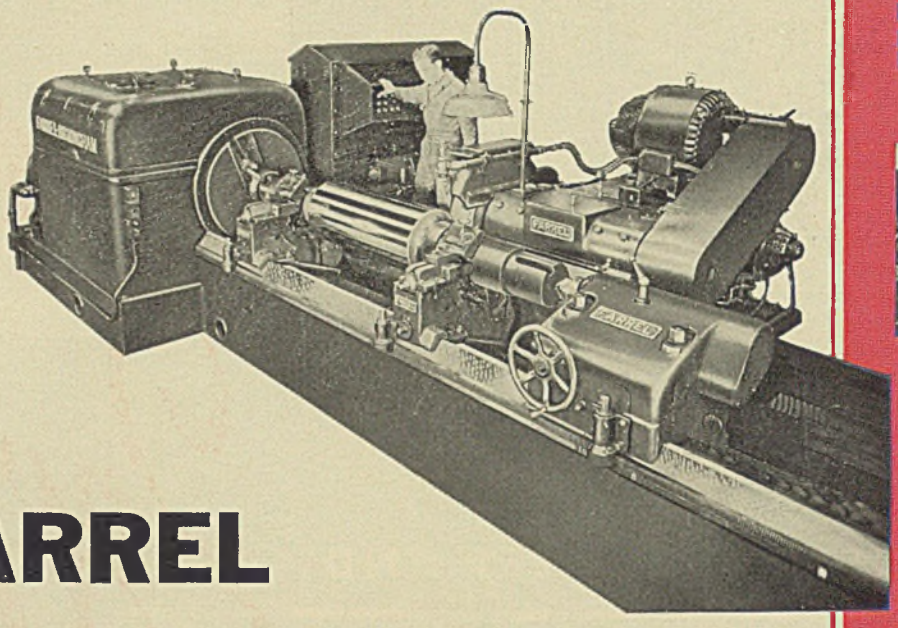
Indiana Harbor Plant



2-Stand Tandem Skin Pass Mill

DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND • DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q. • UNITED INTERNATIONAL, S. A. PARIS, FRANCE • SHIBAURA-UNITED ENGINEERING CO., TOKYO, JAPAN

For Fast Production of High Precision Rolls



FARREL ROLL GRINDERS

The Farrel Heavy Duty Roll Grinder is both a production and a precision machine. It operates continuously at maximum speed . . . . gives high output . . . . grinds rolls of any material with extreme accuracy. It grinds perfect surfaces free from all marks . . . . grinds straight, concave or convex contours of exact symmetry . . . . applies the finest mirror finish or does heavy roughing equally well.

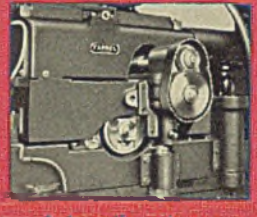
Automatic and semi-automatic features so minimize dependence on the operator's skill that there is no necessity for frequent stops to make adjustments or correct defects. With this machine is secured close control of accuracy and finish to meet predetermined standards.

Full Information At Booth 224 Iron and Steel Show

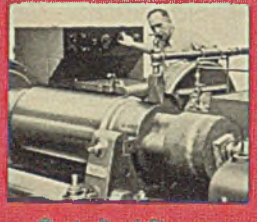
The construction and operation of Farrel Heavy Duty Roll Grinders will be explained in detail during the Iron and Steel Show by Farrel engineers stationed at Booth No. 224. They will also be glad to give you full information on Farrel Gears and Gear Units, Gearflex Couplings and the entire line of Farrel-Birmingham machinery.

Illustrated below are some of the features which contribute to the low-cost, high-output, high-accuracy performance of Farrel Heavy Duty Roll Grinders.

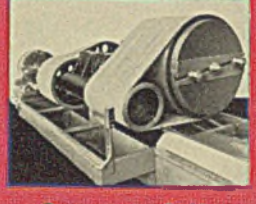
Heavy, Rigid, Smooth-Running Spindle.



Automatic, Accurate, Symmetrical Roll Crowning and Concaving.



Centralized, Finger-Tip Control.



Compact, Self-Contained, Smooth-Running, V-Belt Roll Drive.

VISIT FARREL BOOTH No. 224 IRON & STEEL EXPOSITION CHICAGO Sept. 24-27, 1940

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(ORGANIZED 1907 AS ASSOCIATION OF IRON AND STEEL ELECTRICAL ENGINEERS)

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TO OUR FRIENDS IN THE INDUSTRY:

The Association of Iron and Steel Engineers takes great pleasure in extending a cordial invitation to attend its Annual Convention and Iron and Steel Exposition, to be held in the Hotel Stevens, Chicago, Illinois, September 24, 25, 26 and 27, 1940.

In view of the increasing demands being made on the steel industry at the present time, it is extremely necessary that we in the industry keep in step with the rapid progress being made in methods and equipment for our plants. One of the best ways of accomplishing this is to attend the Annual Convention and Iron and Steel Exposition. Here, under one roof, it is possible to get first-hand information on the latest designs and equipment for our steel mills. Here, too, by attending the technical sessions one can keep abreast of the times by learning from leading authorities the best engineering and operating practice.

Participation in this particular convention, with all its coordinated activities, will enable us all to return to the task that lies ahead with a firm conviction that we can better meet the demands of the present and future in our industry.

Yours very truly,

J. A. Clauss

President, A.I.S.E.

Invites You

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President, A.I.S.E.

W. A. PERRY
1st Vice President, A.I.S.E.

J. L. MILLER
Secretary, A.I.S.E.

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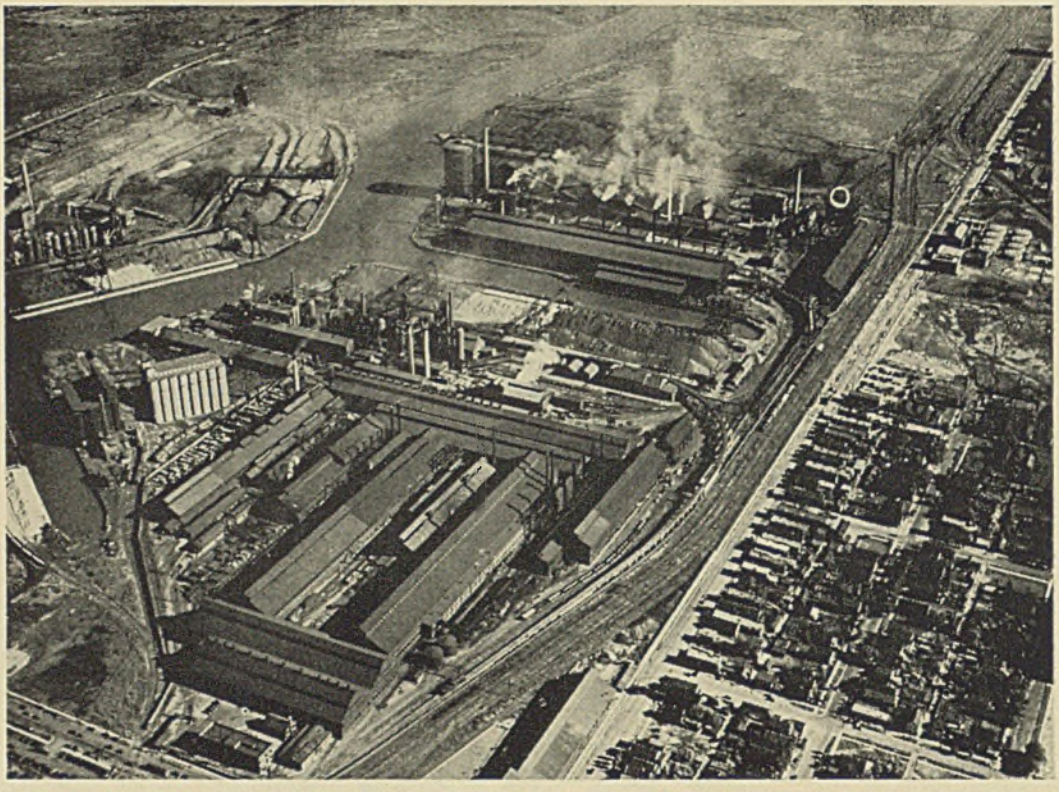


Airplane view of the Wisconsin Steel Works of the International Harvester Co., S. Chicago, Ill.

Open House

■ Members and guests of the Association of Iron and Steel Engineers are afforded the opportunity of visiting the Indiana Harbor, Ind. plant of the Youngstown Sheet & Tube Co., during the afternoon of Wednesday, Sept. 25, and the Wisconsin Steel Works of the International Harvester Co. at South Chicago, Ill. Friday morning, Sept. 27.

Last year the Youngstown Sheet & Tube Co. completed a modernization program amounting to $16,500,000 at its Indiana Harbor division which involved the installation of a 54-inch continuous hot strip mill with cold reducing facilities, increasing the blooming mill from a 35 to a 46-inch unit, the addition of a 165-ton basic open-hearth furnace and improving and enlarging its complement of open hearths.

The new hot strip mill is designed to roll 87,000 gross tons of material a month. Specifications handled by mill range from 8 to 52 inches wide in thicknesses down to 20 gage. A 5-stand cold reducing mill at the finishing end handles strip in coil form at the rate of 2000 feet per minute. Details of strip manufacture at this plant were presented in the Oct. 16 and 23, 1939 issues of STEEL.

* * *

The earliest development of the iron and steel industry in South Chicago was what now is the Wisconsin Steel Works of the International Harvester Co. The plant was founded in 1875 by J. H. Brown Iron & Steel Co. and was owned subsequently by the Calumet Steel Co., the South Chicago Furnace Co., and the Deering Harvester Co.

When the plant was acquired by the International Harvester Co. in 1902, it included a rolling mill, a cut nail mill and a blast furnace located on a plant site of 55 acres; the land since has been enlarged to 202 acres. Major improvements have been made until the plant today has an open-hearth capacity of 600,000 tons and a rolled steel production of 564,000 tons. Recent modernization included a 32-inch re-

NATIONAL CARBON GRAPHITE KARBATE PRODUCTS

TRADE-MARK

TRADE-MARK

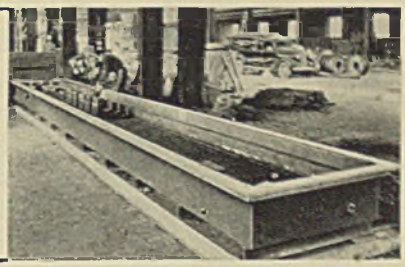
Reduce Losses

FROM CORROSION, THERMAL SHOCK AND CONTAMINATION OF PRODUCT

● Carbon, Graphite and "Karbate" products are highly resistant to the action of most acids, alkalies and other corrosive liquids and gases. They possess good mechanical strength and exceptional resistance to thermal shock.

"Karbate" is a brand of material, of carbon or graphite base, which is impervious to the seepage of fluids under pressure. Graphite and "Karbate" No. 2 have high thermal conductivity and excellent heat transfer properties.

CONSTRUCTION MATERIALS

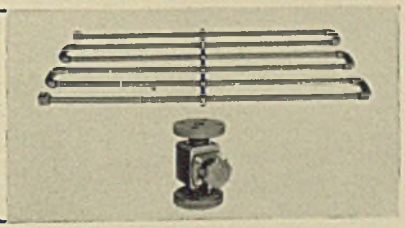


Carbon and Graphite Brick, Flat Tile, Blocks, Beams and other structural shapes are used for the construction or lining of many types of processing equipment because of their high resistance to corrosion and their ability to resist the destructive effects of severe thermal shock. Graphite construction materials are used where high thermal conductivity is needed.

Carbon is used with excellent results for lining

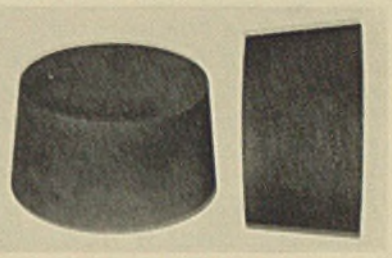
PICKLING TANKS • DESULPHURIZING LADLES • BLAST FURNACES

PIPE, VALVES AND FITTINGS



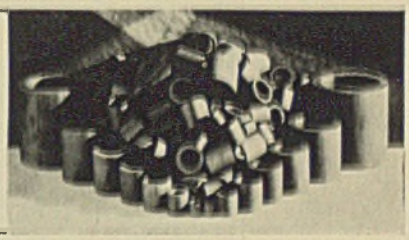
Carbon, Graphite and "Karbate" pipe and fittings are available in sizes from ½ inch to 6 inches I.D. Saunders type valves of "Karbate" construction are also available. These corrosion resistant products are used for the construction of drain lines, heating coils — both steam and gas-flame types, and other types of conveying, circulating and heat exchange equipment. Carbon or "Karbate" No. 1 is recommended where high heat transfer properties are not desired. Graphite and "Karbate" No. 2 pipe have heat transfer properties equal to steel pipe of corresponding I.D. Plain Carbon and Graphite pipe and fittings are sufficiently impervious to convey fluids at low pressure without disturbing seepage. Graphite pipe heat exchangers are being used to heat corrosive baths with low pressure steam and eliminate the dilution resulting from injection of steam in the bath. At higher pressures, or where all seepage must be prevented, "Karbate" materials are recommended.

CARBON INGOT MOLD PLUGS



The use of Carbon Mold Plugs in alloy steel ingot molds eliminates ceramic inclusions and resulting loss of ingots. It also prevents contamination of the scrap obtained from the cropped ingot ends. With correct use, carbon plugs can each be used for several pourings.

CARBON RASCHIG RINGS



Carbon Raschig Rings provide an efficient and economical packing material for gas scrubbing towers. They are mechanically strong and highly resistant to both the thermal shock and the corrosive materials encountered in this service. Their low weight per unit of volume reduces cost of tower construction.

OTHER PRODUCTS OF VALUE TO THE IRON AND STEEL INDUSTRY

- Graphite Crucibles and Molds
- Carbon Powder to prevent piping of hot tops
- Graphite Powder for mold wash
- Graphite Powder for lubrication

Write FOR COMPLETE INFORMATION ON THE PRODUCTS IN WHICH YOU ARE INTERESTED

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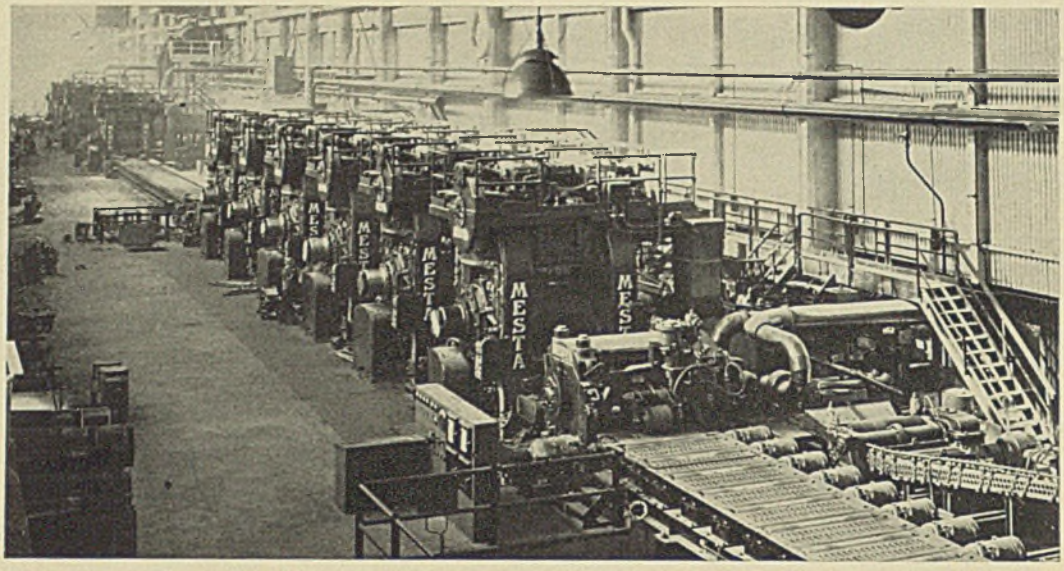


Finishing end of hot strip mill, Youngstown Sheet & Tube Co., Indiana Harbor, Ind.

versing blooming mill, 21-inch continuous billet mill and the rehabilitation of one of the four merchant bar mills. The company also operates 133 by-product coke ovens of the Wilputte and Koppers types.

The 40-inch blooming mill is equipped with rolls 92 inches long turned with a bullhead and other passes ranging from 3 to 12 inches.

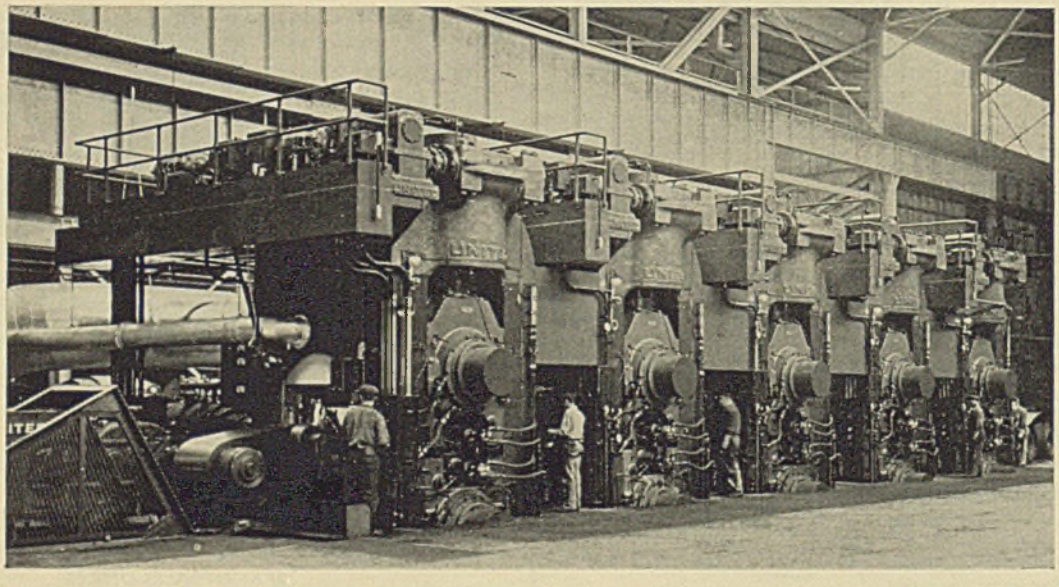
The 32-inch bloomer is a 2-high reversing unit driven by a 4000-horsepower direct-current motor. The mill takes a 72-inch roll having a bullhead pass and others ranging from 3 to 8 inches. The mill will roll billets from 4 x 3 inches to 8 x 8 inches and slab billets and slabs from 5 to 24 inches wide.

The 21-inch mill is in line with the 32-inch bloomer and consists of six horizontal and two edger stands of rolls. The rolls operate in phenolic resin type bearings. Billets from 1¾ to 3-inch billets in varying lengths up to 30 feet are produced. Flats from 3/16 to 1½ inches thick and up to 24 inches wide can be rolled.

The telautograph system is used throughout the mill, thus making possible instantaneous communication between the clerks at the finishing end and the rollers in the pulpit and heaters at the charging end of the heating furnaces.

Products of the Wisconsin Steel Works include heavy structural shapes, universal plates, hot strip, merchant bars, rods and cold-drawn bars.

Working side of cold strip reducing mill with tension reel shown in left foreground



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1st—three-shift operation

2nd—maximum performance per wage dollar

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The READY-POWER equipped electric truck gives you these "must" requisites. Since 1924 thousands of these machines have been adapted by industry to their toughest jobs. Reliability and superior performance have been proven. READY-POWER today serves industry better and more completely, than ever before with power units that cover the range of trucks from 2000 to 60,000 pounds rating—machines good for the life of the industrial truck! READY-POWER, for new trucks, is gladly supplied by the truck manufacturers. You can convert your present "electrics" to READY-POWER drive. Ask us how—and for complete information, mentioning the make and type trucks you operate.

The READY-POWER Co.

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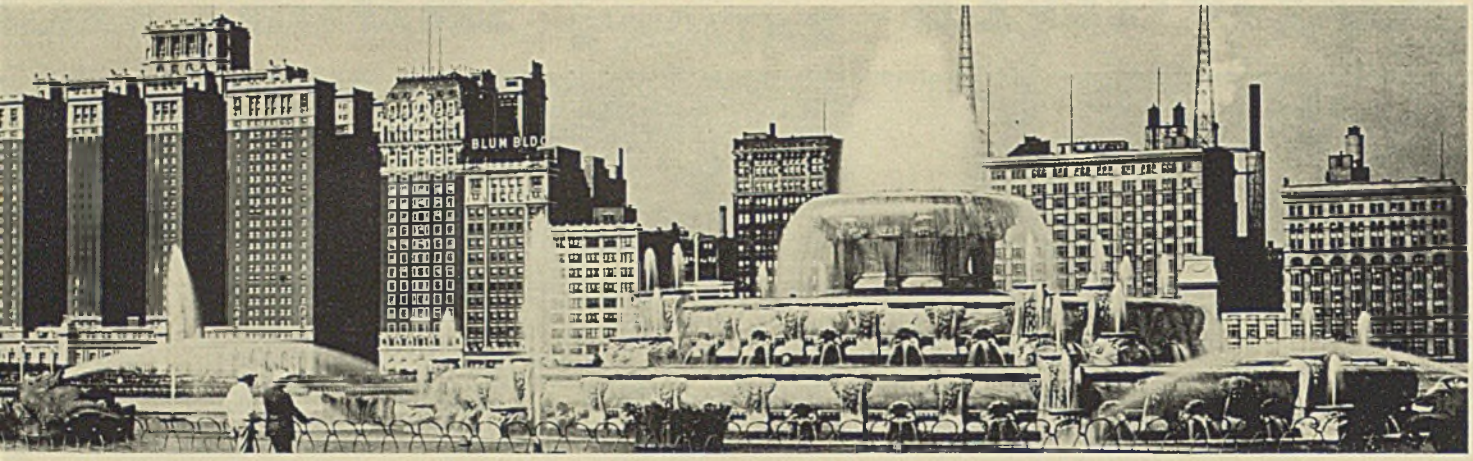

Hotel Stevens where sessions of A.I.S.E. will be held and steel plant equipment of 100 manufacturers displayed is shown at the left

Chicago Steel Producers Account

■ Just 83 years ago smoke appeared on the Chicago horizon to mark the beginning of the iron and steel industry there; today Chicago is one of the important iron and steel manufacturing centers. Concentration of steel producing facilities in the area including South Chicago, East Chicago and Gary, Ind. never has been duplicated.

District blast furnaces are capable of smelting 10,635,800 tons of pig iron annually. Ingot producing capacity amounts to 14,078,000 tons per year, with basic open-hearth shops being credited with 12,872,000, bessemer departments with 1,140,000 and electric furnace shops with 66,000 tons. Facilities for rolling finished steel have an annual rating of 9,679,000 tons.

Rising above the sand dunes at Gary, Ind. is the Gary works of the Carnegie-Illinois Steel Corp. which made its first heat of steel in 1909. The Gary works is the largest steel plant in the world and includes 974 by-product coke ovens, 12 modern blast furnaces, 49 basic open hearths, three tilting basic open hearths, two acid open hearths, three bessemers for duplexing, and 22 rolling mills consisting of two blooming, a slabbing, two billet, a sheet bar, a rail, 10 bar, two plate and three continuous strip mills.

Repair shops serving the Gary works occupy 300,000 square feet and employ about 2000 men. The entire plant covers 1200 acres and gives employment to approximately 16,000 men. Annual capacity includes 3,501,750 tons of pig iron, 5,041,000 tons of ingots and 2,447,200 tons of finished hot rolled commodities.

South works of the Carnegie-Illinois Steel Corp., South Chicago, is the second largest steel plant in the country from the standpoint of capacity. Its 10 blast furnaces have an annual rating of 3,096,250 tons of pig iron, its steelworks 3,876,000, its rolling mills 1,451,000 tons. The steelmaking department at South Works includes 40 stationary and three tilting open hearths, three bessemer converters and

L. F. COFFIN

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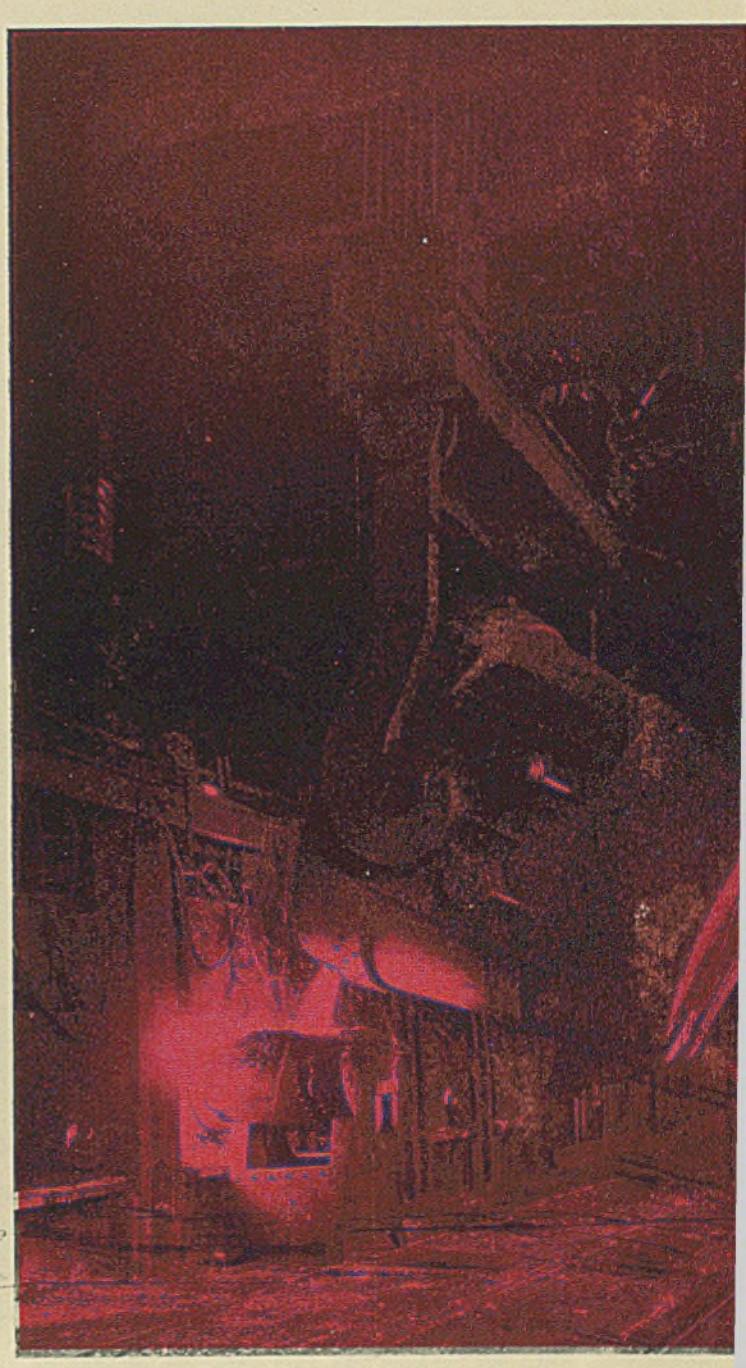
for Large Tonnage

six electric steel furnaces. Rolling facilities include three blooming, two slabbing, three structural, two rail, two bar, and three plate mills.

Early in 1903 the Steel & Tube Co. of America was acquired by the Youngstown Sheet & Tube Co. Two plants were involved in the purchase. One was a modern blast furnace and steel plant at Indiana Harbor, Ind. and the other a blast furnace plant on the lake at South Chicago. The two plants are located in different states but adjoin one another.

Extensive improvements and additions were made to both plants. New tin mills were installed and bar mills placed in operation. Last year the company replaced the blooming mill, enlarged the capacity of the open hearths and installed an additional unit, and laid down a 54-inch continuous hot strip mill



Open-hearth charging floor, Wisconsin Steel Works, South Chicago, Ill., showing iron being charged into furnace

A. W. VINCENT

F. J. THOMAS

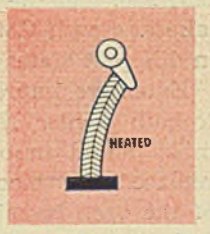
BI-METAL PROTECTS

Ask your Westinghouse Representative for this BI-METAL demonstration

MAKE THIS TEST YOURSELF . . . A strip of Bi-Metal and a match are all you need to prove to yourself the time and moneysaving advantages of Bi-Metal Protection. Ask your Westinghouse Representative for a Bi-Metal Demonstration Kit.

HERE'S HOW BI-METAL SAVES MONEY . . . GIVES BETTER PROTECTION

Two different metals bonded together, when heated always bend in the same direction. The heat from short circuit or continued overload currents causes the Bi-Metal, which is exactly calibrated to the job at the factory, to act and open the circuit. Because of Bi-Metal's characteristics, its accuracy never changes, regardless of the number of operations. There's nothing to replace . . . there's nothing to wear out.



YOU PAY NO MORE FOR BI-METAL PROTECTION IN THIS WESTINGHOUSE EQUIPMENT

THERMOGUARD MOTOR

Single-phase sizes up through 2 hp. Impossible to burn out. Bi-Metal protection.

NOFUZE CIRCUIT BREAKER

Bi-Metal eliminates fuses. "De-ion" arc quenchers save contacts. Operates with cabinet closed.

"DE-ION" LINESTARTER

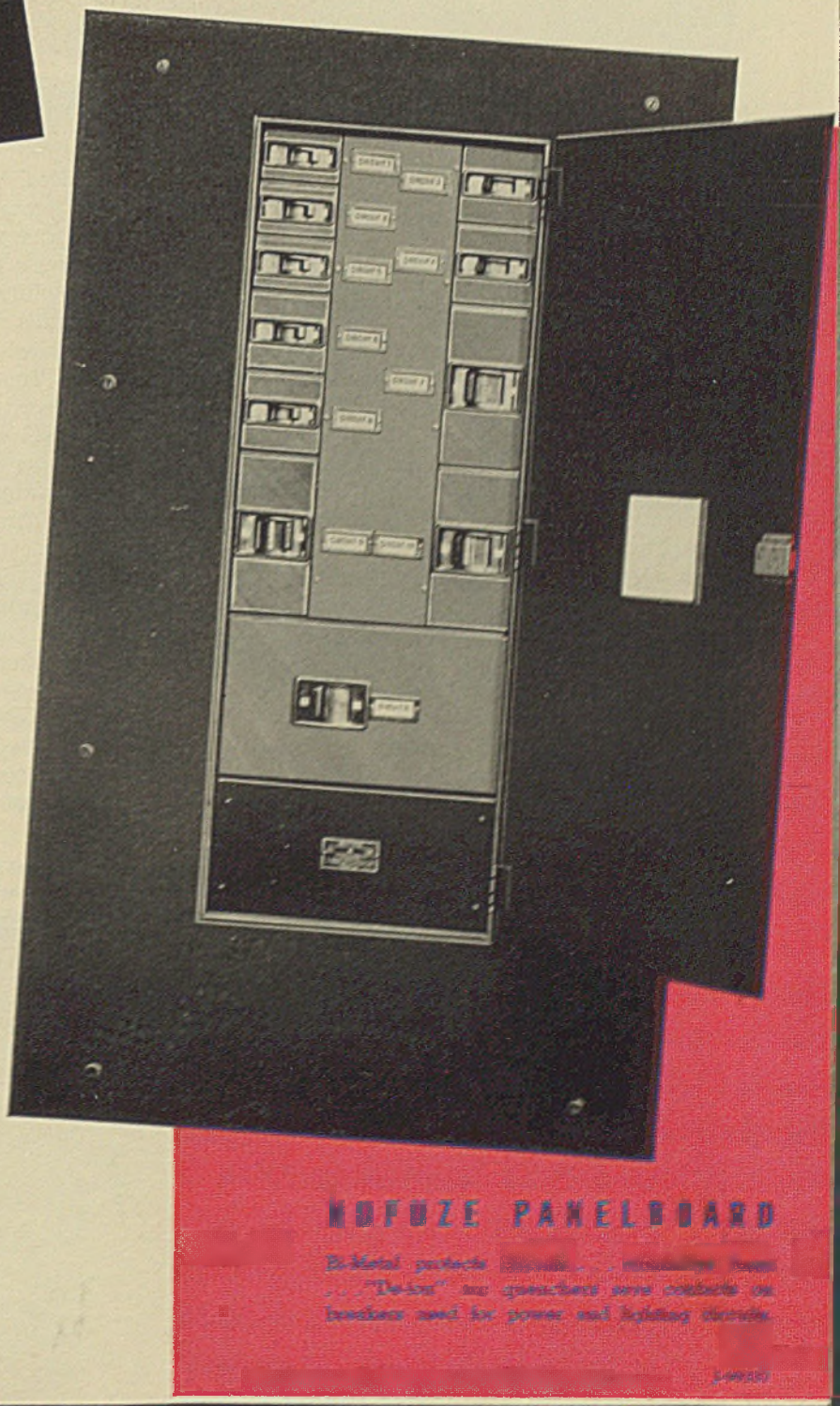
Magnetic motor starter. Bi-Metal overload protection. "De-ion" arc quenchers save contacts.

Westinghouse

W WESTINGHOUSE ELECTRIC

All Circuits Automatically

..Without Fuses



You Get It For Both Power and Lighting Circuits in NOFUZE PANELBOARDS

Bi-Metal protection for lighting and power circuits eliminates the necessity of replacing fuses. Saves lost production time, saves unnecessary interruptions to service.

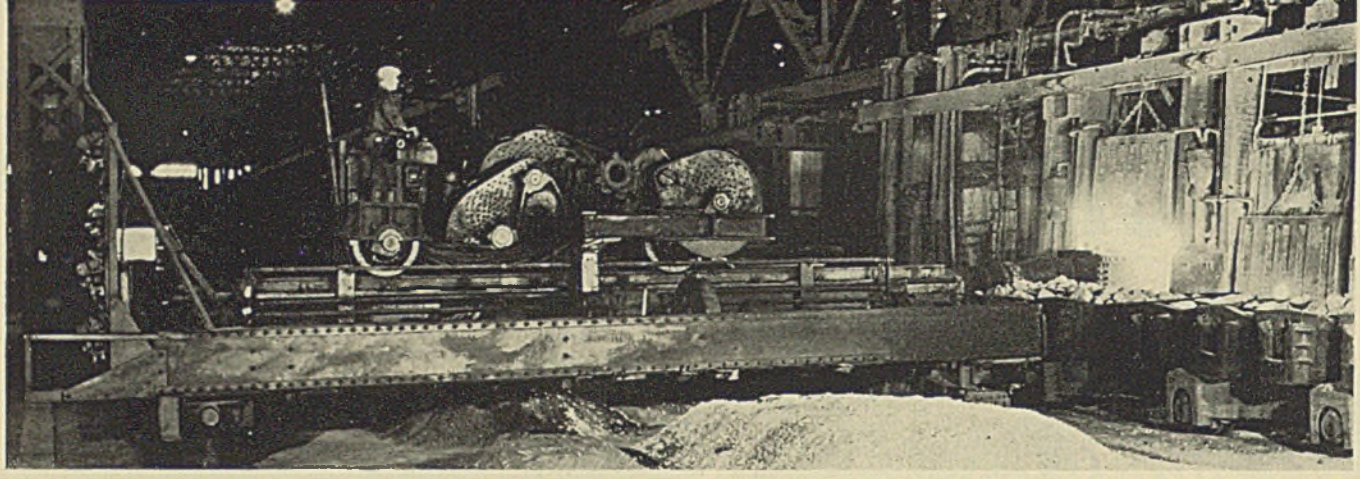
The breaker trips automatically before dangerous current values are reached. Temporary or harmless overloads do not operate the breaker. When the breaker trips, service is restored by a simple movement of the handle. There is nothing to replace.

Nofuze panelboards are assembled from either of two types of breakers—the "Deion" breaker for power; lighting and heating circuits, and the Multi-Breaker for low-cost lighting panelboards. You can have Multi-Breaker convenience at approximately the same cost as conventional fused equipment.

Ask your nearest Westinghouse wholesaler, district office, or industrial agent to show you the economy of Nofuze panelboards.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Motors and Control



Charging machine operator at Gary Works, Carnegie-Illinois Steel Corp., about to empty a charging box of limestone into open-hearth furnace

served by adequate cold reducing facilities.

Inland Steel Co., largest independent steel producer in the Chicago district, was incorporated in 1893, its first activity being the rerolling of old rails into bars and small shapes at a mill which it acquired in Chicago Heights. A few years later lake front property was purchased at Indiana Harbor, Ind. A steelworks was completed in 1902 which had a monthly capacity of 20,000 tons; within the next four years ingot capacity was doubled. Iron ore property was acquired in 1906 and blast furnaces built.

Succeeding years were marked with steady growth. Today the Inland company holdings include five blast furnaces, 36 basic open hearths and rolling facilities consisting of three blooming, two billet, two plate, a sheet bar, two bar, a rail and structural mill and two continuous hot strip mills served by various cold reducing units. Annual capacity is 2,760,000 tons of basic steel and 2,012,000 tons of finished hot rolled products.

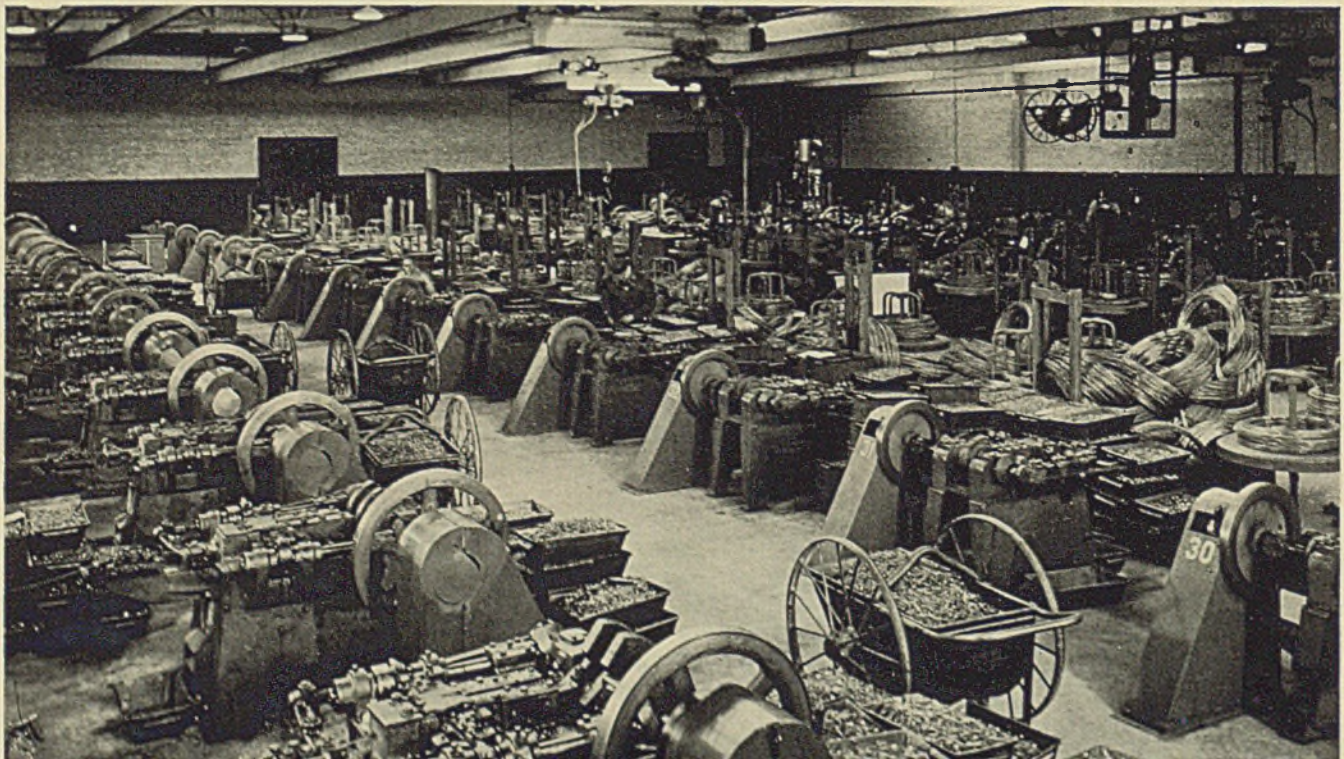
Republic Steel Corp. entered the Chicago district through the purchase of the Central Alloy Steel Corp. which had acquired the Interstate Iron & Steel Co. holdings consisting of a steelworks at South Chicago and a wire mill in Chicago. The steelmaking department includes eight basic open hearths having an annual output of 430,000 tons of steel ingots. Rolling facilities include a blooming, billet, bar and rod mills with an annual output of 335,000 tons of hot rolled steel products.

Though a nonintegrated concern the Acme Steel Co. at Riverdale, Ill. is an important interest in strip steel circles. It operates three continuous hot strip mills with an annual output of 430,000 tons and 11 continuous and one reversing cold strip mills.

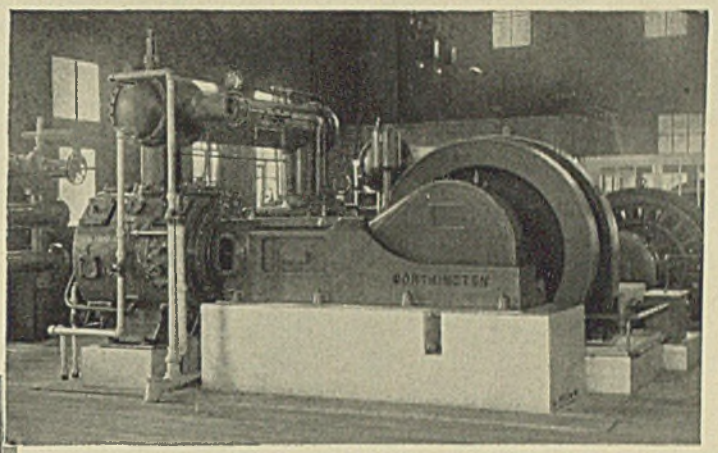
Three important cold drawn steel bar manufacturers operate plants in the Chicago district. Bliss & Laughlin, Inc. with works at Harvey, Ill. have an annual capacity of 90,000 tons of cold drawn bars. The Wyckoff Drawn Steel Co.'s Chicago plant has an annual capacity of 40,700 tons of cold drawn bars. LaSalle Steel Co. with a plant at Hammond, Ind. produces 100,000 tons of cold drawn bars per year.

Clayton Mark & Co. has an annual capacity of 126,000 tons of black pipe, 60,000 tons of galvanized, 16,000 tons of conduit, and 10,000 tons of buttweld.

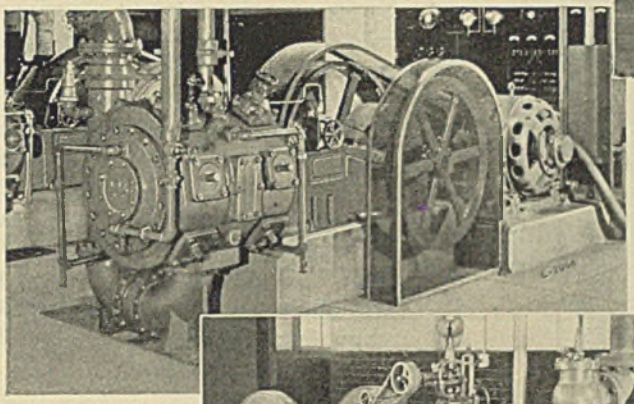
Wire nail mill of the Republic Steel Corp., Chicago. All driving mechanism is located in the basement which facilitates adjustment of machines



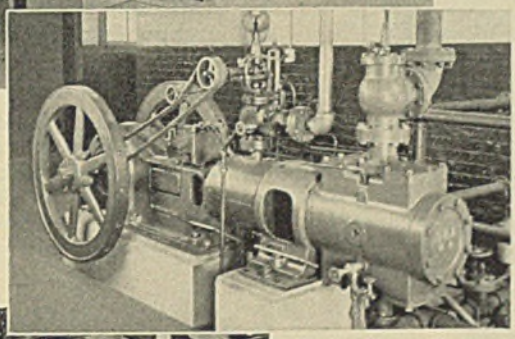
WORTHINGTON AIR and GAS COMPRESSORS



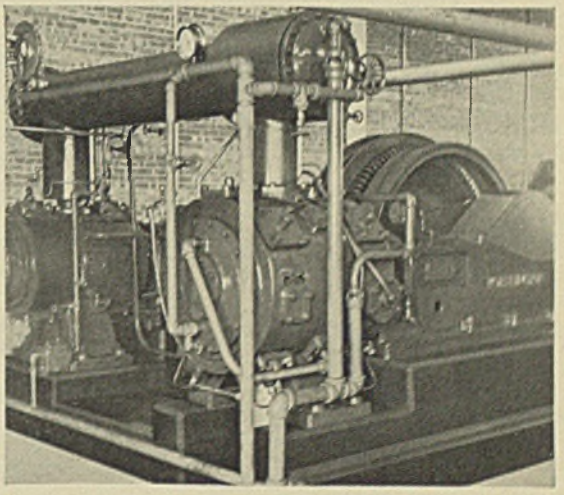
Two-stage air compressor, driven by synchronous motor, recently installed in a large steel foundry



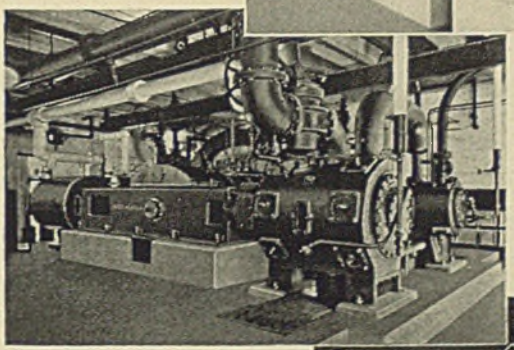
Single-stage air compressor, motor-driven through Worthington Multi-V-Belt drive, supplying air to a pneumatic tube system



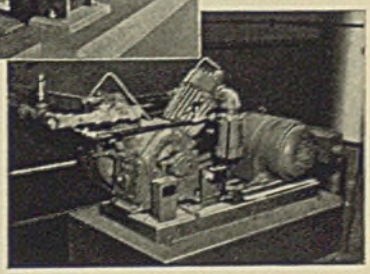
Single-stage steam-driven air compressor . . . in the service of a Western railroad



Two-stage air compressor, synchronous-motor-driven, in a large metal products plant



Two-stage steam-driven compressor . . . in a prominent Southern oil refinery.



Two-stage angle type air compressor . . . for many medium air supply applications

are serving important users in every industry

FOR any condition . . . from that of the smallest shop to the largest industrial plant . . . there is a Worthington compressor unit to meet it correctly . . . without bias or compromise in its selection.

An UNFAILING COMPRESSED AIR SUPPLY
A Prime Requisite for Profitable Operation

•

Complete descriptive literature available

Get in touch with the nearest Worthington District Office . . . today

PRODUCTS OF **WORTHINGTON**

AIR CONDITIONING EQUIPMENT
REFRIGERATION AND ICE PLANT EQUIPMENT
AIR AND GAS COMPRESSORS
STEAM TURBINES
DIESEL ENGINES
GAS ENGINES
CONVERTIBLE GAS-DIESEL ENGINES
CENTRIFUGAL HIGH-PRESSURE BOILER FEED PUMPS
DIRECT-ACTING STEAM PUMPS POWER AND ROTARY PUMPS
DEEP WELL, SUMP, AND DRAINAGE PUMPS
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VACUUM PUMPS
STEAM-JET EJECTORS
PORTABLE COMPRESSORS AND AIR TOOLS
For sheet . . . trench . . . conduit service
V-BELT DRIVES LIQUID METERS

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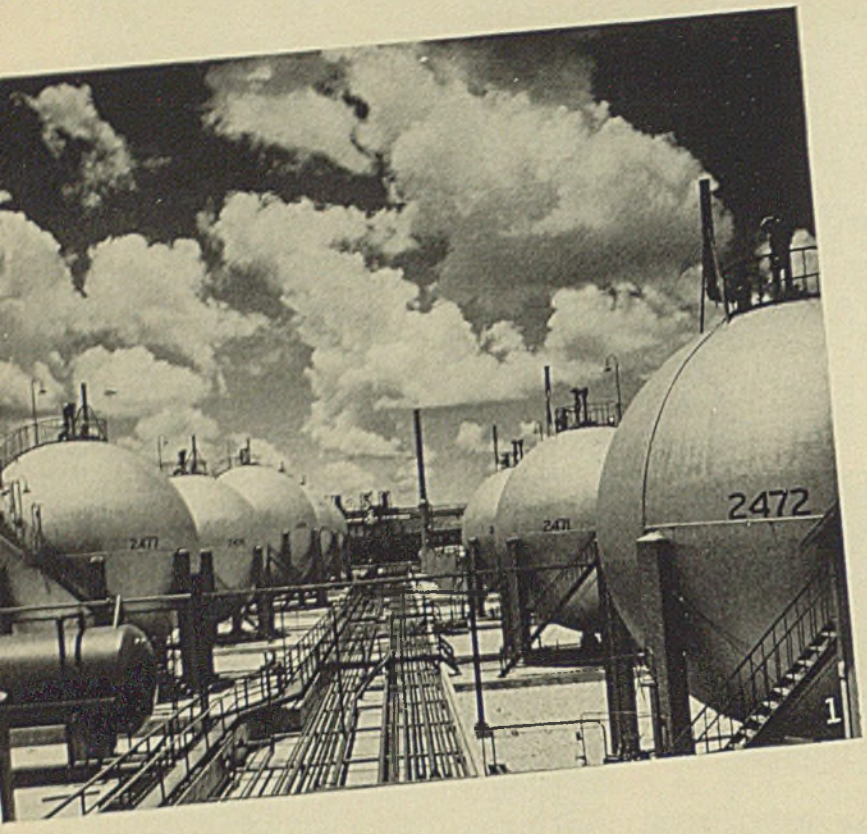
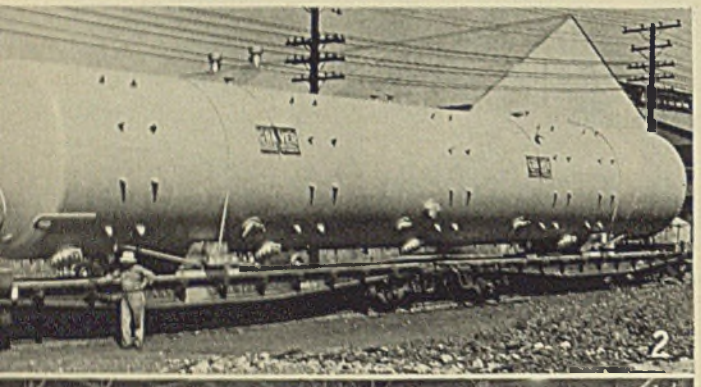


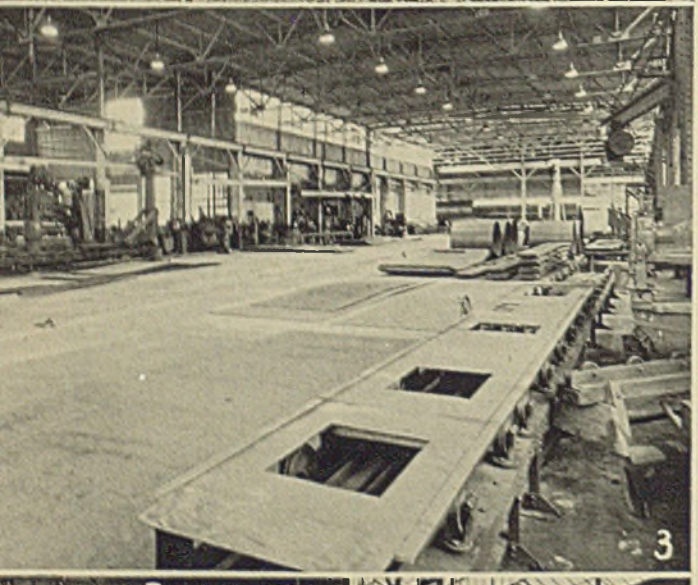
Chicago FABRICATORS

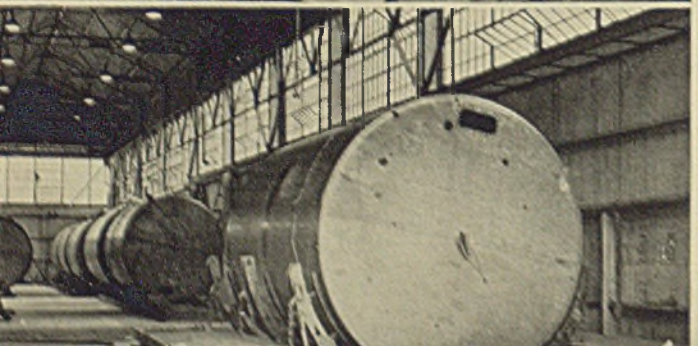
■ Large tonnages of steel are fabricated annually by consumers in the Chicago district and to give some idea of the material handled and the various methods of assembly employed, STEEL presents on these and the following pages illustrations of operations in plants as well as the finished product.

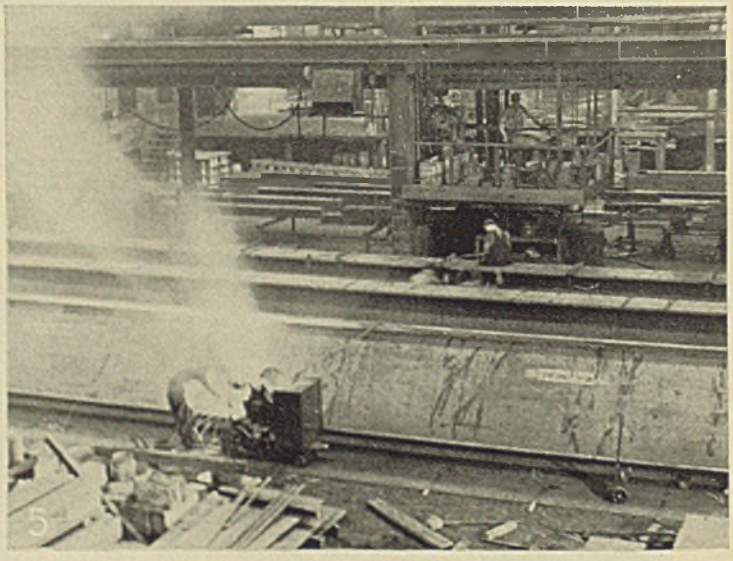
This illustrated section has been made possible through the courtesy of the following companies: Chicago Bridge & Iron Co., 332 S. Michigan avenue, Chicago; Bliss & Laughlin, Inc., Harvey, Ill.; Acorn Wire



(1) These Hortonspheres are located at a Gulf coast oil refinery. Three are of 2500 barrel capacity, two of 3500 barrel and three of 7500 barrel capacity. They are used to store natural gasoline, butane and other refinery gasolines under pressures of 35, 85, and 75 pounds per square inch, respectively





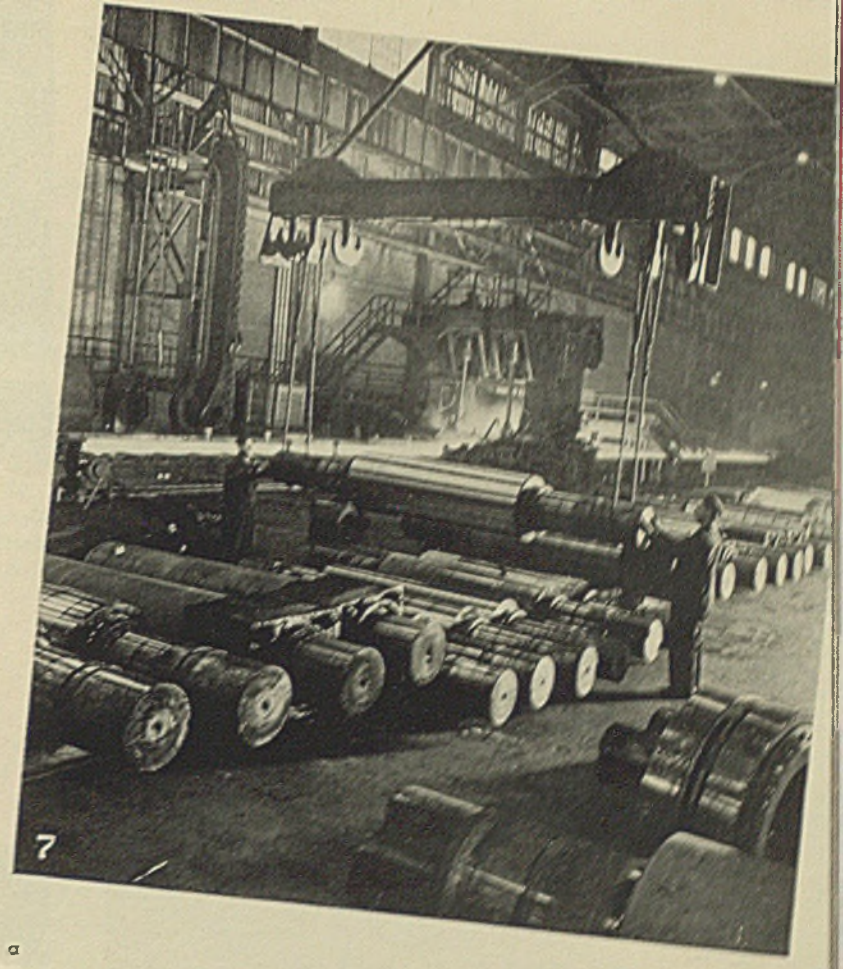


(2) Vacuum bubble tower manufactured by a Chicago fabricator. The unit weighs 185,000 pounds and is 12 feet diameter and 84 feet, 8 inches high. (3) Interior view of steel plate fabricating building equipped with jib and post cranes and castor beds. (4) Fitting-up aisle for small tanks adjoining the main assembly building of a Chicago fabricator.

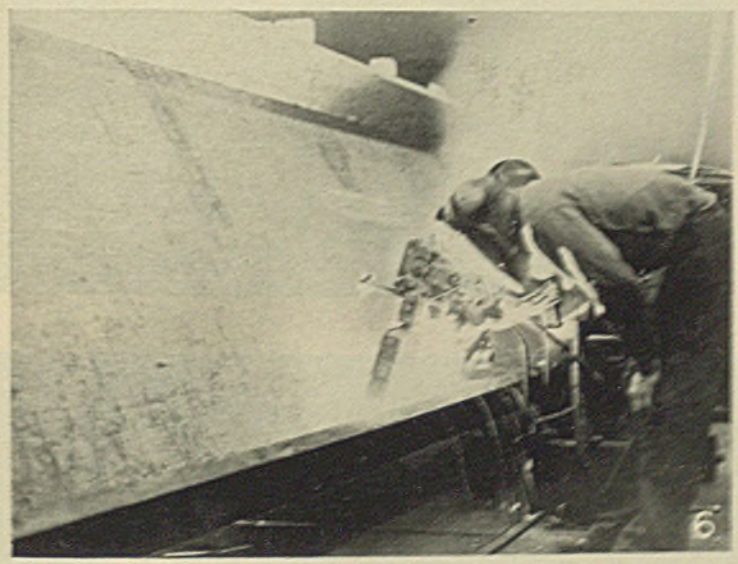
STEEL

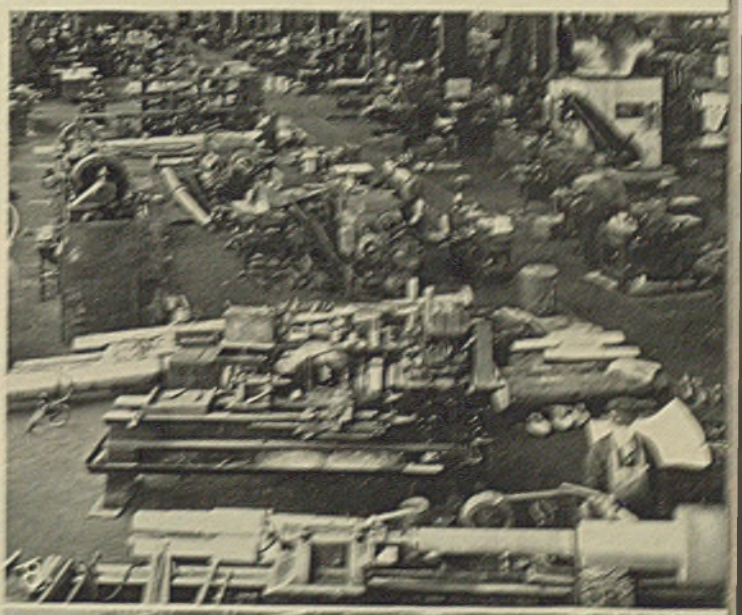
WORKSHOP

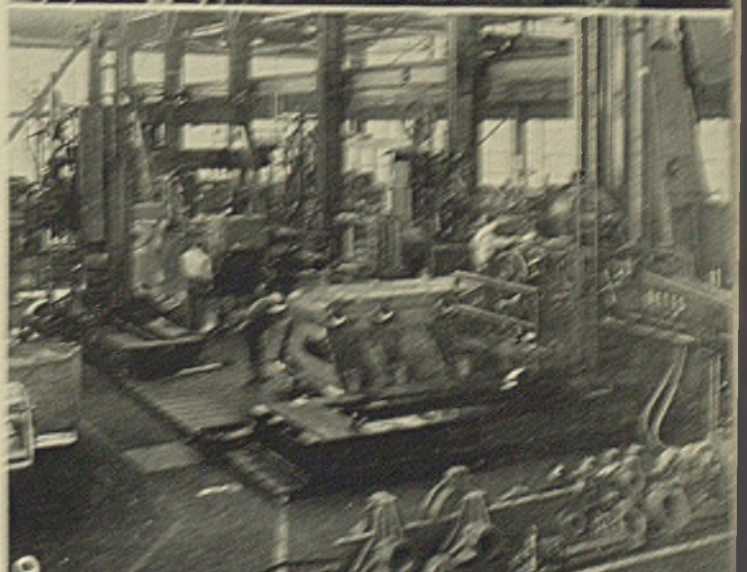
& Iron Works, 5912 S. Lowe avenue, Chicago; Graver Tank & Mfg. Co., E. Chicago, Ill.; Joseph T. Ryerson & Son, Inc., 16th & Rockwell streets, Chicago; Butler Bin Co., Waukesha, Wis.; Wendnagel & Co., 22nd & Jefferson streets, Chicago; Wisconsin Bridge & Iron Co., 5023 N. 35th street, Milwaukee; John Mohr & Sons, 3200 E. 96th street, Chicago; Stefco Steel Co., Michigan City, Ind.; A. Finkl & Sons Co., 2011 Southport avenue, Chicago; and Continental Roll & Steel Foundry Co., 144th street & Railroad avenue, E. Chicago, Ill.



(7) Cromonite rolls which are molded and ground by a maker in the Chicago district. They are being handled by a special carrier at a 76-inch hot strip mill located in the Gary, Ind., district



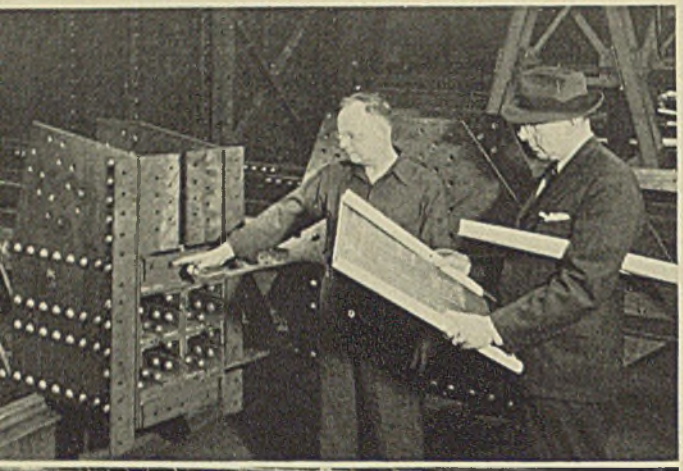


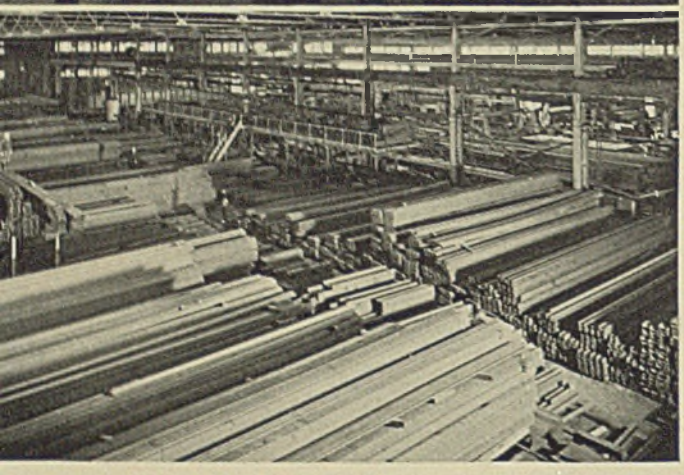


(5) Laying a ⅜-inch fillet weld continuously with an automatic welder on a single plate girder 50 feet long and weighing 12 tons. (6) Close-up of welding machine. When each 50-foot girder is welded, two are assembled by plate diaghragms to make one double-box girder. (8) Machine shop for finishing up small castings. (9) Large tools for machining heavy castings

CHICAGO.....

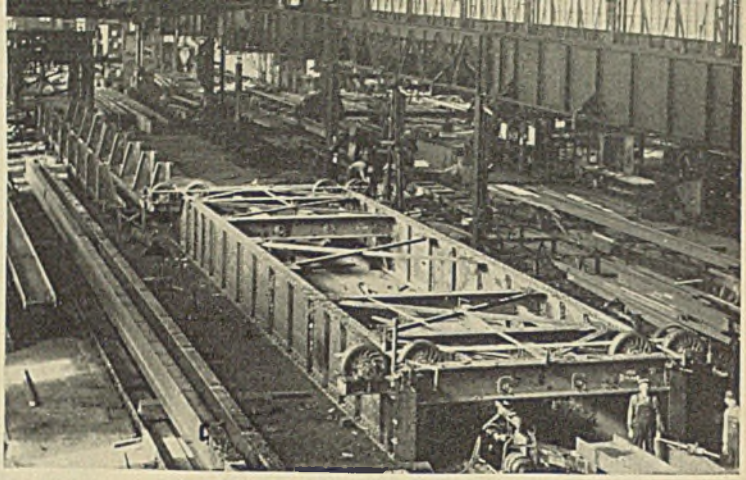
Steel Fabricators' Workshop





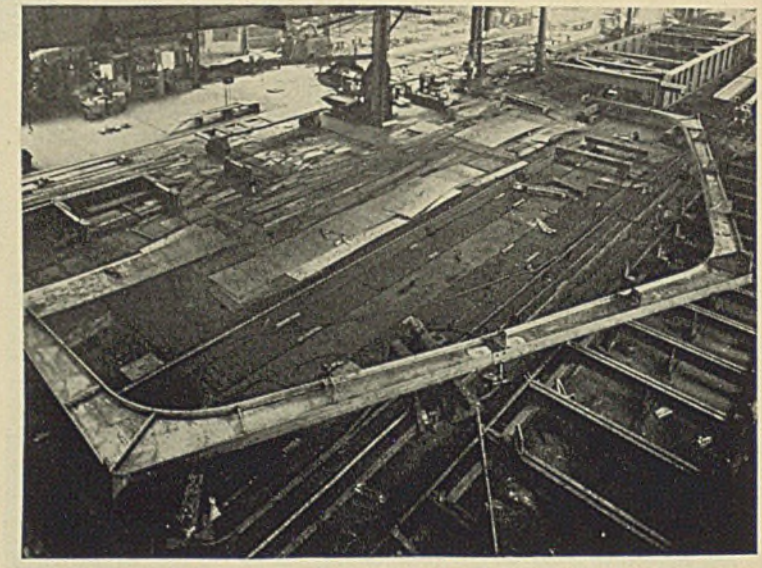
Above, architect and shop foreman study a fabricated piece in a Chicago structural steel plant. Structural bay in a Chicago steel service plant where over 10,000 kinds, shapes and sizes of steel are carried in stock

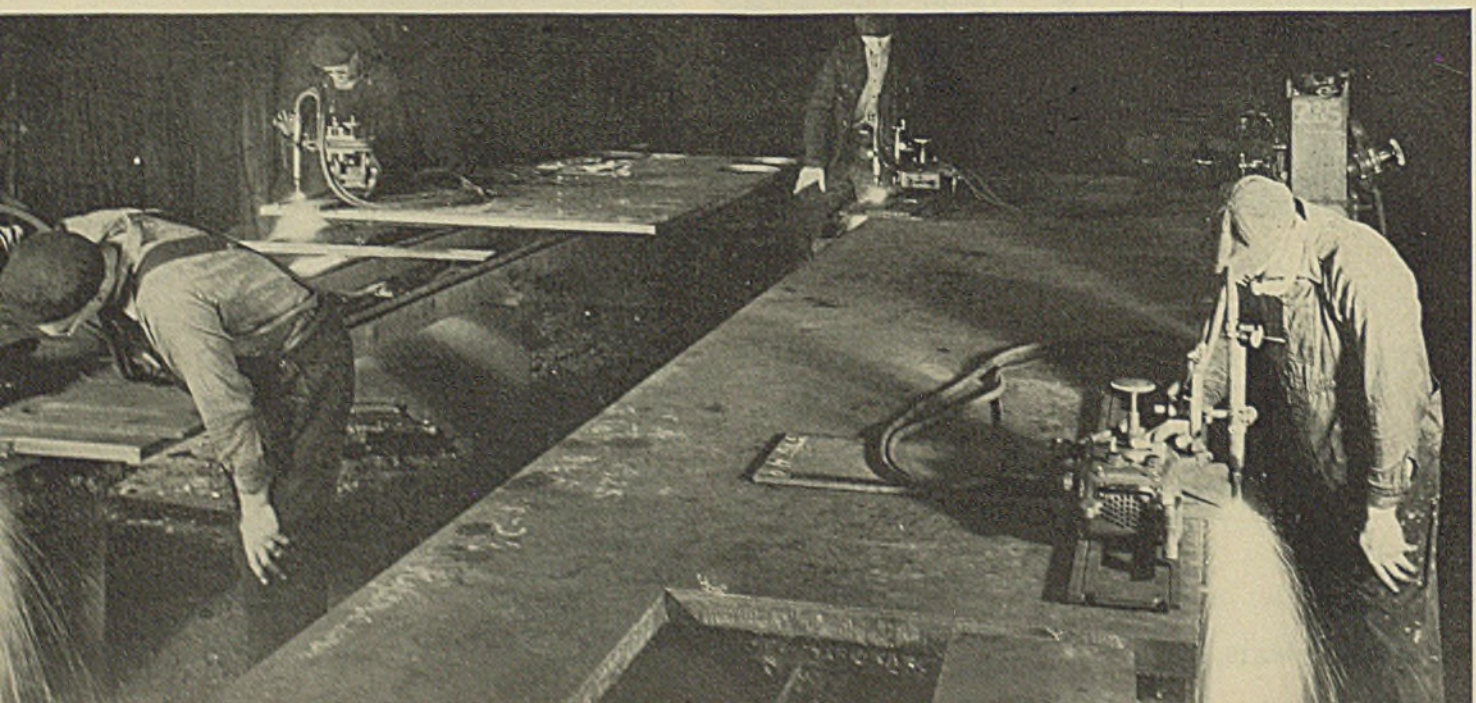
Below, flame cutting heavy plates to customers exact specifications at a steel service plant



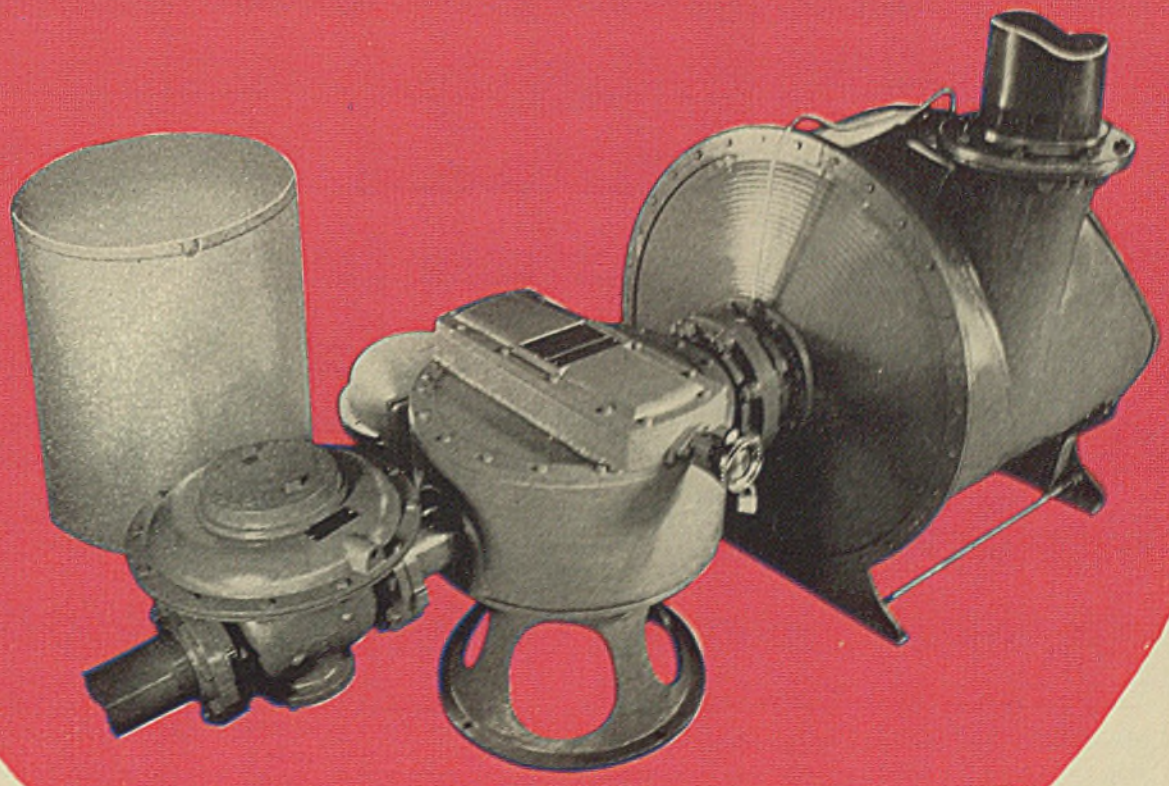
Completely assembled railroad transfer table in upside down position for transferring cars from one building to another. It is 25 feet wide, 8 feet high and 75 feet long and weighs about 65 tons

All welded steel arch truss structure completely welded in the shop. The section is 34 feet high in the center and 85 feet wide. Little shop space is required for fabrication and little material handling





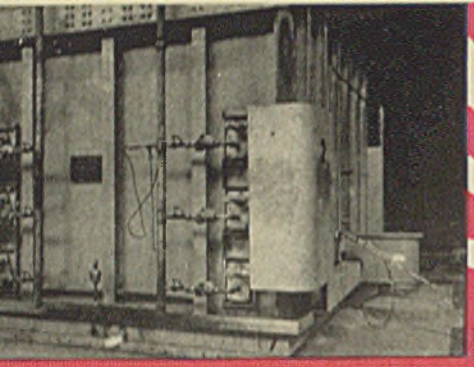
When BETTER HEATING
means BETTER PRODUCT
and BETTER PROFITS . . .

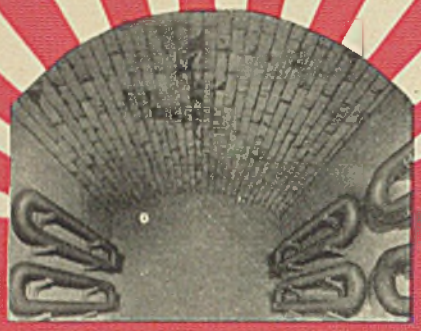


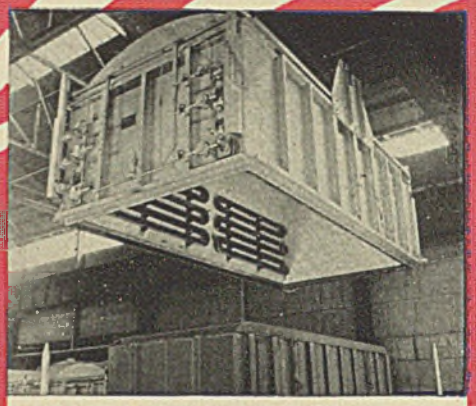
Basis of all Kemp Industrial Heat Treating installations is the patented **Kemp Industrial Carburetor** which makes possible heating efficiencies, types of application and accuracy of control hitherto unheard of.

you should know

KEMP of BALTIMORE



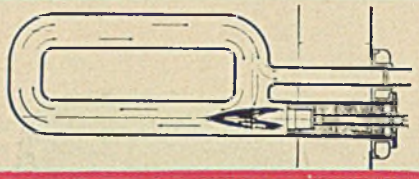


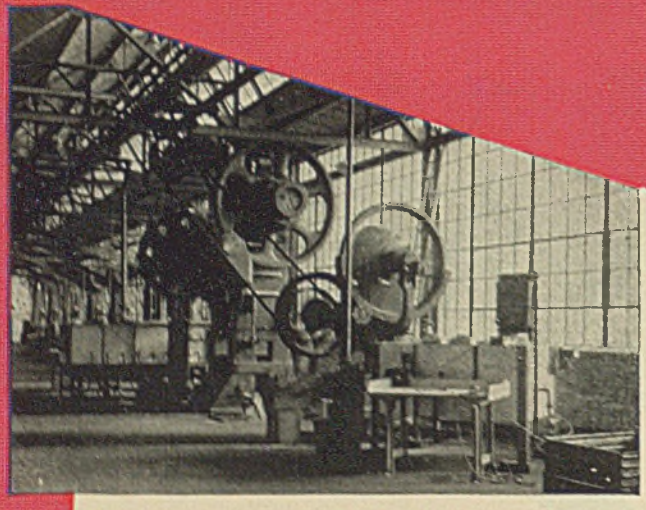


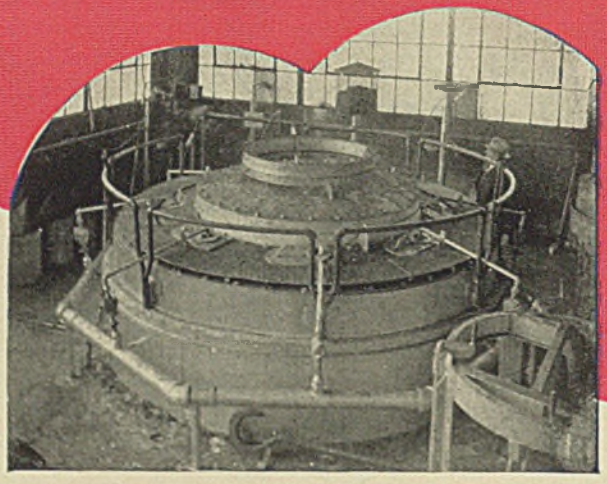
ANNEALING—

of steel sheets, tubes or other shapes requires long heating in a protective atmosphere to prevent oxidation. Many of the newer mills have selected the Kemp Atmos Gas Producer and Swindell-Dressler Annealing Covers, fired by the Kemp Industrial Carburetor (see above).

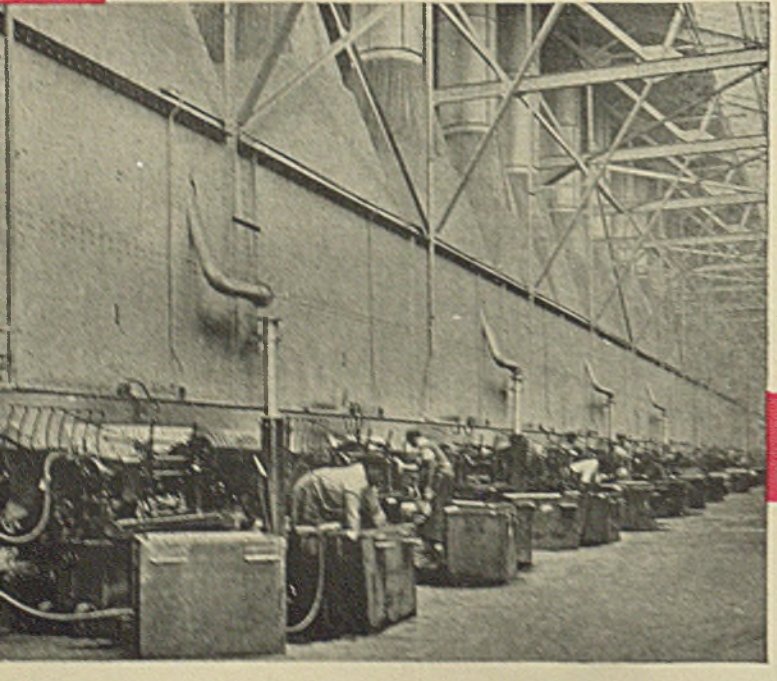
Center above, is seen the interior of the annealing cover with Kemp Recirculating Radiators in place. Below is a diagram of this burner, and left, a battery of steel mill Industrial Carburetors.



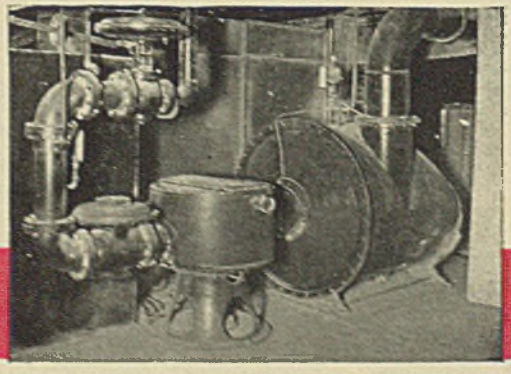




Above, forge shop for Brass. Right, an immersion salt bath heat treating furnace. Below, general view of one of the world's most modern tin-stacks —all Kemp Immersion Heated.



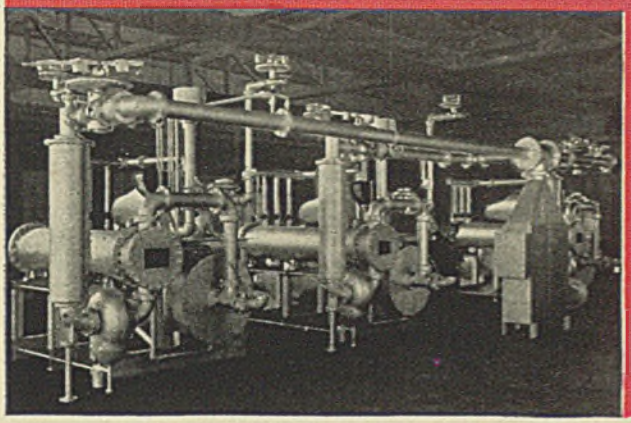
HEAT TREATING, FORGING, TIN-STACKS. The Industrial Carburetor is ideal in heat treating since the ratio of air and gas may be infinitely varied to meet the need for oxidizing and reducing atmospheres of any degree as well as providing complete combustion.

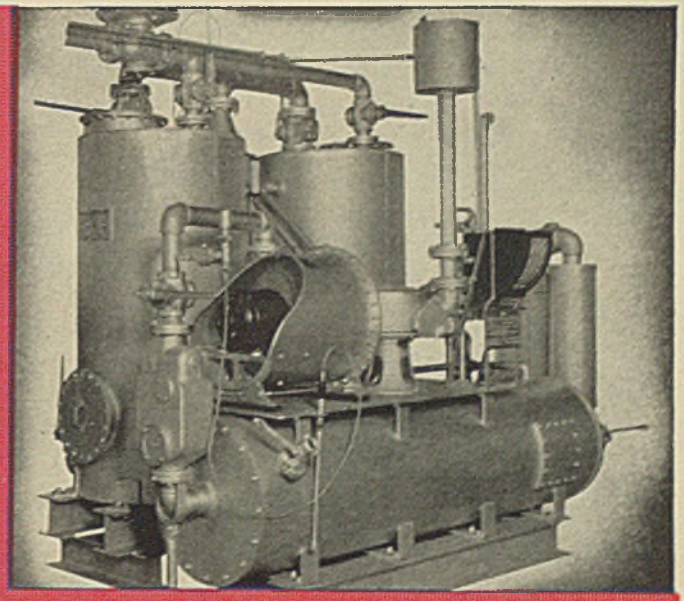


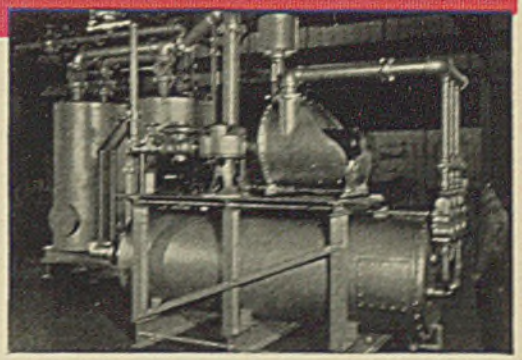
KEMP

Atmos Gas Producers

*with the Mechanical Brain**



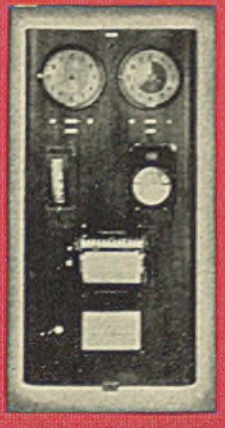




KEMP ATMOS GAS PRODUCERS are made in a wide variety of types and in capacities from 1,000 to 15,000 c.f.h.

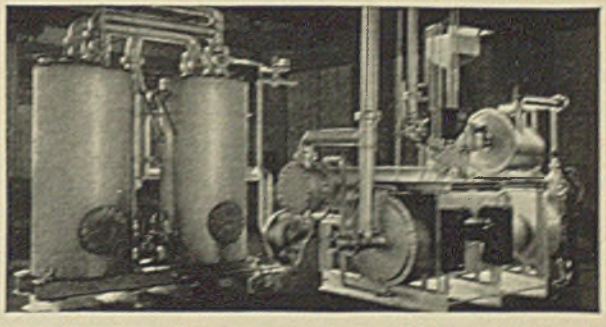
Four methods of dehumidification are available depending on the service and providing required dew points of 0° F. or lower.

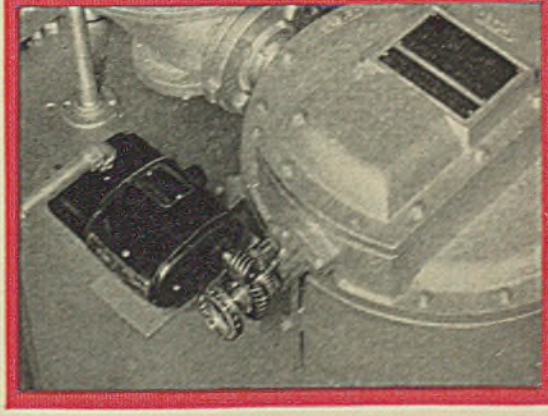
The heart of this equipment is the Industrial Carburetor insuring accurate proportioning of air and gas to provide atmos gas of the desired analysis.

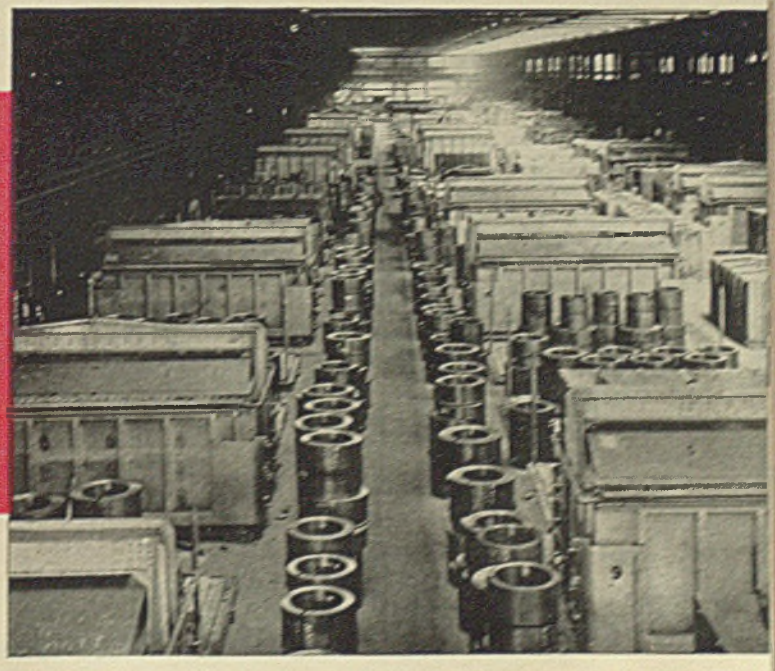


CONSTANT ANALYSIS MONITOR

BRAIN of the Atmos Gas Producer is Kemp Constant Analysis Monitor, shown left and below. This device continually samples and analyzes conditioned gas, compensating automatically for changes in fuel gas or air supply and recording as well, a continuous graphic record of analysis.







What about

Your PROBLEM?

Among the varied and interesting applications presented in the foregoing pages, some no doubt suggested to you a heating job of your own in which Kemp might possibly save you money, improve quality, speed production, reduce labor or provide more accurate control. Kemp equipment is functioning in many more industries than could be presented within the covers of this booklet, and the chances are that Kemp engineers *can* be of help in *any problem involving heat.* At any rate, they are at your service, without obligation, and *right now.* For prompt, qualified assistance, address the office nearest you.

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BIRMINGHAM, ALA.

2032 Santa Fe Ave.
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481 Winspear Avenue
BUFFALO, N. Y.

31 Gibbs St. Bldg.
ROCHESTER, N. Y.

317 State Tower Bldg.
SYRACUSE, N. Y.

Commercial Arts Bldg.
CINCINNATI, OHIO

National Bldg.
CLEVELAND, OHIO

Huntington Bank Bldg.
COLUMBUS, OHIO

101 N. 33rd St.
PHILADELPHIA, PA.

Oliver Bldg.
PITTSBURGH, PA.

201 Petroleum Bldg.
HOUSTON, TEXAS

544 Inspector St.
MONTREAL, CANADA

203 St. John St.
QUEBEC, CANADA

11 Front St. East
TORONTO, CANADA

New York Office: 623 Graybar Building, 420 Lexington Avenue

HOME OFFICE: 405 E. OLIVER ST., BALTIMORE, MD.

KEMP of BALTIMORE

How **YALE EQUIPMENT** Serves and Saves in the **STEEL INDUSTRY**

YALE SERVES THE STEEL INDUSTRY ...that it may better serve America

YALE HAND LIFT TRUCK
handling load of tin plate

YALE ELECTRIC FORK TRUCK
quickly loads freight car

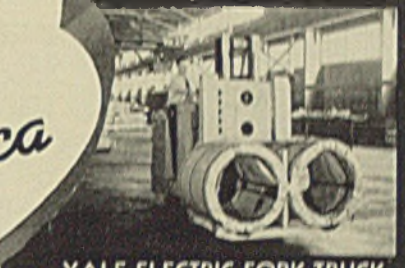
YALE SPUR-GEARED HOIST
handles bulky loads easily

YALE CABLE KING HOIST
rapidly loads motor truck

YALE GIANT RAM TRUCK
handles 2 coils in one load

YALE HAND LIFT TRUCK
"on the go" with its load

ALE CABLE KING HOIST
acks bulky load in warehouse



YALE ELECTRIC FORK TRUCK
transports coils for shipment

YALE RAIL HUGGER HOIST
operates in close headroom space

YALE HAND LIFT TRUCK
reduces car unloading time

YALE SPUR-GEARED HOIST
insures greater operator safety

YALE CABLE KING HOIST
unloading sheet steel from trailer

EVERYONE knows that materials handling adds nothing to the value of a product—only to its cost. Yale builds materials handling equipment that cuts that cost, allows the steel industry to sell its products for less, permits the public to get more for its dollar.

For almost 75 years Yale has been designing superior materials handling equipment. The complete line includes Chain and Electric Hoists, Trolleys, Hand Lift Trucks and Electric Industrial Trucks. Although each has a different form and is designed for a different job, each has a common record of cutting handling costs to a minimum.

These are scenes showing how Yale equipment has cut materials handling costs in several of America's largest steel plants. We will be pleased to show you additional on-the-job picture stories of Yale equipment, as well as motion pictures without obligation. Just write us on your company letterhead—or use the coupon.

-YALE-

THE YALE & TOWNE MANUFACTURING CO.
4530 TACONY STREET, PHILADELPHIA, PENNA.

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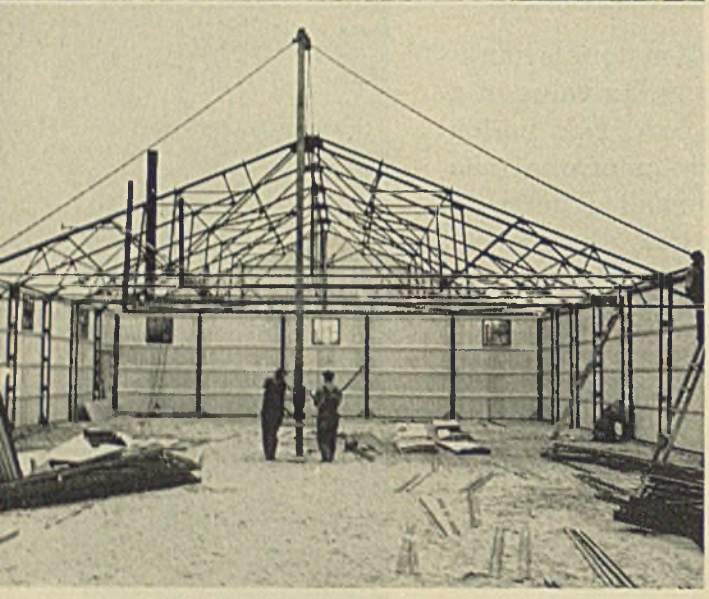
STREET _____

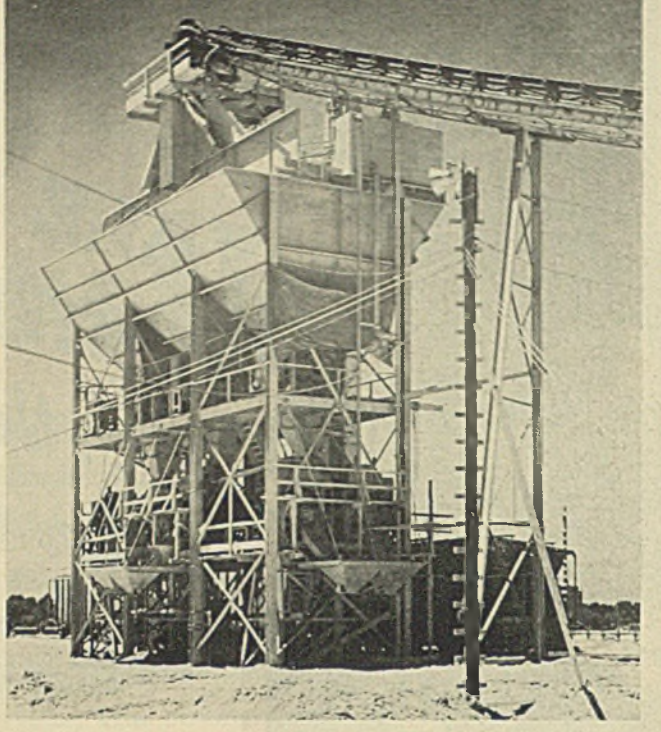
CITY _____

STATE _____

CHICAGO.....

Steel Fabricators' Workshop





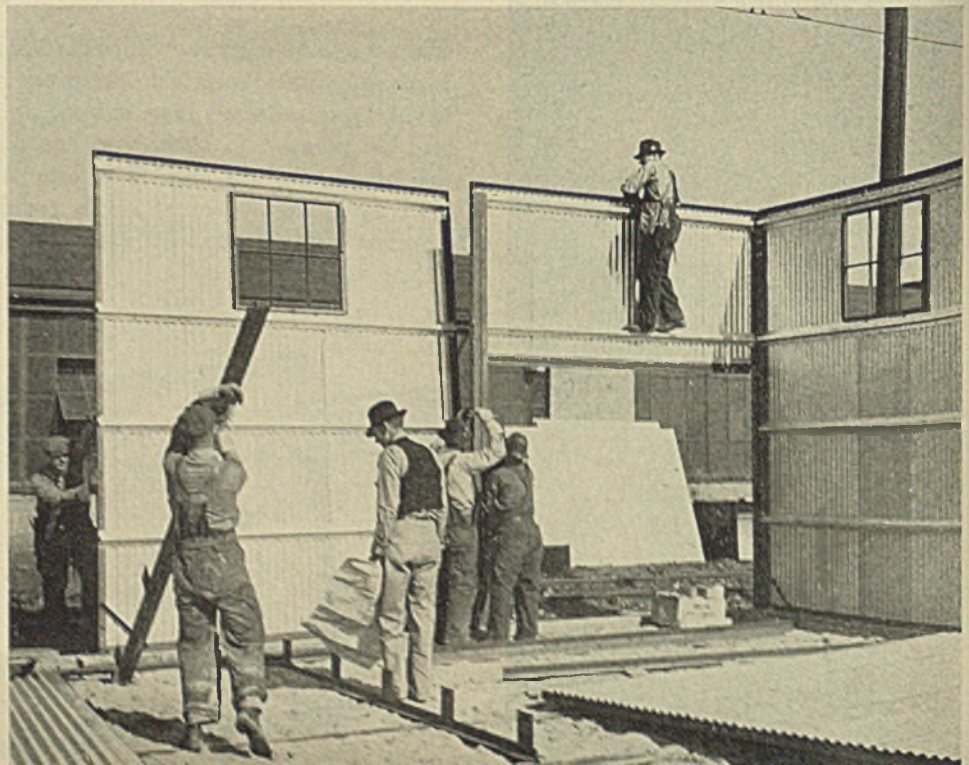
Bin system with a capacity of 750 tons for handling concrete materials. The unit has a high salvage value. Upon completion of job it can be reassembled into three transit mixed concrete plants without use of additional material

Material distributed at site for quick erection of a building, 18 x 64 x 12 feet high, designed for a warehouse

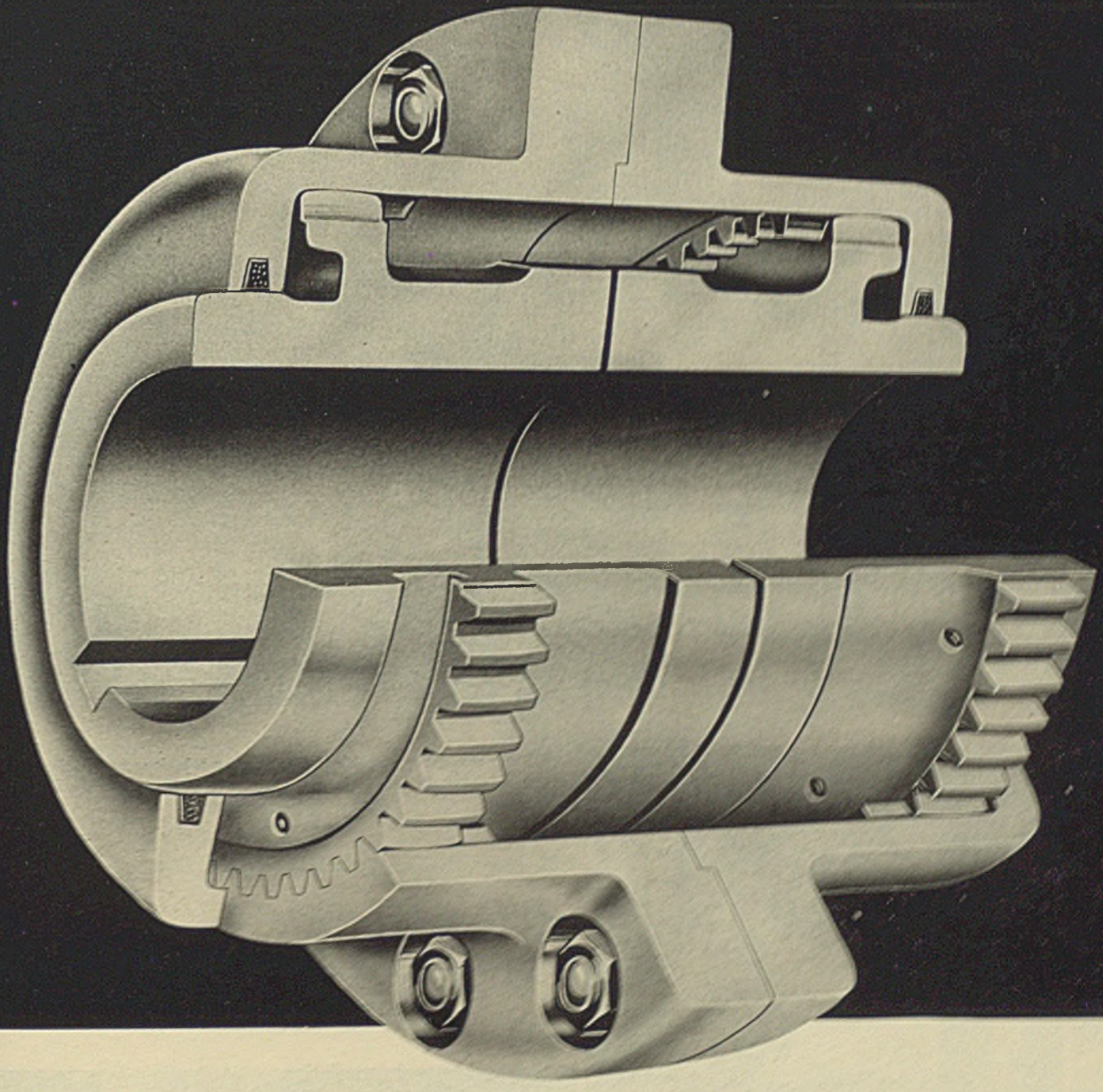
One of the 50-foot trusses being elevated in place on top of columns

Start of erection at one corner. The building is fabricated into 10 x 12-foot panels with corrugated galvanized sheets copper riveted to structure and with windows flashed in place

By making these wire panels interchangeable they can be utilized for various applications. Door sections may be placed between any two sections and corners may be formed at any intersection



POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

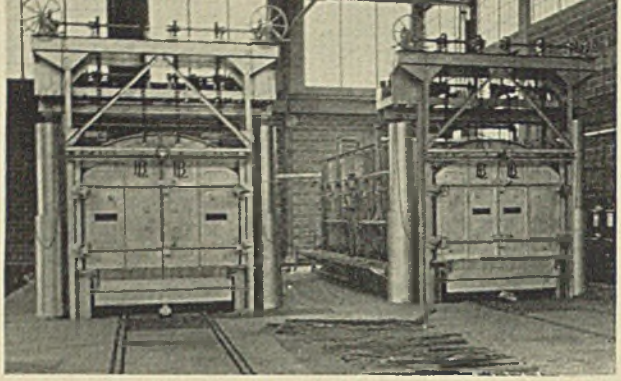
FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY

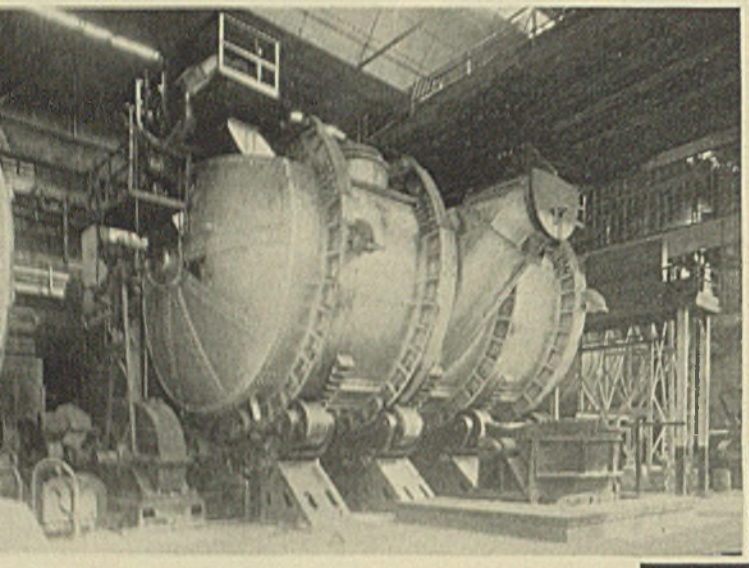
WOODBERRY, BALTIMORE, MD.

CHICAGO.....

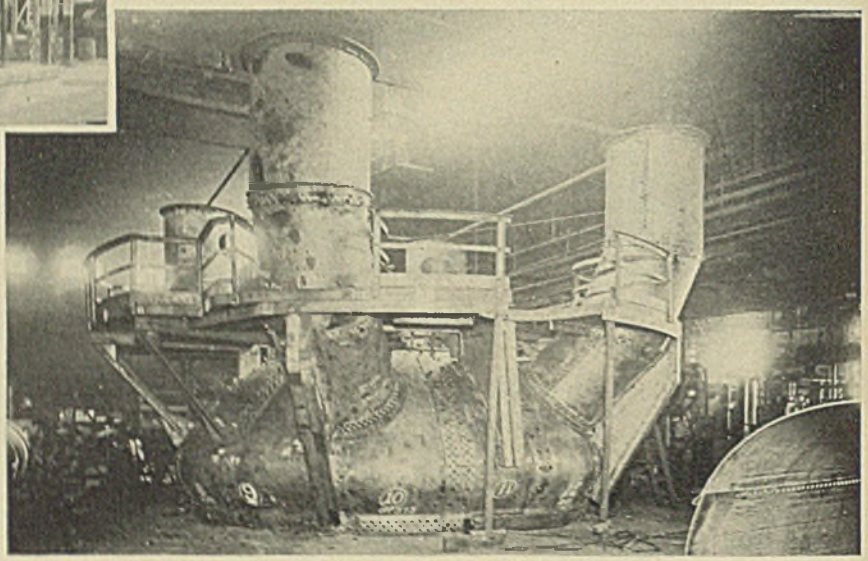
Steel Fabricators' Workshop



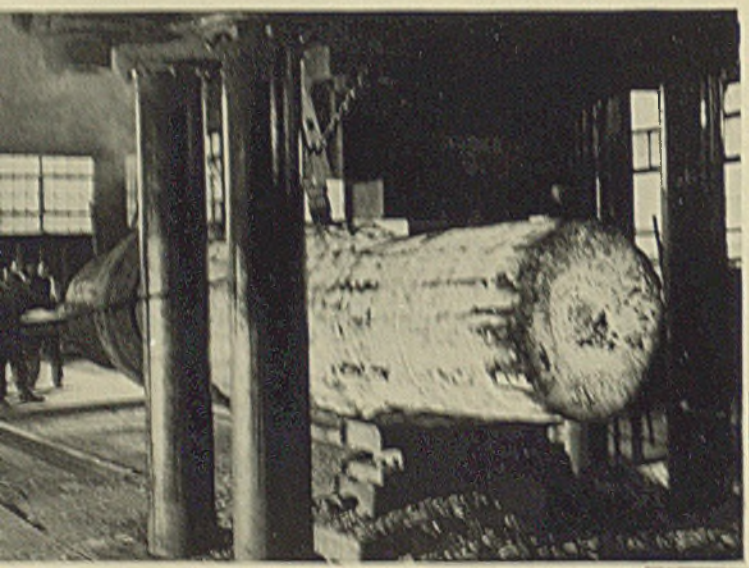
Two gas-fired, car-type annealing furnaces recently installed at a cold drawn plant in Chicago district. The pyrometer panel is shown at right



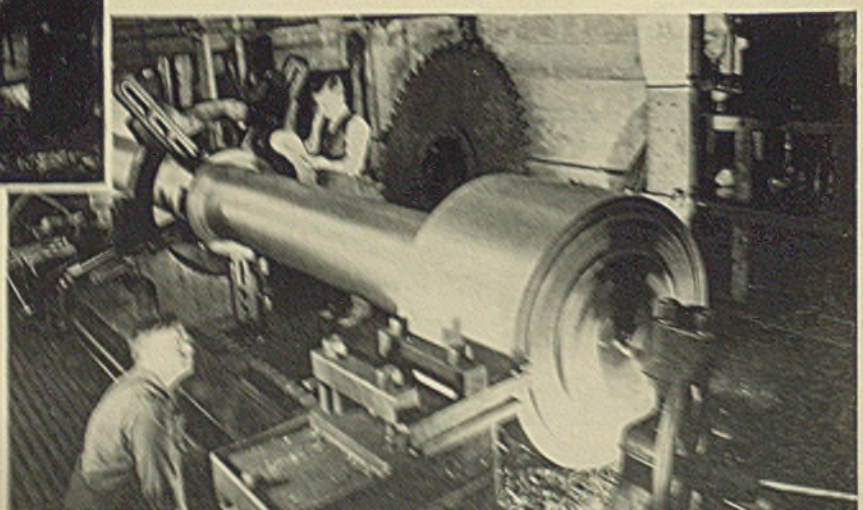
1100-ton cylindrical hot metal mixer built in the shops of a Chicago plate fabricator and installed in the plant of a district steelmaker. The cylindrical-type mixer serves as a reservoir as well as a means for blending molten iron from blast furnaces prior to its being charged in either the open-hearth furnace or bessemer converter. The temperature of the bath is maintained by combustion of coke oven gas fired through a burner positioned at the top of the vessel



Shop assembly of a blast furnace top which was installed on a stack in the Chicago district. The four uptakes are shown amply reinforced



Spindle for installation in a rolling mill in the process of machining in a 40-foot lathe

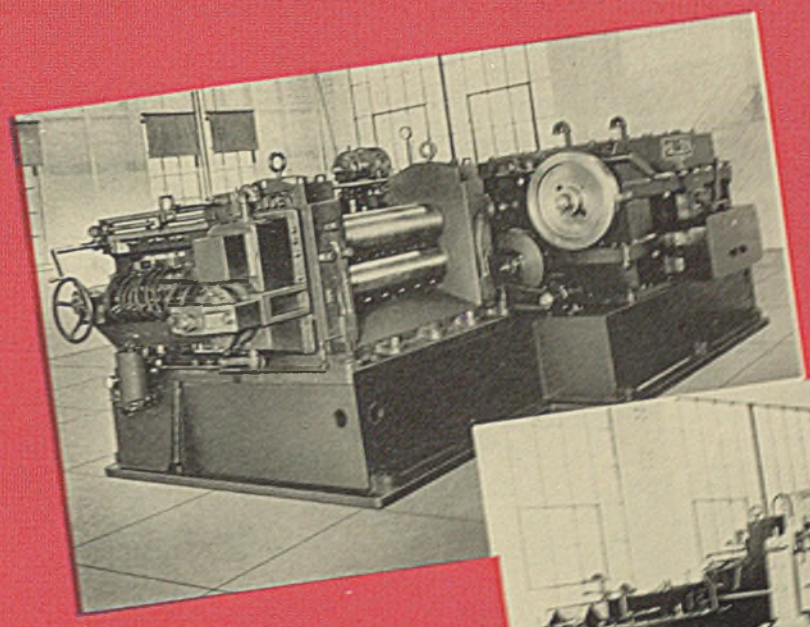


Ingot weighing 110,000 pounds being forged into a shaft under a forging press having a capacity of 2000 tons. Such plants as this may shortly be called upon to adapt their equipment to the production of material suitable for the national defense program now under way in this country

SPECIALISTS

SHEARS

FOR EVERY PRODUCT COMPRISE OUR ENTIRE LINE



The Hallden Synchronized Rotary Shear above operates on tin plate at high speeds, accurately and efficiently. The synchronizing mechanism prevents marking the metal in the flattening stand.

At the right is the Hallden Automatic Flattening and Cutting Machine. This machine operates efficiently on cold rolled and cold hot rolled metal, both on the light and heavy gauges.

Specializing in one product exclusively has established Hallden as a leader in the manufacture of Flying Shears. Automatic levellers and shears for steel and nonferrous metals, shears for round, square or hexagon wire and shears for special applications are among the Hallden products. Consult us about your shear problems.

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W. H. A. ROBERTSON & COMPANY, LTD. – BEDFORD, ENGLAND

Program

■ Demands both present and future with which operating personnel in the steel industry are confronted will be emphasized at the thirty-sixth Annual Convention and Iron and Steel Exposition to be held in Hotel Stevens, Chicago. All activities will be under one roof. During the three days sessions 26 papers will be presented under such divisions as mechanical, electrical, welding, operating, combustion and lubrication engineering.

Inspection trips are scheduled to the plant of the Youngstown Sheet & Tube Co., Indiana Harbor, Ind., Wednesday, Sept. 25, and the Wisconsin Steel Works, Friday, Sept. 27.

Tuesday, Sept. 24

9:00 A.M.

Registration

Chairman: L. F. Coffin, Supt., Bethlehem Steel Co., Sparrows Point, Md.

Vice Chairman: A. R. Dibben, Elec. Dept., Youngstown Sheet & Tube Co., East Chicago, Ind.

9:00 A.M.

Ladies' Registration

9:15 A.M.

Business Session

Chairman: J. A. Clauss, Ch. Engr., Great Lakes Steel Corp., Ecorse, Mich.

Vice Chairman: J. L. Miller, Asst. Ch. Combustion Engr., Republic Steel Corp., Cleveland.

9:30 A.M.

Mechanical Engineering Division

Chairman: George H. Rose, Ch. Engr., American Steel & Wire Co., Cleveland.

Vice Chairman: T. E. Hughes, Maint. Supt., Carnegie-Illinois Steel Corp., Duquesne, Pa.

"Design and Operation of Gear Drives," by F. P. Dahlstrom, Elec. Engr., Farrel-Birmingham Co., Ansonia, Conn.

"Maintenance Shops in the Steel Plant," by T. R. Moxley, Gen. Master Mech., Wheeling Steel Corp., Steubenville, O.

"Diesel Shifting Equipment in the Steel Plant," by E. M. Smith, Asst. Sales Mgr., Electromotive Corp., LaGrange, Ill.

1:30 P.M.

Electrical Engineering Division

Chairman: I. N. Tull, Elec. Supt., Republic Steel Corp., Cleveland.

Vice Chairman: H. W. Neblett, Develop. and New Design Engr., Inland Steel Co., East Chicago, Ind.

"Modern Electric Furnace Design and Practice," by H. F. Walther, Asst. Melt. Supt., Steel and Tube Div., Timken Roller Bearing Co., Canton, O.

"Mercury Arc Rectifiers for Main Roll Drives," by L. A. Umansky, Mining and Steel Mill Section, Industrial Dept., General Electric Co., Schenectady, N. Y.

1:30 P.M.

Welding Engineering Division

Chairman: L. J. Gould, Asst. Ch.

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is served by "3C" Electrical control devices such as those shown above. "3C" apparatus developed, engineered and manufactured in the pictured plant, has an enviable performance record in thousands of heavy duty applications. • Automatic Controls . . . Brakes . . . Edgewound and Ventilated Resistor . . . Rheostats . . . Push Buttons . . . Cam and Knife-way Limit Switches . . . Master and Foot Switches . . . Auxiliary Electrical Equipment . . . all for successful operation and protection of A.C. and D.C. Motors . . . these are "3C" contributions to modern high speed accurate production in every class of industry.

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Lee Built Springs, traditional but mythless, have likewise built themselves an enviable reputation, in the machine world. Their boast of "*trouble-free spring performance*" is backed by their STABILITY in operation, their ACCURACY in specification and their ENDURANCE in service. Built in *all types, all sizes* and *all metals*—Lee-Built Springs have proved themselves *conditioners* to all spring ailments. Complete bulletins on every type available!

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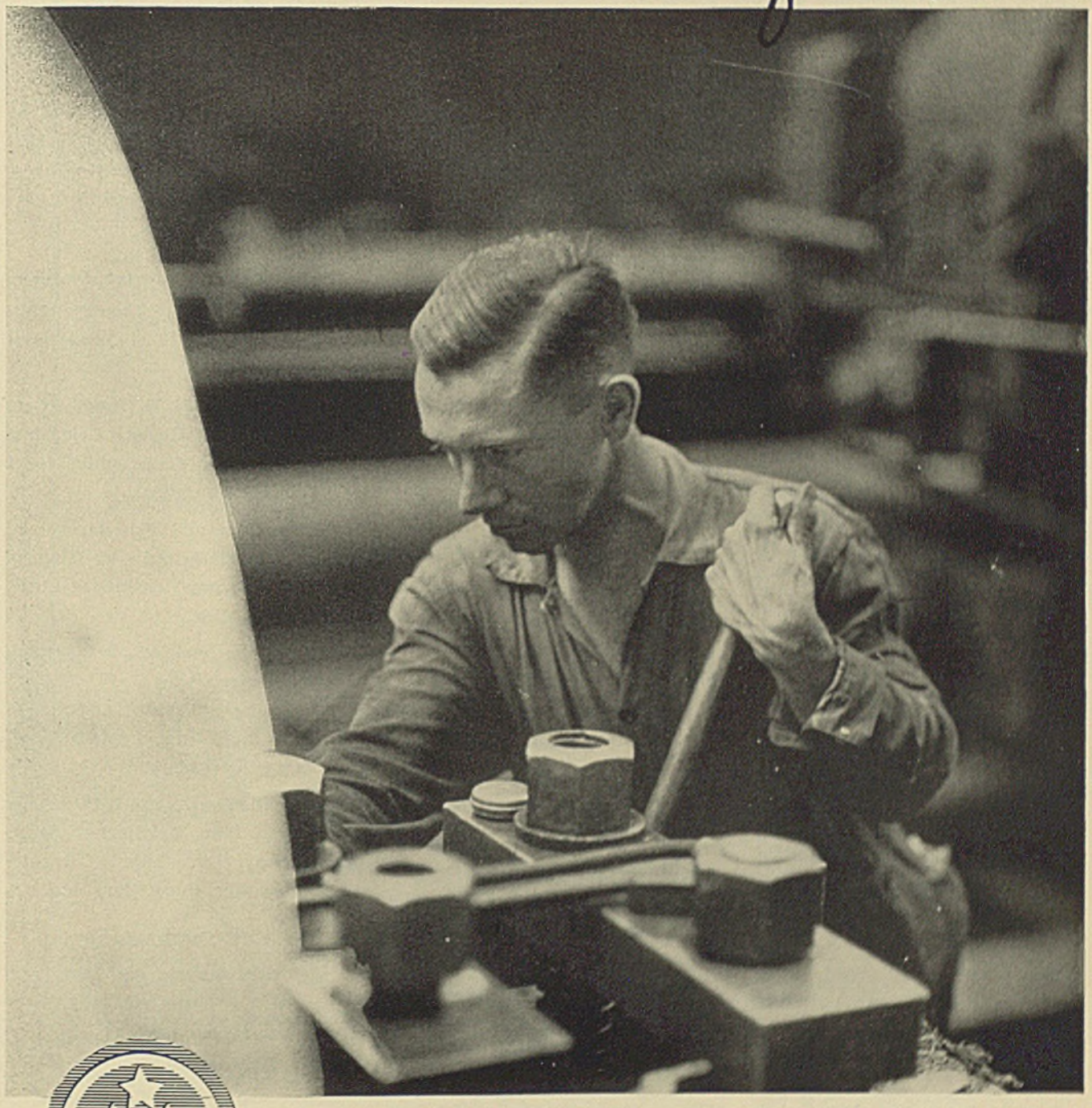

IN the ranks of Midvale craftsmen are seasoned veterans. Here, too, is a younger generation, enriched by the advantages of more recent schooling and by the enthusiasm that goes with younger years. Midvale is proud of its veterans who have made steel history. It is equally proud of its younger craftsmen who are doing things with steel that will be history tomorrow.

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Engr. of Construction, Bethlehem Steel Co., Bethlehem, Pa.

Vice Chairman: A. W. Steed, Maint. Supt., American Rolling Mill Co., Middletown, O.

"Welded Construction of Blast Furnace Stoves," by H. C. Boardman, Chicago Bridge & Iron Co., Chicago.

"Welded Open-Hearth Auxiliaries," by C. C. Keyser, Weld. Super., Bethlehem Steel Co., Steelton, Pa.

"Building Up and Hard Surfacing," by L. Ames, Air Reduction Sales Co., New York.

2:00 P.M.

Ladies' Sight-Seeing Trip and Tea

10:00 P.M.

Exhibitors' Dance

Wednesday, Sept. 25

9:00 A.M.

Combustion Engineering Division

Chairman: H. T. Watts, Comb. Engr., Republic Steel Corp., Birmingham, Ala.

Vice Chairman: E. J. Wagar, Asst. Ch. Engr., Otis Steel Co., Cleveland.

"Effect of Pit Operation on Steel Conditioning," by Charles Labeka, Met. Dept., Pittsburgh Steel Co., Monessen, Pa.

"The Comparison of Soaking Pit Designs," by F. E. Leahy, Supt. of Fuel Dept., Youngstown Sheet & Tube Co., Youngstown, O.

9:00 A.M.

Operating Practice Division

Chairman: H. G. R. Bennett, Engr. Hot Rolling Mill, Carnegie-Illinois Steel Corp., Pittsburgh

Vice Chairman: J. D. Jones, Ch. Engr., Youngstown Sheet & Tube Co., Youngstown, O.

"Composition Bearings for Roll Necks," by H. R. Gilchrist, Lub. Engr., Carnegie-Illinois Steel Corp., Youngstown, O.

"Hot Scarfing of Billets, Blooms and Slabs," by E. A. Doyle, Cons. Engr., Linde Air Products Co., New York.

"Design and Operation of Continuous Butt Weld Pipe Mills," by J. A. Laux, Elec. Engr., and E. T. Trebilcock, Asst. Elec. Engr., Salem Engineering Co., Salem, O.

11:00 A.M.

Ladies' Luncheon and Card Party

12:45 P.M.

Inspection Trip

Youngstown Sheet & Tube Co., Indiana Harbor, Ind.

Thursday, Sept. 26

9:00 A.M.

Electrical Engineering Division

Chairman: F. O. Schnure, Elec. Supt., Bethlehem Steel Co., Sparrows Point, Md.

Vice Chairman: G. R. Carroll, Asst. Supt. of Maint., Jones & Laughlin Steel Corp., Aliquippa, Pa.

"Reversing Drives for Slabbing Mills," by F. R. Burt, Engrg. Dept., Metal Working Section, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Power Requirements for Hot Strip Mills," by W. M. Ballenger, Steel Mill Engr., General Electric Co., Chicago District, and T. R. Rhea, Steel Mill Engr., General Electric Co., Schenectady, N. Y.

"Hot Strip Coilers and Their Drives," by R. A. Geuder, Application Engr., Reliance Electric & Engineering Co., Cleveland.

"Factors Affecting Production of Blast Furnace Gas," by J. S. Fulton, Special Representative, Ingersoll-Rand Co., Pittsburgh.

1:30 P.M.

Lubrication Engineering Division

Chairman: F. J. Thomas, Lub. Engr., Republic Steel Corp., Cleveland.

Vice Chairman: H. H. Shakely, Gen. Master Mech., Hot and Cold Strip Mills, Jones & Laughlin Steel Corp., Pittsburgh.

"Composition and Manufacture of Grease Lubricants," by Thomas Lenox, Socony-Vacuum Oil Corp., Trenton, Mich.

"Lubrication and Its Relation to Maintenance," by C. W. Phillips, Gen. Master Mech., and R. A. Barta, Lub. Eng., Republic Steel Corp., Cleveland.

"Application and Care of Bearings in Steel Plant Auxiliaries," by F. L. Gray, Lub. Engr., Carnegie-Illinois Steel Corp., Gary, Ind.

7:30 P.M.

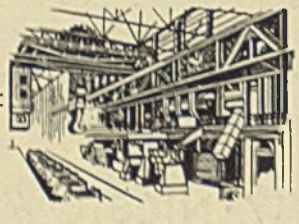
Formal Banquet and Dance

Friday, Sept. 27

9:00 A.M.

Inspection Trip

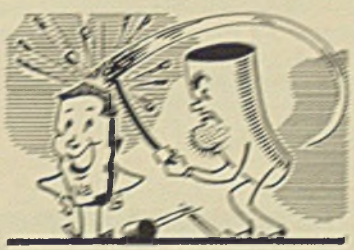
Wisconsin Steel Works, International Harvester Co., Chicago.



Items of Interest about Vanadium

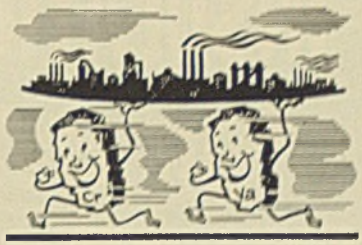
Vanadium Has Wide Application — Ferrovanadium is used for making fine-grained steels having high dynamic strength, fatigue resistance, and wear-resistance. Such steels include high-speed tool steels, nitriding steels, and many engineering and structural steels. Vanadium oxide and ammonium meta-vanadate are used for making other vanadium compounds useful to the chemical industries, one example being substitutes for the more costly platinum catalysts in the manufacture of sulfuric and nitric acids.

Vanadium Improves Steel Castings — A small amount of vanadium, usually not over 0.10 per cent, in steel castings refines grain, materially raises yield strength without sacrificing ductility, and greatly increases resistance to shock and fatigue. For instance, the addition of 0.10 per cent vanadium to a nickel steel raised the yield strength from 53,450 to 69,900 pounds per square inch and increased the Izod impact from 35.5 to 74.3 foot-pounds.



Vanadium Raises Fatigue Strength of Medium-Manganese Steels — The addition of a small amount of vanadium (about 0.1% per cent) to medium-manganese steels makes it possible to obtain a consistently high endurance ratio.

Chromium-Vanadium Steels Help Carry the Loads of Industry — Wherever severe service demands a tough steel . . . a steel that can take punishment . . . chromium-



vanadium steels are the answer. Such highly stressed parts as springs, gears, sprockets, pneumatic and machine tool parts, roller bearing covers, pistons, axles, shafts of all kinds, connecting rods, and crankpins are better and last longer if made of chromium-vanadium steels.

Vanadium Steels for the Railroads — Fine-grained, shock-resistant vanadium steels are used for such engine and railroad car castings as main frames, crossheads, piston heads, wheel centers, driving boxes, rocker arms, equalizers, truck frames,

bolsters, and brake rigging. Wrought vanadium steels are used for helical springs, elliptical springs, and other parts requiring high dynamic strength.

• • •

If you want more information about Vanadium and the many other "Electromet" ferro-alloys and metals and the service that goes with their purchase, write for the booklet, "Electromet Products and Service."

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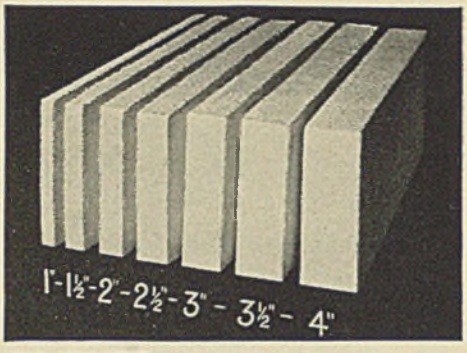
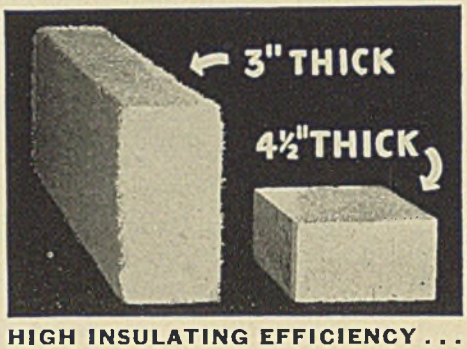
Standard throughout the steel and metal-working industries, J-M Superex has proved itself the most efficient, economical insulation for all types of high-temperature equipment . . . Check these money-saving features

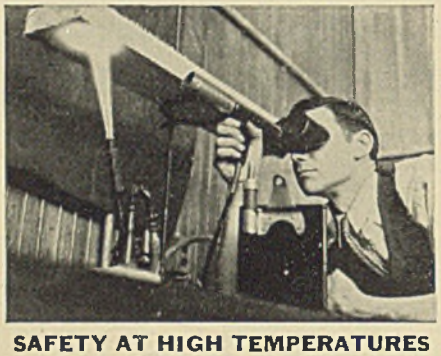


NO WASTE . . . You can buy the exact thickness you need when you use Johns-Manville Superex. This modern material is available in the wide range of thicknesses shown above . . . and in any intermediate thickness you might want.

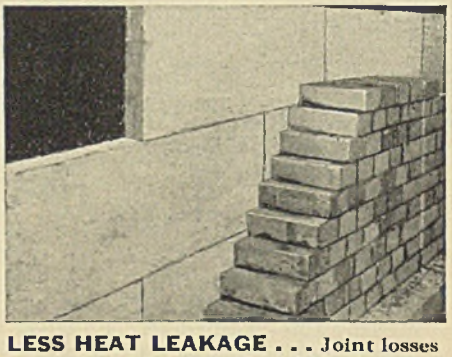


HIGH INSULATING EFFICIENCY . . . J-M Superex has an exceptionally low thermal conductivity, even at high temperatures. It is frequently possible to use 3 inches of this durable, efficient insulation in place of 4½ inches of other materials.

LOW INSTALLATION COSTS . . . Superex is supplied in large lightweight blocks that are easy to handle and install. As much as 3 sq. ft. can be applied in one unit. Think what this means in time and labor savings!



SAFETY AT HIGH TEMPERATURES . . . Made of asbestos and diatomaceous silica, Superex has unusually high heat resistance. Thousands of installations in service up to 1900° F. prove its dependability and long life.



LESS HEAT LEAKAGE . . . Joint losses are a potential source of costly fuel waste. The large-size units in which Superex is supplied reduce the number of joints needed . . . keep such leakage at the absolute minimum.

WHEREVER a block insulation is needed, you can't go wrong with J-M Superex. For over 15 years, it has been proving its superior efficiency and dependability for high-temperature service. You'll find Superex ideal for insulating slab-heating, annealing and all types of controlled-atmosphere furnaces, hot-blast stoves, open-hearth regenerators, soaking pits, producer-gas mains, etc. For details, ask for brochure IN-55A. Johns-Manville, 22 E. 40th St., N. Y. C.

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For every temperature . . . for every service condition

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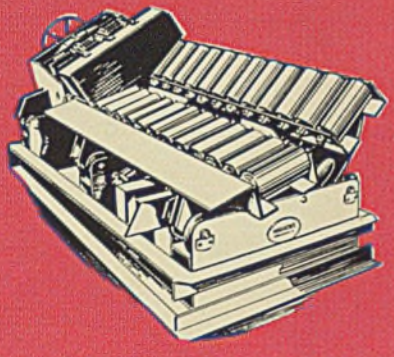


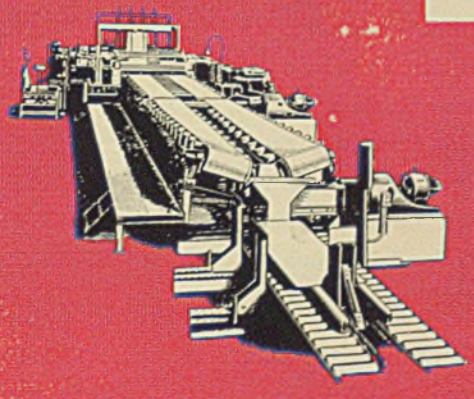
Side Tilter for discharging coils at right angles.

The plan for rearming America demands the rapid production of a vast amount of materials. A great share of the responsibility for this production has fallen to the Steel Industry. In fact, upon the ability of that industry to produce is hinged the success of this huge and vital armament program. Rightfully, then, Steel has been called "America's first line of defense."

The Mathews Conveyer Company, with greater facilities than ever before, is backing that line. Mathews engineers are working with Steel Plant engineers toward the application of conveying equipment which is designed to stand the coming months of severe service and abuse with a minimum of costly maintenance.

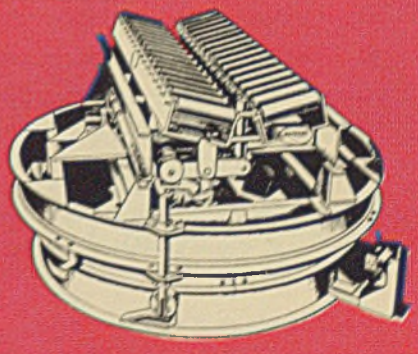
Mathews is glad for the opportunity to offer to the Steel Industry the experience gained from 35 years of engineering and manufacturing conveying equipment of high quality, and in this way help that industry to better serve the nation.

A Mathews engineer near your plant is eager to make your materials handling problem his own. We hope you will take advantage of his wide experience.



Belt Conveyer, troughed at end, for handling finished sheets from shear to piler.

Pallet Conveyer for handling hot or cold coils.



Power operated Turntable for changing the direction of coils as they move along conveyer line.

MATHEWS CONVEYER COMPANY

ELLWOOD CITY, PA.

PORT HOPE, ONT. SAN FRANCISCO, CALIF.

EXPOSITION HOURS

TUESDAY
9:00 A.M. to 10:00 P.M.

THURSDAY
9:00 A.M. to 5:30 P.M.

WEDNESDAY
9:00 A.M. to 10:00 P.M.

FRIDAY
9:00 A.M. to 12:00 NOON

All exhibits are in Hotel Stevens

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Allis-Chalmers Mfg. Co., Milwaukee.....67-68-69-70
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American Air Filter Co., Inc., Louisville, Ky. ...190-191
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Electric Controller & Mfg. Co., Cleveland.204-205-206-207
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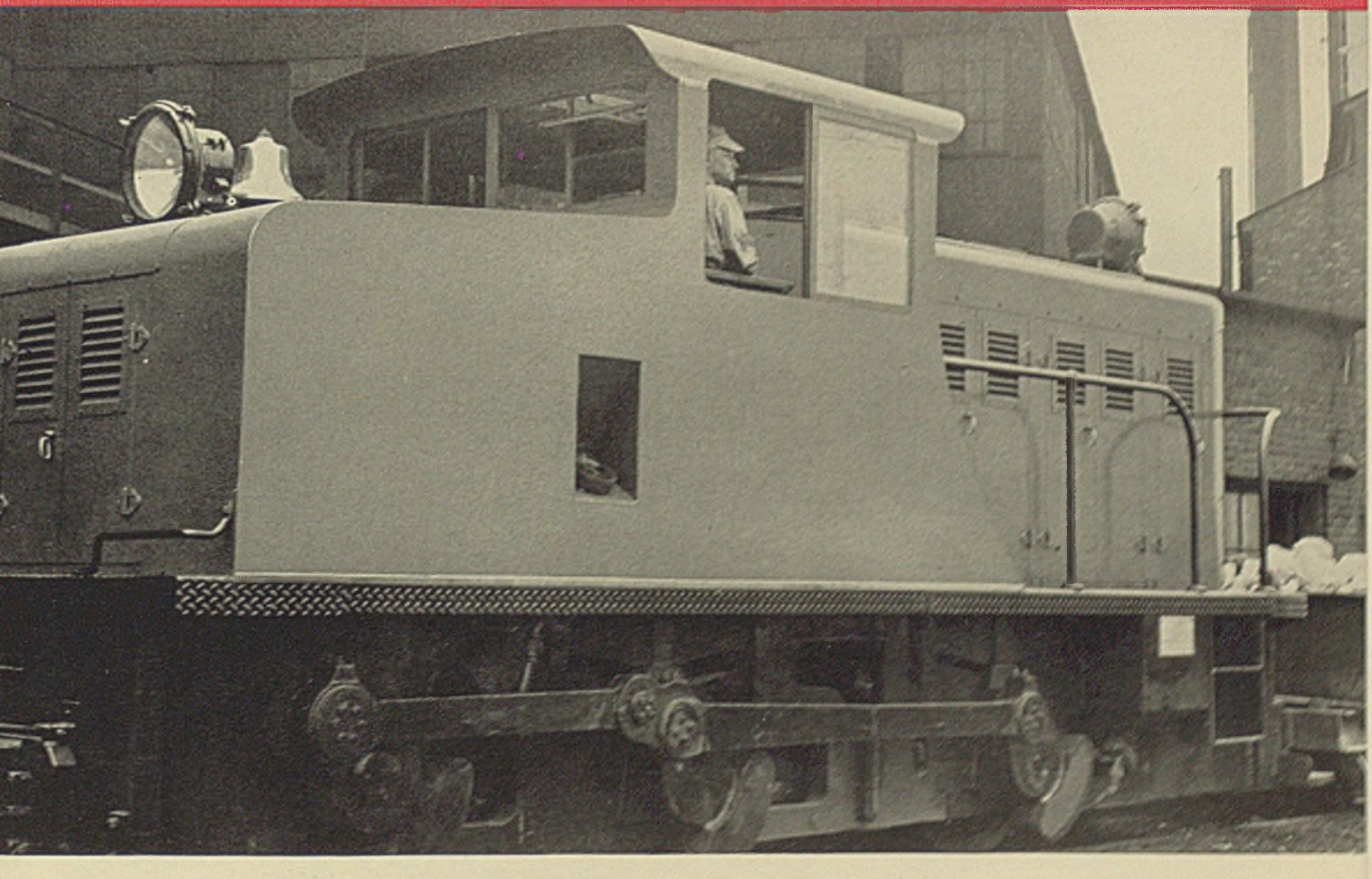
...That's the record!



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Division, The Fate-Root-Heath Company

PLYMOUTH, OHIO

*TRADE MARK REG.

PLYMOUTH FLEXOMOTIVE

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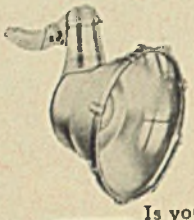
G-Men Warn Against Unprotected Grounds

MEET THIS CHALLENGE WITH...

CHECK THESE DANGER POINTS



Protective Lighting

☐ Are your yards, sidings, storage tanks, loading platforms and other outdoor areas well lighted? (GRAYBAR offers floodlights and lighting equipment.)

☐ Is your system of night lights in plants, warehouses, drafting rooms, offices, arranged to discourage intruders and aid the watchman in a thorough check-up? (Your GRAYBAR lighting specialist can help you here.)

Protective Alarm Systems

☐ Is your fire-alarm signaling system dependable, with conveniently located boxes, and all the necessary gongs and other warning accessories? (Write for details on fire-alarm systems.)

☐ Is your system for recording the watchmen's rounds the modern *electrical* type which cannot be "cheated"? (Ask GRAYBAR why the Edwards system offers extra security.)

Protective "Lines of Communication"

☐ Does a system for keeping in touch with key men throughout offices and plant enable them to be located *instantly* in an emergency. (Write for details on the Webster Teletalk, Edwards Lokator.)

☐ Is intercommunication with all corners of the plant swift, clear and dependable? (GRAYBAR Inter-Phones assure good "lines of communication" as planned by a GRAYBAR specialist.)

Protective Electrical Circuits

☐ Is vital production equipment powered by circuits that can't be put out of action by a minor "accident"? (GRAYBAR can advise on modern distribution circuits and devices that are virtually accident-proof and tamper-proof . . . Rigid iron or Nocrete underground conduit in place of open wires to out-buildings, for example.)

Planned Protection

Today, as production *essential to defense* is spread to an ever-widening group of plants, the danger of intruders and "unauthorized visitors" is no longer remote. Government experts are advocating greater precautions; foresighted management is insisting upon protective measures in plants serving defense needs either directly or indirectly.

To assure yourself of *planned protection*, check with GRAYBAR on these electrical means to keep intruders out, to warn of emergencies, and to give instant communication throughout plant, offices and outbuildings.

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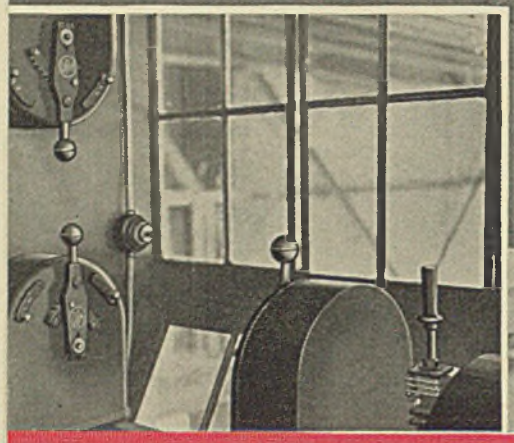
EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N.Y.

Smooth OPERATION

of 2-Motor Bucket Hoists



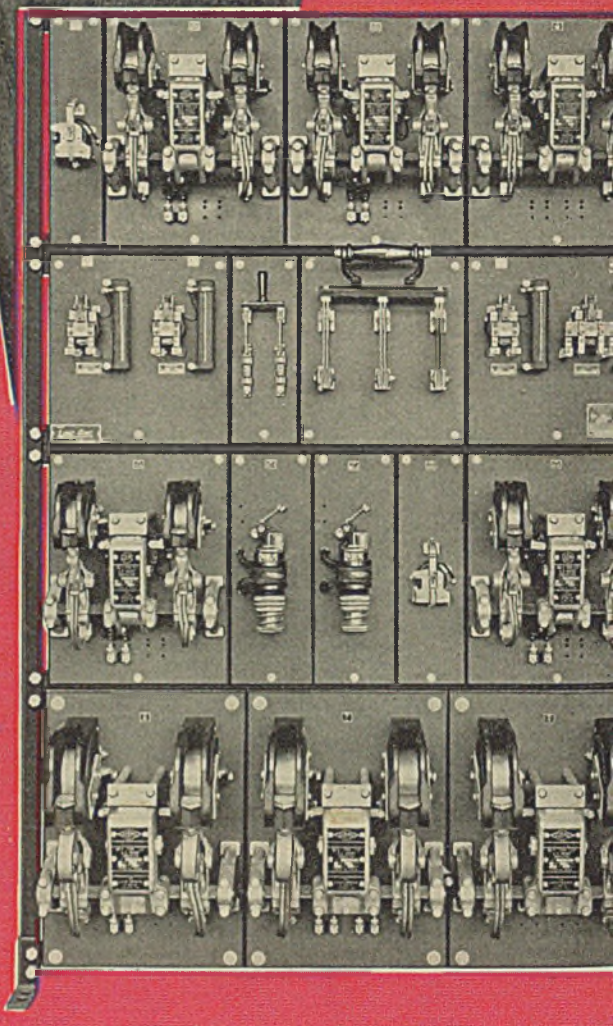
6½-Ton Cleveland Cra
in cement plant in Oh

with EC&M FREQUENCY RELAY MAGNETIC CONTROL

HERE IS another installation of EC&M Frequency Relay Magnetic Control for a 2-motor bucket crane operated by A-c wound-rotor motors. Extremely smooth and accurate operation is possible because the Frequency Relay method of control permits weak values of counter-torque for very slow speeds when needed. This enables the operator to manipulate the bucket without danger of overshooting or landing hard.

The advantages of Frequency Relay Control are particularly important on cranes used to unload cars or ships in which slow, accurate control is essential for clean-up operations or when entering hatchways.

EC&M Control for A-c Cranes gives smooth operation. On the hoist motion, counter-torque lowering permits—the ability to land the empty bucket carefully—fast bucket opening to discharge the load quickly—and the ability to stop the motors without imposing severe duty on the holding brakes. Ask for complete details on EC&M Frequency Relay Magnetic Control for your A-c cranes.



THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

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EC&M Frequency Relay Acceleration matches Motor Torque to the requirements of the load.

Where to Use A. C. Welding

Wherever arc blow is found, welding with alternating current will improve weld quality, permit faster and easier welding. Especially suitable for gapped welds, deep grooves and corners

By HAROLD LAWRENCE
Welding Engineer

■ AS MANUFACTURERS become more conscious of the many angles to cost reduction in arc welding, the search for labor saving methods becomes more intense. One of the common factors in proper welding from the standpoint of quality and cost is the correct selection of the welding process. This article points out some of the applications of alternating current welding.

Unfortunately a good deal of interest was manifested in alternating-current welding before the equipment and electrodes had been advanced to the present state of perfection. As a result, many would-be users of alternating current were turned away from the process needlessly.

Before going into the various phases of the correct application of alternating current welding, it may be well to emphasize one point. There is nothing at all wrong with direct-current welding. In fact there are some types of welding that may be done best with direct current; others are suitable for direct current only. Alternating-current welding is not a panacea for all welding problems. Rather, it should be looked upon as a specific remedy for certain difficulties.

Three types of alternating-current welding equipment are available. These are transformers, motor generator sets or rotary convertors for single-operator work and large transformers for multiple-operator setups.

The prime motive for the use of alternating current for welding is the elimination of arc blow. Although some experts have gone to great lengths in an effort to prove some superiority of metal deposited with the alternating-current arc over that deposited with the direct-current arc, no definite scientific proof of such superiority exists. Since alternating current offers distinct labor savings when properly applied, the search for a doubtful small benefit in the quality of deposit is just so much wasted effort.

For that reason, it is well to regard the elimination of arc blow or magnetic interference as the sole benefit of alternating-current welding. For there is no question in the mind of anyone familiar with welding that arc blow represents a distinct hazard in the way of good welding. Sometimes the fury of this magnetic disturbance is so great as to prevent fusion. Cold shuts become almost commonplace at locations where the arc is violently disturbed by strong magnetic fields.

Not only does the internal quality of the joint suffer from arc blow but the surface appearance becomes ragged and irregular, giving a bad impression to anyone looking at such a weld. In addition an excessive amount of weld splatter accompanies a weld made under adverse magnetic conditions. Such splatter

(Please turn to Page 142)

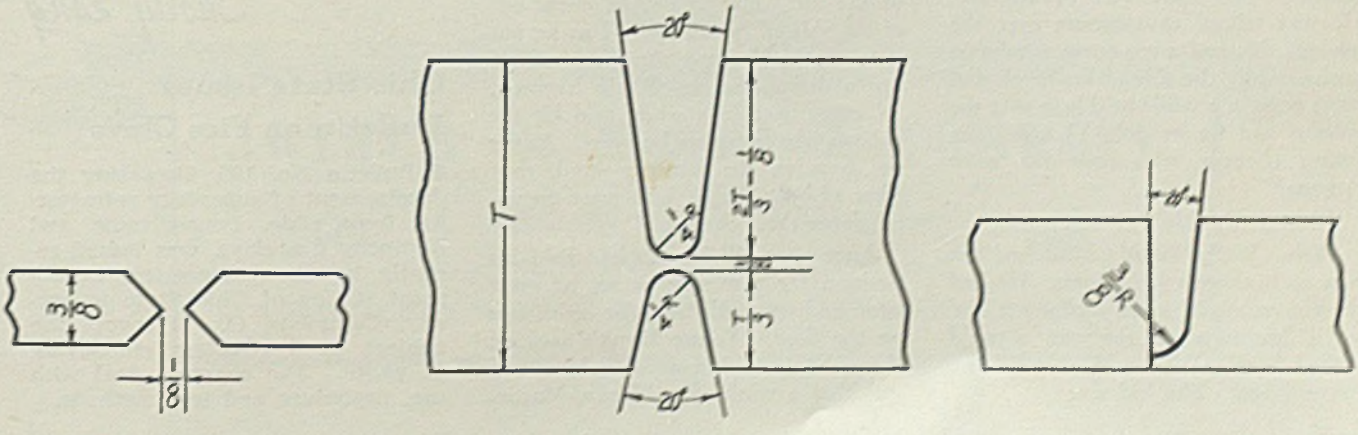


Fig. 1. (Left)—Gapped welds such as this are best welded with alternating current. Fig. 2. (Center)—Deep grooves in straight runs require alternating-current welding. Fig. 3. (Right)—Straight runs in J-welds are good applications also

BETWEEN HEATS WITH *Shorty*

■ Say Fellers:

Jus' as I was comin' out of the blacksmith shop today, I bumped inta Dad Hartzell, the watchman, as he was makin' his rounds. He had a big smile on his face and I felt there was somethin' back of it that needed tellin' so I sez to him:

"Dad, y' must've kicked Ol' Man Grumble inta the ash pit as y' passed the boiler house a few minutes ago, I betcha, for y' got a heap a smiles breakin' all over yer face and a batch of chuckles comin' from yer throat."

Quick as a wink he tried to brush the smile off his face but it just wouldn't go. He sez: "Shorty, I'll let y' in on some stuff the boys pulled off a few minutes ago on Ol' Martin Young, the Irishman who watches at the main gate. They sure got 'is goat.

"Recall how Ol' Martin keeps watch out of the window at the corner of the buildin'. Well, he was sittin' in his chair castin' his eyes out over the plant when I came 'long makin' my rounds and jus' as I was 'bout to say, 'Hey, Martin,' he was called to the 'phone.

"I turned in the labatory building and whaddaya think? One of the helpers on No. 9 open hearth by the name of Dandy Biddle was inside supposed to be gettin' the analysis on a heat that hadn't been out of the furnace long. 'N jus' as I entered he grabs me by the arm and sez, 'Dad, ya wanna see some fun?'

Puts Me on the Spot

"I don't mind," I sez, " 'n with that he pointed out the window of the laboratory and as looked through the glass 'n across the driveway I could see Ol' Martin. His back was toward me. He was talkin' to someone over the 'phone. He had a big chew of tobacco pushed up in the side of his cheek and every once in a while he'd lean over the gaboon and let 'er go. Y' know the young chemist who runs the color carbons?"

"Young Dunkle?" I sez.

"Yeh. Well, Dandy Biddle had put him up to the whole business. He had the kid on the labaratory 'phone talkin' to Ol' Martin across the way 'n you'd a died laughin' if you'd a heard the conversation. The kid sez:

"Hello. Is this the Worldwide Steel Co.? 'Tis, huh? Well this is the trouble department of the telephone company. Understand you've been havin' lota difficulty down at your place with the 'phone in your office. Who's talkin'?" he inquires.

"Sure, 'tis Martin Young, watchman on the main gate. Ya say we've been havin' some trouble, heh?"

"Yeh," sez young Dunkle, the chemist. " 'N what's more, I understand it has been pretty serious. Can ya hear me, Martin? Ya can, huh? Well can ya hear me plainly?"

Reply Is Candid

I watched Ol' Martin through the window as he moved his lips and at the same time balanced the chew of tobacco in the side of his mouth. He was sayin', "Sure, I can hear y' like a dandy."

Young Dunkle continued: "Wonder if you'd stand on your left foot and say 'Hello,' Martin?"

'N with that Ol' Martin held his right foot in the air and sez, "Hello, how's that?"

"That's fine," sez young Dunkle. "Now I've made a few 'justments and your voice oughta clear up. Would y' mind standin' on your other foot and sayin' 'Hello,' till I see how it is?"

'N with that Ol' Martin reversed his position, standin' on his right foot and liftin' the other off the floor. He sez, "Hello, can y' hear me now?"

"Not so good, Martin. But hold that position. Are y' holdin' it?"

Ol' Martin did as he was told. Y' shoulda seen 'im standin' by his desk with one foot on the floor and the other in the air. He pulled the chew out of the side of his cheek and as he put it to work, his long mustache moved up 'n down like an ol' trip hammer. 'N every once in a while he'd hit the gaboon like nobody's business. As for the boys in the labatory—well, they were all bent double, with tears streamin' down their cheeks.

After poor Ol' Martin had held his position for a minute or so, he grew tired and reversed the order of his feet on the floor. Young Dunkle looking through the window saw him and quick as a wink sez: "Hello, Martin, 'm afraid you're movin' somethin' for my instruments are jumpin' all over the map."

'N with that Martin changed feet on the floor and sez, "You're crazier than h–l; I'm doin' jus' as y' told me. But you'd better shake a leg for I've got somethin' else to do besides this."

"Now can y' hear better?" asked young Dunkle.

"Not a bit better than before," sez Martin.

"That so. Well then, Martin, Ol' Timer, I wonder if you'd do one more thing. Try standin' on your head for a while and say, 'Hello' five times 'n see if she's any plainer." 'N with that young Dunkle slammed the receiver back in place and ducked beneath a bench so Ol' Martin couldn't see 'im. Fact of the matter is, we all ducked.

"Well sir, Shorty, y' should've seen poor Ol' Martin. Out went his chew in the direction of the gaboon—but he missed it by a mile. He had been boilin' before hand, but y' should've seen 'im sizzlin' now. His lips were movin' as they never moved before and what he was sayin' will never be repeated. Fact of the matter is y' couldn't say it with the same amount of emphasis.

"Well, anyway Shorty, Dandy Biddle and I left the labatory by the back door and I'm tryin' my best to get the grin off my face before I make my rounds 'past Ol' Martin's lookout."

* * *

Don't suppose, fellers, there's any such horseplay goin' on in yer plant, is there? Guess all yer boys 'round yer plant are serious-minded. That's what y' think. But if y' ever find a steel plant in America where the fellers don't have a few tricks up their sleeves for their buddies now 'n then, let me know. It's the plant where tricks are played that motors hum their sweetest tunes and the boys step with the tread of a go-getter. Lotta big boss' sittin' in the front office will agree to this for they've played many a trick themselves back where they tap out steel.

Well, so long fellers.

"Shorty" Long

Ohio State Issues Bulletin on Fire Clays

■ Bulletin No. 105, discussing the development of superduty refractories from Ohio, Pennsylvania and Kentucky fire clays, was issued recently by the engineering experiment station of Ohio State university, Columbus, O. It covers the subject in 6 chapters embodying 81 pages. The chapters deal with use, procedure and test methods.

THROUGHOUT U. S. A., PLANT MEN KNOW

You Can Always Trust "600-W"!

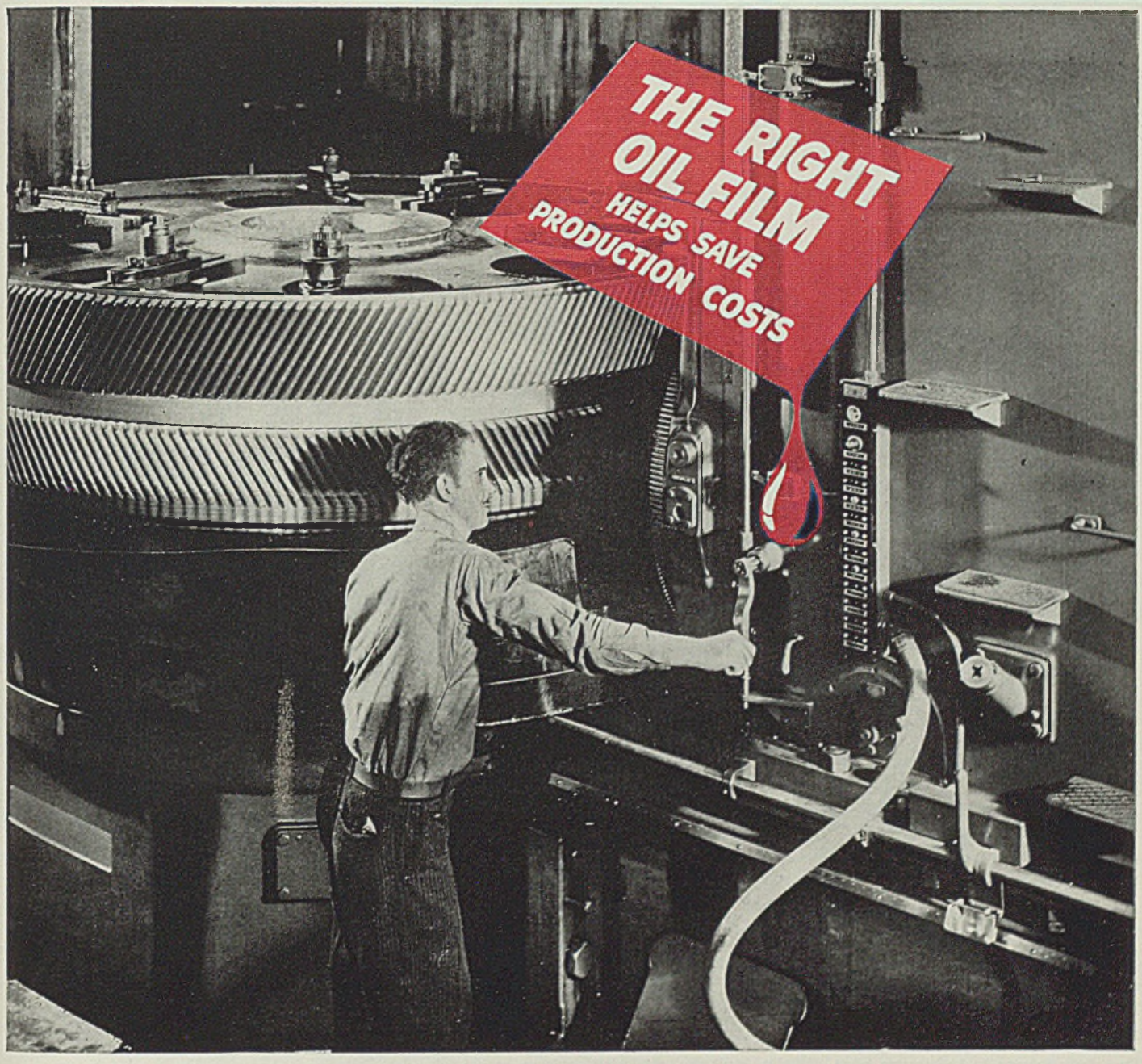
SPEAKING ABOUT "600-W" for worm gears is like talking about an old friend who's proved his worth. Gargoyle 600-W Cylinder Oil is a brand that stands for years of trustworthy lubrication in thousands of plants. In fact, more "600-W" is now being used for worm gear lubrication than any other oil.

CALL IN Socony-Vacuum for

You'll Profit from these "Exclusives"

☞ **SKILLED LUBRICATION COUNSEL** of a Socony-Vacuum man backed by 74 years' experience . . . the greatest in the Petroleum Industry.

☞ **A COMPLETE LINE** of Lubricants . . . the scientifically correct lubricant for every type of machine you now own . . . or will buy.



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NEW LUBRICANTS ahead of new needs . . . developed in close cooperation with machine builders by famous Socony-Vacuum laboratories.

HALF A MILLION CASE HISTORIES to guide our engineers in recommending the right use of these lubricants to earn Lubrication Profits for you.

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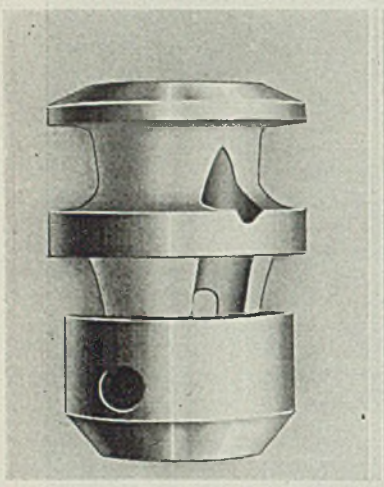
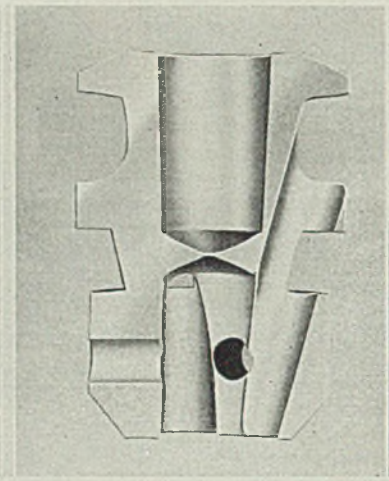
Hardening Small Parts

Up to 600 parts are selectively hardened per hour to extreme accuracy and uniformity. High-frequency induction fixtures are interchangeable. Production is easier, parts have longer life





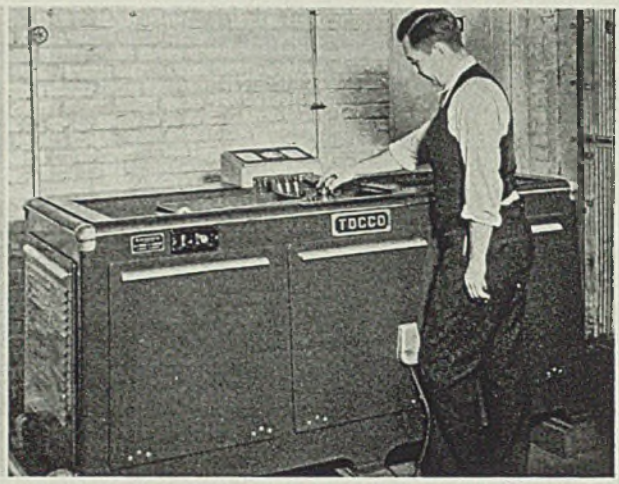


Fig. 1. (Left)—Exterior and cross section of typical part hardened. Fig. 2. (Right)—Completely self-contained automatic induction hardening equipment

■ HEAT TREATING small parts by high-frequency electric induction equipment designed for high-production work has effected marked improvement at the plant of Jacobs Mfg. Co., Hartford, Conn., maker of drill chucks.

The changeover to induction heating has resulted in close control of hardness which can also be confined exactly to the specific area subjected to wear. It has been found advantageous to adopt a different type of steel but this change has not increased costs.

This company has been making drill chucks for many years but the hardening of the chuck bodies always has presented a perplexing problem as will be noted by referring to Fig. 1 which shows a complete chuck body and an irregular cross section.

Only the exterior of the chuck body nose, which incorporates the key or wrench pilot holes, is subjected to wear. However, with the pack-hardening method previously used, it was necessary to treat the entire nose which meant it was difficult to obtain desired accuracy of the jaw sockets. Rejections consequently were high.

Recently, the company substituted the Tocco method of localized hardening developed by the Ohio Crankshaft Co., Cleveland. While it has been found that the actual cost of heat treating by the process is slightly higher, it is more than offset by the complete elimination of rejections due to distortion or lack of proper hardness.

With this method, the heat is confined precisely to the area to be hardened. The jaw sockets are not heated and a constant check of the treated body surfaces shows little or no variance in hardness which generally is 60 Rockwell C and never falls below 58.

Standard Tocco Junior equipment is used, Fig. 2, with the exception of the fixture, Figs. 3 and 4, comprising a post for positioning the chuck bodies and an induction coil and quenching unit which sprays water conducted through three hose lines. Water also is circulated through the inductor coil which is made of small-diameter tubing.

Fixtures have been made up for each of the several sizes of chuck bodies required and these may be changed within five minutes by merely disconnecting and reconnecting the three hose lines and the two coil leads.

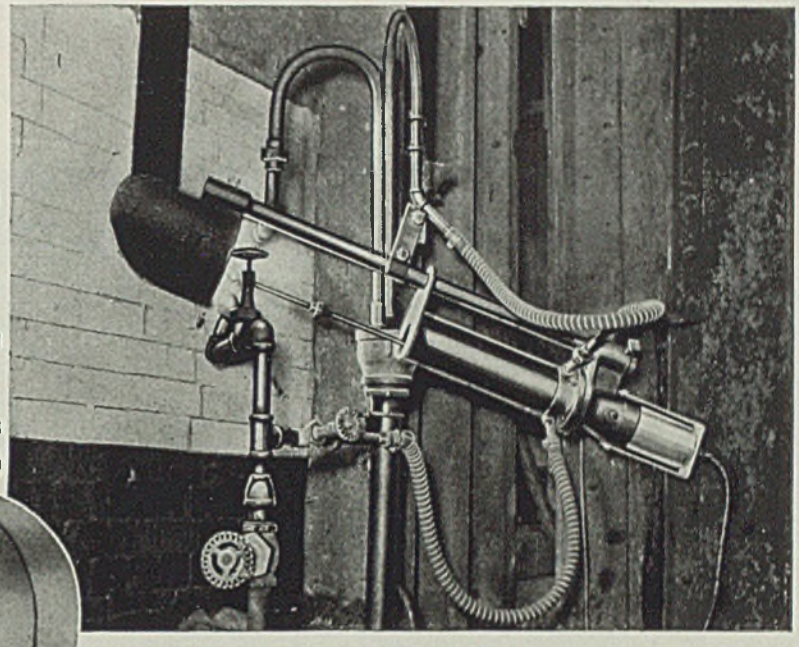
In operation, the workman simply places the chuck bodies in turn over the positioning post as shown in Fig. 4 and presses a button which initiates the automatic heating and quenching cycle. The complete cycle of heating and quenching is automatically controlled with accuracy of plus or minus 0.05-second. Power input, length of heating, quenching pressure and time of quenching are preset.

As soon as the cycle is completed, the part may be immediately removed and replaced with another. From 120 to 600 parts are treated per hour, depending upon size.

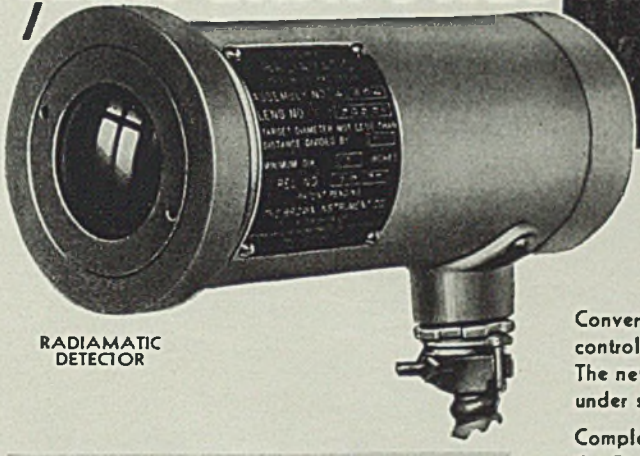
The actual heat treatment is

New RADIAMATIC

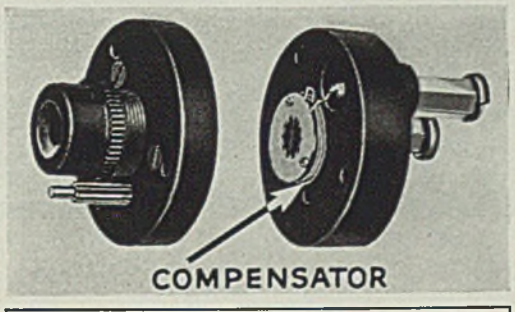
COMPENSATED for AMBIENT TEMPERATURES



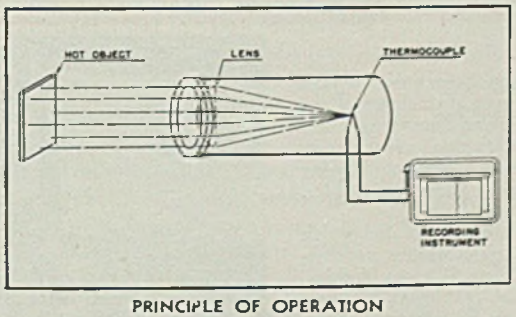
Radiamatic sighted on roof through hole in furnace back wall. Potentiometer continuously indicates and records roof temperature.



RADIAMATIC DETECTOR



COMPENSATOR



PRINCIPLE OF OPERATION

Satisfies All Demands

Convenient to operate and universal in applications for the measurement and control of temperatures where thermocouples are impractical and unreliable. The new Brown Radiamatic Pyrometer (Made in America) is designed to operate under severe conditions of temperature, vibration, etc.

Completely self-contained and compensated for ambient temperature errors, the Radiamatic detector is sighted on the hot object, moving or still, and continuously measures the desired temperature of the material itself.

The Radiamatic consists essentially of a heat-resisting lens, a compensator and a thermopile. The heat radiated from the hot object falls on the lens and is focused on the thermopile which generates an E.M.F. proportional to the true temperature. The compensator corrects for ambient temperature fluctuations surrounding the detector—hence the desired E.M.F. alone developed by the thermopile is translated into degrees of temperature and is continuously indicated, recorded or controlled by the potentiometer.

The Brown Radiamatic is ruggedly constructed, built to withstand vibration—accuracy is unaffected by dust, dirt, fumes and corrosive atmospheres. Easily installed complete with all accessories for mounting.

Use the Radiamatic for those applications where vibration breaks thermocouples—furnaces move or rotate—work moves or thermocouples cannot be installed—temperature is above thermocouple range—maintenance of platinum thermocouples is costly.

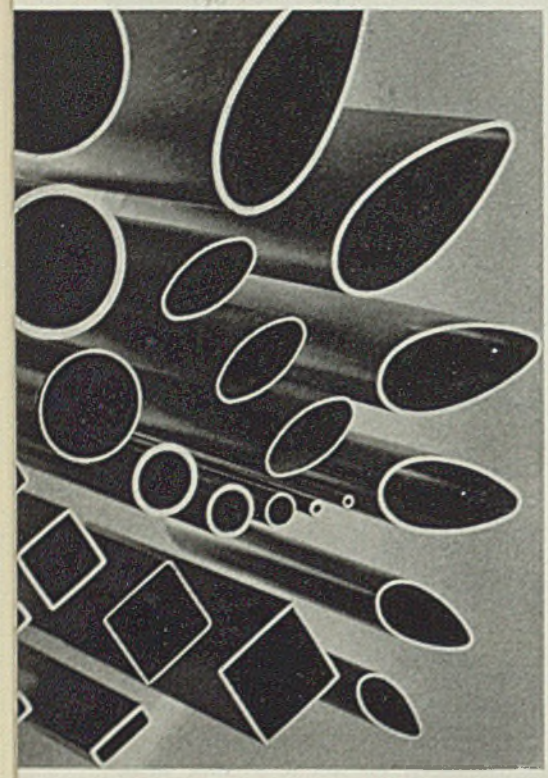
For information write THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4462 Wayne Avenue, Philadelphia, Pa. Offices in all principal cities. Toronto, Canada: 117 Peter Street—Amsterdam-C, Holland: Wijdesteeg 4—England: Wadsworth Road, Perivale, Middlesex—Stockholm, Sweden: Nybrokajen 7.

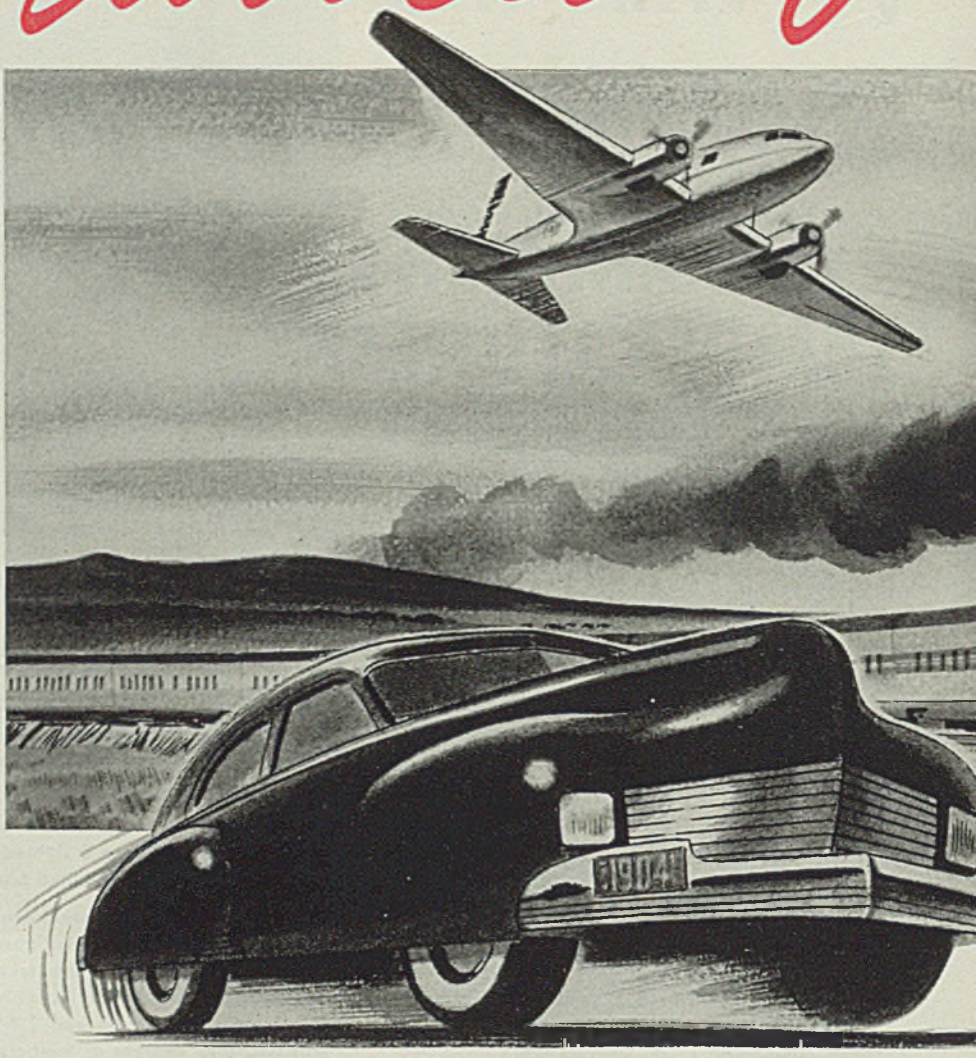
Brown Radiamatic will be on display at the National Metal Exposition, Cleveland, Ohio, Booth F4, October 21st. to 25th., 1940 and The Iron and Steel Exposition, Chicago, Booth 66, September 24th. to 27th., 1940.

BROWN RADIAMATIC PYROMETER

CONTRIBUTING SAFETY AND

Marvels of





NATIONAL SEAMLESS derives its unsurpassed physical properties first, from the steel of which it is made; and second, from the process by which it is produced. Billets of only the finest, selected, open-hearth steel go into its manufacture. These are pierced at high temperature, then precision-rolled to the correct size and wall thickness. At every stage of production, thorough tests and inspections keep quality at its peak. The result is NATIONAL Seamless as you receive it—uniform in wall strength, accurate in dimensions, and uniform in all physical properties—the finest pipe and tubes metallurgy can produce.

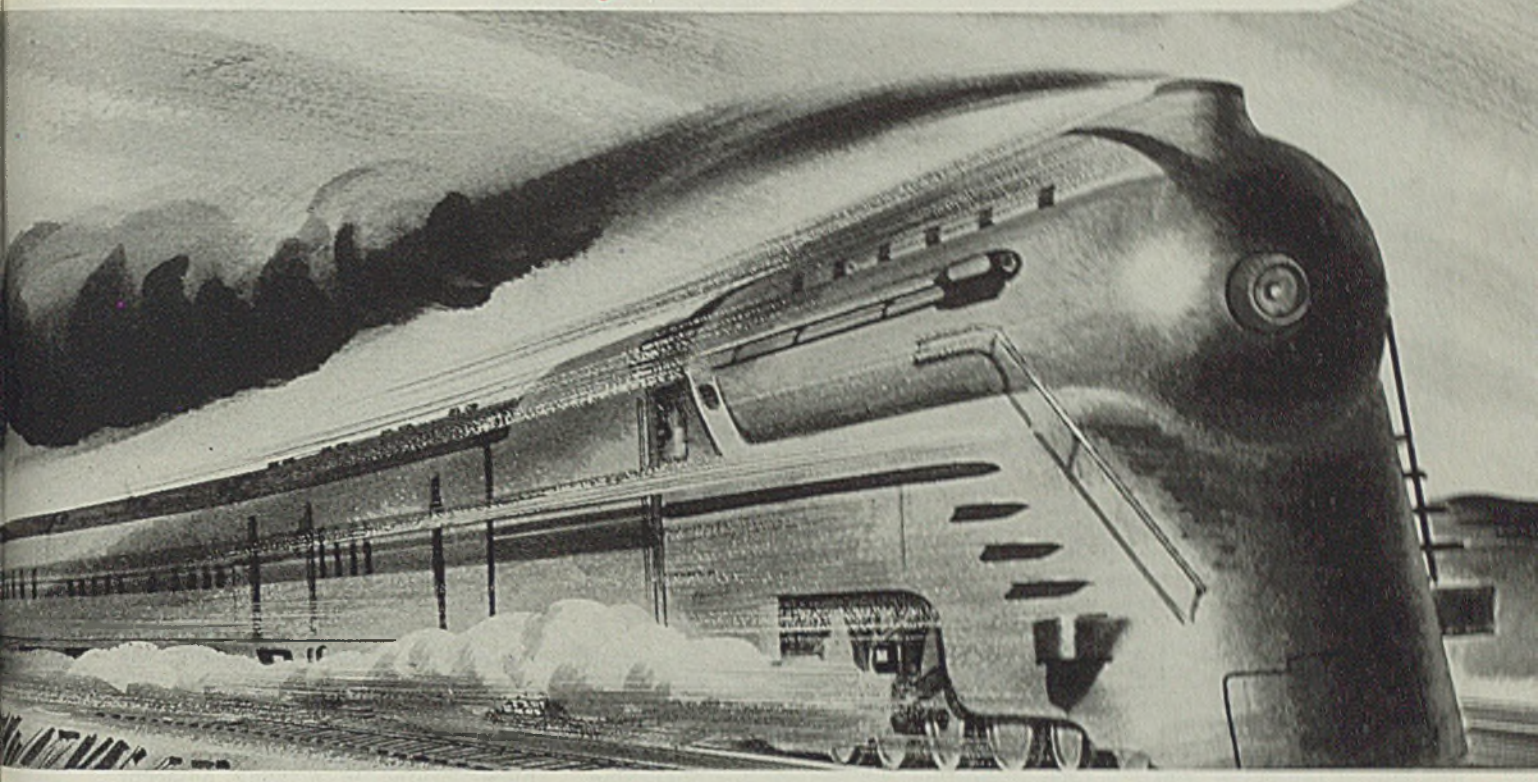
By Air Aircraft designers have been quick to take advantage of the structural efficiency of the seamless steel tube. That's why you'll find SHELBY Seamless Tubing used extensively in modern airplane construction for fuselage struts, spar chords, motor mounts, landing gears, axles, bearings and other highly stressed members.

By Rail Behind the smooth operation for which today's streamliners are famous are NATIONAL Seamless Pipe and Tubes, "Walls Without Welds," today's most modern tubular material. NATIONAL Seamless contributes to safety and dependable performance in air brake lines, water lines, steam lines and boiler tubes.

By Highway In the modern automobile, drag links, tie rods, torque tubes, steering columns, shock absorbers, axles, brake shafts, bearings, and other vital parts are made from SHELBY Seamless Tubing. Automotive engineers have found that this tubing, because of its constant uniformity, is best adapted to the requirements of mass production.

THE SEAMLESS TUBE

COMFORT TO AMERICA'S *Transportation*



Seamless Tubes serve extensively in modern transportation

WHETHER you travel by rail, by air, or by highway, you ride today in real "armchair" comfort. You arrive refreshed and alert, whereas the same trip a few years ago would have left you "dog-tired." And records prove that you are safer as you travel than in your own home.

America owes thanks for these marvels of modern transportation to the men whose vision and courage converted "fantastic" ideas into actual operating realities.

National Tube Company is proud to have co-operated in the development of these thrillingly modern forms of transportation, by supplying seamless tubes of the finest quality, of exactly the right physical properties for every requirement. You might well be surprised at the extent to which Seamless Tubes are used; bearings, so necessary for high speeds and smooth performance, structural members, air brake piping, boiler tubes—these are only a few of the many purposes for which the seamless tube is employed in modern transportation. And every application is engineered with the same precision that characterizes the whole.

For whatever purpose you need consistently dependable materials, you will find, as have the builders of these marvels of transportation, that your pipe and tubing specifications are safest when they read "NATIONAL SEAMLESS."

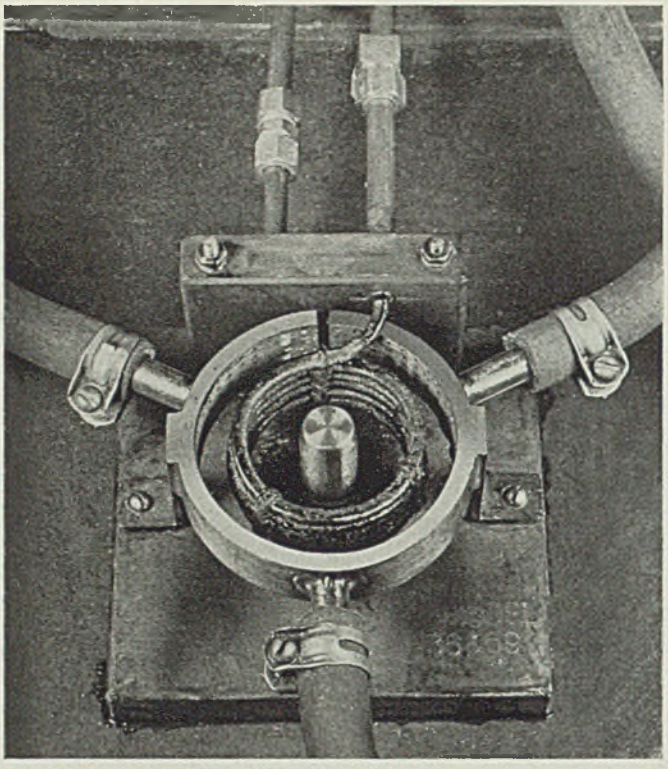
NATIONAL TUBE COMPANY

PITTSBURGH, PA.

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

UNITED STATES STEEL

IS THE SAFEST TUBE



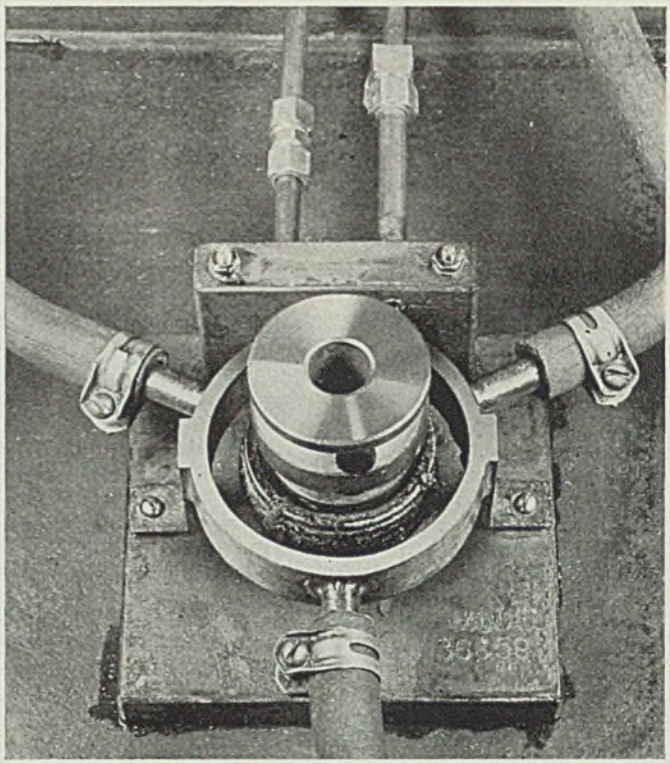


Fig. 3 (Left)—Fixture of hardening machine showing induction coil and ring containing water spray outlets. Fig. 4. (Right)—Part inserted in fixture ready for hardening

effected by passing a 250,000 cycle current through the tubular inductor coil which exactly encompasses the area to be hardened and subjects it to a high-frequency magnetic field. In all cases, the treated area is brought up to a temperature of 1475 degrees Fahr., resulting in a penetration of 1/16-inch.

Total time cycle for the complete treatment, of course, varies with the size of the parts. Parts ¾-inch in diameter and with a treated area 7/16-inch wide, require 0.4-second to bring the area up to the desired temperature. This is followed by a quench of 0.5-second. The larger the area, the longer the cycle. For example, parts 1 5/16 inches in diameter and with a treated area ⅞-inch wide, require 4.7 seconds for heating, 4.8 seconds for quenching.

With the adoption of the new method, it has been found that an 0.40 per cent carbon steel works out well. Previously, a carburized steel was used but the use of the Tocco equipment has eliminated the carburizing. The finished product is more uniform, longer wearing and more accurate.

Little or no difficulty is presented in handling these small parts. As the parts are machined, they are placed in shallow wood trays which are stacked up on trucks and conveyed to the heat-treating department located in a wing adjacent to the main plant. Use of these trays facilitates handling the individual bodies to and from the heat-treating unit.

New Method Developed for Tinning Brass Gauze

■ Tinning brass gauze by the hot-dip method often causes the interstices of the gauze to become filled with tin. In addition tin in the pot becomes sluggish and drosses badly.

According to the publication of International Tin Research and Development council, "Tin and Its Uses," contamination of the molten tin is quite commonly experienced when tinning brass by hot-dipping. Furthermore, the troubles arising from it would be accentuated when dealing with fine gauze owing to the large surface area of this material. Copper and zinc dissolved from the brass make the tin sluggish and difficult to drain from the interstices of the gauze, and the zinc causes surface oxidation of the tin bath. This oxide dross is liable to adhere to the surface of the tinned gauze and to spoil its appearance. It is difficult to avoid trouble from these causes in the case of fine gauze, although contamination of the bath can be delayed by employing the minimum temperature which permits adequate draining of surplus tin, and a short time of dipping.

There is, however, an alternative method which has none of the disadvantages of hot-dipping for this purpose. Tests have shown that very fine brass gauze can be successfully tinned by electro-deposition in the alkaline sodium stannate bath. A coating of 0.0005-inch is deposited, and, after plating, the gauze is heated to a temperature a little above the melting point of tin so as to fuse the coating. This causes the wires to solder together at the points of contact, but the interstices of the gauze remain free from tin. Fusion should be carried out as rapidly as possible to avoid undue alloying of the tin with the gauze. It may be effected by the careful use of a gas-flame if the work is not too large. A definite change in the appearance of the coating takes place during fusion, and this is quite easily detected. A tin coating closely resembling a hot-dipped coating is obtained by this method.

Men of Industry

(*Concluded from Page 49*)

ly held by Earl H. Davidson, who has been transferred to Pittsburgh as metallurgical engineer, handling structural and plate. John N. Crombie has been made manager, tin plate bureau, and Elmer Gammeter, manager, stainless steel bureau, metallurgical division, Chicago.

♦

M. J. McKeever has been appointed manager, Atlanta, Ga., branch, Crucible Steel Co. of America, New York. He has been associated with the company 15 years and has been located at the Atlanta branch since 1927.

♦

P. J. Christy has been appointed manager, Philadelphia office of Chicago Pneumatic Tool Co., New York. He succeeds A. M. Brown, who has been transferred to Washington as manager of the new branch recently opened there. C. A. Diehl has been named manager of the Houston, Tex., office.

♦

Anker Winther has been made assistant general sales manager, York Ice Machinery Corp., York, Pa. Since 1930 he has been associated with the company's Cincinnati office as a sales engineer. He is a member, American Society of Heating and Ventilating Engineers, and was recently president, Cincinnati Air Conditioning association.

♦

Edward W. Voss, Pittsburgh machinery manufacturer and builder of the Voss Ungerer leveler, has announced appointment of Frank W. Robertson as general manager in charge of both the Ungerer leveler and the machine tool divisions of the Voss organization. Mr. Robertson was formerly sales manager, Ungerer leveler division.

Clyde DeVilling, formerly with Universal Cyclops Steel Corp., has been placed in charge of heavy machinery sales.

♦

William B. McFall, president, Commonwealth Trust Co. of Pittsburgh, has been named to succeed J. D. A. Morrow, former president of Pittsburgh Coal Co., as chairman of the emergency committee of the Pittsburgh district. Mr. Morrow recently resigned his Pittsburgh business connections to become president, Joy Mfg. Co., Franklin, Pa. The function of the emergency committee is to co-ordinate industrial and business facilities of the Pittsburgh area to the defense needs of the nation and to work with the national defense advisory commission.

■ Haddock Sheet & Tin Plate Co. has been organized at Marietta, O., and this month will start operations in the now-idle plant of the old Hudson Sheet & Tin Plate Corp. Plant will be managed by Dan. T. Haddock, formerly associated with Carnegie-Illinois Steel Corp. Operations are scheduled to begin at 60 per cent of capacity, and 125 men will be employed.

Domestic Manganese Ore Output Up Slightly

■ Production of domestic manganese ore containing 35 per cent or more manganese in July amounted to 2700 gross tons; shipments, 2900 tons. Producers' stocks at close of month totaled 2300 tons. These figures are based on reports to bureau of mines, United States department of interior, from producers who accounted for 90 per cent of output in 1939. June production was 2600 tons; shipments 2300 tons; month-end stocks, 2500 tons.

Shipments in July were reported from Arkansas, Georgia, Montana, Tennessee, Utah, Virginia and West Virginia.

July imports for consumption of metallurgical manganese ore containing 35 per cent or more manganese totaled 78,909 tons, containing 37,681 tons of manganese; general imports were 98,341 tons, containing 45,680 tons of manganese.

July imports for consumption of battery-grade ore totaled 2340 tons with manganese content of 1339 tons, all from Gold Coast, British West Africa. There were no general imports of battery-grade ore in July and no entries or withdrawals of foreign ferruginous manganese.

In June, imports for consumption were 101,046 tons containing 48,960 tons of manganese; general imports, 62,908 tons, containing 28,814 tons of manganese.

Stassen Helps Mediate 9-Foundry Strike

■ Proposed agreement to settle a strike in nine Minneapolis foundries was reported last week by Harold E. Stassen, governor of Minnesota. The strike has tied up work at the foundries since July 31.

According to Governor Stassen, the proposals were accepted by representatives of the foundry owners, and will be submitted for ratification by members of the United Electrical and Machine Workers union, CIO affiliate.

The agreement includes a wage increase, other increases based upon any rise in the national cost-of-living index, fixes an 8-hour 5-day week, 5-day vacations with pay for certain employes and wage payment four times a month instead of twice.

Employers also agreed to recognize the union as sole collective bargaining agency.

Six Wilson Generations With Jessop Steel Co.

■ Harry Wilson Sr., timekeeper for Jessop Steel Co., Washington, Pa., one of the oldest workers in the steel industry, is celebrating his sixty-fifth year of combined service with the company and its former parent concern, Jessop of Sheffield, England. He is the fourth direct descendant of Wilsons who have worked continuously for Jessop from 1774 and is father and grandfather of four Wilsons now employed by the American Jessop.

He started as screw boy on the sheet mills at Sheffield, Eng., at the age of 11 years and became a roller at 19. In 1905 he was sent to America and became night superintendent of sheet mills at the new plant at Washington, Pa., continuing in that capacity until 1938, when he was given less onerous employment.

The six generations of Wilsons serving the Jessop company have worked a total of 249 years. The Jessop Steel Co. was separated from the Sheffield company in 1924 and is now an American concern.

Cincinnati Holds Coal Exposition in Zoo

■ Coal occupied the spotlight at a "coal exposition" featuring various types of coal-burning equipment and coal by-products in Cincinnati's zoo, Aug. 20 through Sept. 2. Nearly 50,000 registered at the exposition, and 253,675 visited the zoo during the show.

Appalachian Coals Inc., Cincinnati Coal Exchange, Coal & Coke Merchants Credit association, Greater Cincinnati Stoker association, Solid Fuel Institute, coal-burning equipment manufacturers and coal-carrying railroads sponsored the exhibit.

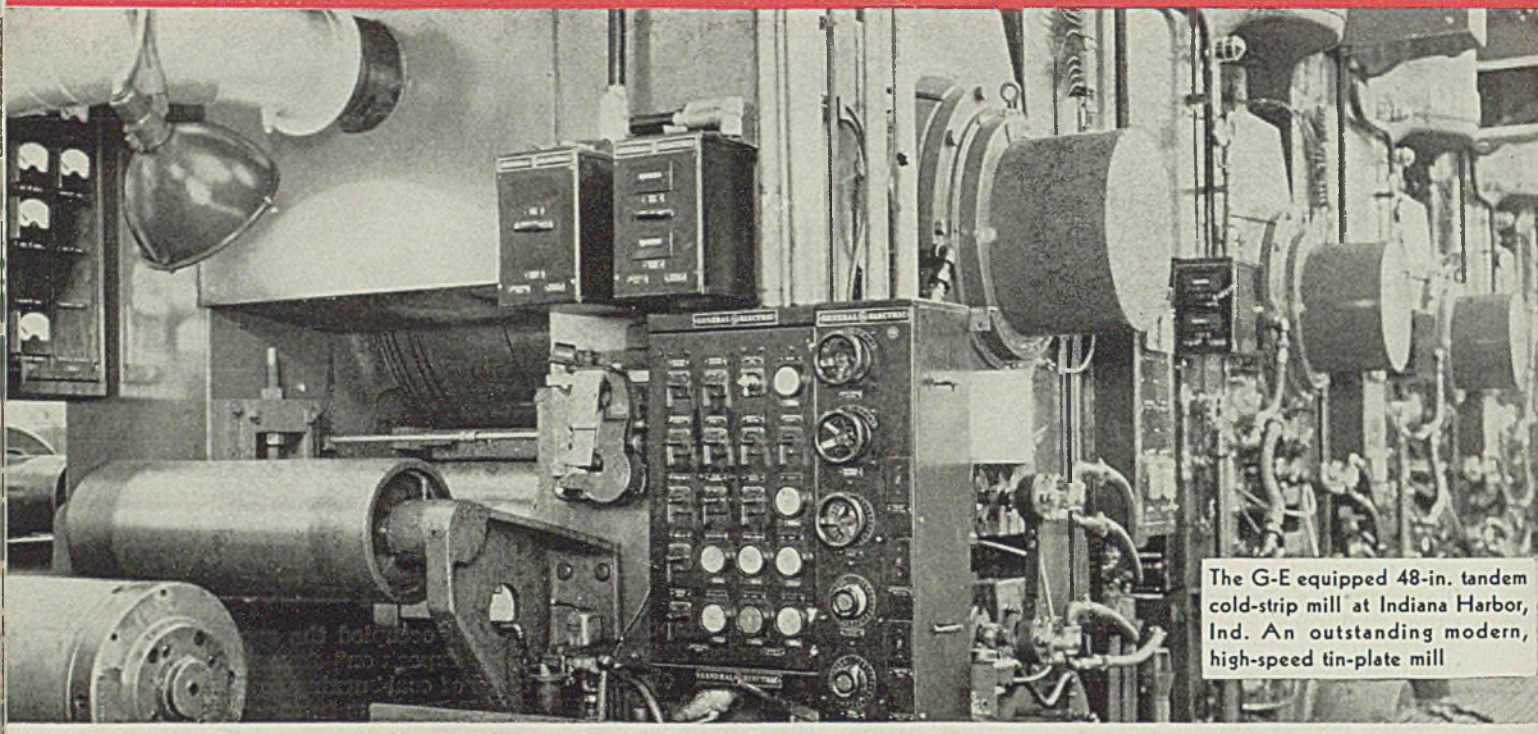
The exposition displayed one sample of each type of modern coal-burning equipment, including small water heaters, automatic range, hand-fired and stoker-fired space heaters, stoker-fired water heater, magazine-type heating stove, stoker, fully automatic warm-air heating plant equipped with bin feed stoker, warm-air furnace, boiler for hot water or steam heat, and a new-type fireplace.

Noncommercial, the exposition may be repeated on a larger scale next year.

■ A proposal to prevent further construction of skyscraper apartment and business buildings in Chicago was submitted last week by a subcommittee of the city council's building and zoning committee. It was recommended the setback for downtown buildings be reduced from 264 to 165 feet.

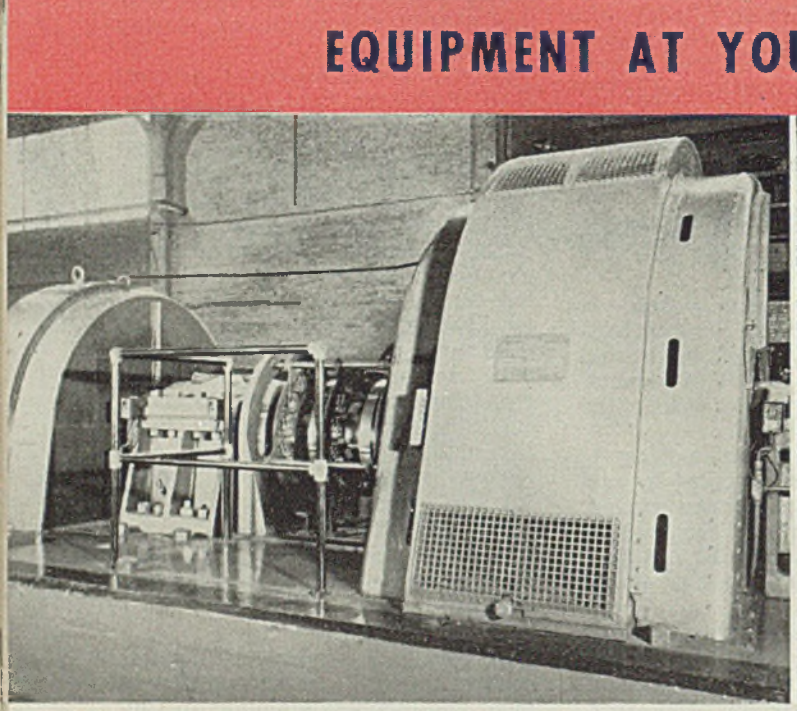
STEEL'S HIGHEST-POWERED

ROLLS TIN PLATE

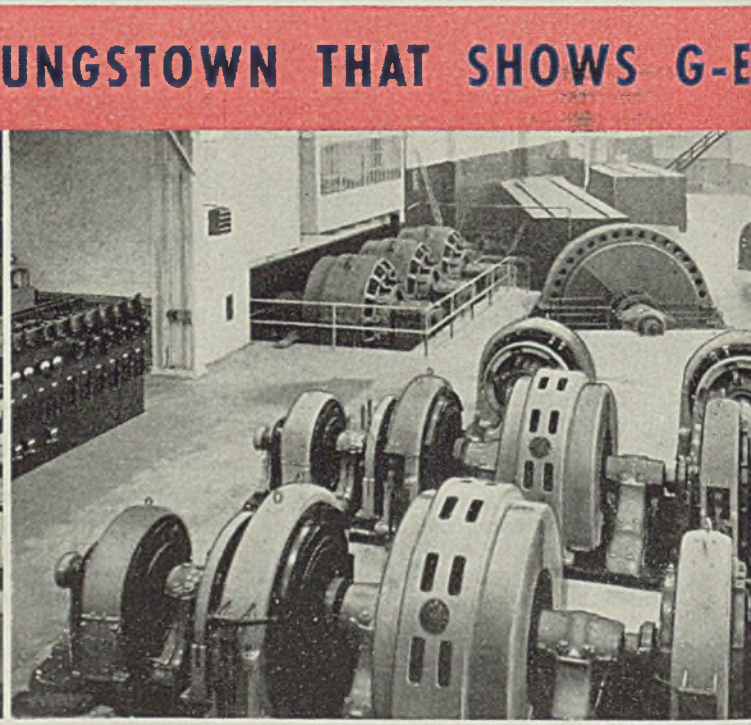


The G-E equipped 48-in. tandem cold-strip mill at Indiana Harbor, Ind. An outstanding modern, high-speed tin-plate mill

EQUIPMENT AT YOUNGSTOWN THAT SHOWS G-E



THE SECOND LARGEST ADJUSTABLE-SPEED A-C MOTOR (6000 hp). Drives stands 8, 9, and 10 in 24-18-inch billet mill. It is part of a constant-horsepower Kraemer drive, which also includes a 6200/4920-hp induction motor and a 0/1150-hp d-c motor. Installed in 1929.



WORLD'S LARGEST ADJUSTABLE-SPEED A-C MOTOR (7500 hp). In motor room of the 21-in. continuous sheet bar and skelp mill (center background of picture). It is part of a constant-torque Kraemer drive, which includes the other G-E equipment shown. System was installed in 1926.

G E N E R A L

COLD-STRIP MILL . . .

THE LOW-COST WAY

G-E Precision Control Slashes Scrap Losses, Maintains Quality, in High-tonnage Production at Youngstown

EIGHTY-NINE hundred horsepower in main drives, a delivery speed of 2100 fpm! But the new 48-inch five-stand tandem cold-strip mill of the Youngstown Sheet and Tube Company has *even more* than power and speed!

It has a control system in which have been incorporated practically all of the electrical refinements found on the latest and best tin-plate mills. This system helps the mill to do a *real* job of rolling tin plate—to roll high tonnages of smooth-finish, on-gage strip, with an amazingly small amount of scrap. It includes:

TAPERED-TENSION CONTROL, which increases the tension between the stands when the mill is started up and tapers it off as the mill approaches normal running speed, reversing the action in the slowing-down process. This brings the strip on gage much faster and keeps it on longer than would otherwise be possible.

INDICATING TENSIOMETERS between the stands, which enable the operator to see what the tension is at all times. He can, as a result, keep it within safe limits and thus prevent strip wrinkling or breakage.

AMPLIDYNE GENERATORS—these are high-speed exciters specially designed to function as control units. They maintain such electrical and mechanical values as voltage, speed, and tension with amazing dependability.

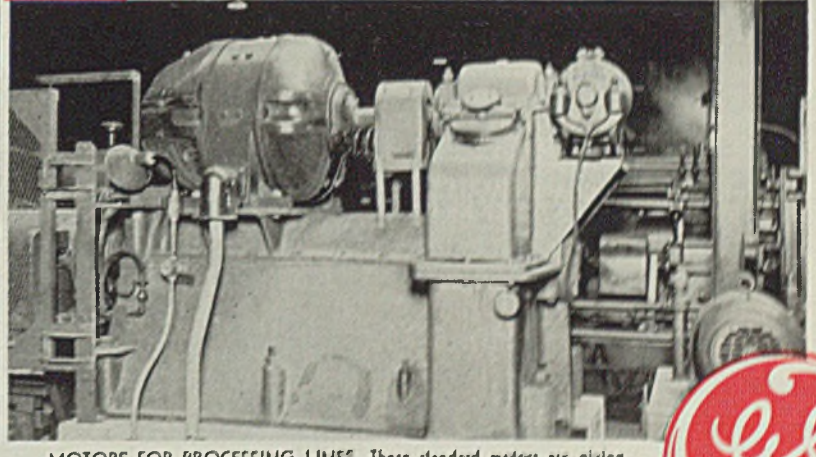
AUTOMATIC GAGE CONTROL, which provides a means of compensating automatically for any variations in gage that may occur when the mill is up to speed.

These and numerous other features have been expertly co-ordinated into a precise, responsive, smooth-working system that has won the praise of steel men.

This mill is completely G-E equipped, with motors, motor-generator set, and control applied and co-ordinated by G-E engineers. It's another example of how General Electric contributes to increased tonnages, improved quality, and lower costs in steel production. General Electric, Schenectady, N. Y.

ENGINEERING LEADERSHIP

D-C DRIVE FOR RUNOUT TABLES. G-E direct-current motors in the 54-in. hot-strip mill. The steel industry continues to recognize the advantage of direct-current motors with Ward Leonard control for runout tables and coilers in wide-hot-strip mills. This is another G-E contribution to better, more economical steel-mill operation.



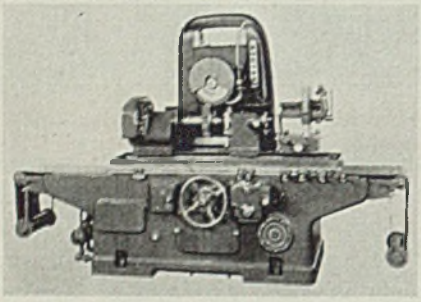
MOTORS FOR PROCESSING LINES. These standard motors are giving dependable, low-maintenance service on cleaning line No. 2 in the tin-plate mills at Indiana Harbor. In center is a Type CD, 40/60-hp, d-c motor. At right is a totally enclosed, fan-cooled induction motor. Motors like these show how General Electric can meet all drive requirements.

GE

ELECTRIC

Gear Grinder

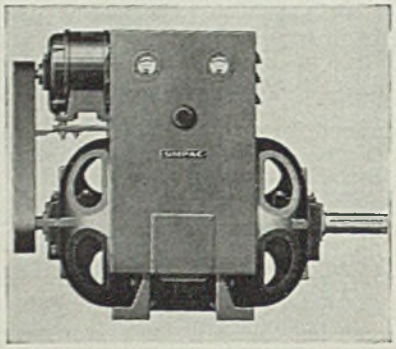
■ National Broach & Machine Co., 5600 St. Jean avenue, Detroit, has introduced a new red ring gear grinding machine to meet needs for precision grinding of master gears and involute broaches. It is rigid, utilizing a U-column, with wheel spindle mounted on long bearings, the spindle being integral with the motor rotor. The spindle slide is adjusted by a hand wheel. Hydraulic counterbalance removes all backlash from the lead screw. The table slide is reciprocated hydraulically and controlled automatically through a feed box mounted on the front of the machine. A cam on the table slide provides force feed lubrication



to the ways at each stroke. The index head is furnished with either fully automatic or semi-automatic control. For gear tooth work, a template control trimmer is provided which trims both sides of the wheel simultaneously. The table feed box includes a dead stop. Diamond points are adjustable up and down and may be set with a micrometer. For accessibility, both coolant and hydraulic pumps are located on the outside of the machine. Reservoirs are inside the base.

Alternating-Current Generating Unit

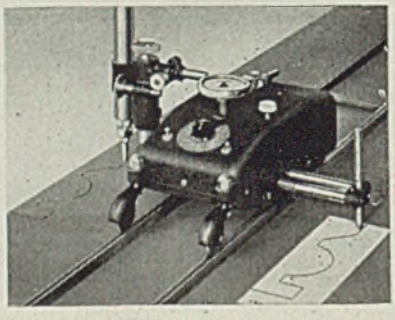
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new and self-contained alternating current generating unit which regulates, controls and meters its output. Called the Simpac power unit, it combines a standard open-type alternating current generator, a direct current exciter, exciter field rheostat, voltmeter, ammeter and optional voltage regulator in one unit. Its construction is simple, yet strong. The direct-current exciter is mounted on a fabricated steel shelf above the generator and is driven off the generator shaft extension by a V-belt. The control, regulator and meters are enclosed in a sheet steel cabinet fastened to one side of the generator frame. Voltage is adjusted manually by the exciter field rheostat, the voltmeter being in plain sight of the operator. Generators em-



ployed have an inherent voltage regulation of 10 per cent at 80 per cent power factor. Should this not be sufficient, the voltage variation may be improved to as low as 1½ per cent by use of Silverstat automatic resistance type regulator. Ratings from 3.75 to 187 kilovolt amperes are available at voltages of 120/208, 240 or 480, with operating speeds from 600 to 1800 revolutions per minute. Units above 187 and up to 312 kilovolt amperes may be obtained with separately mounted controls.

Cutting Machine

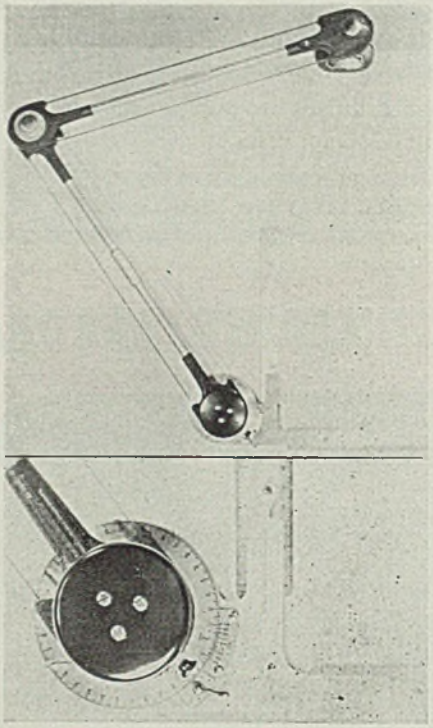
■ Harris Calorific Co., 5501 Cass avenue, Cleveland, announces an improved model K portable, motor-driven gas cutting machine for cutting steel of light or heavy gage. It is powered by a Universal elec-



tric motor and will cut straight lines of any length, with square or beveled edges and 1 to 86-inch diameter circles with standard equipment. It has a speed range from 3 to 60 inches per minute, forward or reverse. An instant stop feature permits cutting of sharp angles and a tracing feature facilitates the cutting of irregular forms. The machine has a low chassis and underslung torch holder. Mounts for two torches also are provided. Maximum traction is assured through two large diameter drive wheels. Swivel follower wheels provide 4-point support. Torches using acetylene, propane, natural gas and other fuel gases in combination with oxygen are available. Standard equipment includes cutting torch and tip, torch mounting, circular cutting attachment and 5-foot track.

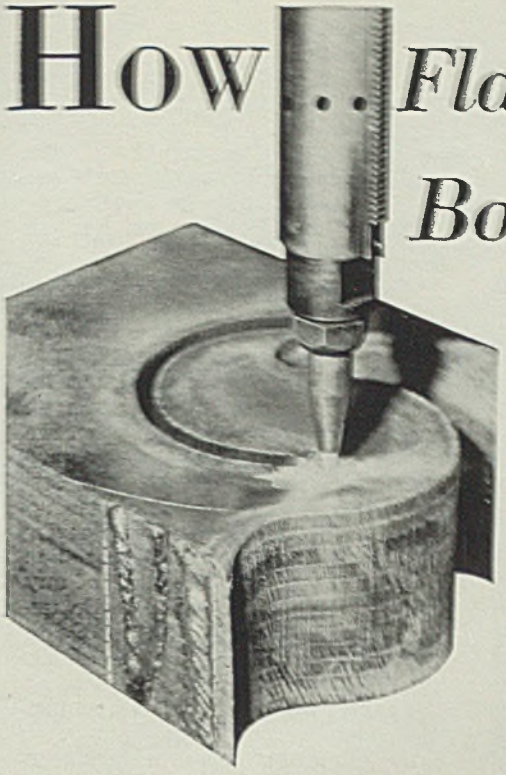
Drafting Machine

■ V. & E. Engineering Co., 758 South Fair Oaks, Pasadena, Calif., announces a Veeco drafting machine which combines manual and automatic indexing in one machine. The change from one to the other is made by pressing the thumb piece in the handle and moving it laterally toward the operator, and then re-



leasing it. It is readily adjusted by a single thumb screw to prevent sliding on an inclined table, braking action being accomplished by large disks. The arms are so articulated with the brackets that the head of the machine adjusts itself to irregularities in the drawing surface, the scales always remaining in flat position. The head can be raised high off the table to facilitate positioning the drawing paper. The zero reading on the machine can be set for a baseline of any orientation. The head is supported by a large, cen-

How . . . Flame-Cutting Overcomes Bottlenecks in Production



WITH PRODUCTION schedules soaring to unprecedented heights, oxy-acetylene flame-cutting is a fast and economical answer to the need for shaping steel. This flame quickly slices through heavy plate, light gauge sheet, and billets, slabs, or forgings—in straight lines, circles, or irregular shapes. In addition, it cuts through tightly clamped stacks of plate as shown at the left. Some of the ways in which this versatile process overcomes production bottlenecks are outlined here.

MACHINING TIME and expense can be materially reduced—and in some cases completely eliminated—by flame-cutting, thus relieving men and machine tools for other work.

LESS DEPENDENCE on outside sources of supply for fabricated parts is made possible by the ability to make what you need as you need it.

DESIGN CHANGES can be made quickly, without loss of time or money for new dies, molds, or patterns. Change-overs on flame-cut parts are only a matter of minutes.

PARTS INVENTORIES can be held down, because almost any parts can be produced immediately as needed from stock steel.

SAVINGS IN WEIGHT and bulk, and in most cases, increase in strength over parts fabricated by older methods are made possible by use of flame-cut, or flame-cut and welded, parts.

OPERATORS of flame-cutting machines can be trained to do good work in a short time. The investment required for equipment is moderate.

ONE-OF-A-KIND production for replacement or new-model development work is economically practical with flame-cutting, and is usually much faster than by other methods.

QUANTITY PRODUCTION can be facilitated by cutting numerous parts simultaneously—either by "stack-cutting" or by multiple blowpipe operation.

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• Linde can supply the gases, machines, and other essential materials for using flame-cutting, with the assurance of dependable, uninterrupted deliveries. In addition, Linde has the process ability and the organization to render on-the-job assistance that helps customers use flame-cutting effectively. For the full story, *send the coupon!*

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Attend American Welding Society's annual meeting . . . and National Metal Exposition . . . at Cleveland during October 21 to 25 . . . Hear authorities discuss latest welding and cutting developments . . . See the new apparatus and equipment . . . Exchange ideas with other experts . . . Write now for program.

trally-positioned skid button that will not mar the paper. Resilient scale sockets hold the scales firmly, yet release them readily. The engine divided circle is 4¾ inches in diameter and is easy to read.

Projection Welder

■ Federal Machine & Welder Co., Warren, O., announces a new heavy-duty P-4 projection welder, which may be furnished for hydraulic air or motor operation. In the direct hydraulically operated machine, a two-pressure pump, gives high-speed operation using a comparatively small motor. Low pressure is used to bring the slide down until the electrodes contact the work and high pressure is used to actually perform the welding operation. Both the high and low pressures may be controlled so that the proper pressure for a given job may be applied.

A pressure gage shows the actual pressure being applied on the work for each stroke and an adjustable pressure switch operates the timer. This machine is offered in five transformer capacities, ranging from 250 to 600 kilovolt-amperes inclusive. A four-point regulator switch is mounted on the side of the welder, giving a total of eigh steps of heat regulation through a high and low plus four-point tap arrangement. The stroke of the welding slide is adjustable from one to four inches, and the lower com bination knee and platen has an 8-inch vertical adjustment.

Molding Machine

■ F. J. Stokes Machine Co., 5984 Tabor street, Philadelphia, has introduced a completely automatic molding machine which by means of an automatic built-in unscrewing device produces threaded plastic moldings at production rates up to 1000 or more per mold-cavity per day. It molds standard machine threads, internal or external, of any desired pitch, the speed of the unscrewing device being adjustable to that of the pitch of the thread. Ejection is positive and takes place at the same time the mold is opening it is said.

By mounting separate molds in the machine and charging each individually, 1, 2 or 3-threaded moldings can be made simultaneously. Single, double or triple powder feed mechanisms are provided to charge each mold with an accurate amount of material. The machine requires no operating attention. It may be kept in continuous operation 24 hours per day.

Lubrication System

■ Farval Corp., 3255 East Eightieth street, Cleveland, announces a new Dualine Jr. system of lubrication which operates on the same piston displacement principle of measurement employed in the systems on heavy machines. Its size has been reduced to provide correct application to small machine tools and other equipment.

The Dualine Jr. valve has only two moving parts and is fully adjustable. Positive delivery of lubricant to each bearing is made independently of the oiler.

Automatic Vise and Clamping Tool

■ Automatic Vise Sales Co., 2845 Sunset place, Los Angeles, announces an automatic vise and clamping tool which gives the operator free use of both hands at all times. It features a movable jaw which slides free and is easily pushed with the hand or body against the work to be clamped. This, together with the clamping and releasing, is an instantaneous operation, both of the latter being accomplished through foot pedals. The main clamping pedal gives sufficient pressure for general work, but if additional pressure is desired the small auxiliary

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- ☐ Replacements and Spare Parts for Coke Plants (give details below)
- ☐ Material Handling Engineering Service
- ☐ Material Handling Systems for Coke Plants
- ☐ Electrical Engineering Service
- ☐ Boiler Plant Service
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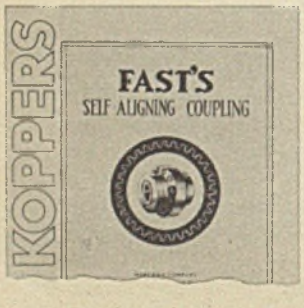

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pedal immediately below the main pedal will give enough to hold practically any work. Two side pedals are also incorporated for releasing. For repetitive work, the tool can be made to operate automatically by adjusting a small screw on the right side of the body. The unit may be mounted on a bench or on a portable stand. The 4½-inch size tool lists at $49.75.

Butt Sealing Lathe

■ Eisler Engineering Co., Newark, N. J., has developed a No. 103-XB horizontal butt sealing and general glass working lathe for the production of large electronic tubes where metal and glass have to be sealed together. It will take tubing up to 6 inches in diameter and can be supplied for larger sizes. The butt sealing is accomplished by a series of circular shaped flames, using air and gas or at times oxygen and hydrogen, depending on the nature of the glass.

This machine is equipped to work hard and soft glass and can be supplied in many types and sizes, either horizontal or vertical. A 1/3-horsepower motor, however, is required. The swing over bed can be from 12 to 36 inches. The bed is available in 4, 6, 8, 10 or 12-foot lengths.

Double-Check Strainer

■ Elgin Softener Corp., Elgin, Ill., announces a double check strainer system which represents a new method of controlling the distribution and flow of water in a zeolite softener. Primarily it prevents the loss of zeolite, obtains better water distribution and increases the capacity of the softener. Another advantage of this new arrangement is that it doubles the backwash water flow rates that can be obtained. This agitates and cleans the softener bed thoroughly. Since approximately 80 per cent of the backwash water passes through the strainers to the drain, the flow of the remaining 20 per cent is reduced to eliminate the hazard of zeolite being washed out. The system allows the use of a deeper bed of zeolite. It may be applied to softeners already installed.

Fire Extinguisher

■ Walter Kidde & Co., 140 Cedar street, New York, announces a pistol-grip carbon dioxide fire extinguisher which throws out a blanket of gas and snow to smother fire by robbing it of oxygen. Designed for use on small and incipient fires this 16-inch Kidde-Lux extinguisher can be used safely on electrical fires without fear of grounding. Besides its dry and nonpoisonous gas cannot harm delicate materials. The extinguisher is specially recommended for laboratory fires, or fires in electrical equipment or small quantities of flammable liquids.

Filter Cartridge

■ American Optical Co., Southbridge, Mass., is showing a new filter cartridge for its R-1000 respirator to provide protection against toxic dusts formed by crushing, grinding or abrading such solids as lead, cadmium, arsenic, chromium, manganese, selenium, vanadium and their compounds.

Distribution Panelboard

■ Square D Co., 6060 Rivard street, Detroit, announces a type MH multibreaker distribution panelboard, capable of 100 ampere, 230 volt, branch circuit capacity for power and lighting distribution. Branch breakers are furnished in 15 to 100 ampere capacities—1, 2 or 3 poles, for 115 and 230 volt, single phase and 3-phase, alternating-current systems. Since

all breakers used in these panels are common trip, they are suitable for use on ungrounded systems, and single phasing of motors protected by these circuits is prevented. The panels are completely dead front and compact.

Hook-On Volt-Ammeter

■ General Electric Co., Schenectady, N. Y., has introduced a portable type AK-1 hook-on volt-ammeter for measuring alternating current and voltage. With it, alternating current can be read on both insulated and noninsulated conductors. Designed for use on conductors of 2-inch maximum diameter, it is small enough to get into tight places and it weighs only 3½ pounds. Four current ranges, 0-15/60/150/600 amperes, and two voltage ranges, 0-150/600 volts are available at the setting of a 6-position snap switch. An integral part of the instrument is a C-shaped, split-core current transformer designed so it can be operated without a trigger. To make measurements, the transformer is simply pulled open and placed against the conductor.

The indicating instrument is the type DO-40 miniature rectifier instrument. Readings are taken on a single, uniformly divided scale approximately 2½ inches long and marked in large red and black figures corresponding to the figures on the selector switch.

Oil Burners

■ York Oil Burner Co. Inc., York, Pa., has introduced model T series oil burners in three sizes with capacities to fit demands of the particular heating problem. They are supported from the floor on an adjustable pedestal mounting which permits easy adjustment of the blast pipe height and features the Iris shutter which provides an exact air-oil mixture for perfect combustion. Each unit has a self-contained pump, shut-off valve and antihum device. Fuel is atomized under high pressure. Special intermittent-type ignition is used on all three models of the T series.

Hand Miller

■ Machinery Mfg. Co., 3636 Irving street, Los Angeles, has introduced a No. 0 hand miller for high speed milling of small parts. It has a hand-lever-operated rack and pinion feed and provides two speed ranges —100 to 1000 revolutions per minute or 150 to 1500 revolutions per minute. The enclosed variable drive provides correct spindle speeds for every job. The spindle of heat-treated steel is mounted on roller bearings. Power is provided by a ½-horsepower, 1750-revolutions per minute motor operating at 60 cycles. The tool weighs approximately 650 pounds and its overall height is 58 inches.

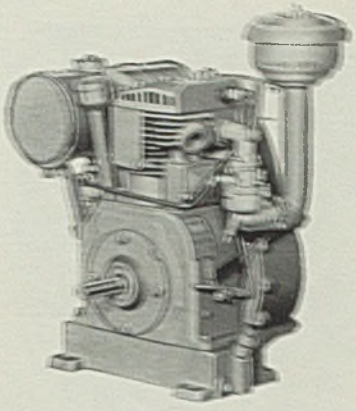
Portable Dustpan

■ Palmer Shile Co., 7100 West Jefferson avenue, Detroit, announces a shop clean-up cart that functions like a dust pan on wheels to assist the sweeper in the factory. It is mounted on ball-bearing rubber-tired wheels, and has a capacity of more than a bushel. Simple in design and light in weight, it is easily maneuvered in small spaces.

Industrial Motor

■ Briggs & Stratton Corp., Milwaukee, announces a new model ZZ 4-cycle, air-cooled gasoline motor, for use in driving pumps, hoists, generators and mixing equipment. It has a piston displacement of 22.97 cubic inches and a 3 x 3¼-inch bore and stroke. Ignition is supplied by a high tension flywheel magneto. Specially designed float-feed type carburetor, adjustable mechanical governor, pump and splash lubricating system, gasoline filter, oil-bath

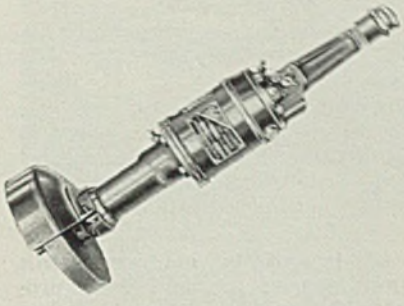
air cleaner and screened blower housing are some of the other



equipment included. The fuel tank capacity is 1¾ gallons and oil reservoir .5 pints.

Air Grinder

■ Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, has introduced a new Thor No. 255 portable air grinder featuring "Air Behind the Blades" which working principle keeps the rotor blades of the grinder out against



the cylinder wall, preventing any dead center position or the depression of the blades in the slots due to oil accumulation. This assures positive starting under all operation conditions.

Threading Machine

■ Landis Machine Co., Waynesboro, Pa., announces a threading machine for handling operations in which extremely close tolerances for concentricity must be maintained between the thread and the body of the work. Its special mechanical features include a face plate on the machine spindle supplanting the usual die head, a special carriage front on which the die head is mounted and a tall stock which is adjustable and also supports a center. The face plate is employed in the same manner as the face plate on a grinding machine or lathe, that is to drive the work with the use of a dog. The carriage supports the die head which is in this case, used as a stationary type head. Provision is made for opening and closing the die head with a yoke when necessary. Clamped into position on ways located on the side of the machine bed is the adjustable tailstock. These ways are of sufficient length to permit handling work ranging from 2 to 16 inches long. The tailstock center is advanced to or withdrawn from the work by a quick acting lever located on the top of the tailstock. This movement is actuated by means of a rack and pinion gear. The center can be clamped rigidly into position by a clamping lever. The chuck is centered by revolving the work between the centers, the die head being propelled onto the work and the thread lead being controlled by leaderscrew.

Dual Voltage Switch

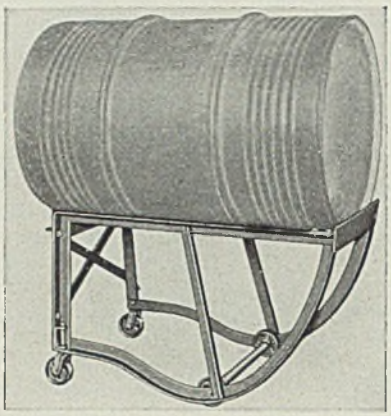
■ Wilson Welder & Metals Co. Inc., 60 East 42nd street, New York, announces a new dual voltage switch for installation on arc welding machines. Known as type CD, it can be used on any motor employing alternating current, provided the motor and starter are recommendable for two voltages.

The switch has two main parts,

a base which is mounted directly on the machine and a removable top cover which is held in place by a center stud and nut. The latter has three equally spaced tabs which fit between bosses on the base. The top cover can be set on the base in either of two different positions, each corresponding to a line voltage. Adaptation of the unit to different line voltages is simple and fast. The center nut is loosened and the top cover is rotated until the desired voltage figures are visible. It is designed for 220-440 volts of a delta connected motor. It reconnects the stator winding and also adjusts the holding coil of the magnetic starter and heater relays. Other connections, such as 220-440 volts of Y connected motor and of Y delta connection (380/220) are obtainable.

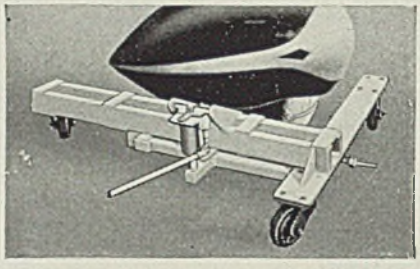
Cradle Truck

■ Morse Mfg. Co. Inc., Syracuse, N. Y., has introduced a cradle truck for handling drums or barrels. It features a wide wheel base with liberal sized wheels, easy turning casters and properly shaped rocker. The caster frame swings inside the curve of the rockers when the drum is being rocked up and is then thrown forward by pressure on the foot lever placing casters well forward. The cradle is rigidly constructed of steel angle with a malleable iron nose piece. The axles are encased in pipe.



Lift Dollie

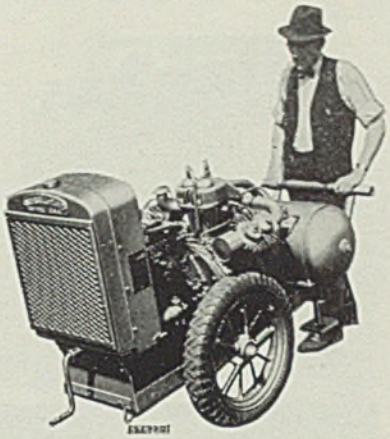
■ Butler Bin Co., Waukesha, Wis., announces a Hydra-Float lift dollie for use in the aircraft industry. It enables hangars to store more planes in a given space with less help in less time. The dollie is fabricated of steel and is equipped with hydraulic jack lift and floor protecting casters. Its adjustable arms can be accommodated to a wide range of tire sizes. The dollies are obtainable in capacities from 1000 to 2000 pounds per unit.



Air Compressor

■ Ingersoll-Rand Co., Phillipsburg, N. J., has introduced a 2-stage air cooled portable compressor that delivers 60 cubic feet of air per minute at a discharge pressure of 100 pounds. It is known as the D-60 and will operate most of the rock drills, grinders, paint sprays and other pneumatic tools that are in common use. Three types of mountings are available—all built around the same gasoline engine-compressor plant. The push-about type is mounted on roller-bearing, pneumatic-tired wheels. It is well balanced and one man can handle it. A turtle-back cover protects the compressor and the engine from the weather and provides a means of locking the wheels against theft. The deluxe model is a spring-mounted, high-

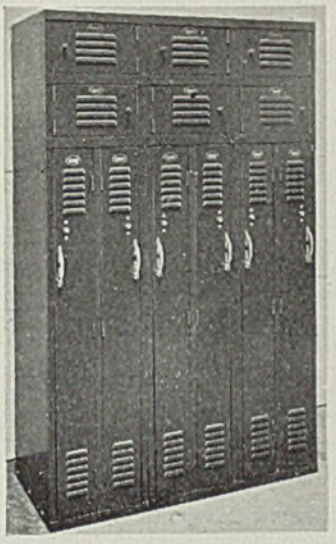
speed trailer unit with tool boxes for carrying equipment built into the sides of the body. The third model is



mounted on a steel base and can be mounted directly on a service truck or built into the body.

Steel Lockers

Penn Metal Corp. of Penna., Oregon and Swanson, Philadelphia, has introduced a two-in-one steel locker for use in cramped quarters. A group of three lockers affording ample accommodations for six persons is shown in the accompanying illustration. Fabricated from heavy



gage furniture steel, the frame members of these units are spotwelded. All nuts and bolts used in the assembly are cadmium finished, rubber bumpers being used at contact points. Each locker is 15 inches wide, 21 inches deep and 73½ inches high, including a 1½-inch base. It is divided into two coat compartments, each of which is 7½ inches wide, 21 inches deep and 54 inches high. Each compartment also is provided with two single prong coat hooks and a coat rod. The two hat compartments are each 15 inches wide, 21 inches deep and 9 inches high.

Atomizing Nozzles

Spraying Systems Co., 4021 West Lake street, Chicago, has placed on the market hydraulic atomizing nozzles for spraying water, oil and other liquids with similar viscosities. Their spray pattern is hollow cone with uniform distribution. Nozzles are accurately machined with polished orifice insert and are now available with male and female ¼-inch pipe connection. Capacities range from 1.2 to 17 gallons per hour at 60 pounds pressure. Standard stock construction is brass with 18-8 stainless steel inserts for orifice and core tip, and Monel strainer built in.

Master Switch

Cutler-Hammer Inc., 315 North Twelfth street, Milwaukee, announces a new drum-type master switch providing 3-wire control for machine tools and other equipment. It affords functions equivalent to 2 and 3-button heavy duty push button stations and is offered where an operating lever is preferred.

Three kinds of construction are

available, surface, cavity and panel mounting and two kinds of handles, standard and pistol grip. By removing a stop post, the drum may be converted from nonreversing to reversing. Ratings of the switch are for pilot circuits up to 600 volts alternating and direct current.

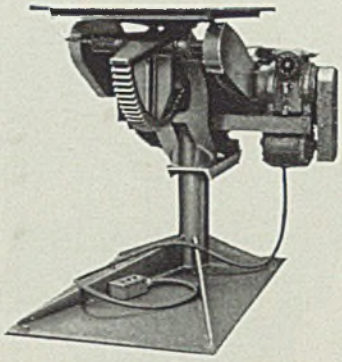
Electric Hoist

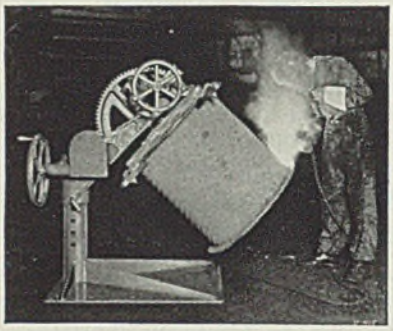
■ Philadelphia division, Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, has introduced the Load King, an air-cooled wire-rope, electric hoist. Made in two capacities, ¼ and ½ tons, it is available in three types—lug, hook or plain trolley with a choice of either right angle or parallel suspension.

Other features include standardized interchangeability of repair parts, small overall dimensions, maximum use of ball or roller bearings and high overall efficiency. All hoists may be operated out-of-doors as well as under all normal plant conditions.

Welding Positioner

■ Cullen-Friestedt Co., 1300 South Kilbourn avenue, Chicago, announces a new size model 12 positioner of 1200 pounds capacity. It can be tilted a total of 135 degrees from horizontal, and the table can be revolved through a full circule, 360 degrees, regardless of angle of



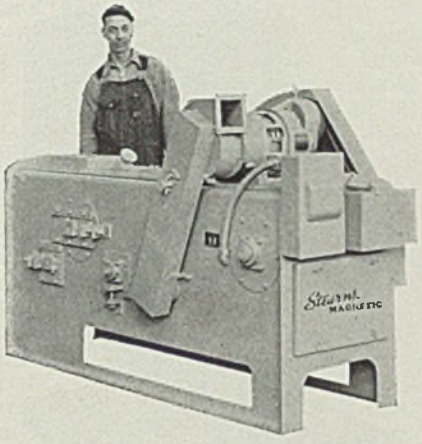


tilt. The table is removable for attachment of special jigs or fixtures and is adjustable in height. By mounting the operating mechanism on a special base, extremely large and bulky work can be fully rotated when tilted either vertical or a total of 135 degrees without interference from floor or pedestal mounting. This unit can be furnished powered with independent motor and controls for table tilt and table rotation. Power for table rotation can be furnished with either constant or variable speed drive. The Model 12 also can be furnished for manual operation with independent hand wheel for table tilt and table rotation, or a combination of manual and power operation.

Magnetic Separator

■ Stearns Magnetic Mfg. Co., Milwaukee, has placed on the market a type AM magnetic separator which utilizes alternating current for energizing the magnetic field. It enables the lines of force to change 60 times a second, while the material affected by the magnet receives 120 pulsations of constant agitation. Particularly effective for treating finely ground powdered metal, the unit spreads the material uniformly by an adjustable vibrating feeder which provides even distribution on the separator belt. The high pulsating effect of the magnet frees the nonmagnetic impurities allowing them to drop out. Although the

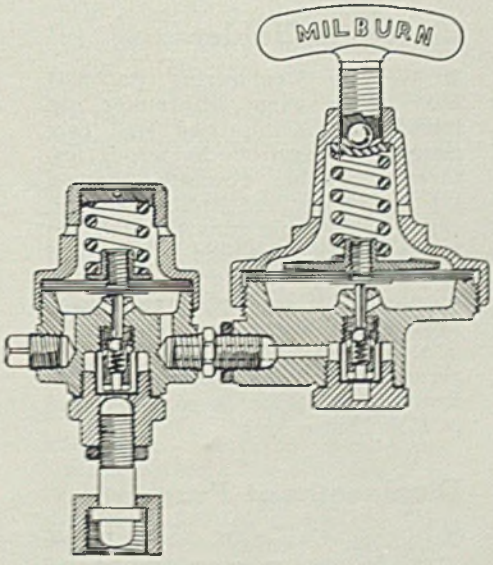
separator is fully enclosed in a steel frame, provision is made for removable panels by which the material can be inspected while the



separator is in operation. Bearings requiring oiling are mounted on the outside. An exhaust fan removes dust from the material while in process.

Twin-Stage Regulator

■ Alexander Milburn Co., 1416 West Baltimore street, Baltimore, announces a new type FF twin-stage regulator which can be adjusted to various pressures, permitting it to be used for different operations. It



operates smoothly, and permits a uniform delivery up to 200 pounds pressure. Feature of this regulator is the unitary valve assembly which consists of only four parts—a small body, stainless steel spring, stainless steel ball, and special vulcanite seat—operated by a monel metal pin. Seating is with instead of against the pressure. Each stage has a loose, replaceable diaphragm, and removable and interchangeable inlets, adaptable to any tank or line connection for any type of gas. Noncorrosive cylindrical filter screens enclose seat units. The bodies and adjusting keys are of forged bronze. The first stage of the type FF can be purchased separately and attached to practically any make of single stage regulator, converting it to a two-stage control.

Storage Battery Lamp

■ Stewart R. Browne Mfg. Co. Inc., 258 Broadway, New York, announces model SB 100 storage battery lamp for emergency work. All of its joints between the two parts of the battery case, the lamp and the lens holder, case and the cord are sealed, and together with a vapor-proof switch, insure protection against ignition or explosive gases or vapors. A special shatter-proof lens protects the light bulb. A second refractor lens is mounted in the same holder with the shatter-proof lens and adds to its lighting efficiency. Battery plates are designed to prevent spillage of acid.

Broaching Machine

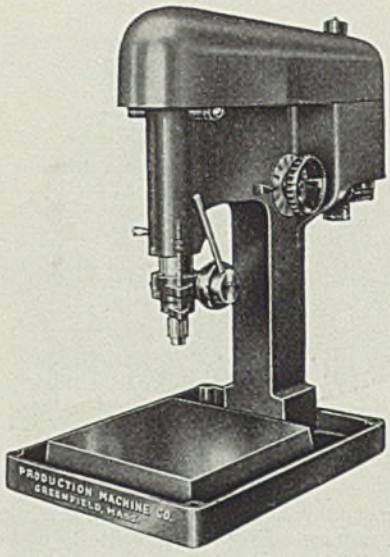
■ American Broach & Machine Co., Ann Arbor, Mich., has introduced

a 4 HC-18 horizontal broaching machine for finish broaching the half-round slots in differential cases. It is provided with a machine base which contains the oil reservoir, coolant reservoir, coolant pump, hydraulic pumping unit and motor. Design is such that any one side of the machine may be operated, and that two adjacent sides may be operated simultaneously by two different operators. A separate machine control is provided for each cylinder slide assembly.

The unit has a broaching speed of 18 feet per minute and a return speed of 28 feet per minute. It has a cylinder stroke of 18 inches and a work height of 40 inches. It is capable of producing 90 pieces per hour from each side of the machine. Inclined troughs convey chips to one corner of the base where they may be removed.

Bench Drill

■ Production Machine Co., Greenfield, Mass., has developed a new No. 25 high speed sensitive bench drill for high speed production. Its drive is completely enclosed, the only exposed moving part is the chuck and drill itself. It has a spindle speed range of from 2000 to 10,000 revolutions per minute available instantly by the turning of a handwheel. The running speed is



shown at all times by the indicator incorporated. The drill is driven through a V-belt, the power being supplied by a ½-horsepower, 110 volt, 3450 revolutions per minute motor. Its capacity (center spindle to column) is 7 inches and the travel of the spindle with depth stop is 3 inches. The working surface of the drill table is 11 x 11 inches. Overall height of the unit is 27 inches.

Electrode Holder

■ Welding Engineering Co., 264 East Ogden avenue, Milwaukee, has introduced an improved Bull Dog clamp type electrode holder. It features a double strength channel type lower jaw and strong insulated spring. The cable runs through the handle to the lug and is fastened by a clamp, making a solid connection. Both the upper and lower jaws are of bronze, and the handle is of corrugated fiber. The jaws are arranged to hold the rod out in front. The holder is compact and is 11½ inches long.

Displacement Pumps

■ Oilgear Co., 1301 West Bruce street, Milwaukee, has placed on the market type DX 2-way, 3-position electric controlled variable displacement pumps in sizes from 2 to 150 horsepower. These utilize oil as the fluid power medium and each size is available with internal pumping mechanisms for normal working pressure ratings of 1100, 1700 and 2500 pounds per square inch, and for peak pressures up to 3000 pounds per square inch. They are arranged for flanged mounting to a separate reservoir base, or reservoir integral with the machine being

fully equipped with built-in auxiliary gear pumps.

With the integral control embodied, it is possible to reverse the direction of oil flow in these pumps, and select the neutral position at will. Two opposing solenoids mounted on pump control operate a built-in pilot valve. When one solenoid is energized, a preset volume of oil is discharged in one direction. When both solenoids are de-energized, the pump slide block moves to neutral position and no oil is delivered. Hand control adjustment provided on each side of the unit permit operator to preset the volume of oil to be delivered in either direction from zero to maximum. Since these pumps are especially adapted for remote, finger-tip pushbutton control, they are being used as standard equipment on all styles of Oilgear broaching machines.

Coil Bobbin

Precision Paper Tube Co., 2033 Charleston street, Chicago, has introduced a new electric coil bobbin for use by manufacturers of small motors, relays, solenoids, reactors, photo electric devices and other electrically actuated equipment. It is made of either kraft or fish paper, or a combination of both, depending on the requirements. The paper is spirally wound on a steel die to form a tube of convenient length, which is cut to proper bobbin sizes.

The flanges are of vulcanized fiber, die cut to the exact size, shaped and pressed over the ends of the tubes. The ends of the tubes are swaged, locking the flanges in place. A special lacquer increases the bobbin's strength and forms a seal between the tube and flange, improving electrical characteristics. Round, square or rectangular bobbins of any size are available.

Portable Pipe Machine

Oster Mfg. Co., 2057 East Sixty-first place, Cleveland, has introduced a portable No. 502 Pipe Master pipe machine equipped with a new sliding floating type of die-head which is front-cutting. This, with the close-gripping front chuck, makes it possible to handle nipples as short as 3½ inches in the 2-inch size without the use of a special nipple chuck.

An integral cone fluted reamer is mounted on the front of the die-head. The cutoff device has standard cutter wheels and rollers and is extremely powerful for quick cutting-off action. The carriage floats on all steel ways and is fed by a hand lever. A 3-jaw centering chuck on the rear of the spindle assists the front gripping chuck in centering the longer lengths of pipe. Also the machine has a thread length gage that can be set to insure duplicate, standard length threads. Power is furnished by a ½-horsepower motor. Overall length of unit is 46 inches, width 19½ inches and height 18 inches.

Regulator

The Linde Air Products Co., unit of Union Carbide & Carbon Corp., 30 East Forty-second street, New York, announces three new single-stage, general service regulators for welding and cutting apparatus. These, the Oxweld R-80 oxygen regulator for the delivery of oxygen at working pressures up to 200 pounds per square inch, the Oxweld R-81 companion acetylene regulator, and the Oxweld R-82 fuel gas regulator, are strongly built.

The R-80 and R-81 regulators are of the stem type. The passageways are of sufficient size to permit unrestricted flow of gases. In addition, the R-80 oxygen regulator has a special inlet screen formed of a double thickness of fine mesh to filter out dirt. The third, the R-82 fuel gas regulator, also is of the stem type and is for use with various other gases.

A. C. Welding

(*Concluded from Page* 121)

must be removed. And this removal is reflected in higher cleaning costs.

The first type of joint to be considered with respect to the use of alternating-current welding is the gapped joint in thin plates such as Fig. 1. Thin plates will be considered those less than ⅜-inch thick. Thicknesses ¼-inch and less may not even be beveled.

In such butt joints, magnetic influences exert a profound effect on the weld. Only with difficulty will the experienced operator achieve satisfactory penetration and buildup. It can be done with direct current—but only with difficulty. Switching to use of alternating current allows a sound weld to be made at about twice the speed otherwise possible.

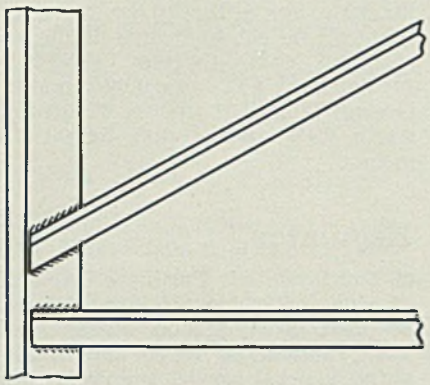


Fig. 4——Structural welds in places such as shown here are ideal for alternating-current welding

Although the increased production permitted by the use of alternating current for this type of weld should be inducement enough, a material improvement in weld appearance is an added benefit. Also there will be a marked reduction in the amount of spatter near the seam.

Much work now being scheduled is for one or another government agency carrying with it a requirement for radiographic inspection. Heavy sections of U or J-bevel design will be so inspected. Joints such as those shown in Figs. 2 and 3 are relatively simple to weld. Situated in structures devoted largely to straight runs of welding, trouble with magnetic blow is liable to be encountered at the extremities of the welds. Just as surely as magnetic interference makes its presence known, defective regions will be uncovered by the X-ray.

As long as such troubles are anticipated, and the experience of fabricators indicates that they should be, steps may be taken to avoid them. Luckily the use of alternating current arc is a certain remedy.

Nor is the help made possible through the adoption of alternating current restricted to gapped joints in light plate and straight runs in heavy plate. Structural welding such as that shown in Fig. 4 is well suited to this kind of welding, for here, too, the existence of magnetic fields of high intensity interferes with the welding operation.

Included in the general classification of structural welding is all welding that involves getting into corners. The welding of gussets furnishes another example. Prove this for yourself the next time your shop endeavors to make a weld where a number of plates or sections are in close proximity.

The development of electrodes for alternating-current welding lagged behind the growth of suitable equipment. Early in the adaptation of the alternating current arc it was discovered that almost all downhand electrodes were suited to welding with direct current in either polarity or with alternating current. Later it was learned that poor fit-up electrodes that had been designed for direct current in straight polarity could be used. That left the reversed-polarity all-position electrode. For some time the efficiency of this

(*Please turn to Page* 154)

Tension Control

(*Concluded from Page 72*)

giving the tin plate the final surface finish and temper, has been developed. A single-stand 2-high mill had developed into a 2-stand tandem mill with drag reel, entry tension device, delivery tension device, and rewinding tension reel. The material having already been rolled to approximately a uniform gage, the most important function of the skin pass mill is to obtain the desired temper and surface. The first tandem skin pass mills were installed using current regulators for the entry and the delivery tension devices, as well as the reels. In order to get the strip to track through the various rolls and tension devices, it is absolutely necessary to maintain tension on the strip throughout the mill. To obtain a certain surface and temper it is necessary to give the strip a definite percentage reduction. The percentage reduction in the skin pass mill depends upon the screw setting and the tension. Any change in tension results in a change in reduction. As in the case of the tandem cold mills the current regulator failed to give entirely satisfactory results during acceleration and deceleration of the mill.

A 2-stand tandem skin pass mill was installed with two tensiometers, one between stands and the other between the last stand and the delivery tension device. When first installed, this mill did not have an entry tension device. The mill is now being revamped and another tensiometer added, and the speed is being increased from 800 to 1600 feet per minute. At approximately the same time, a tensiometer was installed between the stands of a 2-stand tandem skin pass mill with 1700 feet per minute delivery speed.

Several months ago, a third skin pass mill was installed, completely equipped with three tensiometers. The mill operates at a maximum speed of 2700 feet per minute. Due to the successful operations of this mill, two more duplicate mills will be so equipped soon.

Conceived and developed for use on a tandem cold mill, the regulating tensiometer has finally found a place on the 2-stand tandem skin pass mill, while on the tandem cold mill the indicating tensiometer is being used. However, an indicating tensiometer to be used on a tandem mill should be so designed that it can be made regulating, in case that regulation may be found desirable when more experience and information have been obtained.

Courses in Metallurgy To Be Offered

■ Specialized courses in electroplating and metallurgy under Dr. C. B. F. Young will be offered by the Institute of Electrochemistry and Metallurgy, 59 East Fourth street, New York, during 1940-41. Registration will be held for the fall term from Sept. 10 to 17. Registration for spring courses will take place from Feb. 6 to 10 inclusive, the first class meeting will be held Feb. 7.

More Lessons For Arc Welders

■ "Lessons in Arc Welding" is the title of a new book published by Lincoln Electric Co., 12818 Coit road, Cleveland. Covering some 144 pages, it is helpful not only to beginners but also to experienced operators desiring comprehensive practical information. The book contains a series of 51 lessons, based upon experience of Arthur Madsen, instructor of the Lincoln arc welding school. The lessons, in four principal sections, cover welding with unshielded arc electrodes, welding with shielded arc electrodes, electrodes for particular joints and metals.

The text explanations are graphically supplemented by line drawings and photos. A valuable feature of the book is the questions on each lesson, enabling the student to check his knowledge. Price is 50 cents.

Ductile Zirconium

(*Continued from Page 58*)

glazes. The silicate, zircon, has been used for balance knife edges and planes, because of its hardness.

Titanium resembles iron and takes a high polish. It does not occur free in nature and its compounds are not found in concentrated form, yet it is more abundant than copper, lead and zinc. The metal is hard and so brittle in the cold that it can be powdered in an agate mortar but it can be forged at a red heat. It burns in oxygen at 610 degrees Cent. to form the oxide and in nitrogen at 800 degrees Cent. to form the nitride. This latter is the only known vigorous combustion in nitrogen gas. Like zirconium, titanium is chiefly used in metallurgy as a deoxidizer and denitrogenizer (previously noted) and to add certain desirable qualities such as toughness to alloys. Titanium oxide is a brilliant white pigment used in ceramic, rubber and other industries. Certain titanium compounds are used as incandescent media in illumination and others as dyes and mordants for wool, cotton and paper.

Producing Ductile Zirconium and Titanium. First step in producing these ductile metals is reduction of a salt with calcium or some strong metallic reducing agent to make a nonductile metal in powder form. No one seems to have successfully agglomerated this form into the massive form that can be made ductile in the cold by the usual methods of the tungsten industry. The powders therefore are utilized for their chemical rather than their mechanical characteristics. The rate of oxidation of zirconium is extraordinarily rapid once it is heated to the ignition temperature (3300 degrees Cent.) which fits it for use in ammunition primers and as a starting fuse in photoflash lamps. It finds some use in penny torpedoes and in firecrackers because of the high ratio of noise per milligram, a metallurgical value not often listed.

Ductile zirconium or titanium as a massive metal is produced by vapor-phase decomposition of zirconium or titanium tetraiodide. The metal in nonductile powder form is placed in the bottom of an evacuated pyrex bulb and a small amount of iodine is placed in a side arm. A tungsten or a previously made zirconium or titanium wire in the form of a long hairpin occupies the body of the bulb with external electric connections made so it can be heated by passage of an electric current. After evacuation and sealing of the bulb, the whole is warmed gently to vaporize the iodine and to allow it to react to form zirconium or titanium tetraiodide vapor. The hairpin filament then is heated electrically by passage of current, the vapor decomposes to deposit the metal on the filament and release iodine which travels back to the powder to form more tetraiodide.

Metal Is Deposited

As the metal builds up on the filament, the current is increased to maintain the proper temperature for decomposition. After this ring-around-the-rosy has continued long enough, metallic zirconium or titanium has been deposited and any oxide or nitride that has contaminated the original powder is left behind. It is customary to build deposits up to about ¼-inch in diameter, except that the deposits do not have a diameter since they consist of large crystals as shown in Fig. 4. There is no reason, however, why this thickness cannot be built up much larger if desired, provided sufficient electric energy is available to maintain the temperature of the filament and deposit on it.

As these crystals are formed above the inversion point, they retain the exterior appearance of the high temperature (beta, body centered cubic), form on cooling, but below about 860 degrees Cent. the

structure is alpha, hexagonal, so the crystals of the rods are pseudomorphic.

The pure material is a comparatively good electric conductor and fairly soft. Contamination with but a few thousandths of a per cent of oxygen and nitrogen easily increases the hardness from 20 to 35 Rockwell C.

Nevertheless, the crystal rods can be hot worked at about 500 degrees Cent. with impunity. Momentary heating to 700 degrees Cent. seems permissible. The oxide film does not thicken rapidly at such temperatures, and the diffu sion rate of oxide into the metal is so low at these temperatures that the metal is not perceptibly contaminated.

In spite of the chemical activity of the powdered metal, the massive metal can be handled without trouble in the air as long as it is kept well below a red heat.

It is customary to swage the bars of big crystals before drawing or rolling. If done at 400 to 500 degrees Cent., a surface film of oxide is formed that prevents adhesion of the metal to drawing dies and rolls. From there on cold working can be employed readily. The metals have an exceptionally low rate of work hardening and so will stand large cold reductions to produce extremely fine wire and thin foil.

Tensile Strength. In agreement with the low rate of work hardening, the strength of even hard-drawn material is not high. A zirconium rod, cold swaged to 0.5-millimeter diameter, gave a tensile strength of 115,000 pounds per square inch at 2 per cent elongation. The highest strength in fully cold-drawn wire appears about 142,000 pounds per square inch in tension with 1 per cent elongation. After vacuum annealing for 3 hours at 400 degrees Cent. a figure of 100,000 pounds per square inch with 3 per cent elongation was obtained and 3 hours at 500 degrees Cent. reduced this to 56,000 pounds per square inch at 12 per cent elongation. This indicates, however, that even the annealed material has tensile strength of the same order as ordinary structural steel.

Deep Drawing Easy

From the mechanical point of view, the pure metals cannot be made very strong by cold working, but in spite of the rather low elongation of even annealed materials, they can be deformed severely. Deep drawing is easy, and when annealing does become necessary it can be done at a harmless temperature.

Modulus of elasticity tests gave zirconium around 10,700,000 and titanium about 12,100,000 pounds on wires 0.01-inch in diameter.

It is possible that by co-depositing zirconium and titanium by the vapor method from a mixture of two instead of one pure metal, alloys could be obtained that would be stronger than either metal since the two form an unbroken series of solid solutions. The behavior of the two metals is so similar that for many uses the alloys should serve equally well. The alloys appear more gas-sensitive than the metals themselves.

Intentional alloying with oxygen or nitrogen has possibilities in increasing the hardness and wear resistance. Since the oxides and nitrides go into solution in the metal so easily, the corrosion resistance may not be affected greatly. This is an unexplored field.

Develops New Hose

■ A new air hose made with a synthetic tube and rubber cover is announced by B. F. Goodrich Co., Akron, O. It is known as type 5-F and is recommended for use under excessive hot oil conditions.

Laboratory tests indicate that the synthetic tube used in this construction has increased the life of the hose for this kind of service. The hose is built with a smooth green abrasion-resistant cover.

Activities of Steel Users, Makers

■ PATENTS on a new process of welding galvanized sheets and structural elements so that joints are left in a rustproof condition have been granted to Artkraft Sign Co., Lima, O. The company states the process, named "Galv-Weld," consists of regalvanizing at the time of welding.

♦

Graver Tank & Mfg. Co. Inc., East Chicago, Ind., has formed a division to construct equipment for the petroleum industry. Division will do construction work only from plans and specifications furnished by customers. L. K. Wells is manager.

♦

American Zinc Co. of Illinois, a wholly owned subsidiary of American Zinc, Lead & Smelting Co., St. Louis, has purchased the electrolytic zinc plant of Evans-Wallower Zinc Co. located at Monsanto, Ill. American Zinc expects to spend approximately $500,000 in rehabilitating the plant, which will have an annual capacity of 17,000 tons of high grade slab zinc, and will employ 100 workers. It also plans to install additional roasting equipment at its Fairmont City plant to cost about $300,000.

♦

Fairbanks, Morse & Co., Beloit, Wis., will expand its diesel engine plant in a $500,000 program which includes erection of a new nonferrous foundry 80 x 220 feet, according to A. C. Howard, general manager. The foundry will triple present capacity and will handle 22 alloys including brass, bronze, high brass, zinc and tin alloys. Plans call for completion in eight months.

♦

Babcock & Wilcox Tube Co., Beaver Falls, Pa., has appointed MacFarlane Foundry & Honolulu Iron Works, S.A., Sagua La Grande, Cuba, as boiler tube distributor and agent in Cuba.

♦

Corning Glass Works, Corning, N. Y., has let contract to H. K. Ferguson Co., Cleveland, to design and construct a one-story, 60 x 260-foot warehouse at its Wellsboro, Pa., plant.

♦

Coledrinx Co., recently located in New York, is establishing a factory at 636-38 North Albany avenue, Chicago. The firm manufactures machines for vending freshly mixed carbonated beverages and will employ about 20 persons.

♦

Bettendorf Co., Bettendorf, Iowa, is undertaking a $500,000 foundry expansion and modernization program, featuring controlled in-line operations in core, molding, pouring and shakeout rooms, and expected to increase production 35 per cent.

♦

Otto Construction Co. has established offices at 500 Fifth avenue, New York, for building of coke ovens and equipment for by-product recovery and treatment. Dr. Carl Otto is president; Frans Wethly, vice president, and Fred Stadelman, assistant to president.

Milestones for Gunite

■ Gunite Foundries Corp., Rockford, Ill., recently added electric steel castings to its line of foundry products. When the company began business in 1854, the product was exclusively gray iron. Ten years later malleable iron was added. In recent years products included high test cast iron and pearlitic malleable iron.

Another notable event has been the start of a business career with the company by the fifth generation of the Forbes family. Duncan P. Forbes, namesake and great grandson of the founder, has begun work as foundry laborer during his summer vacation.

Low-Cost Ore Loading

(*Concluded from Page 66*)

inches. Belts are all the same width, 48 inches, but travel at different rates of speed. The slowest speed is used in the tunnel, and each succeeding belt runs a little faster with the tunnel belt traveling 580 feet per minute and the gantry belt 610 feet per minute.

This eliminates possibility of any excess ore piling up at any point. The tunnel belt also can be stopped instantly by the loading operator in the tunnel while other belts continue running. But if any other belt is stopped, all belts which precede it will stop automatically.

Duplication of drives and other items assures continued service. All main drive motors and machinery are made identical even though this means some units are oversize. Head and foot end of pulleys, bearings, shafts, etc., are duplicated on each conveyor. This permits a minimum of spare parts.

Metroloy Co. Now Making Tungsten Contacts

■ Electrical contact points made from highly fused pure tungsten metal are now being manufactured by Metroloy Co. Inc., Newark, N. J. These are said to assure uniform grain structure, eliminating excessive oxidization or pitting during operation periods.

Because of the purity of this metal, film coatings are prevented from adhering to contact surfaces during the time when apparatus is not operating. Furthermore, the electrical contact resistance is reduced.

Stresses Greater When Beams Are Curved

■ Maximum stresses are produced in a curved beam when the loads on the beam are concentrated in the section of the beam farthest from the supports. The stresses throughout the beam increase directly with the loading.

This is the conclusion embodied in bulletin 145 of the Iowa engineering experiment station, Iowa State college, Ames, Iowa, entitled "Stresses in a Curved Beam Under Loads Normal to the Plane of Its Axis." Another fact revealed in the bulletin is that in a circular-arc I-beam the greatest outer fiber stress in the flanges occurs at or near the supports. This maximum stress is considerably greater than that which would result from the bending moment alone, being seven times as great as the stress resulting only from bending moment when the I-beam is loaded at each quarter point.

The 64-page publication also contains a general algebraic analysis for computing stresses in a curved beam and a special analysis for stresses in a circular-arc I-beam. Both have been checked by experimental investigations which also are included. The complete study may be obtained without charge.

Electrical Conductivity High in New Rubber

■ Specialized compounds of natural and synthetic rubber with a high degree of electrical conductivity are announced by B. F. Goodrich Co., Akron, O. In addition, the company can now furnish solutions of synthetic rubber which can be applied to the surfaces of natural rubber products like paint, thus carrying away static. The material has already proved successful in application as a belt dressing to carry static away from transmission belts.

Electrically conductive compounds generally can be made softer and more "rubbery" from synthetic rubber, while in the case of natural rubber the compound has to be "loaded" and consequently is stiffer and less yielding. Natural rubber, unless specially compounded, has high electrical resistance. For conducting static a certain amount of resistance is desirable.

A. C. Welding

(*Concluded from Page* 148)

electrode with its carbonaceous coating was in question. However, satisfactory electrodes are now widely available.

To say that operator hazards from use of alternating-current equipment are much more serious than with direct-current welders is stretching a point. The truth of the matter is that with due regard for safe practices, either equipment may be used without any danger whatsoever.

Of course the transformer types of equipment do not employ moving parts in the same sense as the direct-current motor-generator sets. For that reason there is almost no current consumption when the arc is not going. Even when the arc is in play there are fewer electrical losses in the transformer itself than there are in the rotating set. Certain savings in power are thus obtained.

Due to the rapid reversal of the direction of current flow that extinguish the arc many times a second, some would have you believe that deposition rates are lower with alternating current. Actual tests show some slight difference. The are cases, also, where electrodes d signed specifically for alternati current have higher deposition rat than similar electrodes prepared f direct current. In general the di ferences that exist in depositio rates are of secondary importance.

In selecting transformers for wel ing, it is well to insist that the uni be definitely designed for weldi service. Ordinary transformers d not have the requisite arc chara teristics. Nor are they constructe with the same regard for safety.

Most welding transformers a equipped with a movable core th allows an infinite number of wel ing current adjustments. Remer ber in setting the scale for amper to compensate for the length of th welding leads. To keep losses fro inductance to a minimum, lea must be kept close together.

When you purchase alternati current equipment, in many cas the welding operators will be ab to produce excellent savings fro the very beginning. In other i stances, a short time will be nece sary for the operators to get t "feel" of the new equipment befo savings become pronounced.

Hammered Metal Effect Produced by New Finish

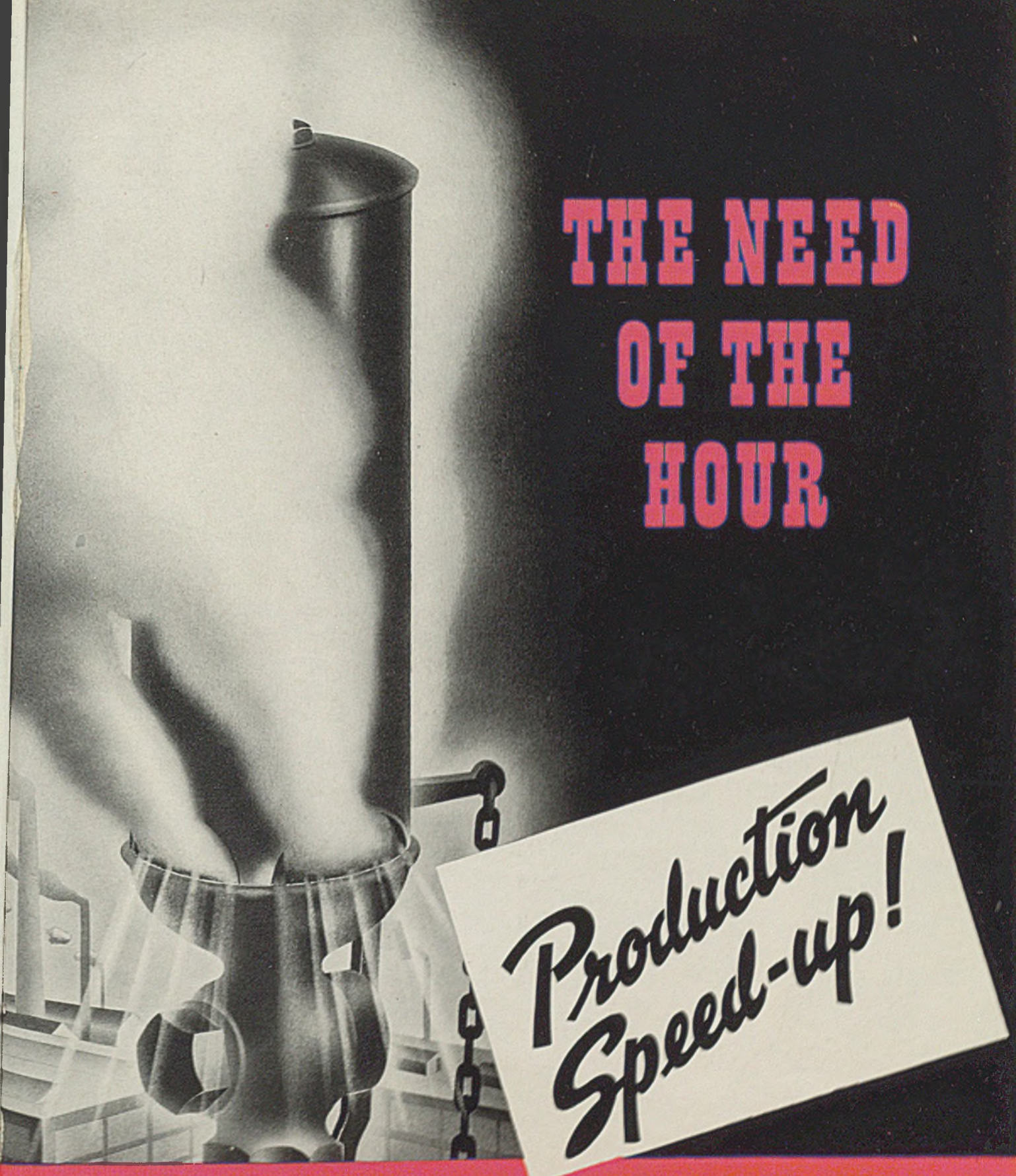
■ Finishes resembling hammere silver, copper, bronze and oth metals can be applied to produc of any kind of metal and bakeli molded plastics by use of a ne finish, known as Hammertone, r cently developed by Maas & Wal stein Co., Newark, N. J.

In finishing a surface with th development, a base coat of the d sired color is first sprayed on. Th is followed immediately by a spatt coat of Hammertone liquid, whi produces the hammered pattern the base coat. The product is the baked at medium heat for an hou

Film on Neoprene Offered on Request

■ The new sound motion pictu produced by E. I. du Pont de Ner ours & Co. Inc., Wilmington, De telling the story of neoprene, a sy thetic rubber-like material, is no available without charge to any o ganization having available a millimeter sound projector.

Having a running time of 20 mi utes, the film shows how the produ is made, explains its chemical fo mula by means of animated cartoon shows interesting tests of the m terial, and pictures hundreds of a plications of products made fro it. Bookings may be arrange through the Rubber Chemicals d vision of the company.



A PRODUCT THAT HAS HELPED OTHERS CAN HELP YO

(See other side)

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A well-known rubber mill encountered the usual trouble of hot bearings and excessive wear on a huge mixer. But that was only half the headache. The grease lost its body under heat, ran out of the bearings and damaged the product. » » » Grease in rubber spells loss . . . Changing to TYCOL GREEN CAST GREASE stopped this highly unsatisfactory condition immediately. Tycol Greases hold their body and prevent over-heating and wear on bearings. That's why fewer greasings and less grease are necessary. It's easy to see that switching to Tycol was highly profitable. » » » . . . This mill now knows . . . in dollars and cents . . . the full meaning of "less soap, more high quality cylinder oils" in TYCOL GREEN CAST GREASES. Let us prove it to you . . . show you the extra lubrication value in every pound of Tycol Grease. There is a Tycol Grease or Oil scientifically engineered to fit every industrial need. Write for all the facts.

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THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

Steel Output at New Peak: Pressure for Deliveries

Defense Requirements Steadily Mounting. 725,000 tons pending for 200 warships. Prices firm; scrap higher.

MARKET IN TABLOID ★

Demand
Strong; pressure for delivery increases.

Prices
Firm. Scrap up.

Production
Up 11 points to 83 per cent, year's highest.

■ STEELWORKS operations last week averaged 93 per cent of capacity, 11 points above the preceding week, which included Labor day. It was the peak so far this year.

Due to broadening demand and growing concern over deliveries, consumers are exerting more pressure on mills. Deliveries in general still are moderately good, but large commitments now on mill books, combined with business immediately in prospect may result soon in extending shipping dates.

Requirements for national defense are multiplying rapidly and in many directions. The increasing volume of such needs, plus substantial backlogs of varied character, is bringing nearer the question of priorities, a matter undoubtedly influencing many buyers.

Pressure for bars, plates and shapes is strongest, to meet manufacturing and construction needs, especially those associated with defense work. Shipments of sheets this month are likely to be among the heaviest of the year, due to the Sept. 30 deadline for deliveries of tonnages taken at price concessions.

Steel purchases in this country by Great Britain continue heavy. It is unofficially but reliably estimated that exports to England, including all descriptions except scrap, were 600,000 tons in August, compared with slightly more than 500,000 tons in July.

Award of contracts for 200 ships for the United States navy was an outstanding development last week. The seven battleships, eight aircraft carriers, 27 cruisers, 115 destroyers and 43 submarines will take a total of 725,000 tons of steel, including armor plate and heavy forgings. Deliveries will extend over several years. In the meantime, large scale expansions will be required in government and private shipyards.

Eight C-3 cargo vessels, requiring 34,000 tons of plates and shapes, were awarded last week to Pacific coast yards by the United States maritime commission. Pending are 28,000 tons of plates and shapes for two passenger vessels for the maritime commission, and 11,000 tons for three C-2 cargo vessels, Ocean Dominion Steamship Co. The navy department will open bids Sept. 20 on 82,500 tons of plates, shapes and bars for various yards.

Awards in the week included 2700 tons of shapes for a shop and runway at the Brooklyn navy yard; 7600 tons for a war department bridge at St. Georges, Del.; and 15,000 tons of plates for delivery to the Panama canal zone.

For work at the Philadelphia navy yard 2400 tons of reinforcing bars were placed. Seven thousand tons are pending for a Bonneville dam, Oregon, power station.

An inquiry for 5000 tons of shell steel was current in Chicago, and the Edward G. Budd Mfg. Co., Philadelphia, was negotiating for 2500 tons of bars and coils for bombs.

Inland Steel Co., Chicago, booked 22,500 tons of rails and accessories for the Rio Grande do Sul railway, Brazil, to be financed in part by the United States Export-Import bank. Chicago, Rock Island & Pacific placed 300 freight cars; Canadian Pacific, 500. Southern Railway will open bids Sept. 23 for 3000. Domestic freight car orders in August totaled 7525, largest this year, bringing the total for the first eight months to 29,562, compared with 12,456 in the corresponding period last year.

Shipments of finished steel by United States Steel Corp. subsidiaries in August amounted to 1,455,604 net tons, 158,717 tons more than in July, and highest since April, 1937, with 1,485,231 tons. The total for eight months this year is 9,040,889 tons, 39.7 per cent over the comparable period in 1939.

Automobile assemblies last week showed a sharp increase, up 26,950 to 66,615, despite minor labor difficulties.

Steelworks operations last week advanced 18 points to 98 per cent in the Wheeling district; 8 to 89 in Cleveland; 5 to 93, Birmingham; 15 to 87, Pittsburgh; 13 to 97.5, Chicago; 11.5 to 90.5, eastern Pennsylvania; 11 to 86, Youngstown; 1 to 95, Detroit; 14 to 82, Cincinnati. Buffalo was unchanged at 90.5; St. Louis held at 80. New England rate dropped 10 points to 75 per cent, as more open hearths were taken off for repairs.

STEEL's finished steel price composite last week held at $56.60. The iron and steel composite was up 13 cents to $37.94, while the steelworks scrap composite advanced 63 cents to $20.13.

COMPOSITE MARKET AVERAGES

	Sept. 14	Sept. 7	Aug. 31	One Month Ago Aug., 1940	Three Months Ago June, 1940	One Year Ago Sept., 1939	Five Years Ago Sept., 1935
Iron and Steel	$37.94	$37.81	$37.78	$37.70	$37.69	$36.67	$32.82
Finished Steel	56.60	56.60	56.60	56.60	56.60	55.60	53.70
Steelworks Scrap..	20.13	19.50	19.16	18.71	19.03	17.97	12.65

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 represen tative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

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

Finished Material

	Sept. 14, 1940	Aug. 1940	June 1940	Sept. 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.37	2.37	2.37
Iron bars, Chicago	2.25	2.25	2.25	2.05
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.00
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.00
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.40

Semifinished Material

Sheet bars, Pittsburgh, Chicago.	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅝-inch, Pitts.	2.00	2.00	2.00	1.92

Pig Iron

	Sept. 14, 1940	Aug. 1940	June 1940	Sept. 1939
Bessemer, del. Pittsburgh	$24.34	$24.34	$24.34	$23.35
Basic, Valley	22.50	22.50	22.50	21.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	23.54
No. 2 foundry, Pittsburgh	24.21	24.21	24.21	23.20
No. 2 foundry, Chicago	23.00	23.00	23.00	22.20
Southern No. 2, Birmingham	19.38	19.38	19.38	18.58
Southern No. 2 del. Cincinnati	22.89	22.89	22.89	22.09
No. 2X, del. Phila. (differ. av.)	25.215	25.215	25.215	24.415
Malleable, Valley	23.00	23.00	23.00	22.00
Malleable, Chicago	23.00	23.00	23.00	22.50
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	29.84
Gray forge, del. Pittsburgh	23.17	23.17	23.17	22.15
Ferromanganese, del. Pittsburgh	125.33	125.33	115.33	95.35

Scrap

Heavy melt. steel, Pitts.	$20.75	$18.75	$19.90	$18.75
Heavy melt. steel, No. 2, E. Pa.	19.75	18.35	18.10	17.10
Heavy melting steel, Chicago	19.25	18.15	18.00	16.05
Rails for rolling, Chicago	22.25	22.00	22.25	19.65
Railroad steel specialties, Chicago	21.50	21.05	21.40	18.00

Coke

Connellsville, furnace, ovens	$4.75	$4.75	$4.75	$3.75
Connellsville, foundry, ovens	5.75	5.75	5.75	5.00
Chicago, by-product fdry., del.	11.25	11.25	11.25	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

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

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

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

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.05c
Chicago or Gary	2.05c
Detroit, delivered	2.15c
Cleveland	2.05c

Buffalo	2.05c
Birmingham	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.70c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.50c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55

(Per Pound)

Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, del.	3.275c
Chicago, del.	3.29c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	67	70
⅝-1-inch	64	65
1⅛-1½-inch	62	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset 1-in., smaller	70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific Coast ports	2.95c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cutlengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	.....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.86	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	62.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼" O.D.	13	9.26	10.67
1½" O.D.	13	10.22	11.79
1¾" O.D.	13	11.84	13.42
2" O.D.	13	13.04	15.03
2¼" O.D.	13	14.54	16.76
2¼" O.D.	12	16.01	18.45
2½" O.D.	12	17.54	20.21
2¾" O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½" O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½" O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Pat Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fittgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅞-inch incl. (per 100 lbs.)	$2.00
Do., over ⅞ to 1⅛-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.35- 4.60
Connellsville, fdry.	5.25- 5.50
Connell, prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c
Per lb. f.o.b. Frankford and St. Louis	
Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	12.75c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	7.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birmingham, Ala.§	19.38	.....	18.38	24.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, and $1.24 freight.		84c,	
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81
St. Louis, northern	23.50	23.50	23.00	.....
St. Louis from Birmingham	†23.12	.....	22.62	.....
St. Paul from Duluth	25.63	25.63	.....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

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

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

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

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00
Do. barge	20.00
No. 2 lump	21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 36.00
Do., 26-28% 49.50

Ferrosilicon, 50% freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon 118.00
2% carbon, 108.00; 1%, 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 84.00c
Do., spot 89.00c
88% chrome, contract 83.00c
Do., spot 88.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ¼-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $69.50
Ton lots 79.50
Less-ton lots, lb. 3.75c
Less 200 lb. lots, lb. 4.00c
Spot ¼-cent higher.

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., spot 107.50
34-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	3.86	4.86	3.85	3.85	5.66	3.51	4.48	4.66	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.76	3.76	3.76	3.75	5.56	3.38	4.40	4.05	3.31	4.09	8.59	7.19
Philadelphia	3.85	3.75	4.25	3.55	3.55	5.25	3.35	4.05	4.00	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.62	3.62	3.62	3.40	5.25	3.05	4.30	4.00	3.22	3.75	8.15	6.75
Pittsburgh	3.35	3.40	3.40	3.40	3.40	5.00	3.15	....	4.45	....	3.65	8.15	6.75
Cleveland	3.25	3.30	3.30	3.40	3.58	5.18	3.15	4.05	4.42	3.20	3.75	8.15	6.75
Detroit	3.43	3.23	3.48	3.60	3.65	5.27	3.25	4.30	4.64	3.20	3.80	8.45	7.05
Omaha	3.90	3.80	3.80	3.95	3.95	5.55	3.45	....	5.00	....	4.42	....	....
Cincinnati	3.60	3.47	3.47	3.65	3.68	5.28	3.22	4.00	4.67	3.47	4.00	8.50	7.20
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.05	4.10	4.60	3.30	3.75	8.15	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.30	4.35	4.75	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.62	3.52	3.52	3.47	3.47	5.07	3.18	4.12	4.87	3.41	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.55	3.55	3.70	3.70	5.30	3.25	....	4.76	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.33	4.33	5.93	3.99	....	5.71	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
Seattle	4.00	3.85	5.20	3.65	3.75	5.75	3.70	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	4.45	4.00	4.00	6.40	4.30	6.50	5.25	....	6.60	10.65	9.80
San Francisco	3.50	4.00	6.00	3.35	3.35	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.20	5.75	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 1500-3499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia.

Cold Rolled Strip: No base quantity; extras apply on lots of all size

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Official Rates of Exchange

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons‡‡: **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	....	$33.23	3 18 0
Basic bessemer	....	.....	.....
Hematite, Phos. .03-.05	....	.....	.....
Billets	....	$31.95	3 15 0
Wire rods, No. 5 gage	....	60.71	7 2 6
Standard rails	....	$48.99	5 15 0
Merchant bars	2.66c 14 15 0	2.77c	7 6 0
Structural shapes	2.48c 13 15 0	2.83c	7 9 0
Plates, ¼ in. or 5 mm.	2.68c 14 17 6	3.53c	9 6 0
Sheets, black, 24 gage or 0.5 mm	3.40c 18 17 6	2.98c	7 17 0*
Sheets, gal., 24 ga., corr.	3.98c 22 2 6	3.94c	10 7 6
Bands and strips	....	2.76c	7 5 0
Plain wire, base	....	3.15c	8 6 3
Galvanized wire, base	....	3.75c	9 17 6
Wire nails, base	....	3.56c	9 7 6
Tin plate, box 108 lbs.	$ 5.61 1 7 9	.....	.....

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French ‡‡Francs		Belgian ‡‡Francs		Reich ‡‡Mar
Fdy. pig iron, Si. 2.5.	$24.24	6 0 0(a)	$17.18	788	$31.44	950	$25.33	63
Basic bess. pig iron	22.83	5 13 0(a)	.....	...	29.79	900	27.94	(b) 69.50
Furnace coke	6.77	1 13 5	4.91	225	10.92	320	7.64	19
Billets	42.42	10 10 0	26.62	1,221	42.20	1,275	38.79	96
Standard rails	2.30c	12 15 6	1.69c	1,692	2.06c	1,375	2.38c	132
Merchant bars	2.78c	15 8 6††	1.53c	1,530	2.06c	1,375	1.98c	110
Structural shapes	2.46c	13 13 0††	1.49c	1,487	2.06c	1,375	1.93c	107
Plates, ¼-in. or 5 mm.	2.55c	14 3 0††	1.95c	1,951	2.42c	1,610	2.29c	127
Sheets, black	3.49c	19 17 6§	2.30c	2,295‡	2.85c	1,900‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.07c	22 12 6	3.59c	3,589	4.80c	3,200	6.66c	370
Plain wire	3.83c	21 5 0	2.34c	2,340	3.00c	2,000	3.11c	173
Bands and strips	2.91c	16 3 6††	1.71c	1,713	2.48c	1,650	2.29c	127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. ‡‡No quotations.

IRON AND STEEL SCRAP PRICES

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

HEAVY MELTING STEEL

Birmingham, No. 1.	16.50
Bos. dock No. 1 exp.	16.75-17.00
New Eng. del. No. 1	16.75-17.00
Buffalo, No. 1	19.50-20.00
Buffalo, No. 2	17.50-18.00
Chicago, No. 1	19.00-19.50
Chicago, auto, no alloy	18.00-18.50
Cincinnati, dealers.	15.75-16.25
Cleveland, No. 1	19.00-19.50
Cleveland, No. 2	18.00-18.50
Detroit, No. 1	†15.50-16.00
Detroit, No. 2	†14.50-15.00
Eastern Pa., No. 1	20.50-21.00
Eastern Pa., No. 2	19.50-20.00
Federal, Ill., No. 2	15.50-16.00
Granite City, R. R. No. 1	16.25-16.75
Granite City No. 2.	15.00-15.50
Los Ang., No. 1, net	13.00-13.50
Los Ang., No. 2, net	12.00-12.50
N.Y. dock No. 1 exp.	†15.50-16.00
Pitts., No. 1 (R. R.)	22.00-22.50
Pittsburgh, No. 1	20.50-21.00
Pittsburgh, No. 2	19.50-20.00
St. Louis, No. 1	16.25-16.75
St. Louis, No. 2	15.00-15.50
San Fran., No. 1, net	13.00-13.50
San Fran., No. 2, net	12.00-12.50
Seattle, No. 1	15.00
Toronto, dirs., No. 1	11.00
Valleys, No. 1	19.50-20.00

COMPRESSED SHEETS

Chicago, factory	18.50-19.00
Chicago, dealers	16.00-16.50
Cincinnati, dealers.	14.75-15.25
Cleveland	18.50-19.00
Detroit	†17.50-18.00
E. Pa., new mat.	20.50
E. Pa., old mat.	17.50-18.00
Los Angeles, net	10.00-10.50
Pittsburgh	20.50-21.00
St. Louis	12.50-13.00
San Francisco, net.	10.00-10.50
Valleys	19.00-19.50

BUNDLED SHEETS

Buffalo, No. 1	17.50-18.00
Buffalo, No. 2	16.00-16.50
Cleveland	14.50-15.00
Pittsburgh	19.50-20.00
St. Louis	11.50-12.00
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	13.00-13.50
Cincinnati, dealers.	10.25-10.75
Detroit	†14.00-14.50
St. Louis	10.50-11.00
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1.	13.00
Buffalo, No. 1	17.50-18.00
Chicago, No. 1	17.75-18.25
Cincin., No. 1 deal.	11.50-12.00
Cincin., No. 2 deal.	6.75- 7.25
Cleveland, No. 2	13.00-13.50
Detroit, No. 1 new.	†17.00-17.50
Valleys, new, No. 1	19.00-19.50
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	5.00
Buffalo	13.00-13.50
Chicago	12.50-13.00
Cincinnati, dealers.	8.25- 8.75
Cleveland, no alloy.	12.50-13.00
Detroit	†9.75-10.25
Eastern Pa.	14.50
Los Angeles	4.00- 5.00
New York	†9.00- 9.50
Pittsburgh	16.00-16.50
St. Louis	9.50-10.00
San Francisco	5.00
Toronto, dealers	7.00- 7.25
Valleys	13.50-14.00

SHOVELING TURNINGS

Buffalo	14.00-14.50
Cleveland	13.00-13.50
Chicago	13.25-13.75
Chicago, spcl, anal.	14.50-15.00
Detroit	†11.00-11.50
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS
For Blast Furnace Use

Boston district	†7.00- 7.25
Buffalo	12.50-13.00
Cincinnati, dealers.	6.75- 7.25
Cleveland	13.00-13.50
Eastern Pa.	13.00-13.50
Detroit	†11.00-11.50
New York	†8.75- 9.00
Pittsburgh	14.00-14.50
Toronto, dealers	6.75

AXLE TURNINGS

Buffalo	16.00-16.50
Boston district	†11.50-12.00
Chicago, elec. fur.	18.00-18.50
East. Pa. elec. fur.	17.50-18.00
St. Louis	13.00-13.50
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†9.00- 9.25
Buffalo	12.50-13.00
Chicago	13.00-13.50
Cincinnati, dealers.	6.75- 7.25
Cleveland	13.00-13.50
Detroit	†11.00-11.50
E. Pa., chemical	14.50-15.00
New York	†8.75- 9.00
St. Louis	9.00- 9.50
Toronto, dealers	6.75

RAILROAD SPECIALTIES

Chicago	21.25-21.75

ANGLE BARS—STEEL

Chicago	21.50-22.00
St. Louis	18.50-19.00

SPRINGS

Buffalo	24.00-24.50
Chicago, coil	23.00-23.50
Chicago, leaf	22.00-22.50
Eastern Pa.	24.50-25.00
Pittsburgh	26.50-27.00
St. Louis	20.00-20.50

STEEL RAILS, SHORT

Birmingham	18.00
Buffalo	24.00-24.50
Chicago (3 ft)	21.50-22.00
Chicago (2 ft)	22.50-23.00
Cincinnati, dealers.	21.50-22.00
Detroit	†21.50-22.00
Pitts., 3 ft. and less	26.00-26.50
St. L. 2 ft. & less	21.50-22.00

STEEL RAILS, SCRAP

Birmingham	16.00
Boston district	†14.50-15.00
Buffalo	22.00-22.50
Chicago	19.25-19.75
Cleveland	23.50-24.00
Pittsburgh	23.50-24.00
St. Louis	18.75-19.25
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	12.50-13.00
Cincinnati, dealers.	12.00-12.50

RAILROAD GRATE BARS

Buffalo	14.00-14.50
Chicago, net	13.50-14.00
Cincinnati, dealers.	11.25-11.75
Eastern Pa.	17.50
New York	†12.00-12.50
St. Louis	13.50-14.00

RAILROAD WROUGHT

Birmingham	14.00
Boston district	†9.50-10.00
Eastern Pa., No. 1	20.00-20.50
St. Louis, No. 1	13.00-13.50
St. Louis, No. 2	15.50-16.00

FORGE FLASHINGS

Boston district	†12.00-12.25
Buffalo	17.50-18.00
Cleveland	18.00-18.50
Detroit	†15.50-16.00
Pittsburgh	19.00-19.50

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	22.50-23.00

LOW PHOSPHORUS

Cleveland, crops	23.00-23.50
Eastern Pa., crops	25.00-25.50
Pitts., billet, bloom, slab crops	26.00-26.50

LOW PHOS. PUNCHINGS

Buffalo	23.50-24.00
Chicago	21.75-22.25
Cleveland	20.00-20.50
Eastern Pa.	25.00-25.50
Pittsburgh	25.50-26.00
Seattle	15.00
Detroit	†19.00-19.50

RAILS FOR ROLLING
5 feet and over

Birmingham	18.00
Boston	†15.75-16.00
Chicago	22.00-22.50
New York	†17.50-18.00
Eastern Pa.	23.00-23.50
St. Louis	21.50-22.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†18.50-19.00
Chicago, net	23.00-23.50
Eastern Pa.	25.00-25.50
St. Louis	22.00-22.50

LOCOMOTIVE TIRES

Chicago (cut)	22.50-23.00
St. Louis, No. 1	17.00-17.50

SHAFTING

Boston district	†19.00-19.25
New York	†19.00-19.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"	19.00-19.50

CAR WHEELS

Birmingham, iron	13.50
Boston dist., iron	†14.75-15.00
Buffalo, steel	24.00-24.50
Chicago, iron	20.00-20.50
Chicago, rolled steel	22.75-23.25
Cincin., iron deal.	19.00-19.50
Eastern Pa., iron	21.50-22.00
Eastern Pa., steel	24.50-25.00
Pittsburgh, iron	21.00-21.50
Pittsburgh, steel	26.50-27.00
St. Louis, iron	18.50-19.00
St. Louis, steel	19.50-20.00

NO. 1 CAST SCRAP

Birmingham	16.50
Boston, No. 1 mach.	†15.75-16.25
N. Eng. del. No. 2	15.25-15.75
N. Eng. del. textile.	19.50-20.00
Buffalo, cupola	18.50-19.00
Buffalo, mach.	20.00-20.50
Chicago, agri. net.	15.00-15.50
Chicago, auto net.	18.00-18.50
Chicago, railr'd net	16.00-16.50
Chicago, mach. net.	16.50-17.00
Cincin., mach. deal.	19.50-20.00
Cleveland, mach.	21.50-22.00
Detroit, cupola, net.	†17.00-17.50
Eastern Pa., cupola.	22.00-22.50
E. Pa., No. 2 yard	18.50-19.00
E. Pa., yard fdry.	19.00-19.50
Los Angeles	16.50-17.00
Pittsburgh, cupola.	19.50-20.00
San Francisco	14.50-15.00
Seattle	14.50-16.00
St. L., agri. mach.	18.00-18.50
St. L., No. 1 mach.	19.00-19.50
Toronto, No. 1 mach., net dealers	18.00-18.50

HEAVY CAST

Boston dist. break.	†15.00-15.25
New England, del.	16.25-16.75
Buffalo, break	17.50-18.00
Cleveland, break, net	16.50-17.00
Detroit, auto net.	†17.25-17.75
Detroit, break.	†15.00-15.50
Eastern Pa.	21.00
Los Ang., auto, net.	13.00-14.00
New York break.	†16.00-16.50
Pittsburgh, break	16.50-17.00

STOVE PLATE

Birmingham	10.00-11.00
Boston district	†11.50-11.75
Buffalo	16.00-16.50
Chicago, net	12.00-12.50
Cincinnati, dealers.	11.75-12.25
Detroit, net	†11.00-11.50
Eastern Pa.	17.50
New York fdry	†13.00
St. Louis	†12.50-13.00
Toronto dealers, net	12.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	22.50-23.00
Chicago, R. R.	22.00-22.50
Cincin. agri., deal.	16.75-17.25
Cleveland, rail.	22.50-23.00
Eastern Pa., R. R.	22.50-23.00
Los Angeles	12.50
Pittsburgh, rail.	23.50-24.00
St. Louis, R. R.	19.00-19.50

Ores

Lake Superior Iron Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos	nom.
Spanish, No. African basic, 50 to 60%	nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c
F.O.B. Rio Janeiro.	
Scheelite, imp.	$25.00
Chrome ore, Indian, 48% gross ton, c.i.f.	$28.00-30.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	60.00
So. African, 50-52%	58.00-59.00
Indian, 49-50%	56.00
Brazilian, 46%	50.00-53.00
Cuban, 50-51%, duty free	71.00-73.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

—The Market Week—

Sheets, Strip

Sheet & Strip Prices, Pages 158, 159

Pittsburgh—Heavy miscellaneous tonnage combines with more active automotive releases to pile up sheet backlogs at most points. Deliveries are running fairly close to schedule, however. With prices firm, most producers are content to satisfy domestic demand and are not making overtures for additional export tonnage.

Chicago — Specifications continue to pile up for hot and cold-rolled sheets and strip, with auto partsmakers and stampers' facilities getting busier each succeeding week. Mills have backlogs varying from three to six weeks, depending upon widths and gages.

New York—Sheet deliveries continue to expand. This is attributed in part to slightly better consumption, but more importantly to the Sept. 30 deadline on deliveries of tonnage purchased at concessions last spring.

Specifications from stovemakers are particularly brisk. Automobile accessory manufacturers are specifying more freely. Toy manufacturers, who began their buying season early this year, are still ordering heavily.

More tonnage is going into defense work. Several thousand tons of hot sheets and strip for bomb crates have been ordered recently.

Deliveries on hot sheets are three to four weeks and cold sheets four to five weeks.

Philadelphia — Due primarily to the Sept. 30 deadline on shipments of sheets taken at concessions, sellers expect the movement this month to be one of the heaviest so far this year. Moreover, there is some quickening in actual consumption and it appears that while the heavy products will bear the brunt of defense work, an increasingly substantial burden will be placed on sheets for a wide diversity of needs. For instance, the quartermaster camp, Halebird, Md., has recently placed 20,000 five-gallon water containers with Columbian Steel Products Co., and will open bids Sept. 26 on 29,000 ten-gallon gasoline containers. Quartermaster, Jeffersonville, Ind., is expected to inquire shortly for 30,000 field stoves after having placed 9000 about a month ago, of which 5000 went to an eastern Pennsylvania fabricator. The 9000 were of stainless steel, although there is a possibility that the next lot will be made of mild steel. Substantial tonnages are being figured for bomb crates. Cantonment requirements will be heavy.

Buffalo—Mills are having diffi-

culty making deliveries, and further expansion in demand for sheets and strip is reported. Motor manufacturers and plants with armament orders, are calling for increased tonnages. Rolling schedules are at capacity on a six-day week basis.

Cincinnati — Demand for sheets and strip is expanding, due chiefly to automotive buying. Almost none of the district tonnage reflects directly the moves in national defense. Prices are firm.

St. Louis—Producers and distributors of sheets and strip report a broadening in specification, and good volume of new ordering. Black sheets and enameling stock are receiving most attention at the moment. Deliveries by local mills are reasonably prompt on a majority of items.

Birmingham, Ala.—Sheet and strip demand, while satisfactory, has fallen off slightly. Sheets are moving in much greater quantity than strip, the larger part of the output of which in this territory is cotton ties. Sheets sales are estimated at around 80 per cent of capacity.

Toronto, Ont.—Demand for sheets and strip is well sustained with the automotive industry the most important buyer. Brisk demand also is reported from electrical equipment makers and various other consumers engaged in war work. Mills are booked to the end of the year with substantial tonnage carryover into 1941. Much business is going to United States producers.

Plates

Plate Prices, Page 158

Pittsburgh — Shipments about equaled new bookings last week, with no perceptible increase in backlogs, and deliveries remaining about as far behind as they were. Carnegie-Illinois Steel Corp. is installing facilities at its Mingo Junction, O., works to facilitate heat treating of armor plate.

New York — In addition to its order for 200 combatant ships last week, the navy also placed repair ship requiring 7000 tons of steel with Los Angeles Shipbuilding & Dry Dock Co. It is reported Cramp shipyards, Philadelphia, are scheduled to build six cruisers following reorganization and equipment of property.

Philadelphia — Although some eastern producers still are in a position to make fairly early deliveries, the plate situation generally is tightening. Some sellers are unable to do anything under four to five weeks regardless of size and gage of plates, and in some cases deliveries run eight and nine weeks. Navy will open bids Sept. 20 on 82,500 tons of plates, shapes and bars for various yards. Originally the navy inquired for 118,000 tons, with bids scheduled for Sept. 6. District yards shared substantially in the navy's distribution of 200 ships last week, although it will be several months, it is believed, before any of this will be translated into actual tonnage. Total steel requirements for the 200 are estimated at 725,000 tons, mainly plates. Sun Shipbuilding & Dry Dock Corp., Chester, Pa., is low on three C-2 ships for Ocean Dominion Steamship Co., requiring approximately 11,000 tons of steel.

Birmingham, Ala.—Mills at Birmingham and Gadsden are heavily booked on plates and additional business is accumulating or definitely in sight. Car production, shipbuilding and tank manufacture is accounting for a large part of the tonnage, and renewal of shipbuilding at Mobile, as announced this week, is expected to add to requirements in a large measure.

San Francisco—The plate market was the most active so far this year and 34,200 tons were booked. Un-

named interests took 15,000 tons, under schedule 4171, for the Panama canal. Western Pipe & Steel Co. and Seattle-Tacoma Shipbuilding Corp. were each awarded four C-3 type cargo vessels for the United States maritime commission calling for 9600 tons for each award. The latter company submitted the only bid for two P-4-P passenger vessels for the same commission involving 16,800 tons. Bookings for the year to date total 91,370 tons, compared with 35,514 tons for the same period a year ago.

Toronto, Ont.—Placing of rolling stock orders by the Canadian Pacific railway will have further stimulating effect on an already brisk market for plates. Most of the business will go to United States firms. Canadian demand generally is heavy and continues to increase as the government places new orders for ships and including tanks. An order for 300 18-ton tanks recently was awarded the Angus shops of Canadian Pacific railway.

Plate Contracts Placed

15,000 tons, schedule 4171, Panama canal, C. Z., to unnamed interests.

Approximately 11,000 tons steel, mainly plates, three C-2 ships, Ocean Dominion Steamship Co.; Sun Shipbuilding & Dry Dock Co., Chester, Pa., low.

9600 tons, four C-3 type cargo vessels, United States maritime commission, to Western Pipe & Steel Co., San Francisco.

9600 tons, four C-3 type cargo vessels, United States maritime commission, to Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash.

935 tons, barges, River Terminals Corp., Leetsdale, Pa., to Dravo Contracting Co., Pittsburgh.

Plate Contracts Pending

82,500 tons, plates, shapes and bars for various navy yards; bids Sept. 20, navy department Washington. Original inquiry for 118,000 tons was scheduled for Sept. 6.

16,800 tons, two P-4-P passenger vessels, United States maritime commission; Seattle-Tacoma Shipbuilding Corp., only bidder.

1625 tons, schedule 4274, Panama canal; bids opened.

1280 tons, schedule 4303, Panama Canal, C. Z.; bids opened.

Bars

Bar Prices, Page 158

Pittsburgh—Merchant bar tonnage is heavy and mills are loaded up. Deliveries are 60 days behind in some cases. Export demand is heavy, at the domestic price level, Pittsburgh, plus freight to seaboard. Releases from miscellaneous manufacturers are slightly better, and automotive tonnage is good.

Chicago—Demand for all forms of steel bars continues to expand gradually, auto partsmakers still leading. Some of this material appears to be destined for stocks, but mainly the tonnages are going into active manufacture as shown by insistence upon prompt deliveries. An inquiry for 5000 tons of shell steel is current here.

Philadelphia—Increasing specifications from machine tool builders, forge and government shops are tightening bar deliveries. Plain carbon bars are difficult to obtain under four to six weeks and alloy bars, eight or nine weeks. Where special heat treating and annealing is required, little can be done this year. Frankford arsenal has opened bids on two lots of cold-drawn rounds totaling 639 tons. Edward G. Budd Mfg. Co., Philadelphia, is negotiating for 2500 tons of bars and coils for bombs. A heavy tonnage of billets continues under negotiation by a district company for a British shell contract.

Birmingham, Ala.—Demand for bars has gained in the South in the past several weeks. Merchant bars are considerably more active and output of concrete reinforcing remains at a high level. Some

backlog of orders in bars is reported.

Buffalo — Practically every consuming source is pressing mills for bar steel deliveries. Consumers are endeavoring to build up inventories for future demands from the national defense program. Aircraft, toolmakers and machine plants are after increased tonnage. Mille are working at top speed but deliveries are in arrears a month or more.

Toronto, Ont.—Merchant bar sales have been moving steadily and mills report heavy backlogs, covering production to the year's end. Toolmakers continue the principal buyers, although implement makers and the automotive industry have been active. Deliveries are extended. Canadian mills, despite the sharp gain in demand, report no difficulty in meeting requirements.

Semifinished Steel

Semifinished Prices, Page 159

Pittsburgh — Specifications from Great Britain have tapered off and it is expected if new tonnage is purchased it will be at the full price. However, there is some indication that future buying by Britain will be more in the form of finished steel than semifinished. Meanwhile, local nonintegrated mills continue active releases on sheet bars, skelp and wire rods, with specifications from nonintegrated tin plate mills off considerably.

Pipe

Pipe Prices, Page 159

New York—Competition continues keen among merchant pipe distributors here. Despite apparent firmness of mill prices and the probability of more extended deliveries later, due to heavy demands for raw steel in other directions, re-sellers in many cases are still quoting at concessions. The question is growing as to how much longer they will be able to do so.

Demand is fairly good. There is also good buying of line pipe throughout the country by the oil and gas companies, with some of this business being placed through offices here. Certain of the larger utility companies have about completed the purchase of all pipe needed for maintenance purposes over the remainder of the year.

Birmingham, Ala.—Another five-day week in the pipe plants of the district is reported. Orders are in good aggregate volume, although not individually large.

San Francisco—While awards and inquiries for large lots of cast iron pipe are limited, carload lots are moving swiftly and stocks in Pacific coast yards are nearly depleted. Awards in the week aggregated 685 tons and brought the total to date this year to 32,846 tons, compared with 23,334 tons for the corresponding period in 1939.

Cast Pipe Placed

287 tons, 8-inch, San Francisco, to United States Pipe & Foundry Co., Burlington, N. J.

190 tons, 8-inch, San Francisco, to Central Foundry Co.

166 tons, 10 and 16-inch, east bay municipal utility district, Oakland, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

810 tons, 8 to 12-inch, cast iron, steel, concrete or asbestos cement pipe, Bishop, Calif.; bids opened.

143 tons, 4 and 6-inch, cast iron, steel or cement asbestos pipe, Tulelake, Calif.; bids Sept. 23.

Rails, Cars

Track Material Prices, Page 159

New York—New York Central closed bids last week on 1000 high-side gondolas for Pittsburgh & Lake Erie, and will open bids Sept. 30 on at least a substantial portion of its 1941 rail requirements. These requirements are expected to be heavier than those for this year, which amounted to more than 70,000 tons.

Inland Steel Co. received a cable from W. J. Hammond, vice president, from Rio de Janeiro, Brazil, announcing completion with the Rio Grande do Sul railroad of all details in connection with an order for 22,500 tons of 75-pound steel rails and accessories. The transaction will be financed in part by the United States Export-Import bank. Shipments are expected to start in November and be completed by February.

Domestic freight car awards, 7525, in August represented the largest monthly total this year, surpassing 7475 in June, and bringing the total for the first eight months up 29,562. This latter figure compares with 12,456 units in the first eight months of last year, 8203 in the corresponding period in 1938, and 48,490 in the same period in 1937. Further comparisons follow:

	1940	1939	1938	1937
Jan.	360	3	25	17,806
Feb.	1,147	2,259	109	4,972
March	3,104	800	680	8,155
April	2,077	3,095	15	9,772
May	2,010	2,051	6,014	4,732
June	7,475	1,324	1,178	548
July	5,864	110	0	1,030
Aug.	7,525	2,814	182	1,475
8 mos.	29,562	12,456	8,203	48,490
Sept.	.....	23,000	1,750	1,216
Oct.	.....	19,634	2,537	1,355
Nov.	.....	2,650	1,232	275
Dec.	.....	35	2,581	275
Total	.....	57,775	16,303	51,611

Car Orders Placed

Canadian Pacific Railway Co., 100 seventy-five-ton gondolas, 10 baggage and express and 25 steel frames for passenger coaches to Canadian Car & Foundry Co. Ltd., Montreal; 100 seventy-five-ton gondolas and 300 fifty-ton coal cars to National Steel Car Corp., Hamilton, Ont.

Chattanooga Traction Co., two diesel electric switchers to General Electric Co.

Chicago, Rock Island & Pacific, 300 freight cars; 200 fifty-ton steel box cars, to American Car & Foundry Co., New York; 100 seventy-ton low-side, drop-end gondolas, to Pullman Standard Car Mfg. Co., Chicago.

Car Orders Pending

Chief United States engineers, Washington, three flats and three gondolas; Haffner-Thrall, low.

Chief United States engineers, Washington, 410 to 660 tank cars; American Car & Foundry Co. and General American Tank Car Corp., low.

Chief United States engineers, Washington, 160 to 310 10,000-gallon tank cars; General American Tank Car Corp., low.

Norfolk & Western opens bids Sept. 20 on 500 fifty-five ton gondolas.

Southern Railways opens bids Sept. 23 on 3000 freight cars comprising 1500 forty-ton steel box cars; 750 fifty-ton hoppers; 500 fifty-ton high side gondolas and 250 fifty-ton low side gondolas.

Rail Orders Placed

Rio Grande do Sul, Rio de Janeiro, Brazil, 22,500 tons, including track accessories, to Inland Steel Co., Chicago.

Buses Booked

A.c.f. Motors Co., New York: For Philadelphia Transportation Co., thirty-seven 31-passenger; for Santa Fe Trail Transportation Co., Chicago, four 29-passenger; Santa Fe Transportation Co., Chicago, two 29-passenger; Kansas City & Leavenworth Transportation Co. Kansas City, Kans., one 29-passenger; Texas Motorcoaches Inc., Fort Worth, Tex., ten 29-passenger; Southeastern Greyhound Lines, Lexington, Ky., one 29-passenger; Florida Motor Lines Corp., Jacksonville, Fla., two 37-passenger; Dixie Motor Coach Corp., Dallas, Tex., three 37-passenger.

J. G. Brill Co., New York: Six 40-passenger for Delaware Electric Power

Co., Wilmington, Del.; five 44-passenger for Indianapolis Railways Inc., Indianapolis.

Wire

Wire Prices, Page 159

Pittsburgh—A slight lull is noted in new business, after a period of increased demand, principally from domestic manufacturers. Export market for merchant wire products continues good and there is some sign that the domestic market for wire products will increase, with sellers here looking for a pick-up in agricultural demand shortly. Prices are strong.

Birmingham, Ala.—Wire production remains at about last week's level and is estimated at 85 per cent. All items are in good demand and some backlog of business is reported.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 159

New York—Bolt and nut demand is becoming increasingly diversified and operations are being stepped up briskly. September business was the best in several months. Specifications for defense work are increasing. In addition to requirements here, there is good demand from abroad, particulary from British possessions in the Near East and Far East. The Dutch colonies in the Far East also are ordering freely.

Boston—Demand for heavier bolts, nuts and washers is slightly more active due to more heavy timber construction. Buying of smaller pieces continues at high level, especially for alloy material for aircraft and miscellaneous industrial assemblies. Bayonne Bolt Corp., Bayonne, N. J. is supplying bolts and washers for a pier, Electric Boat Co., Groton, Conn., through Elliot & Watrous, Inc., Providence, R. I. contractors.

Shapes

Structural Shape Prices, Page 158

Pittsburgh — New inquiries over the past week were as heavy as they had been in many weeks, and backlogs continued to increase. Deliveries are running heavily behind in some cases. Considerable tonnage now being placed is not scheduled for delivery until next year.

Philadelphia — Fabricators look for increasing activity over coming weeks as industrial construction expands in meeting defense requirements. Outstanding award was 7600 tons for war department bridge at St. Georges, Del., to Phoenix Bridge Co., Philadelphia.

Buffalo—Fabricators backlogs are expanding and brisk operations are assured for months. Awards are the best in some time and numerous jobs are pending. Bethlehem Steel Co. took 1750 tons of steel piling for the new Cargill grain elevator here.

San Francisco — Featuring the structural market was the award of eight C-3 type cargo vessels by the United States maritime commission, four to Western Pipe &

Shape Awards Compared

	Tons
Week ended Sept. 14.....	42,360
Week ended Sept. 7	49,247
Week ended Aug. 31.....	29,909
This week, 1939	47,130
Weekly average, year, 1940.	22,881
Weekly average, 1939	22,411
Weekly average, August....	29,403
Total to date, 1939	836,891
Total to date, 1940	846,597

Includes awards of 100 tons or more.

Steel Co., and four to Seattle-Tacoma Shipbuilding Corp., 6400 tons in each award, total 12,800 tons. Awards in the week aggregated 18,250 tons, and brought the total to date to 232,700 tons, compared with 97,826 tons for the corresponding period in 1939. Seattle-Tacoma Shipbuilding Corp. was the only bidder on two P-4-P type passenger vessels for the maritime commission, requiring 11,200 tons.

Birmingham, Ala.—Shapes are in consistently good demand for private construction and considerable highway and bridge work. Output is at approximately 80 per cent.

Toronto, Ont.—Demand is heavy and additional large orders are in prospect. The government's war construction program has created an extraordinary demand for structural steel, with orders now pending for almost immediate closing exceeding 15,000 tons. During the past week government construction contracts totaled about $4,000,000, while for plant and ordinary building jobs contracts total about $20,000,000.

St. Louis—Orders being received for structural shapes by St. Louis fabricators continue small individually, and the aggregate is not impressive. However, backlogs permit of operations at 50 to 60 per cent of capacity.

Shape Contracts Placed

7600 tons, war department bridge, St. Georges, Del., to Phoenix Bridge Co., Philadelphia.

6400 tons, four C-3 type cargo vessels, United States maritime commission, to Western Pipe & Steel Co., San Francisco.

6400 tons, four C-3 type cargo vessels, United States maritime commission to Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash.

3600 tons, depot supply and other buildings, Albrook field, Canal Zone, United States Steel Export Co., through Robert E. McKee, El Paso, Tex.

2310 tons, additions to buildings B and C, Glenn L. Martin Co., Middle River, Md., to Fort Pitt Bridge Works, Pittsburgh.

1750 tons, sheet piling, foundation for new grain elevator, Cargill Inc., Buffalo, to the Bethlehem Steel Co., Buffalo.

1700 tons, school buildings for mental defective, Willowbrook, N. Y., for state, to Belmont Iron Works, Philadelphia.

1100 tons, warehouses M-20 and M-26, Philadelphia, for government, to Belmont Iron Works, Philadelphia.

1050 tons, viaduct, Water street, Alexandria, Pa., for state, to Bethlehem Steel Co., Bethlehem, Pa.

750 tons, sheet piling, naval air station, Tongue Point, Ore., to Bethlehem Steel Co.

700 tons, building addition, Spencer Lens Co., Cheektowaga, N. Y., to the R. S. McMannus Steel Construction Co. Inc., Buffalo. Gilmore-Carmichael & Olson Co., Cleveland, contractor.

670 tons, state highway bridge, FASH-40-2, Renssalaer county, New York, to American Bridge Co., Pittsburgh.

500 tons, building, for International Business Machines Corp., Endicott, N. Y., to American Bridge Co., Pittsburgh.

400 tons, addition, Aluminum Company of America, Vernon, Calif., to Pacific Iron & Steel Co., Los Angeles.

350 tons, addition, Federal Reserve bank, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, process stage, R.K.O., Los Angeles, to Pacific Iron & Steel Co., Los Angeles.

315 tons, piling, jetty, Ocean City, N. J., to Carnegie-Illinois Steel Corp.

310 tons, Scott County Milling Co. plant, Sikestown, Mo., to Laclede Steel Co., Jones Hettelsater, contractor.

300 tons, Marginal street improvement, contract 32, New York, for city, to American Bridge Co., Pittsburgh.

300 tons, Thrift Park Inc., parking deck, Philadelphia, Pa., to Republic Steel Corp., through Truscon Steel Co., S. H. Levin, contractor.

300 tons, Newport News Shipbuilding & Drydock Co., improvements, Newport, News, Va., to Jones & Laughlin Steel Corp.

288 tons, state highway at San Marcos, Texas, to Virginia Bridge Co.

275 tons, building, for Keene Belvidere Canning Co., Belvidere, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

Behind the Scenes with STEEL

Mr. Penton

■ The first day we met John A. Penton was several years ago as we were ushered into his elaborate office overlooking Lake Erie to be interviewed for employment. Our college commencement address was still ringing in our ears and behind those ears there was considerable evidence of dampness. With our cocky self-assurance leaving us in the hall we marched in as best we could to find him reading at his desk, oblivious of any interruption whatsoever. After what seemed like hours he looked up slowly with a friendly frown and pursed lips, behind which we hoped we saw a faint smile. We were asked the usual questions but the answers seemed unimportant for he would be off on something else again before we had half-opened our mouth. But all the time we could feel ourselves being studied, sized-up and catalogued, even when we simply sat attentively and listened to his challenging picture of things a young man could still accomplish in these days, just as he had done in his. But soon it was time to leave. We moved to go in our best manner, as our escort lagged behind, and it was then we overheard our gruff recommendation — "There's a good 150-pound boy. Better get him."

"D" For Deficit

■ We see where F.D.R. went "political" last week at the teamsters' meeting which was a very timely move for a "draft horse"; all of which reminds us of the slogan some of our more ardent Republican friends are passing around. It's about not switching horses, or any part thereof, in the middle of the stream or something like that.

Renegade

■ And since we're off onto politics, we might as well 'fess up to a family that was so Democratic that we all practically had to crow like a rooster morning, noon and night. One "took a walk" four years ago which we feel, now, as then, was a mistake, but already this year we were half way out the door before the farce in Chicago and with that over, we slammed it shut and headed straight for the nearest drug store and a shiny new button reading: *Win With Willkie!*

Power of the Press?

■ *Editor & Publisher* has been making a survey of the editorial stand of the country's daily newspapers and finds that out of 1030, 683 are actively supporting Willkie, 208 are supporting Roosevelt for Term III, and 139 are either neutral or haven't made up their minds yet.

Bible Expert

■ In the same paper there's an item about the Associated Press subscriber who was fed up with constant errors in the baseball box scores as they came over the wire. So he broke in on the trunk line with this message: *Tonight's Text: Hebrews* 13-8, *Pittsburgh one run short.* AP men all over the country opened their Bibles and read: "Jesus Christ. The same yesterday, today and forever."

What Do You Think?

■ C. E. McIntire of American Rolling Mill's Butler, Pa. plant says if we think this is good, he wrote it; if not, he hasn't any idea where it came from:

There was a young lady from Wheeling
Who was accused by her boss of stealing.
Said he: "What's under your arm?"
Said she: "I mean no harm."
"That's the magazine STEEL —I'm just STEELING."

That ain't the way we heard it!

SHRDLU.

—The Market Week—

250 tons, two highway bridges, Larrys Creek, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

250 tons, sheet piling for building for General Chemical Co., Chicago, placed with Inland Steel Co., Great Lakes Dredge & Dock Co., contractor.

240 tons, addition to power house, for U. S. Tobacco Co., Chicago, to Eggers Iron Works, Chicago.

208 tons, state highway bridge, Burwell, Neb., to Omaha Steel Works, W. A. Biba Engineering Co., contractor.

205 tons, addition, electrical engineering building, Purdue university, Lafayette, Ind. to Hetherington & Berner, Inc., Indianapolis, Ind.

200 tons, extension to buildings, for Harrisburg Steel Corp., Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, addition, Marine Corps base, San Diego, Calif., to Pacific Iron & Steel Co., Los Angeles.

200 tons, state bridge 5921, Red Lake Falls, Minn., to American Bridge Co., Pittsburgh.

200 tons, dry dock, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., to Bethlehem Steel Co., Bethlehem, Pa., through McLean Contracting Co., Baltimore.

175 tons, Santa Clara river bridge for Los Angeles county, California, to Pacific Iron & Steel Co., Los Angeles.

175 tons, bridge, FAP-7-B, between Calhoun and Cleveland counties, Arkansas, to Fort Smith Structural Steel Co., Fort Smith, Ark.

170 tons, ferry and gallows frame, Governors Island, N. Y., for government, to J. Edward Ogden.

165 tons, state bridge B-1 of 67-16-3, Sears, Mich., to Elkhart Bridge & Iron Co., Elkhart, Ind.

155 tons, bridge, contract No. 2014, Franklin, Ind., to Central States Bridge & Structural Co., Indianapolis, Ind.

150 tons, bus garage and central school, Victor, N. Y., to Genesee Bridge Co., Rochester, N. Y.

140 tons, state bridge RC-40-68, Avon, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, bridge 35.50, Greens Farms, Conn., for New York, New Haven & Hartford railroad, to American Bridge Co., Pittsburgh.

140 tons, bridge, contract No. 2011, Lebanon, Ind., to Midland Structural Steel Co., Cicero, Ill.

140 tons, bridge, 32.03, New York, New Haven & Hartford, Westport, Conn., to American Bridge Co., Pittsburgh.

135 tons, sheet piling, United States Indian Irrigation Service, Parker, Ariz., to Bethlehem Steel Co., Los Angeles.

120 tons, Mulberry St. Bridge approach, Kansas City, Mo., to Sheffield Steel Corp.

120 tons, bridge, route 850, Westmoreland county, Pennsylvania, to Fort Pitt Bridge Works, Pittsburgh.

120 tons, Individual Drinking Cup factory, Easton, Pa., to Bethlehem Steel Co., Lauter Const. Co.

110 tons, viaduct FLHP-8 (1), Crookston, Nebr., for state, to Bethlehem Steel Co., Bethlehem, Pa.

110 tons, sheet piling, H. J. Settergren-Taveres, Los Angeles, to Bethlehem Steel Co.

110 tons, bridge 38.36, Fairfield, Conn., for New York, New Haven & Hartford

railroad, to American Bridge Co., Pittsburgh.

110 tons, bridge, 29.88, New York, New Haven & Hartford, East Norwalk, Conn., to American Bridge Co., Pittsburgh.

105 tons, Carmelite monastery, 171st street, New York City, to Schacht Steel Construction Co. Inc., New York.

100 tons, Consolidated Cement Corp. building, Cement City, Mich., to Calumet Steel Co.

Shape Contracts Pending

11,200 tons, two P-4-P passenger vessels, United States Maritime Commission; Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash., only bidder.

8000 tons, elevated highway, Hamilton avenue, Brooklyn, N. Y., contract B-18, for Triboro bridge authority.

6000 tons, elevated highway, contract B-20, Third avenue, Brooklyn, N. Y., for Triboro bridge authority.

4000 tons, engineering shop, invitation 6812-41-1, Hickam Field, T. H.; bids opened.

2000 tons, additions, naval ammunition depot, Hawthorne, Nev.; bids Sept. 25.

1778 tons, including 990 tons sheet piling, units 7 to 10, power plants, Bonneville dam, Oregon; Puget Construction Co., 3915 Sixth avenue, N. W., Seattle, Wash., low bidder at $3,131,606.

1500 tons, foundry building, for Wright Aeronautical Corp., Paterson, N. J.

1300 tons, furnace building, for New Jersey Zinc Co., Dupue, Ill.

1200 tons, barracks 1 to 14, Quonset Point, R. I., for navy.

1100 tons, extension to machine shop, for Mesta Machine Co., Homestead, Pa.

1000 tons, office and factory buildings, for Aeroproducts division, General Motors Corp., Vandalia, O.

946 tons, Mokelumne river bridge, Sacramento and San Joaquin county, California, for state; bids Oct. 2.

850 tons, Goss Printing Press Co., South Side, Chicago; bids to close Sept. 12.

675 tons, buildings, Aberdeen Proving Ground, Md., for government.

650 tons, plant, Hercules Powder Co., Pepper, Va.

650 tons, state highway bridge, Pittsford, N. Y., E. W. Foley, Brooklyn, low on contract.

600 tons, post office and garage, Boston; bids Sept. 21.

600 tons, addition to service building, for Chevrolet Motor Co., Flint, Mich.

595 tons, fabricated deck supports, schedule 4274, Panama Canal; bids opened.

550 tons, U. S. war department, two more hangars, Rantoul, Ill.; bids to close Sept. 17.

500 tons, Marion housing project, Jersey City, N. J.; bids due Sept. 16.

500 tons, accessories overhaul shop, San Diego, Calif., for navy.

450 tons, State highway bridge, Montana, entrance to Glacier national park; bids to close Sept. 27.

375 tons, Commonwealth Edison Co., addition to shop building at Northwestern plant; bids to close Sept. 19.

350 tons, warehouse, Sears Roebuck & Co., St. Louis; bids to close Sept. 17.

300 tons, psychiatric unit, state hospital, Weston, W. Va.

300 tons, copper shop, New York Shipbuilding Corp., Camden, N. J.

265 tons, addition to building, for Stamford Rolling Mills Co., Springfield, Conn.

250 tons, state highway bridge, Orchard Park, N. Y., bids Oct. 2.

245 tons, state highway bridge, Brookville, Pa.

240 tons, state bridge over Salt river, Nelson-Larue counties, Kentucky.

235 tons, factory building, for Taylorcraft Aviation Corp., Alliance, O.

225 tons, state highway bridge, Macedon, N. Y., bids Oct. 2.

200 tons, garage building, for General Electric Co., Lynn, Mass.

200 tons, Benjamin Franklin high school, New York City, Psaty & Fuhrman, contractors.

150 tons, three under-passes and one over-crossing, relocation Great Northern Railroad, Kettle Falls, Wash.; bids opened.

115 tons, two overpass structures, Lehigh county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Sept. 20.

Reinforcing

Reinforcing Bar Prices, Page 169

Chicago—Several substantial reinforcing bar contracts have been closed here within a few days, and a number of inquiries are out for smaller jobs. The largest pending

item is that for the S. James Herman gardens housing project in Detroit, requiring 2500 to 3000 tons. Several more sections of the Chicago loop section subway will be up for figures shortly.

Pittsburgh — New inquiries are slightly less than a week ago, but orders remain active. Reports from various sections of the country indicate prices are firm at the full quoted level.

Philadelphia—Reinforcing bar business is featured by placing of 2400 tons by Drydock Associates, Philadelphia, for work at the local navy yard, with Bethlehem Steel Co., Bethlehem, Pa. Considerable small work is being figured. Prices are steady.

San Francisco—The reinforcing bar market is active and some large lots are up for figures. Awards in the week totaled 2517 tons, bringing the aggregate for the year to 124,486 tons, compared with 118,179 tons in the period last year. Puget Construction Co., Seattle, is low for power house units for the Bonneville dam, Oregon, involving 7000 tons.

Reinforcing Steel Awards

2400 tons, Drydock Associates, Philadelphia, for work at local navy yard, to Bethlehem Steel Co., Bethlehem, Pa.

1500 tons, Clarence Perkins housing, Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.; Consolidated Engineering Co., contractor.

600 tons, dry dock, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., to Virginia Bridge Co., Roanoke, Va., through McLean Contracting Co., Baltimore.

465 tons, loading line buildings, United States ordnance proving grounds, Savannah, Ill., to Bethlehem Steel Co.

460 tons, Sears, Roebuck & Co., Honolulu, T. H., to Bethlehem Steel Co., San Francisco.

450 tons, depot supply and other buildings, Albrook field, Canal Zone, Truscon Steel Co., Youngstown, O., through Robert E. McKee, El Paso, Tex.

450 tons, factory, Yellow Truck & Coach Co., Pontiac, Mich., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown; Darien & Armstrong, contractors.

400 tons, for Sprague, Warner & Co., plant addition, Chicago, to Concrete Steel Co.

350 tons, office building addition, 820 South Flower street, Los Angeles for Southern California Gas Co., to unnamed interest.

320 tons, billet steel, sanitary district, Chicago, public lighting, to Ryerson division, Inland Steel Co.

300 tons, George Gayno elevator, Hutchinson, Kans., to Sheffield Steel Corp., Kansas City, Mo.; J. T. McDowell, contractor.

260 tons, miscellaneous buildings, navy yard, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; Hughes-Foulkrod Co., contractor.

250 tons, warehouse for Broadmore Development Co., Vernon, Calif., to unnamed interest.

220 tons, Kurth Malting Co., Milwaukee, to Calumet Steel Co., Chicago; McKenzie-Hague & Co., contractor.

216 tons, bureau of reclamation, invitation A-33,965-A, Zillah, Wash., to Bethlehem Steel Co., Seattle, Wash.

210 tons, warehouse, Dixie Vortex Co., Chicago, to Inland Steel Co., Chicago; J. W. Snyder Co., contractor.

203 tons, billet steel, bridge No. 1998, Rockford, Ind., Truscon division Republic Steel Corp.; R. P. Ollinger & Co., contractor.

168 tons, addition to Roosevelt high school, Fresno, Calif., to Kyle & Co., Fresno, Calif.

160 tons, plant, Columbia Chemical Co., Cleveland, to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.

150 tons, warehouse and office, Las Vegas Land & Water Co., Los Angeles, to unnamed interest.

120 tons, bureau of reclamation, invitation 22,374-A, Mills, Wyo., to Bethlehem Steel Co., Los Angeles.

111 tons, rail steel, Columbia housing project, Hammond, Ind., Holliday Steel Co.

100 tons, research building, Lockheed Aircraft Corp., Burbank, Calif., to unnamed interest.

100 tons, office, Menasco Manufacturing Co., Burbank, Calif., to unnamed interest.

Concrete Bars Compared

	Tons
Week ended Sept. 14.....	9,963
Week ended Sept. 7.....	3,910
Week ended Aug. 31.....	23,817
This week, 1939	2,450
Weekly average, year, 1940.	9,118
Weekly average, 1939.....	9,197
Weekly average, August...	14,186
Total to date, 1939.....	365,423
Total to date, 1940.....	337,371

Includes awards of 100 tons or more.

Reinforcing Steel Pending

7000 tons, power house units 7 to 10, Bonneville dam, Oregon; Puget Construction Co., 3951 Sixth ave, N. W., Seattle, Wash., low on general contract at $3,131,606.

1200 tons, sewage plant, contract 9, Bowery Bay, N. Y.; bids in.

940 tons, including 240 tons mesh, addition, naval ammunition depot, Hawthorne, Nev.; bids Sept. 25.

800 tons, purchasing agent, Los Angeles county, Calif.; Ceco Steel Products Corp., Los Angeles, low.

500 tons, new grain elevator, Cargill Inc., Buffalo.

375 tons, Harbor Homes housing project, Newport News, Va.; bids in.

360 tons, treasury department, invitation A 10668, Los Angeles; bids opened.

320 tons, Cedarmount Co. apartments, Cleveland.

260 tons, Bitterbro college, La Crosse, Wis.

230 tons, steel piling, shapes and bars, state highway project, Orange, Conn.; bids Sept. 17, Hartford.

199 tons, highway work, San Mateo county, California, for state; bids Sept. 25.

177 tons, highway work, Mendocino county, California, for state; bids opened.

150 tons, West End pumping stations,

Huntington, W. Va.; bids Sept. 10.

149 tons, invitation 699-41-21, army engineers, Providence, R. I.; bids in.

143 tons, Mokelumne river bridge, Sacramento and San Joaquin county, California, for state; bids Oct. 2.

124 tons, San Gabriel river bridge, Los Angeles and Orange county, California, for the state; bids Sept. 26.

100 tns, shapes and bars, state bridges Byron and Rangeley, Me.; bids Sept. 18.

100 tons, buildings for Junior high school, South Gate, Calif.; bids Sept. 20.

100 tons, Sears, Roebuck & Co., Modesto, Calif.; bids in.

Unstated tonnage, addition to shops American Brakeshoe & Foundry Co., South Hoyne ave., Chicago, tonnage unknown, to close Sept. 12.

Unstated tonnage, addition to Northwest station, Commonwealth-Edison power plant, North California ave., bids to close Sept. 19.

Unstated tonnage, St. Francis Xavier high school, South Cottage Grove ave., Chicago, tonnage unknown, bids to close Sept. 11.

Unstated tonnage, Staff house, Jacksonville, Ill., hospital, bids to close Sept. 16.

Unstated tonnage, addition to Englewood hospital, 60th and Greece St., Chicago, bids to close Sept. 26.

Pig Iron

Pig Iron Prices, Page 160

Pittsburgh—Production continues unchanged, prices strong, export demand good, and releases against domestic orders active. Foundry iron is a little more active. Forty of the 50 stacks in the district remain active.

Chicago—New business is slow but blast furnace interests continue to ship iron steadily on previous orders. Yard stocks are being reduced. Both malleable and gray iron foundries are expanding their operating rates.

New York—Pig iron shipments are expanding, reflecting improved foundry operations. In addition to releases attributed directly to machinery work, there is a noticeable improvement in specifications from stove foundries and a general improvement. Soil pipe consumption is tapering seasonally, but even this is holding up better than many expected.

While still of modest volume, new orders are increasing, due not only to larger requirements, but to growing concern over a possible shortage of iron later. The average foundry, which until recently has been ordering on a hand-to-mouth basis, is now endeavoring to build up stocks.

England continues to inquire actively for pig iron, particularly for low phosphorus iron. Export buying from other sources has been relatively light.

Philadelphia — Shipments this month will be the heaviest since late last spring, according to some sellers. Consumption is increasing steadily, with specifications exceeding production in a number of cases. Apart from deliveries to England the export movement is dull.

Buffalo—Substantial fourth quarter bookings afford bright prospects for a near-record movement of pig iron during the remainder of the year. Motivated by indications of expanded national defense needs, consumers are seeking larger tonnage to be ready for future increased business.

Cincinnati—Shipments are holding to the highest level of the year, with possibility that further expansion will appear soon. Some buying for fourth quarter is being done. Prices are firm.

St. Louis—Demand for pig iron continues to expand, as evidenced by shipments and new buying. While current purchasing is almost exclusively for prompt shipment, several sizable tonnages were taken, and the aggregate during the past week or ten days makes a favorable showing.

Birmingham, Ala.—Capacity output of pig iron continues in the South. All 18 furnaces are active,

and not much stocking is in evidence. Additional iron could be used by steelmakers.

Toronto, Ont.—While pig iron sales are well sustained they show little change for the preceding week. Most new business is for spot delivery and ranges up to 300 tons per order, while deliveries on new order account and against contract are responsible for movement of some 5000 tons weekly. Melters are showing special interest in foundry and malleable iron due to scarcity in cast scrap and malleable scrap. Producers will open books later this month for fourth quarter contracts.

Scrap

Scrap Prices, Page 162

Pittsburgh—During most of last week markets were strong with buying active. Toward the close a slight lull developed but prices continued strong, and the Pennsylvania railroad list which closed Wednesday brought new highs on the movement. No. 1 heavy melting steel is quoted at $21 top, up from last week, with other grades stronger as a result of sales made here.

Chicago—The scrap market keeps gathering strength and dealers seem reluctant to part with stocks. Some old orders have been covered at $19.50. The heavier melting grades advanced 75 cents a ton a few days ago, and some railroad specialties have risen by as much as 50 to 75 cents a ton.

Philadelphia—While talk of broadening of licensing system on scrap for export to include other than No. 1 steel has had a slightly easing effect in some quarters, the tone of the market still is strong and heavy melting steel has been sold at higher levels. Some of England's long range contracts expire this month, and indications point to new orders.

Buffalo—Except for small sales, the iron and steel scrap market has slipped into a watching and waiting period. However, interest in the market is by no means dormant. The high rate of ingot production coupled with the sharp advance in price in the last large sale is keeping the trade alert.

Range on No. 1 heavy melting remains $19.50 to $20 a ton, with dealers covering sales reporting receipts at yards ample to cover outstanding orders.

Detroit—Stimulated by rousing improvement in markets in other industrial centers, sentiment in the scrap trade is noticeably stronger, but local consumers profess to show little interest. Unabated demand for electric furnace scrap has tilted prices on No. 1 busheling and low-phosphorus plate to $17-$17.50 and $19-$19.50 respectively. A fair-degree of speculation in these items is apparent as well as to a certain extent in hydraulic compressed bundles. Outlook now is for continued upward movement of prices.

Cincinnati—Prices remain unchanged in face of consumer resistance, despite reflected strength and demand from nearby districts. Renewal of mill interest in augmenting supplies, with freer purchasing, is resulting in a more active market.

St. Louis—Scrap prices continue to advance, new highs on the present movement being recorded by heavy melting steel and a number of other grades. Advance is due almost solely to covering by brokers and dealers, who, in some instances are paying as much or more than they originally sold the scrap for to customers. The movement from the country is still light. Railroad offerings have been considerably freer. Included in lists before the trade is one from the Texas and Pacific railroad of 24,453 tons. Other railroad offerings: Baltimore & Ohio, 4805 tons; Missouri-Pacific, 1360 tons; Louisville & Nashville, 7870 tons; Chicago, Burlington & Quincy, 3390 tons, and Gulf Coast Lines, 2497 tons.

Birmingham, Ala.—Scrap remains active this week in the local district with prices tending upward. Republic Steel Corp. is buying for immediate requirements.

Toronto, Ont.—Low phosphorus steel scrap and stove plate were advanced 50 cents per ton by local dealers during the week, with offering prices now $12 and $13.50 per ton respectively, delivered Toronto yards. Owing to strict specifications by mills, dealers reduced price on No. 2 heavy melting 25 cents per ton, while other items were unchanged. Demand by both dealers and consumers is brisk, and to meet consumers' requirements dealers are drawing heavily from northern Ontario areas. Supplies in the immediate Toronto area are starting to dry up. Imports from the United States continue at record levels. All grades of scrap have active call from consumers in Ontario and Quebec.

San Francisco—Due to the ease with which licenses can be obtained for material for export the Japanese are more active than ever, and ships are being loaded constantly. As a result prices for domestic con-

sumption have advanced another 50 cents a net ton, and the movement is strong.

Warehouse

Warehouse Prices, Page 161

Chicago—Anticipating further extended deliveries, the warehouse trade is building up stocks. At present the movement of materials from warehouse is pronounced very satisfactory. Considerable new building is taking place throughout the city, some of it in the downtown section, promising continued good business. Quotations are steady.

Philadelphia — Jobbing demand has undergone sharp spurt recently, and distributors now look for September business to be at least on parity with August. Prices are firm.

St. Louis—Barring the Labor day interruption, business of warehouses in this area has continued the steady upward trend which began in late May. Demands are well diversified, and in many instances larger tonnages are being ordered.

Tin Plate

Tin Plate Prices, Page 158

Pittsburgh—A slight increase is noted in export business which, coupled with reports that Welsh tin mills are not able to make deliveries on some of their orders in this hemisphere, indicates there may be a substantial increase shortly. However, since the packing season is completed in North America and will not be active in South America for some time, it is unlikely that there will be any heavy demand from this source. Currently operations are estimated at 46 per cent, off 11 points from the preceding week.

Chicago—New business in tin plate is comparatively quiet, the usual seasonal development. Resumption of activities is expected to appear within six weeks or two months.

Steel in Europe

Foreign Steel Prices, Page 161

London—(*By Cable*)—With supplies of iron ore, coke and scrap presently adequate steel production tends to increase. Semifinished steel supplies are enabling rolling mills to operate near capacity.

Tin plate exports are recovering after a slump caused by the collapse of France. Generally export business is quiet and an increase in export quota is expected.

Nonferrous Metals

New York—Activity waned in major nonferrous metal markets last week, following heavy sales and price advances recorded in the preceding period. Copper and tin markets were unsettled pricewise while lead and zinc remained firm.

Copper—An exceptionally favorable statistical report was issued for August, showing a drop of 17,093 tons in refined stocks to a total of 198,730, as refined output eased 10,144 tons to 80,851 tons while domestic deliveries soared to 96,383 tons. September deliveries are running at a high rate, reflecting capacity operations at many mills.

Lead—Buying was only fair to moderate but prices held at 4.75c, East St. Louis.

Zinc—Offerings of nearby metal remained very tight but sellers again urged consumers to pursue a conservative buying policy.

Tin—Due to dull demand, Straits spot declined to 50.05c, the futures level, which is considered the lowest likely to prevail until Metals Reserve Corp. has purchased its 75,000 tons. On Friday, however, spot rose fractionally to 50.10c.

Antimony—No improvement in demand was noted with bookings confined to only case lots on the basis of 14.00c, New York, for American spot. Chinese spot held nominally unchanged at 16.50c, duty paid New York.

Steel Corp. Shipments Best Since April, 1937

Shipments of finished steel products by United States Steel Corp. subsidiaries in August totaled 1,455,604 net tons, highest since April, 1937, when shipments were 1,485,231 tons. The August figure is an increase of 158,717 tons over July shipments.

For the first eight months this year shipments totaled 9,040,889 net tons, compared with 6,469,404 net tons in the corresponding period of 1939, an increase of 2,571,485 tons or 39.7 per cent.

(Inter-company shipments not included)
Net Tons

	1940	1939	1938	1937
Jan.	1,145,592	870,866	570,264	1,268,403
Feb.	1,009,256	747,427	522,395	1,252,845
March	931,905	845,108	627,047	1,563,113
April	907,904	771,752	550,551	1,485,231
May	1,084,057	795,689	509,811	1,443,477
June	1,209,684	807,562	524,994	1,405,078
July	1,296,887	745,364	484,611	1,315,353
Aug.	1,455,604	885,636	615,521	1,225,967
Sept.	.....	1,086,683	635,645	1,161,113
Oct.	.....	1,345,855	730,312	875,972
Nov.	.....	1,406,205	749,328	648,727
Dec.	.....	1,443,969	765,868	539,553
Total, by Months	.....	11,752,116	7,286,347	14,184,772
Adjustment	..	*44,865	†29,159	*87,106
Total	.....	11,707,251	7,315,506	14,097,666

†Increase. *Decrease.

Nonferrous Metal Prices

Sept.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
7	11.50	11.50	11.12½	50.25	50.05	4.90	4.75	6.85	18.00	14.00	35.00
9	11.50	11.50	11.12½	50.25	50.05	4.90	4.75	6.85	18.00	14.00	35.00
10	*11.37½	11.50	11.12½	50.12½	50.05	4.90	4.75	6.85	18.00	14.00	35.00
11	*11.25	11.50	11.12½	50.05	50.05	4.90	4.75	6.85	18.00	14.00	35.00
12	*11.25	11.50	10.87½	50.05	50.05	4.90	4.75	6.85	18.00	14.00	35.00
13	*11.37½	11.50	11.00	50.10	50.05	4.90	4.75	6.85	18.00	14.00	35.00

*Based on custom smelter sales.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.50c Conn. copper

Sheets

Yellow brass (high) 18.65
Copper, hot rolled 20.12
Lead, cut to jobbers 7.15
Zinc, 100 lb. base 11.50

Tubes

High yellow brass 21.40
Seamless copper 20.62

Rods

High yellow brass 13.67
Copper, hot rolled 16.62

Anodes

Copper, untrimmed 17.37

Wire

Yellow brass (high) 18.90

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York 7.25-7.50
Cleveland 7.62½-8.00
Chicago 7.25-7.50
St. Louis 7.75

Heavy Copper and Wire

New York, No. 1 .....8.87½-9.12½
Cleveland, No. 1 .....8.75-9.00
Chicago, No. 1 .....8.50-8.75
St. Louis 8.75

Composition Brass Turnings

New York 6.87½-7.12½

Light Copper

New York 6.87½-7.12½
Cleveland 6.75-7.00
Chicago 6.50-6.75
St. Louis 6.75

Light Brass

Cleveland 3.75-4.00
Chicago 4.25-4.37½
St. Louis 4.25

Lead

New York 4.25-4.35
Cleveland 3.60-3.75
Chicago 3.75-4.00
St. Louis 3.50-3.75

Zinc

New York 3.87½-4.12½
Cleveland 3.25-3.50
St. Louis 3.50-3.75

Aluminum

Misc., cast, Cleveland 8.50
Borings, Cleveland 6.50
Clips, soft, Cleveland 14.00
Misc. cast, St. Louis 7.75-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .12.00
Standard No. 12 aluminum 14.00-14.50

MEETINGS

TOOL ENGINEERS TO STRESS NEED FOR SPECIAL EDUCATION

■ IMMEDIATE and long-range problems of special education to meet increasing national shortage of tool engineers, designers and skilled craftsmen will be stressed at the American Society of Tool Engineers' semiannual meeting, to be held at Cincinnati, Oct. 17-19. The meeting's general session will be devoted to a symposium on gear finishing. Arrangements have been made for tool engineers to visit machine tool and industrial plants in Cincinnati.

PITTSBURGH EXECUTIVES TO BE AGENTS' GUESTS

Pittsburgh Purchasing Agents' association will be host to executives of its member companies in observing the organization's twenty-fifth anniversary at a dinner meeting in the William Penn hotel, Sept. 17. Dr. De Haas, Harvard university, will speak on "The International Situation and Its Effect on American Business."

MANUFACTURERS' PRODUCTS TO BE SHOWN AT BALTIMORE

Fifth annual manufacturers' products exhibit, sponsored by the Baltimore Purchasing Agents' association, will be held in that city at the Lord Baltimore hotel, Oct. 22-24. Latest in mill, factory and office equipment will be displayed.

Died:

■ John M. Wilson, 64, chairman of the board, National Supply Co., Pittsburgh, Sept. 6, in that city. Following graduation from Bucknell university and Harvard Law school in 1900, Mr. Wilson joined National Supply at Beaumont, Tex., but left two years later to join Franklin Trust Co. In 1908 he rejoined National Supply, becoming president in 1924. Several years later he also became president of Spang Chalfant & Co., which was fully merged with National Supply in 1937. In 1939 Mr. Wilson was elected chairman.

♦

G. F. Liden, 61, president and general manager, Liden Mfg. Co., maker of dies and stampings, Lansing, Mich., in Lansing, recently.

♦

William G. O'Malley, 80, former general master mechanic, Lackawanna Steel Corp., Lackawanna, N. Y., in Buffalo, Sept. 8.

♦

Ralph Sumner Peirce, 65, president of Chicago Expansion Bolt Co., Chicago, which he founded in 1916, Sept. 9, in that city.

♦

Arthur R. Ferris, 61, the past 29 years head of the mechanical engineering department, Foote-Burt Co., Cleveland, recently, at his home in that city. He was a member, Cleveland Engineering society.

♦

Maxon A. Blessing, 60, manager of the Chicago warehouse of Jones & Laughlin Steel Corp., Sept 7, at his home in Wilmette, Ill. Mr. Blessing had been associated with Jones & Laughlin 46 years in various capacities, and formerly was district sales manager at Chicago. He was president, Chicago Steel Warehouse association.

Tungsten Ore on Way

New York — Between 7000 and 8000 tons of tungsten ore will arrive in this country shortly from French Indo-China for Metals Reserve Corp., Washington. This comprises the greater portion of tungsten purchased by the corporation to date.

Construction and Enterprise

Ohio

ALLIANCE, O.—Idle plant of A. G Reeves Co. is under negotiation for purchase by a national concern, name yet unrevealed, which will spend $100,000 for modernization if deal is made. S. L. Geiger, City Savings building and William M. Corry, secretary-manager of Chamber of Commerce, 504 E. Main street, are representing the prospective purchaser.

CLEVELAND — Wellman Engineering Co. is proceeding with construction of a 10,000-square-foot welding shop.

CLEVELAND—White Motor Co., will build a warehouse and loading dock 24 x 76 feet. A. R. Black is in charge of construction.

CLEVELAND — Steel Improvement & Forge Co., will enlarge its boiler plant. Plans are by William C. Kammerer and associates, 1900 Euclid avenue.

CLEVELAND—Cleveland Worm & Gear Co., 3249 E. Eightieth street, will build a plant addition with 4500 square feet of floor space. H. K. Ferguson Co., Hanna building, will handle construction.

CLEVELAND—Mondie Forge Co., 10300 Berea road, will build a forge shop 55 x 60 feet. Bids are being received from steel companies for erecting prefabricated building.

DAYTON, O.—War department, Air Corps, materiel division of contracting officer, Wright Field, will receive bids for 192,550 screwdrivers till Sept. 20 on circular 41-533. On circular 41-517 it will receive bids till Sept. 21, for a quantity of aluminum alloy shapes, tape and welding rod.

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 171 and Reinforcing Bars Pending on page 172 of this issue.

MINGO JUNCTION, O.—Carnegie-Illinois Steel Corp., has begun installation of equipment for treating armor plate in several of its idle heating furnaces.

MOUNT VERNON, O.—Cooper-Bessemer Corp. will make improvements to both Mount Vernon and Grove City, Pa., plants. At present no expansion is necessary but between $400,000 and $500,000 will be spent for new equipment.

NORTH FAIRFIELD, O. — Firelands Electric Co-operative Inc., D. C. Hawn, president of board, will take bids soon on 184 miles of transmission line to serve 516 customers in Huron, Richland and Ashland counties, to cost $140,000. Putnam & Woolpert, 132 N. Main street, Dayton, is engineer.

Pennsylvania

EASTON, PA.—Easton Iron & Metal Co., has leased property of Easton Lime Co., and will use it for scrap iron operations.

PITTSBURGH — United States engineers' office is receiving bids for two complete electrically operated gantry cranes.

Michigan

JACKSON, MICH. — Jackson Crankshaft division of Muskegon Motor Specialties will build a plant addition 105 x 106 feet to increase capacity 10 per cent.

Illinois

CHICAGO—Minneapolis-Moline Power Implement Co. has let contract for foundations of a new building at its Hopkins, Minn., plant to replace the combine-assembly building damaged by fire this spring. Building will be three stories and provide 125,000 square feet of floor area at a cost of about $300,000.

GENEVA, ILL.—Burgess-Norton Mfg. Co., has awarded contract to August Wilson for a plant addition 75 x 128 feet.

ROCKFORD, ILL.—Forgings & Stampings Inc., has awarded contract to Linden & Sons Inc., for a one-story plant addition 97 x 128 feet.

ROCKFORD, ILL. — Rockford Screw Products Co., O. G. Nelson, president, has awarded contract to Linden & Sons Inc., for a two-story plant addition 80 x 142 feet. Herman J. Eklund is architect.

Indiana

FORT WAYNE, IND.—Wayne Iron & Metal Corp., 702 Hayden street, has filed

articles of voluntary dissolution as a domestic corporation.

INDIANAPOLIS—Articles of incorporation have been filed by General Supply & Tool Corp., 124 West Vermont street, to do a general machinery and steel business. Corporation has 1000 shares of no par value capital stock. Incorporators are H. J. Mertz, John Orton and Charles E. Weisnauer.

District of Columbia

WASHINGTON—Office of the General Purchasing Officer, The Panama Canal, will receive bids till Sept. 20 on schedule 4326 for the following: Pneumatic hammer; lathe; upright, radial and sensitive drill; grinding machines; punch and shear machine; metal-working shaper; sheet-metal punch and brake; forming machine; sheet metal shears; brace and wire bender and grooving machine.

WASHINGTON — Bureau of supplies and accounts, navy department, will take bids as follows: Sept. 20, schedule 3006, two universal milling machines; schedule 3015, fourteen electric-powered hacksaws; schedule 3016, seven hand planers and jointers; schedule 3101, thirty-five electric arc welding sets; schedule 3025, one universal grinder; schedule 2035, one motor-driven glass polisher. Sept. 24, schedule 3050, one disk type single-spindle motor-driven grinder; schedule 3048, thirteen tiering and stacking machines; schedule 3111, six floor-type motor-driven drill presses. Sept. 27, schedule 3105, five motor-generator sets.

Tennessee

COLUMBIA, TENN. — Southern Bell Telephone & Telegraph Co., Kerdey Wilson, manager, will spend $45,000 for improvements.

Louisiana

JEFFERSON ISLAND, LA.—Jefferson Island Salt Mining Co. will rebuild burned portion of its plant.

Missouri

HOLLISTER, MO.—REA has allotted $35,000 to White River valley electric co-operative to finance 40 miles of transmission lines to serve 165 customers in Taney, Christian and Stone counties.

SIKESTON, MO.—Scott-New Madrid county electric co-operative, Leon Poffer, president, will take bids on 212 miles of transmission lines. E. T. Archer & Co., 609 New England building Kansas City, Mo., is engineer.

Arkansas

LITTLE ROCK, ARK.—Public buildings administration let contract at $39,444 to Warner Elevator Mfg. Co., 2613 Spring Grove avenue, Cincinnati, for elevators in post office.

Oklahoma

ADA, OKLA.—Cater Construction Co., Blue Springs, Mo., was low bidder at $117,236 for 204.1 miles of transmission lines in Pontotoc, Garvin, Johnston, Coal and Hughes counties to serve 690 customers of the Peoples electric co-operative, Robert J. Croy, superintendent. E. T. Archer & Co., 609 New England building, Kansas City, Mo., is engineer.

CHEROKEE, OKLA.—Alfalfa electric co-operative, Howard Crocker, manager, has awarded contract to Richards & Mullinix, 1401 N. W. Fifth street, Oklahoma City, at $78,840 for 151 miles of transmission lines in Alfalfa, Grant and Major counties to serve 297 customers. C. H. Guernsey & Co., 1216 S. Grand avenue, Cherokee, is engineer.

LINDSAY, OKLA.—Rural electric co-operative, E. E. Burford, acting superintendent, has awarded contract to R. B. Stovall Jr., West Plains, Mo., at $59,034 for 106 miles of transmission lines in Garvin, McClain and Grady counties. C. H. Guernsey & Co., Cherokee, is engineer.

SAYRE, OKLA.—Northfork electric co-operative, John L. Klingman, superintendent, has awarded contract to R. E. Mattison, Britton, at $73,425 for 127 miles of transmission lines to serve 318 customers in Beckham, Washita and Rogers counties. C. H. Guernsey & Co., Cherokee, is engineer.

Wisconsin

APPLETON, WIS. — Scolding Locks Corp., has awarded contract to Miron & St. Aubin Construction Co., for a one-story plant addition 25 x 100 feet. Lytle & Smith are architects.

ARENA, WIS.—Voters have approved issue of $25,000 bonds to finance a new waterworks. J. W. Hankerson is village clerk.

ASHLAND, WIS.—C. Reiss Coal Co. has awarded general contract to Frank Tomlinson & Son for a new 1000-ton capacity coal hopper.

CENTURIA, WIS.—Polk-Burnett electric co-operative, D. D. McChesney, superintendent, has been allotted $146,000 REA funds for 200 miles of transmission lines in Polk, Burnett, Barron, St. Croix and Washburn counties.

MUSCODA, WIS. — Village, Lyman Godfrey, clerk, voted to build a sewage disposal system with WPA aid. Plans are being prepared.

NEENAH, WIS.—J. W. Hewitt Machine Co., has awarded contract to Fluor Bros. Construction Co., Oshkosh, for a plant addition 30 x 49 feet and improvements.

WAUSAU, WIS.—Marathon Electric Mfg. Co., is planning to expand its plant soon.

WAUSAU, WIS.—D. J. Murray Mfg. Co., plans a plant addition and improvements. Oppenhamer & Obel are architects.

WEST ALLIS, WIS.—Kempsmith Machine Co., Thomas Kattnig, president, has awarded general contract to Chas. Maier & Son Co., Milwaukee, for a one story plant addition, 54 x 186 feet.

WEST BEND, WIS.—Ray Townsend has started construction of a one-story shop addition 23 x 88 feet.

WEST BEND, WIS.—West Bend Aluminum Co., has awarded contract to Kremsreiter & Berend for a storage plant 60 x 90 feet.

Texas

ARP, TEX.—Independent Refining Co., W. C. Curtis, general manager, plans improvements to Inreco plant. Construction involves change to Dubbs process adding stabilization plant. Universal Oil Products Co. is engineer.

AUSTIN, TEX.—Brooker Engineering Co., 609 Marquette building, Detroit, has contract for Peters electrical substation for Lower Colorado River authority.

BEAUMONT, TEX. — Jefferson county voted $800,000 bonds to finance mid-county airport in vicinity of Nederland contingent upon federal government supplementing these funds to bring about a total investment of $2,000,000.

CHANNELVIEW, TEX.—Harris county fresh water district No. 6 voted $40,000 bonds for construction of water works system in Channelview, Lakeside Park and De Zavalla Acres.

DALLAS, TEX.—Lone Star Gas Co., 1915 Wood street, and Shamrock Oil & Gas Co., Amarillo, plan a combination gasoline and recycling plant on Opelika structure of eastern Henderson county to cost $200,000. Plant will have a capacity of 30,000,000 cubic feet of gas daily and will recover gasoline by compression method.

EDINBURG, TEX.—Gulf States Oil Corp., Chronicle building, Houston, plans $100,000 unit of a $250,000 recycling plant for San Salvador gas and distillate field of Eastern Hidalgo county.

FT. CROCKETT, TEX.—Constructing

quartermaster, let contract at $96,449 to Charles H. Oehler, 5007 Broadway, Galveston, Tex., for 22 temporary buildings.

FT. SAM HOUSTON, TEX.—Constructing quartermaster, San Antonio, Tex., let contract at $232,575 to C. L. Browning Jr., Builders Exchange building, San Antonio, for buildings at recruit reception center, Dodd Field, Ft. Sam Houston.

FT. WORTH, TEX.—Continental Oil Co. Inc. is planning to build a gasoline and repressuring plant to cost between $300,000 and $500,000 for Hull and Silk pool of northern Archer county.

FT. WORTH, TEX.—Magnolia Petroleum Co., John W. Newton, vice president and manager of refining division, 707 Third street, Beaumont, let contract to M. W. Kellogg Co., 225 Broadway, New York, for $2,000,000 expansion and modernization program.

HONDO, TEX.—P. E. Workman, Liberty Bank building, Dallas, has contract at $72,000 for transmission line in Frio, Atascosa and Bexar counties, for Medina Electric Cooperative Inc. J. W. Beretta Inc., National Bank of Commerce building, San Antonio, Tex., is engineer.

HOUSTON, TEX.—W. R. Davis, 3431 Bradford place, has let contracts for a $2,000,000 refinery to Winkle-Koch Engineering Co., Wichita, Kans.

SAN ANTONIO, TEX. — Edward W. Oeffinger, 710 avenue A, has general contract at $259,200 for engine test building and spray pool, Duncan Field.

SILSBEE, TEX.—M. L. Friday, Arlington, has contract for waterworks improvements for city. Koch & Fowler, Great National Life building, Dallas, are engineers.

TALCO, TEX.—City, C. E. Jones, plans $15,000 waterworks and sewer improvements. Freese & Nichols, Capps building, Ft. Worth, is engineer.

Minnesota

KERKHOVEN, MINN.—Village, J. F. Floren, recorder, is taking bids to Sept. 23 on municipal power plant. Plans are obtainable from Ralph D. Thomas and associates, 1200 Second avenue S., Minneapolis, engineers. Note extension of date from Sept. 3.

MINNEAPOLIS — Minneapolis-Honeywell Regulator Co., H. W. Sweatt, president and general manager, 2727 Fourth avenue South, has awarded general contract to C. F. Haglin & Sons, National building, for a 4-story plant addition, 75 x 200 feet, to cost $250,000 without equipment. E. J. Prondzinski, Pence building, is architect.

PELICAN RAPIDS, MINN.—Zontelli Bros., Ironton, was low bidder at $101,209 for 177 miles of transmission lines in Grant, Otter, Tall and Wilkin counties to serve 439 customers of Lage region electric co-operative, Albert R. Knutson, superintendent. Arnold Christopherson. Fergus Falls, is engineer.

TWO HARBORS, MINN.—Duluth, Missabe & Iron Range Railway Co., Wolvin building, Duluth, E. H. Dresser, chief engineer, has awarded contract to Polaris Concrete Products Co., Duluth, for an eight-stall locomotive shop to cost $75,000.

North Carolina

PISGAH FOREST, N. C.—Ecusta Paper Corp. will erect addition doubling capacity. Fiske-Carter Construction Co., Greenville, S. C., is general contractor.

Kansas

GODDARD, KANS.—Sedgwick county electric co-operative, J. W. Guthrie, superintendent, will take bids soon on 189 miles of transmission lines to serve 400 customers in Kingman, Reno, Harvey and Sedgwick counties. E. T. Archer & Co., 609 New England building, Kansas City, Mo., is engineer.

LEAVENWORTH, KANS. — Leavenworth-Jefferson electric co-operative, Edwin Holman, attorney, will apply to REA for $200,000 to finance transmission lines.

Iowa

ALGONA, IOWA—City council, Adan Carlson, city clerk, will open bids Oct. 1 for a municipal light and power plant 78 x 112 feet, to cost $100,000. Bids for diesel engine will be received later. Burns & McDonnell Engineering Co., Kansas City, Mo., is engineer.

CAMANCHE, IOWA — City council, F. A. Cady, recorder, will open bids Oct. 1 for a municipal waterworks system, including a 50,000-gallon elevated steel tank and tower, turbine pump and 15,000 feet of pipe. Cullen & Bartels, Dubuque, are engineers.

ESTHERVILLE, IOWA—D. E. K. rural electric co-operative, has awarded contract to Sandberg & Johnston, Hampton, at $112,233 for 180 miles of transmission lines. Stanley Engineering Co., Muscatine, is engineer.

GLIDDEN, IOWA—Glidden rural electric co-operative, Thomas Connor, superintendent, has awarded contract to Evans Construction Co., Early, at $70,273 for 114 miles of transmission lines. Stanley Engineering Co., Muscatine, is engineer.

GREENFIELD, IOWA—REA has allotted $174,000 to Farmers electric co-operative to finance 226 miles of transmission lines in Madison, Adair and Cass counties to serve 563 customers.

OSAGE, IOWA—City, F. J. Cromer, clerk, will vote Sept. 27 on a $325,000 bond issue to finance a power and light plant. Hubbard Engineering Co., 80 E. Jackson, Chicago, is engineer.

SEYMOUR, IOWA—City, Grace Buckmaster, clerk, is taking bids to Oct. 2, on one full diesel engine, electric driven fire pump, radiator, fan, motor, fuel tank. Ralph W. Gearheart, 349 Twenty-first street S.E., Cedar Rapids, is engineer. Certified check of 5 per cent to accompany bid.

WEBSTER CITY, IOWA—City, A. K. Westervelt, clerk, will take bids to Oct. 7 on a boiler and stoker, with equipment.

Colorado

GRAND JUNCTION, COLO.—REA has allotted $115,000 to Grand Valley Rural Power Lines Inc., to finance 92 miles of transmission lines in Mesa county.

HOLYOKE, COLO.—City, Guy L. Bereman, clerk, has authorized $65,000 bonds to finance extension of waterworks.

Wyoming

LARAMIE, WYO.—Albany Oil & Refining Co., N. A. Swenson, president, is building an oil refinery.

Idaho

SANDPOINT, IDAHO—Northern Idaho rural electric association has awarded contract to Smith Electric, Spokane, Wash., at $49,069 for 62.8 miles of transmission lines to serve 116 customers. John W. Cunningham, 414 Spalding building, Spokane, Wash., is engineer.

Utah

MOUNT EMMONS, UTAH—REA has allotted $128,000 to Moon Lake electric association to finance additional transmission lines.

Pacific Coast

PORTLAND, OREG.—U. S. Engineer has awarded contract to Parker & Schram, Portland, low at $385,525, to build Columbia river levee and diversion canal.

PUGET SOUND NAVY YARD, WASH. —Bids for shipfitters assembly shop, steel frame, 140 x 73 feet, costing $300,000, will be received Sept. 25.

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