STEEL

ESTABLISHED 1882

Contents

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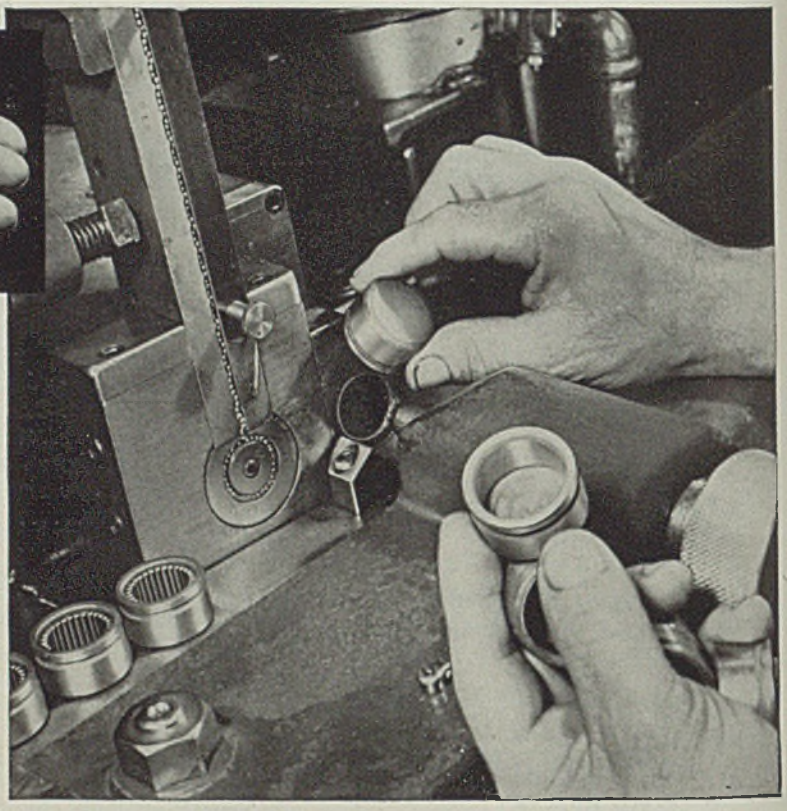
PRODUCTION • PROCESSING • DISTRIBUTION • USE

Space Savers



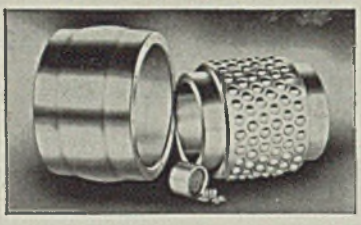
BANTAM NEEDLE ROLLERS FORM THE MOST COMPACT ANTI-FRICTION BEARINGS EVER BUILT

A handful of Bantam's Needle Rollers is your starting-point for the smallest, simplest *anti-friction bearing* ever devised—a bearing you can assemble quickly and easily with simple, automatic equipment right in your own plant.

If there's a place in your product where *anti-friction* bearings are essential and where size and cost are vital considerations, investigate Bantam's Needle Rollers. Their small diameter in relation to shaft size is ideally adapted to the requirements of good product design. They often eliminate the need for space-consuming extra parts—shaft and housing can frequently be used as inner and outer races. And capacity is exceptionally high in proportion to bearing size—for Bantam's Needle Rollers are carefully hardened to carry heavy loads, yet retain their ductility.

For Needle Rollers that will assure dependable operation—or for advice on their assembly—TURN TO BANTAM. Our engineers will be glad to work with you in laying out applications to meet your specific requirements.

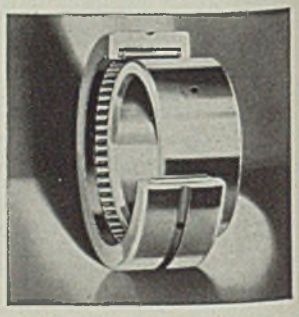
BANTAM BEARINGS CORPORATION • SOUTH BEND, INDIANA



(*Below*) **BANTAM'S QUILL BEARING** meets the need for a compact, self-retained unit that packs high load capacity into limited space. Furnished with or without inner race; carried in stock in sizes from ½ to 5½" I.D. (1¼ to 7" O.D.). Write for Bulletin H-104. For Needle Bearings for lighter service, ask our affiliate, The Torrington Company, Torrington, Conn., for Circular 21-H.

(*Above*) **SPECIAL BEARINGS** for exceptionally severe duty or unusual requirements are an important phase of Bantam's service. Typical instance is the special reciprocating ball bearing illustrated, designed for sheet polishing in a steel mill, where reciprocation of the shaft is combined with rotation at 1,000 RPM.

BANTAM'S ENGINEERING COUNSEL is based on years of experience in the design and application of every major type of anti-friction bearing. Bantam's engineers welcome the opportunity to recommend the type of bearing that best suits your requirements.



BANTAM BEARINGS

STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

HIGHLIGHTING THIS ISSUE

■ NEW orders for finished rolled steel receded somewhat last week. Unfilled orders are sufficiently large, however, to insure continued heavy production for an extended period ahead. Then, heavier buying from several sources (p. 79) is indicated for coming weeks. These include the automotive industry, the railroads, building and heavy construction and the defense program. Steel production—unchanged last week (p. 21) at 88 per cent of ingot capacity—is expected to go to higher levels in the near future. British buying so far in July has been in larger volume. South American demand is lagging, due to lower purchasing power as a result of sharply reduced exports to Europe.

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Armament awards (pp. 15 and 22) are gaining in volume and diversity. Army and navy contracts placed since June 6 involve expenditures of $1,661,891,494. At Washington, seasoned observers (p. 22) say that armament contracts are being placed too slowly, that necessary specifications are not available. Among interesting developments are the decision (p. 32) to rehabilitate the navy's armor plate plant at South Charleston, W. Va., as rapidly as possible, and the award (p. 17) of 627 light tanks. . . Manufacturers who want government orders are advised not to go to Washington; STEEL (p. 13) lists 73 army and navy procurement offices and indicates the nature of their purchases.

Arms Awards Increasing

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Nomination of President Roosevelt for a third term arouses no enthusiasm among industrialists who see business hampered as a result of his policies. Notwithstanding national defense needs, certain facts stand in bold relief. Appropriations and spending authorizations approved and pending in the present session of congress (p. 13) come to $20,449,511,803. Another sign of the times is the increase in the number of federal employes who now number more than 1,000,000. . . Uncertainty about the coming tax bill may be cleared up soon; the treasury department is expected to report the first draft (p. 22) during the week of July 22. . . Export licenses for machinery are expedited (p. 15) under a new system.

Largest Budget

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In discussing today's ball bearing metallurgy C. T. Hewitt (p. 38) lays emphasis on the progress that has grown out of exacting demands of the aircraft industry. . . . D. W. Talbott (p. 40) describes a number of chromium-nickel-iron castings which are resistant to heat and corrosion, presenting data of assistance to users in selecting specifications to meet particular requirements. . . . An improved lead-base bearing alloy for gasoline and diesel engines (p. 44) is announced. . . . A major heat-treating problem is that of maintaining the original shape and straightness of tools and machine parts; W. P. Boyle (p. 46) discloses methods for straightening hardened parts.

Planes Aid Progress

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F. L. Spangler (p. 48) explains how maximum service is obtained from wire rope. . . . W. J. Reagan (p. 62) analyzes current trends in open-hearth steel practice. . . . Robert E. Kinkead (p. 60) shows how studies in operator behavior lead to greater production and superior weld quality with the arc welding process. . . . Walter L. Seelbach (p. 52) describes a conveyor-baking setup which speeds production and finishing of cases formed from steel sheets. . . . Russell Franks and W. O. Binder (p. 56) discuss a new low-temperature heat treatment which improves the properties of 18-8 stainless steel. . . . Continuous milling of irregular contours (p. 68) now is an entirely automatic operation.

Open Hearth Trends

E C Kreutzberg

ARE YOU HELPING YOUR BUSINESS IN YOUR HOME?

DO you help the metal industry by promoting in your home the use of canned food and beverages? Time was when we often overlooked our mutual interest, but today when scientific research and the cooperation of metallurgists and canners have produced the perfect food container, it is time that we do our part.

This is important, not only to canners and steel mills, but to the entire metal industry. When canned food consumption rises, the buying power of growers and canning employees is increased; canneries require more building space and additional plant equipment, and suppliers use more metal parts and in turn buy more manufacturing equipment. An upturn in one branch of the metal industry benefits all.

We know better than most others, that in hermetically sealed tin containers are the purity, the freshness, flavor and healthful vitamins of the finest vegetables, fruits, and other food products as well as beverages. They are scientifically canned in their prime and perfectly preserved—always ready to be served without waste and at moderate prices.

So we urge you to help yourself and the whole metal industry by increasing the use of pure wholesome canned foods and beverages in your home. Inland Steel Company, 38 South Dearborn Street, Chicago. Sales Offices, Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati.

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

INLAND TIN PLATE

Produced only by the cold reduction method

Government Spending Passes World War Peak; To Reach 20 Billions

More Than 1,000,000 Persons on Federal Payrolls

Defense Contracts Since June 6 Total $1,661,891,494

Western Hemisphere Trade Monopoly To Be Difficult

Report Progress in Acquiring Strategic Materials

WASHINGTON

■ APPROPRIATIONS and spending authorizations approved and pending in the present session of congress are the largest in the United States' history and exceed by nearly $2,000,000,000 the peak year of the first World war.

Appropriations and authorizations this session total $20,449,000,000, according to Representative Daniel A. Reed, New York, a member of the house ways and means committee. In fiscal year 1919, the previous peak, federal expenditures were $18,522,895,000.

During the present session, which convened Jan. 3, total appropriations have amounted to $16,702,511,803, of which $10,565,511,803 was for 17 departmental and supplemental supply bills; $1,827,000,000 for permanent annual appropriations and debt interest; and $2,149,000,000 trust funds appropriated. Total appropriations approved to date amount to $14,541,511,803, with requested appropriations still in congress amounting to $2,161,000,000.

Additional contract authorizations approved to date by congress amount to $1,060,000,000, while $2,687,000,000 in authorizations still are pending. This makes a total spending bill for this session of congress of $20,449,511,803.

Mr. Reed pointed out that 50,000 persons have been added to civil payrolls of the federal government during the past 90 days. For the first time in our history, he said, the federal civil employes now exceed a million persons, exclusive of all military personnel and relief workers.

The peak employment in the federal government during the first World war was 918,000. The New Deal passed this in 1939, two months before the European war started and almost a year before President Roosevelt recommended the expansion of this country's national defenses.

Army, Navy Field Offices To Handle Purchasing

■ DATA on purchasing offices for the national defense program have been compiled and published in pamphlet form by the United States department of commerce in collaboration with the war and navy departments. Listed are 46 field procurement offices for the war department, 27 for the navy, maps showing field areas for the various offices, and a partial list of materials which are being purchased by the field offices.

In a foreword to the bulletin, Louis Johnson, assistant secretary of war in charge of procurement, advises manufacturers to deal with the field offices and to minimize visits to and correspondence with Washington.

"The best way to conserve time and effort," says Mr. Johnson, "is to deal direct with the nearest procurement officer in the field. If he finds the problem too difficult to handle, he has orders to take the matter up with Washington.

"The usefulness of these officers in the field extends to every phase of the problem, whether it be surveys of plants, educational orders, information on 'national defense' procurement as well as regular 'current' procurement of commodities and equipment for the army and navy, or any other matter pertaining to the present armament program."

Most of the funds recently appropriated for national defense will be expended through the army and navy field offices, it is stated. The offices, and their location, are listed:

Air Corps

Most air corps procurement is handled through the Wright field office at Dayton, O. Two other offices are maintained, one for the eastern district, located at 90 Church street, New York, and one for the

western district, at 506 Santa Monica boulevard, Santa Monica, Calif.

Air corps procurement offices purchase all flying equipment and the necessary facilities for operating the air bases. Materials now being purchased: Airplanes, and equipment, parts and fuel; ground equipment; portable lighting equipment; portable photographic laboratories; and other aeronautical supplies and accessories.

Chemical Warfare Service

This branch of the army purchases items having to do with toxic gases, gas defense appliances, incendiary war materials and the development of equipment for use in that type of service. Principal purchasing office for normal current supplies is at the Edgewood arsenal, Edgewood, Md. Other army chemical warfare service procurement offices are located at:

Boston, 2000 Post Office and Court House building.
Chicago, 1113 Post Office building.
New York, room 404, 45 Broadway.
Pittsburgh, 1014 New Federal building.
San Francisco, 117 Federal Office building.

Purchased through these offices are a variety of machines, including arc welders, conveyors, turret lathes, electric hoists, automatic presses, automatic riveting, cutting, drilling and power-driven sewing machines and motors. Other buying covers chemicals, chemical plant equipment, ceramics, cotton goods, glass, molded and fabricated metals and plastics.

Corps of Engineers

This branch buys the materials and equipment used for field work in connection with a mobilized army. Army engineer procurement offices:

Chicago, 1117 Post Office building.
Mobile, Ala., 212 Wilson building.
New York, 39 Whitehall street.
Philadelphia, Second and Chestnut streets.
Pittsburgh, 1012 New Federal building.
San Francisco, 409 Customhouse.

Equipment purchased: Airbrake equipment, corrugated steel arches, rubber belting, steel blocks, boilers, carpenter boxes, steel bridges, steel buildings, cable, cameras, railroad cars, chests, compasses, air compressors, cranes, derricks;

Dredges, gasoline and steam engines, forges, generator sets, hoists, drawing instruments, 2 to 50-ton jacks, melting kettles, pocket knives, lathes, lighters, lithographic equipment and supplies, gasoline and steam locomotives, machine and machine tool equipment;

Magnifying equipment, electric motors, camouflage nets, pontoon bridges, hydraulic presses, protractors, pumps, saw mills, searchlights, steam and gasoline-powered shovels;

Structural steel, steel tubes and plates, surveying equipment, storage tanks, electric transformers, printing type, dump wagons, copper and steel wire and netting.

Medical Department

Purchases all articles required for the treatment of patients and for general hospital use; also for the veterinary service and inspection of perishable foodstuffs. Medical department procurement offices:

Brooklyn, N. Y., Fifty-eighth street and First avenue.
Chicago, United States Post Office building.
St. Louis, Second and Arsenal streets.
San Francisco, The Presidio.

Items purchased: Cleaning and preserving equipment, dental instruments, diagnostic instruments, hospital furniture and equipment, laboratory equipment and supplies;

Mess equipment, physiotherapy equipment, surgical instruments, X-ray machines, other equipment.

Ordnance Department

Procures all items of ammunition, weapons, fire control instruments, tools, machinery and supplies used in the arsenals and necessary for the repair and maintenance of ordnance equipment.

Army ordnance district offices:

Birmingham, Ala., 302 Comer building.
Boston, 2004 Post Office and Court House building.
Chicago, 309 West Jackson boulevard.
Cincinnati, 521 Post Office building.
Cleveland, 1524 Keith building.
Detroit, 611 Federal building.
Los Angeles, 409 Chamber of Commerce building.
New York, room 1214, 90 Church street.
Philadelphia, 1417 Mitten building.
Pittsburgh, 1032 New Federal building.
Rochester, N. Y., 1118 Mercantile building.
St. Louis, 935 Customhouse.
San Francisco, 118 Federal Office building.
Springfield, Mass., 3640 Main street.
Wilmington, Del., Nemours building (for explosives only).

Articles purchased: Aluminum and aluminum alloys, bars, plates, rods, shapes, sheets, strip, castings;

Automotive equipment and maintenance supplies, cartridge brass, chemical and physical laboratory supplies;

Copper, brass and bronze wire, bars, rods, plates, strip, castings and forgings;

Dies, molds, gages, electrical light and power supplies, electroplating equipment and supplies, explosives and explosive ingredients and processing equipment, construction supplies, heat-treating furnaces and accessories;

Iron and steel wire, rods, bars, plates, shapes, forgings and castings, machines and machine tools, manufactured metal components, optical instruments and accessories, paints and oils for ordnance materials, spray painting equipment, weighing scales, woodworking machinery and supplies.

Quartermaster Corps

Purchases a variety of material required by the army personnel, clothing, motor vehicles, machinery and supplies. Motor vehicles are bought through the Detroit office.

District quartermaster procurement offices:

Atlanta, Ga., 1306 Twenty-two Marietta building.
Boston, Quartermaster Depot, Army Base.
Brooklyn, N. Y., First avenue and Fifty-eighth street.
Chicago, 1819 West Pershing road.
Detroit, 611 Federal building.
Jeffersonville, Ind., Tenth street and Meigs avenue.
Philadelphia, Twenty-first and Johnson streets.
St. Louis, Second and Arsenal streets.
Ft. Sam Houston, Texas, Quartermaster Depot.
San Francisco, Ft. Mason.

Articles purchased: Agricultural implements, ridge pole bows, buttons, cooking outfits, furniture, kitchen apparatus, lighting equipment, horse clipping machines (hand and power-driven), stoves and ranges and equipment, field safes, scales, tableware, tools (machine and hand), and various vehicles.

Signal Corps

Purchases general equipment for communications, photographic purposes, meteorological studies. Army signal corps procurement offices:

Brooklyn, N. Y., First avenue and Fifty-eighth streets.
Chicago, 1819 West Pershing road.
San Francisco, The Presidio.

Purchases include: Radio equipment, telegraph equipment, telephone equipment, meteorological equipment, photographic equipment, wire cable and miscellaneous supplies for communications.

The coast artillery corps purchases scientific laboratory equipment and submarine mine equipment and supplies. Most materials are furnished by the ordnance department, quartermaster corps, and other branches. The coast artillery corps, largely through its field office at Ft. Monroe, Virginia, purchases such materials as: Anchors, land and submarine cables, electrical equipment, mine cases, mooring rope, scientific laboratory equipment, submarine mine equipment and supplies.

Navy Department

Purchases a wide variety of a military and nonmilitary character through its purchasing officers in the

following cities:

Alameda, Calif., Naval Air Station.
Anacostia, D. C., Naval Air Station.
Annapolis, Md., Naval Academy.
Boston, Navy Yard.
Charleston, S. C., Navy Yard.
Dahlgren, Va., Naval Proving ground.
Great Lakes, Ill., Naval Training Station.
Indian Head, Md., Naval Powder Factory.
Key West, Fla., Naval Station.
Lakehurst, N. J., Naval Air Station.
New London, Conn., Submarine Base.
New York, Navy Purchasing Office, P. O. box 9, station C. (Address, officer-in-charge).
Newport, R. I., Navy Purchasing Office (Officer-in-charge).
Norfolk, Va., Naval Air Station; also Naval Supply Depot, Naval Operating Base (officer-in-charge).
Pensacola, Fla., Naval Air Station.
Philadelphia, Navy Yard; also Naval Aircraft Factory.
Portsmouth, N. H., Navy Yard.
Portsmouth, Va., Norfolk Navy Yard.
Puget Sound, Wash., Navy Yard.
San Francisco, Navy Purchasing Office (Officer-in-charge).
San Diego, Calif., Naval Air Station, North Island; also Naval Depot, Naval Operating Base (Officer-in-charge).
Washington Navy Yard and Naval Research Laboratory.
Yorktown, Va., Naval Mine Depot.

Communications to navy field procurement offices should be addressed to the Supply Officer, except where otherwise noted.

Defense Commissioners Favor "Informal" Priorities System

■ PRIORITIES were discussed in detail at a meeting of the machine tool industry's defense committee, Donald Nelson, procurement coordinator, and other government officials last week.

While no announcement was made following the meeting, it is understood the national defense commission members favor working out priorities informally wherever possible.

Army and navy officials generally believe a formal priority order should be issued.

The defense commissioners believe the machine tool and other industries as well are anxious to co-operate fully in the armament program and that precedence will be given defense needs.

Machinery manufacturers apparently are puzzled by the President's proclamation making it necessary for them to procure licenses to export metalworking machinery. It is said the wording is ambiguous.

The state department's control board, in charge of the licenses, states that no interpretation has yet been made, and there is none in view at this time. Officials say each shipment will be taken up as a specific problem, and the only way to handle the situation is for manufacturers to contact this office.

It is intimated in some quarters that the proclamation was made all-inclusive so that from time to time the government can make changes as required.

In all cases application for a license must be filed by the machine tool builder and not by the purchaser. It is reported that recommendations have been made that builders take no more foreign orders until an export license is secured.

It has been suggested that the manufacturer send a description of the machine which he proposes to export to the army and navy munitions board, which board will telegraph a reply to the manufacturer whether or not the board will recommend a license. If the reply is affirmative, the manufacturer can proceed with the work, and make formal application as required by the President's proclamation. This applies to standard and special machines. It is stated that if the board replies in the affirmative, there is every indication a license will be issued.

Defense Contracts Awarded Since June 6 Aggregate $1,661,891,494

■ CONTRACTS totaling $1,661,891,494 have been awarded for the army and navy since June 6, the national defense advisory commission reported to the President last week. Of the total, $1,390,575,404.87 has been for the navy and $271,316,089.13 for the army, according to William S. Knudsen, production commissioner.

Material covered under the contracts includes airplanes, tanks, battleships, ammunition, antitank guns, antiaircraft searchlights, machine guns, various fire-control precision instruments, tractors, trucks, ship propulsion machinery, storage batteries for submarines, airport and airstation construction and many other items necessary to equip the armed forces.

Mr. Knudsen told the President that progress has been made toward eliminating, for the time being at least, the bottlenecks in the machine tool industry. The embargo authority has contributed substantially to the retention in this country of vital machine tool units which otherwise might have been exported.

Packard Motor Car Co., Detroit, has agreed to manufacture 9000 Rolls Royce aircraft engines—3000 for the United States and 6000 for Great Britain—according to Mr. Knudsen. This project had struck several snags earlier—first when Henry Ford refused to make armaments for a foreign belligerent and later when Packard directors delayed approval of the contract pending further clarification of its terms.

E. R. Stettinius Jr., commissioner in charge of materials, reported that through co-operation with the reconstruction finance corporation and the treasury his division is acquiring substantial supplies of strategic and critical raw materials. Actual purchases have been negotiated and the material loaded aboard ship within three or four days after the availability of the material was made known. Mr. Stettinius' division has made surveys of the entire field of strategic and critical materials.

Mr. Stettinius said that by the end of the month a plan will have been worked out to supply most of our needs through the manufacture of synthetic rubber.

One point of concentration by the materials division involves the production of 100-octane gasoline for aircraft. It is planned to store large quantities of this underground.

The division also is working on plans to relieve our dependence on foreign smelters for tin.

Mr. Stettinius told a press conference that production of heavy armor plate will be adequate to meet the enlarged naval program. Present production capacity will be augmented by expansions and new plants financed by the $50,000,000 already appropriated by congress for that purpose.

Estimates of the steel tonnage to be required for the defense program are being compiled by Dr. Theodore Yntema, of the University of Chicago. Dr. Yntema prepared the survey of the United States Steel Corp. which was presented to the temporary national economic committee some months ago. He

now is working with the defense commission as an aide to Mr. Stettinius.

Sidney Hillman of the labor supply division reported on the progress in training workers; already between 30,000 and 40,000 are enrolled in various courses.

Ralph Budd, commissioner of transportation, said he has urged on the Association of American Railroads "the need for full performance by all lines of the repair work necessary to reduce cars in bad order to not more than 6 per cent, as was agreed."

Miss Harriet Elliott, division of consumer protection, Chester Davis, agricultural division, and Leon Henderson, division of price stabilization, also reported on the work underway by their branches.

How Skilled Manpower Could Be Increased 25 to 50 Per Cent

■ PRIVATE industry is capable of rapidly increasing production of most products necessary to the speedy execution of a well-planned and organized defense program, if an adequate supply of skilled labor is available.

A questionnaire survey of leading business executives by the National Industrial Conference board reveals most industries are free of bottlenecks; many expect to meet anticipated needs without any great difficulty.

It was generally reported that, so far as can now be seen, heavy capital expenditures are not needed, although in some instances substantial investments are likely to be required to provide facilities for entirely new products.

Production on the whole can be greatly expanded through multiple-shift operations or by the lengthening of the work week.

The most serious problem is the skilled labor supply; many executives stated that activities are already hampered by skilled labor shortages while others believe that they will be quickly encountered when demand becomes heavy.

Steps are being taken to correct this condition and a number of business leaders were confident that industry could solve the labor-shortage problem, through careful scheduling of work and through the adoption or extension of training programs.

In the machine tool industry, nearly all replies mentioned the existence of a skilled labor shortage at present. Industries in which reports of shortages or expected shortages outnumbered those of no lack of trained labor included: Automotive, electrical equipment, foundries, hardware and plumbing, heavy machinery, nonferrous metals, railroad equipment, steel, and wire and cable. In the chemical, clothing, construction materials, food, mining, petroleum, rubber, shoes and leather and textile industries, no important shortages were recorded or anticipated.

In summing up the results of the survey, H. F. Browne, director of the board's management research division, makes this suggestion for capitalizing on the present supply of skilled labor:

"There are at present artificial barriers to the accomplishment of this latter objective (increasing the supply) that should be examined with great seriousness and from all points of view, balancing the nation's critical needs in this emergency against the advisability of temporarily relaxing provisions in legislation enacted at a time when no national crisis was in sight.

"The Walsh-Healey act . . . provides among other things that . . . the work week shall not exceed 40 hours. The fair labor standards act, passed in 1938, provided a floor for wages and stepped down the regular work week of concerns engaged in interstate commerce from 44 hours in October, 1938 to 40 hours in October, 1940. Thus existing legislation will, by October, 1940, limit the regular work week in companies engaged in government contract work, or in interstate commerce of any character, to 40 hours.

"It requires no complicated mathematical computation to realize that if this restriction on working hours were relaxed for the duration of the emergency to allow a 50-hour week, the productive effectiveness of the existing supply of skilled labor would immediately be increased by 25 per cent; a 54-hour week would mean an increase in effectiveness of 35 per cent; a 60-hour week, an increase of 50 per cent.

"In this way, without waiting for the weeks and months that will be required to train or retrain new men, the present productive capacity of industry could be substantially increased, and it could much more rapidly make inroads into the appalling deficit in defense equipment that now confronts the nation . . .

"The restrictions would automatically again take effect upon expiration of the time agreed upon.

"The shortage of highly skilled labor is no bogie set up by those opposed to social legislation to accomplish its defeat."

Axis Powers Have Some Advantage In Latin American Trade Battle

■ GERMANY and her allies will have a natural advantage over the United States in the forthcoming struggle for Latin American trade, an advantage which results from the nature of the exportable surpluses of the republics south of the Rio Grande.

Largely foodstuffs and other agricultural products, these commodities are needed critically in famine-threatened Europe; many are not needed in the United States.

That any country wishing to sell in Latin America must also buy there, long has been axiomatic. Although the United States' trade with these republics exceeds that of any other country, our ability to absorb more South American products — without seriously disrupting our domestic economy — is limited.

It is upon this reasoning that German commercial agents already are basing their arguments for a larger share in the market. Argentina, for example, in 1938 sold more than 35 per cent of her surplus to Germany, Italy, Belgium, Czechoslovakia, Austria, the Netherlands, Poland, Norway and Denmark. Approximately the same amount went to England and France. Where else, the Nazi agents ask the Argentines, can you sell your meat, wheat and corn.

Size of the foreign trade of the 20 Latin American countries is revealed by data for 1938 just compiled by the United States department of commerce. Total exports of the 20 republics were valued at $1,839,878,000. Slightly more than 30 per cent were purchased by the United States. Germany took 10.5 per cent; the United Kingdom, 16.9 per cent; France, 4 per cent; Italy, 1.5 per cent; Japan, 1.3 per cent.

Imports by Latin American coun-

tries totaled $1,467,239,000, of which the United States supplied $497,342,000 or 34 per cent. Germany supplied 16.2 per cent; Italy, 3 per cent; Japan, 2.5 per cent; United Kingdom, 11.5 per cent; and France, 3.3 per cent.

Petroleum is the leading export and shipments in 1938 were valued at $317,361,C00. Nearly 80 per cent was produced in Venezuela, with Peru, Colombia and Mexico providing the remainder. Other exports, in order of value:

Coffee	$233,501,000
Meats	124,137,000
Sugar	115,704,000
Copper	106,659,000
Wool	92,187,000
Cotton	76,535,000
Metals, excl. copper, tin	73,066,000
Hides and skins	62,539,000
Wheat	61,438,000
Linseed	59,572,000
Corn	59,299,000
Nuts, waxes, oils	37,739,000
Cereals, except wheat, corn and linseed	32,059,000
Nitrate	31,478,000
Bananas	28,139,000
Tin	24,793,000
Cabinet woods, lumber	21,705,000
Cacao	21,672,000
Fibers	9,069,000

Closing of many European markets as result of the war already has caused large stocks of agricultural products, more or less perishable, to accumulate. This is especially true in the southern republics. Brazil alone has several million dollars worth of coffee in storage; Argentine officials are fretting over unmarketable meats, wheat and similar products.

German agents are offering an outlet for these products—and at the same time are soliciting orders for steel, railroad equipment, airplanes, ships, chemicals and other products. October delivery has been promised in some cases, and cash penalties for failure to deliver as promised are offered.

Shipyards Inc. Formed To Reopen Cramp's

■ Incorporation of Shipyards Inc., Philadelphia, by the Harriman interests is regarded in the industry as the initial step in the reopening of the former William Cramp & Sons' Ship & Engine Building Co.'s yard at Philadelphia.

Company's purposes, according to articles of incorporation, are to "buy, construct, assemble, equip, recondition, repair, sell, import and export vessels and parts of vessels and marine engines, tools, equipment, appliances, materials and accessories of all kinds and to do any and all things in furtherance of or incidental to the aforesaid purpose."

It is understood the yard, at which shipbuilding activities were discontinued in 1927, will be opened to recondition a large number of destroyers idle since the last war.

Scrap Consumption Up 14 Per Cent in June

■ Iron and steel scrap consumption in the United States during June increased 14 per cent to 3,482,000 gross tons, according to estimate of Institute of Scrap Iron & Steel Inc., New York.

This compared with 3,061,000 gross tons consumed in May, and 2,221,000 in June, 1939. Indicated domestic scrap for first 1940 half aggregated 18,212,000 gross tons, contrasted to 13,214,000 in first half last year.

Scrap exports thus far in 1940 have averaged 230,467, gross tons per month, compared to 295,965 tons monthly average in 1939. Exports this year have averaged 7.15 per cent of domestic consumption.

American Car & Foundry Awarded 627 Tanks

■ American Car & Foundry Co. has been awarded a contract by the war department for 627 light tanks to cost $11,000,000. The tanks weigh 12 tons and carry several guns.

It is stated the army now has 3000 tanks either in hand or on order, and an additional 3000 are to be contracted for.

Briggs Mfg. Co. To Make Metal Airplane Wings

DETROIT

■ Briggs Mfg. Co. here, producer of automobile bodies, moldings, plumbing ware and other products, announces through W. P. Brown, president, that arrangements have been concluded with the Vought-Sikorsky division, United Aircraft Corp., East Hartford, Conn., to supply complete wing assemblies for observation and scout planes, the first venture of a new Briggs department devoted to aircraft sheet metal fabrication.

Briggs will equip a plant on Connors avenue here, on a 16-acre tract of land, with necessary presses, forming rolls, riveters, etc., to handle this production. Standard aircraft technique will be used. The wings are of aluminum alloy, about 14 feet in length. The plant will be equipped by Sept. 1, production started in October, and first deliveries made in November.

Complete personnel of the Barkeley-Grow Aircraft Corp., including plant manager, inspectors and plant operators, will be taken over by Briggs as a nucleus of skilled labor for aircraft sheet metal fabrication.

No information can be given out on the number of assemblies to be furnished Vought-Sikorsky, or the amount of money involved in the contract. It is known, however, that other aircraft manufacturers have approached Briggs for sheet metal parts, and it is likely that further business will be placed in the new division. Tail assemblies and other formed parts eventually will be placed in production, it is stated.

Briggs has been a leading supplier of bodies to both Chrysler and Ford, although the latter has now absorbed most body production into his own plants. Briggs operates a tool and die division, employing currently over 1000; a plumbing ware division which is reported grossing about $100,000 monthly; and a large new molding and auto parts plant.

The company is known to have conducted extensive experiments with plastics, both for automotive and aircraft requirements. One of the latest projects is with an aircraft fuselage of molded plastic reinforced with magnesium alloy struts. Equipment circles have heard talk of plans to install an enormous hydraulic press, with platen 44 feet wide, to handle aircraft moldings in the Briggs plant. A press of this huge size would set a new record for this type of equipment.

Planemakers' Backlog Over Billion Dollars

■ Backlog of orders of 15 leading warplane producers now is estimated at $1,095,259,000, compared to $300,000,000 a year ago. The industry also is estimated to have expansion programs, in and beyond the blueprint stage, totaling $25,000,000. According to *Aviation*, orders now held by leading builders are as follows:

Allison	$40,000,000
Aviation Corp.	4,131,000
Bell	22,000,000
Boeing	47,000,000
Brewster	44,628,000
Consolidated	70,000,000
Curtiss-Wright	200,000,000
Douglas	140,000,000
Grumman	9,500,000
Lockheed	111,000,000
Martin	92,000,000
North American	85,000,000
Republic	15,000,000
United	200,000,000
Vultee	15,000,000
Total	$1,095,259,000

Contracts Awarded By Navy Department

■ Bureau of supplies and accounts, United States navy department, last week awarded the following contracts:

Daniel Woodhead Co., Chicago, sockets, $15,500.

Charles F. Guyon Inc., New York, iron pipe $8828.71.

Independent Pneumatic Tool Co., Chi-

cago, pneumatic drills and hammers, $6162.45.

Baldwin Southwark division, Baldwin Locomotive Works, Philadelphia, hydraulic press, $268,010.

Whiting Corp., Chicago, rotary shear, $6617.

Machinery Sales Co., San Francisco, universal miller, $5512.50.

Pratt-Whitney division, Niles-Bement-Pond Co., W. Hartford, Conn., profiling machines, $84,540.

Rockford Machine Tool Co., Rockford, Ill., planers, $49,088.

Faltoute Iron & Steel Co., Newark, N. J., cutters, $5889.60.

Cleveland File Co., Cleveland, files, rasps, $34,498.52.

Delaware Tool Corp., Wilmington, Del., chisels, chisel blanks, $13,610.95.

Buffalo Pumps Inc., Buffalo, pumps, $6690.

Electro Refractories & Alloy Corp., Buffalo, crucibles, $14,993.65.

Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire division, New York, cable, $7346.80.

Gisholt Machine Co., Madison, Wisc., turret lathe, $14,604.

Worthington Pump & Machinery Corp., Washington, pumps, $63,341.

Millers Falls Co., Greenfield, Mass., calipers, dividers, etc., $5280.85.

Morton Mfg. Co., Muskegon Hts., Mich., propeller profiling machine, $113,000.

Electro Metallurgical Sales Corp., New York, ferromanganese, $13,377.60.

Warner & Swasey Co., Cleveland, turret lathe, $12,118.

International Nickel Co., Inc., New York, nickel, copper, $9799.34.

New Jersey Zinc Sales Co. Inc., New York, zinc, $36,001.45.

Atlantic Zinc Works Inc., Brooklyn, N. Y., zinc, $46,213.18.

American Steel & Wire Co. of N. J., Washington, cable, $7815.

General Cable Corp., Washington, cable, $8301.60.

National Electric Products Corp., Pittsburgh, cable, $8210.50.

Rockbestos Products Corp., New Haven, Conn., cable, $8210.50.

International Minerals & Metals Corp., New York, zinc, $44,927.80.

Phelps Dodge Copper Products Corp., New York cable, $7789.40.

General Electric Co., Schenectady, N. Y., cable, $8180.50.

Collyer Insulated Wire Co., Pawtucket, R. I., cable, $8501.40.

Okonite Co., Passaic, N. J., cable, $8268.

Anaconda Wire & Cable Co., New York, cable, $8131.60.

A. B. Farquhar Co. Ltd., York, Pa., press, $8300.

Dunham Carrigan & Hayden Co., San Francisco, files, $12,960.10.

L. S. Starrett Co., Athol, Mass., calipers, dividers, gages, etc., $5417.16.

Austin-Hastings Co. Inc., Cambridge, Mass., planer shapers, $22,862.80.

International Nickel Co. Inc., New York, nickel, copper alloy, $135,942.99.

Carnegie-Illinois Steel Corp., Washington, steel, $76,091.32.

Keystone Steel & Wire Co., Peoria, Ill., nails, $15,340.

John A. Roebling's Sons Co., Trenton, N. J., degaussing wire, $46,935.50.

General Machinery Corp., Hamilton, O., engine lathe, $49,580.

Continental Electric Co. Inc., Newark, N. J., motors, controllers, $5544.85.

Jessop Steel Co., Washington, Pa., corroston-resisting steel, $27,445.

Empire Finished Steel Corp., Newark, N. J., pearlitic manganese steel, $6800.

La Salle Steel Co., Chicago, Ill., pearlitic manganese steel, $5709.

Elliott Bros. Steel Co., New Castle, Pa., strip steel, $8405.50.

Hammond Lead Products Inc., Hammond, Ind., dry red lead, $14,175.

Central Iron & Steel Co., Harrisburg, Pa., plate steel, $6090.28.

Purchases Under Walsh-Healey Act

(In week ended July 6)

Steel and Steel Products

	Commodity	Amount
Allegheny Ludlum Steel Corp., Brackenridge, Pa.	Steel	$13,760.92
Edgewater Steel Co., Pittsburgh	Steel forgings	15,538.75
George D. Ellis & Son Inc., Philadelphia	Containers	10,264.40
Russakov Can Co., Chicago	Containers	17,150.00
Railway & Industrial Eng. Co., Greensburg, Pa.	Structure for substation	17,095.00
Babcock Printing Press Corp., New London, Conn.	Machined shell	183,131.00
American Car & Foundry Co., New York	Suspension parts	33,018.60
Surface Combustion Corp., Toledo, O.	Soaking furnace	15,100.00
United States Steel Export Co., Washington	Gates	872,264.00
Steel Products Engineering Co., Springfield, O.	Cabinet assemblies	16,012.00
Clauss Shear Co., Fremont, O.	Bandage scissors	22,740.00
J. J. Koepsell Co., Sheboygan, Wisc.	Conduit pipe	17,543.12
Edgewater Steel Co., Pittsburgh	Roller paths	15,050.36
R. P. Clarke Co., Washington	Steel shears	12,285.00
Trimont Mfg. Co., Boston	Wrenches	19,207.37
National Tube Co., Washington	Steel flasks	57,690.90
Doehler Die Casting Co., Pottstown, Pa.	Practice bombs	19,140.00
Apollo Steel Co., Apollo, Pa.	Corrugated roofing	95,369.83
Boston Wire Stitcher Co., East Greenwich, R. I.	Wire staples	*38,250.00
American Forge division, American Brake Shoe & Foundry Co., Chicago	Forgings for shell	70,235.00
Bethlehem Steel Co., Bethlehem, Pa.	Steel	12,615.26
Safe Tread Co. Inc., New York	Safety treads	15,630.00
Steel Products Eng. Co., Springfield, O.	Fluid segregators	15,000.00
Lundquist Tool & Mfg. Co., Worcester, Mass.	Telescope mounts	105,710.00
Fort Pitt Bedding Co., Pittsburgh	Metallic belt links	419,200.00
Hart Mfg. Co., Louisville, Ky.	Army ranges	20,766.42
William Miller Range & Furnace Co., Cincinnati	Army ranges	12,695.10
F. A. Klaine Co., Cincinnati	Army ranges	15,186.00
TOTAL		$2,177,649.03

Nonferrous Metals and Alloys

National Lead Co., Baltimore	Wire solder	$24,037.50
Federated Metals division, American Smelting & Refining Co., San Francisco	Copper ingot	11,850.00
Phelps Dodge Copper Products Corp., New York	Condenser tubes	13,789.68
American Brass Co., Waterbury, Conn.	Copper tubing	16,128.36
Guide Lamp division, General Motors Corp., Detroit	Cartridge cases	149,362.81
Aluminum Co. of America, Washington	Aluminum alloy	20,320.40
Aluminum Co. of America, Washington	Aluminum tubing	30,175.97
Aluminum Goods Mfg. Co., Manitowoc, Wisc.	Aluminum filters	10,859.00
TOTAL		$276,523.72

Machinery and Other Equipment

American Laundry Machinery Co., Cincinnati	Ironer, presses	14,217.00
Swind Machinery Co., Philadelphia	Power shear	18,874.00
Lloyd & Arms Inc., Philadelphia	Honing machine	15,464.00
Feerless Pump division, Food Machinery Corp., Massillon, O.	Gasoline pumps	23,194.82
Worthington Pump & Machinery Corp., Washington	Refrigeration equipment	25,753.00
Davenport Machine & Foundry Co., Davenport, Iowa	Recovery equipment	*14,346.00
Allis-Chalmers Mfg. Co., Milwaukee	Pumping units	172,589.00
Hydraulic Press Mfg. Co., Mount Gilead, O.	Hydraulic press	17,310.00
National Acme Co., Cleveland	Automatic machines	35,996.50
Vandyck Churchill Co., Philadelphia	Milling machines	13,668.00
W. E. Shipley Machinery Co., Philadelphia	Shapers	10,639.00
Swind Machinery Co., Philadelphia	Pickling machines	12,300.00
Henry Prentiss & Co. Inc., New York	Grinding machine	10,435.00
Norton Co., Worcester, Mass.	Grinding machines	19,279.20
Cleveland Tractor Co., Cleveland	Tractors	13,775.50
Caterpillar Tractor Co., Peoria, Ill.	Tractors	62,640.09
Gardner-Denver Co., Washington	Pumping units	13,070.00
C. H. Gosiger Machinery Co., Dayton, O.	Drill presses	21,735.00
International Harvester Co., Chicago	Tractor	15,481.20
Gisholt Machine Co., Madison, Wisc.	Lathes	14,477.00
C. H. Gosiger Machinery Co., Dayton, O.	Engine lathe	15,593.00
General Machinery Corp., Niles Tool Works division, Hamilton, O.	Engine lathe	11,239.00
H. R. Kreuger & Co., Detroit	Reaming machine	14,623.00
Iowa Mfg. Co., Cedar Rapids, Iowa	Crushing plant	20,685.00
Koerhing Co., Milwaukee	Hauling and dumping units	17,085.00
International Harvester Co. Inc., Washington	Tractor	55,243.61
Northwest Engineering Co., Chicago	Power shovel	15,754.00
Allis-Chalmers Mfg. Co., Milwaukee	Tractor	10,401.00
Allis-Chalmers Mfg. Co., Springfield, Ill.	Laundry equipment	12,275.00
American Laundry Machinery Co., Cincinnati	Press brakes	11,475.00
Cyril Bath & Co., Cleveland	Cranes	14,718.60
E. A. Kinsey Co., Cincinnati	Presses	21,651.00
Toledo Machine & Tool Div., E. W. Bliss Co., Toledo, O.	Milling machines	133,950.00
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Tractors	32,873.54
International Harvester Co., Chicago	Milling machines	12,920.88
Brown & Sharpe Mfg. Co., Providence, R. I.	Air compressors	11,978.20
Dayton Air Compressor Co., Dayton, O.		
TOTAL		$959,710.14

*Estimated.

British Industry Studies Sites For New Factories in Canada

TORONTO, ONT.

■ CANADA is striving for self-sufficiency in the production of war material. Factories in the Dominion are being equipped as rapidly as possible to manufacture every type of weapon and munition—from the service rifle to the giant coastal defense and naval guns.

Before the war Canada had only the Dominion arsenal, a plant to produce the Bren light machine guns —and another which was preparing to make field guns. Now many plants are being equipped for the production of every type of armament needed in modern warfare. Location and nature of these plants is being kept secret.

The government is building a $2,000,000 plant to produce brass and munitions at Montreal East, Que. Plant will be operated by Canada Wire & Cable Co. Ltd., subsidiary of Noranda Mines Ltd.

Industries Decentralize

Representatives of British industry have been investigating sites in the provinces for building new plants or relocating old ones. H. D. Fearman, civic industrial commissioner for Hamilton, Ont., last week stated: "I understand there are a number of British companies considering locating in Canada. While some British companies may not move their entire plants, they will likely decentralize their activities."

Allied Supplies Ltd., a new company organized by the government to administer the Canadian munitions and explosives program on behalf of Great Britain, will be operated by eight business men. Charles Dunning will be chairman, and Harold Crabtree, Montreal, Que., president of the Canadian Manufacturers association, will be president. Directors are:

W. D. Black, Hamilton, Ont.; Beaudry Leman, Montreal, president, Banque Canadienne Nationale; J. Y. Murdoch, Toronto, president, Noranda Mines Ltd.; D. R. Turnbull, Halifax, N. S., managing director, Acadia Sugar Refinery; H. R. McMaster, Montreal, president, Steel Co. of Canada Ltd.; and E. A. Wilson, Ingersoll, Ont., president, Ingersoll Machine & Tool Co. Ltd. The company is one of three government-owned, nonprofit organizations set up to carry on special phases of producing munitions and war supplies.

Department of munitions and supply last week placed 1206 contracts totaling $8,261,266. Following are the more important:

Aircraft supplies—Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $9597; British Aeroplane Engines Ltd., Montreal, $58,675; Noorduyn Aviation Ltd., Montreal, $11,232; Instruments Limited, Ottawa, $206,307; Irvin Air Chute Ltd., Ottawa, Ont., $128,701; Ontario Hughes-Owens Co. Ltd., Ottawa, $1,072,556; Ottawa Car & Aircraft Ltd., Ottawa, $131,950; National Steel Car Corp. Ltd., Hamilton, $58,833.

Machinery and tools—Canadian Ingersoll-Rand Co. Ltd., Montreal, $5961; Canada Iron Foundries Ltd., Montreal, $148,099; T. E. Ryder Machinery Co., Montreal, $31,897; Williams & Wilson Ltd., Montreal, $24,732; The Canadian Fairbanks-Morse Co. Ltd., Ottawa, $6007; Allatt Machine & Tool Co., Toronto, $5580; E. W. Bliss & Co. of Canada Ltd., Toronto, $956,554; Delamore & Williams Ltd., Toronto, $16,200; A. R. Williams Machinery Co. Ltd., Toronto, $145,990; J. E. Livingstone Machinery Co. Ltd., Windsor, Ont., $13,110; E. J. Manville Machine Co., Waterbury, Conn., $42,313; Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., $213,626; The V. & O. Press Co. Inc., Hudson, N. Y., $25,331; Fidelity Machine Co., Philadelphia, $23,123; Peters Engineering Co., Philadelphia, $32,703.

Construction Active

Electrical equipment — Canada Wire & Cable Co. Ltd., Montreal, $13,797; RCA Victor Co. Ltd., Montreal, $8922; British Air Ministry, England, $297,000; Canadian Westinghouse Co. Ltd., Ottawa, $40,548; Outboard Marine & Mfg. Co. Ltd., Peterboro, Ont., $38,961; Sutton-Horsley Co. Ltd., Toronto, $32,400; Commonwealth Electric Corp. Ltd., Welland, Ont., $44,931.

Shipbuilding — St. John Dry Dock & Shipbuilding Co. Ltd., St. John, N. B., $5700; Dominion Engineering Co. Ltd., Montreal, $12,900; General Supply Co. of Canada Ltd., Ottawa, Ont., $16,308.

Munitions — British Metal Corp. (Canada) Ltd., Montreal, $48,088; Consolidated Mining & Smelting Co. of Canada Ltd., Montreal, $111,500; Merck & Co. Ltd., Montreal, $20,400; E. Leonard & Sons Ltd., London, Ont., $43,485; Winchester Repeating Arms Co., East Alton, Ill., $74,778.

Ordnance — Hudson Bay Mining & Smelting Co. Ltd., Winnipeg, Man., $20,580; Colt Patent Fire Arms Mfg. Co., Hartford, Conn., $23,405.

Naval stores—British Admiralty, England, $15,000; Canada Wire & Cable Co. Ltd., Montreal, $51,435; Canadian John Wood Mfg. Co. Ltd., Toronto, $28,818; Horton Steel Works Ltd., Toronto, $18,345; British Ropes, Canadian Factory, Ltd., Vancouver, B. C., $54,000.

Mechanical transport — General Motors Products of Canada Ltd., Oshawa, Ont., $14,201; La France Fire Engine & Foamite Co. Ltd., Toronto, $142,464; B. F. Goodrich Rubber Co. Ltd., Kitchener, Ont., $48,250.

Construction—Poole Construction Co. Ltd., Regina, Sask., $78,617; H. G. MacDonald Co., Edmonton, Alta., $648,000; Bird Construction Co., Winnipeg, Man., $430,000; Buchan Construction Co., Calgary, Alta., $319,000; General Engineering Co., Toronto, $332,000; Russell Construction Co., Toronto, $419,000.

Miscellaneous — Eggette & Co., London, Ont., $17,000; Howard Furnace Co. Ltd., Toronto, $21,000; Iron Fireman Co. of Canada Ltd., Toronto, $20,500; Canadian Comstock Co. Ltd., Montreal, $28,000; W. G. Edge Ltd, Ottawa, $27,000

Steel Industry Fourth In Accident Frequency

■ Steelmaking ranked fourth in accident frequency and twenty-fifth in severity in 1939, according to the National Safety council, Chicago. Steel plants averaged 6.57 for frequency and 1.77 for severity, compared with 11.83 for frequency and 1.42 for severity, general averages for all industry.

The frequency rate is the number of reportable injuries per 1,000,000 man-hours of exposure and the severity rate is the number of days lost as the result of injury per 1000 man-hours of exposure, including arbitrary charges for permanent disabilities and deaths, in accordance with a standard scale.

Steel industry's frequency rates generally were 1 per cent higher than in 1938. Severity was down 8 per cent. Reductions of 5 per cent in frequency and 10 per cent in severity were reported for industry as a whole.

Since 1926 the steel industry has reduced freqency 69 per cent and severity 35 per cent. Improvement in frequency equals the average for all industries but progress in severity has lagged behind the general average reduction of 50 per cent. Lowest severity rates in large departments were in wire mills, 0.66, pipe mills, 0.86, and sheet mills, 1.03.

Rates in the steel, foundry, machinery and nonferrous industries, and comparisons with the average for all industries, as reported by the National Safety council for 1939 follow:

	Frequency	Severity
All industries	11.83	1.42
Steel	6.57	1.77
Foundry	19.08	1.43
Machinery	7.81	.67
Nonferrous	9.04	1.10

Provisions for New Taxes Reduce Steelmakers' Quarterly Income

■ SIX steel producers, first to report for the second quarter, earned an aggregate net profit of $5,192,898 in the period, compared to $1,203,367 in the second quarter, 1939.

Their aggregate net income for six months ended June 30 was $10,320,785. In the first half last year net earnings of the identical companies totaled $2,623,541.

The industry's first half operating rate this year averaged 72.64 per cent, compared to 52.98 per cent in the 1939 period.

In most cases second quarter net profit was reduced considerably by provisions made to meet new and heavier taxes which have been either passed or are awaiting congressional action. Several companies also made provision for possible future inventory decline.

The six producers include Republic, Rustless, Continental, Sharon, Copperweld and Allegheny Ludlum. Latter's report was published in STEEL, July 15, p. 26.

RUSTLESS IRON & STEEL CORP.

Rustless Iron & Steel Corp., Baltimore, earned $332,754 net profit during second 1940 quarter, equal after dividend requirements on $2.50 preferred stock, to 33 cents per common share. This compared with an indicated net profit of $209,001 or 21 cents a common share in same 1939 period. Adjusted net income for quarter ended March 31 was $300,847, equal to 30 cents a share on common.

Earnings in first half this year totaled $633,601 or 63 cents a share on common, and included adjustments giving effect to the increased tax rates as set forth in the revenue act of 1940. Adjusted net profit for first 1939 half was $402,725, equal to 41 cents a common share.

Corporation's current unfilled orders, according to C. E. Tuttle, chairman, are at an all-time peak. Added shop facilities, now under construction, to increase ingot melting capacity to 75,000 tons annually are to be in operation by October, said Mr. Tuttle. He further added that present business trends indicate the additional melting facilities, which nearly double the company's capacity, will be substantially utilized.

REPUBLIC STEEL CORP.

Republic Steel Corp., Cleveland, reports second quarter consolidated net income totaled $3,337,730. This is equal to 47 cents per share on common after dividend requirements on 6 per cent prior preference and 6 per cent preferred stocks, and compares with $550,412 earned in the corresponding 1939 period. Net profit for quarter ended March 31 was $3,111,723, or 43 cents a common share.

Consolidated net profit for first six months this year was $6,449,453, was equal to 90 cents per share on common after the prior preference and preferred requirements. In the period last year net income totaled $1,083,311, equal after prior preference dividend requirements, to $1.98 a share on the 6 per cent preferred.

Estimated provision for federal income tax was $1,865,000 for first half this year; second quarter estimated provision was $1,140,000.

CONTINENTAL STEEL CORP.

Second quarter net income earned by Continental Steel Corp., Kokomo., Ind., totaled $141,339, after provision of $57,000 for future inventory decline, other contingencies. This was equal, after dividend requirements on 7 per cent preferred stock, to 54 cents per share on common. Net sales aggregated $4,181,482.

Net profit in corresponding 1939 period, when net sales totaled $3,678,005, was $253,128 or $1.06 per share on common. In quarter ended March 31 net profit was $211,456, equal to 89 cents per common share.

Total net profit earned in first half this year, and after provision of $119,000 had been made for future inventory decline and other contingencies, was $352,795, equal to $1.43 per share on common. This compared with $532,307 or $2.24 per common share in corresponding period last year. Sales in first half aggregated $8,046,188, as against $8,071,662 in same 1939 period.

Second quarter profits, according to D. A. Williams, president, resulted from operations after provision was made for the full half year's increased taxes specified in the 1940 revenue act. No further tax reserves have been set up in anticipation of special defense enactments now under consideration by congress, said Mr. Williams.

SLOSS-SHEFFIELD

Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., reports net profit for six months ended June 30 was $572,543, after federal income taxes at rates now in effect. This was equal, after preferred dividends, to $4.20 a share on 99,318 common shares, excluding treasury stock. Net income for corresponding period last year was $343,592, equal to $1.71 a share on common.

Indicated second quarter profit,

Steel Consumers' Earnings Statements

■ AGGREGATE net income reported by 26 iron and steel consumers for first half this year totaled $25,873,999, compared to $15,907,607 for corresponding 1939 period. Twenty-two companies' aggregate second 1940 quarter net income was $13,743,340, compared to $9,453,209 in same period last year. Only one reported a loss for the half, and one for the second quarter this year; net deficits were incurred by 6 and 2 companies, respectively, in corresponding 1939 periods.

	Second 1940 Quarter	Second 1939 Quarter	First Half 1940	First Half 1939
American Brake Shoe & Foundry Co., New York	$644,074	$510,997	$1,226,636†	$919,934†
American Machine & Metals Inc., New York	32,698†‡	20,758	14,222†‡	86,435*
Atlas Imperial Diesel Engine Co., Oakland, Calif.	.....	.....	102,538	84,402
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.	113,803†‡	.....	94,845	8,570*
Bliss & Laughlin Inc., Harvey, Ill.	144,766	119,134	348,218	253,515
Bridgeport Machine Co., Wichita, Kans.	38,746*†	2,581†	60,795*	136,683*
Caterpillar Tractor Co., Peoria, Ill.	2,039,458	1,387,262	3,509,514	2,315,380
Continental Motors Corp., Detroit†‡	112,864†	15,430	207,739†‡	126,234*
Eaton Mfg. Co., Cleveland	970,470	559,692	1,908,348	1,285,691
Florence Stove Co., Gardner, Mass.	245,115†	241,903†	443,145	348,236
General Time Instruments Corp., New York††	231,420	42,086	582,325	167,343
Johns-Manville Corp., New York	1,103,295	1,078,626	1,884,976	1,203,744
LeTourneau Inc., R. G., Peoria, Ill.	762,245	583,109	1,152,043	898,971
Marion Steam Shovel Co., Marion, O.	139,241†	43,837*	201,639†‡	76,532*
Monarch Machine Tool Co., Sidney, O.	359,635	.....	662,194	173,784
Mullins Mfg. Corp., Salem, O.	113,469	22,840	166,420	117,680
National Malleable & Steel Castings Co., Cleveland	148,132	32,169	618,757†	318,498†
New York Air Brake Co., New York	291,401	108,488	832,818	216,291
Superheater Co., New York†	187,093†	91,620†	419,578	266,558
Transue & Williams Steel Forging Corp., Alliance, O.	15,645	9,367*	37,779	524*
Twin Coach Co., Kent, O.	135,412†	291,686	210,000	347,671
Underwood Elliott Fisher Co., New York	484,656	300,756	1,073,384	860,919
Universal Cooler Corp., Detroit	44,119	49,937	75,364†	91,050†
Van Dorn Iron Works, Cleveland	.....	.....	78,502	10,844
Van Norman Machine Tool Co., Springfield, Mass ††	140,932†	64,722†	246,800	123,287
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	5,795,581	3,982,637	9,837,010	6,338,787

†Indicated; ††period ended June 15; ‡excluding Canadian affiliate; †‡before federal income tax; ‡‡quarter ended April 30.

based on first quarter and half reports, was $353,897, compared to indicated net income of $117,148 in second 1939 quarter. Net income for period ended March 31 was $218,648.

COPPERWELD STEEL CO.

Copperweld Steel Co., Glassport, Pa., reports $521,314 net income for six months ended June 30. This was equal, after provision for dividends on the company's $50 par value 5 per cent preferred stock, to $1.05 per share on common.

Subject to audit and year-end adjustment, the first half net income compares with $391,420 or 91 cents per common share earned in the same period last year. Preferred stock was issued during latter half of 1939.

Indicated second quarter net, computed from first quarter and six months' reports, was $293,627, compared to $191,243 in corresponding 1939 period. Net income for quarter ended March 31 was $227,687.

Dividend of 20 cents per common share was declared, payable Sept. 10 to record of Sept. 1; a like amount was paid June 10. Regular quarterly dividend of 62½ cents per share on the cumulative convertible preferred was also declared, payable same date.

SHARON STEEL CORP.

Sharon Steel Corp., Sharon, Pa., reports second quarter net profit was $79,327, equal after dividend requirements on $5 cumulative convertible preferred stock, to 1 cent a share on common. This compares with $148,157 net loss incurred in corresponding 1939 period. Net income earned in first 1940 quarter was $309,576, equal to 60 cents a share on common.

Indicated net profit for six months ended June 30 totaled $388,903 or 61 cents per common share, compared to a $140,544 net loss for the same period last year.

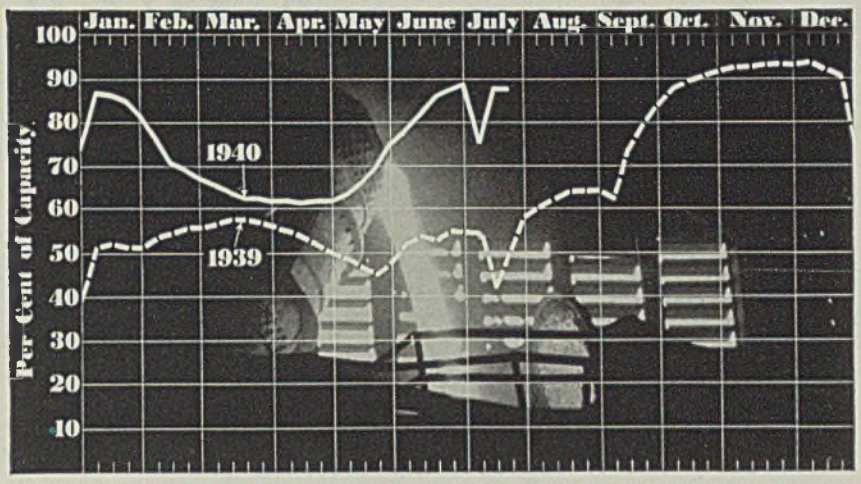
CLEVELAND CLIFFS IRON CO.

Cleveland Cliffs Iron Co., Cleveland, earned $982,723 net profit in second quarter. This was equal to $2.02 a share on $5 cumulative preferred stock, which carries an accumulation of unpaid dividends, and compared with net profit of $302,475 or 62 cents a share on preferred in corresponding period last year. Net loss of $57,953 was incurred in quarter ended March 31.

Net earnings for six months ended June 30 totaled $924,770, equal to $1.90 a share on preferred. In same 1939 period net income was $173,679 or 36 cents per share on preferred.

E. B. Greene, president, explained the sharp increase in first half net

(*Please turn to page* 78)



PRODUCTION... Steady

■ STEELWORKS operations last week continued at 88 per cent, four districts making slight advances, two declined and six maintained unchanged activity. A year ago the rate was 56.5 per cent; two years ago it was 36 per cent.

Youngstown, O.—With 68 open hearths and three bessemers in production the rate remained at 84 per cent, the best since last fall. Addition of an open hearth this week is expected to give a 1-point rise. Pittsburgh Coke & Iron Co. and Struthers Iron & Steel Co. have blown in one blast furnace each and Republic Steel Corp. has resumed blowing in the stack which was down for repair. Youngstown Sheet & Tube Co. has blown out C furnace at Campbell, O., for relining.

Chicago—Continued at 95 per cent, highest mark in ten years. Gain by one large producer was offset by slight curtailments at several smaller plants.

Detroit—Increased 3 points to 95 per cent as one idle furnace was put in service. One producer is operating all 16 open hearths and another nine out of ten.

Birmingham, Ala.—Held at 88 per cent last week but is expected to reach 92 per cent this week when Republic Steel Corp. lights its eighth open hearth.

Pittsburgh—Advanced 1 point to 81 per cent with further upward movement expected this week. Two plants still are idle.

Wheeling—Maintained at 94 per cent with no sign of material change.

New England—Loss of 10 points to 75 per cent. Addition of one open hearth this week will give a better rate.

Central eastern seaboard—Rose 2 points to 86 per cent with prospects for maintenance of this rate.

Buffalo—Unchanged at 90½ per cent, with mill backlogs promising continued high production.

St. Louis—Steady at 65 per cent for the second week, the same schedule being indicated for this week.

Cincinnati—Gained 6½ points to 84 per cent as one mill added three open hearths. Nearby producers are at practical capacity.

Cleveland—Dropped 14 points to 63 per cent, the result of sharp curtailment by one producer for plant vacation. Little change is indicated for this week.

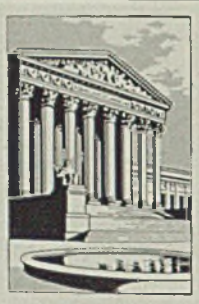
District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended July 20	Change	Same week 1939	Same week 1938
Pittsburgh	81	+ 1	48	27
Chicago	95	None	53.5	34
Eastern Pa. ...	86	+ 2	41	28
Youngstown ..	84	None	53	35
Wheeling	94	None	79	51
Cleveland	63	—14	56	26
Buffalo	90.5	None	46.5	35
Birmingham ..	88	None	81	50
New England..	75	—10	40	40
Cincinnati	84	+ 6.5	31	50
St. Louis.....	65	None	47.5	18
Detroit	95	+ 3	64	29
Average	88	None	56.5	36

■ United States Steel Export Co.'s motorship, STEELMOTOR, has been transferred from the company's Great Lakes fleet to service of Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., for use in Gulf of Mexico trade. Its home port will be Mobile, Ala. The vessel will carry steel products across the Gulf, principally to Houston, Tex.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

Negotiated Contracts To Reduce Dislocation.

WPA Funds Used Freely in Army and Navy Projects.

U.S. Machinery Exports to Brazil Increase 50 Per Cent.

Armor Plates Under Walsh-Healey Act?

WASHINGTON

■ LITERALLY hundreds of manufacturers, trade association and chamber of commerce executives have been in Washington during the past few weeks milling around to get orders either for their individual firms and localities or their members. So far they have had little luck. Army and navy procurement officials seem disposed to use the information which they have on file, which apparently contains all of the information they desire including the productive capacity of plants.

There has been complaint throughout the country that although all appropriations have been made for the defense program, contracts are coming through slowly. Manufacturers' representatives in Washington who are old hands at the game are fearful that before long the public will be wanting to know where all these tanks, airplanes, and other commodities are. These representatives are fearful that the accusation will bounce back on industry that it has been doing a slow job, when as a matter of fact contracts have been slow in coming through and even specifications are not available.

One thing which is going to loom large in the picture is the negotiating of contracts, as that is expected to cut a lot of government red tape. In that way also the government will be able to keep from dislocating industry. When the bids are opened for various commodities certain firms are quite apt always to be the low bidders and this would mean extension of their own plants, while some other plant might be idle. In negotiating contracts government officials feel that they will be able to avoid this situation.

There has been so much talk recently about the new tax bill that some manufacturers are apt to hold up the making of contracts as they hesitate to accept them without knowing what the new tax bill will contain.

Drastic NLRB Changes Seen

It has been stated in Washington that the question of amortization and depreciation will be going through congress with the tax bill. There is no question apparently but that the law regarding amortization will be changed. Statements on Capitol Hill have been to the effect that amortization will cover a period of 5 years instead of the present 10 years, and this seems to be satisfactory to most manufacturers.

First draft of the tax bill, it is reported, will be ready by treasury experts when congress gets back, July 22. It will be submitted at that time, it is understood, to the tax subcommittee of the house ways and means committee.

Talk in Washington now is to the effect that administration officials are quite anxious to pry something loose from the senate committee on labor and education in connection with amending the NLRB act. The administration, it is believed, would be glad to get through a few amendments before election to pacify some of the opponents of the board. However, it is generally believed in Washington that the house will not be satisfied with a few simple amendments but will demand something more drastic, such as passed by that body some weeks ago.

Final approval of more than $17,000,000 in new WPA projects for construction work at army and navy posts in many parts of the country has been announced by Col. F. C. Harrington, commissioner of work projects.

Majority of the projects call for construction or improvement of buildings, utility systems, roadways, rifle ranges and airplane landing fields in line with the rapid expansion of training facilities for the nation's armed forces. Included are 47 projects for the army, located in 21 states and the District of Columbia, which call for expenditures of $7,260,653 of WPA funds, and 23 projects for the navy, located in 14 states, the District of Columbia, Virgin Islands and Puerto Rico, with aggregate expenditures of $10,000,000 in WPA funds. Coast guard has a single project for improvements to its Baltimore station to cost $118,639.

"These are the first allocations from our 1941 funds for projects to be operated by the war and navy departments," Colonel Harrington explained.

"Since 1935 more than a third of a billion dollars of WPA funds has been spent on projects related to national defense, a large proportion of which were either sponsored by the army and navy or operated directly by them with WPA labor. The present sum is, of course, additional to this.

"We anticipate the approval of more projects of this type in the near future and it is our intention to expedite in every way all projects keyed to the national defense."

Two of the largest projects in the

Do YOU KNOW WHERE all skilled wages go?

A breakdown of production costs to show the time spent in handling materials reveals the actual number of man-hours spent in common labor that are paid for at skilled work rates.

With an overhead handling system planned by American MonoRail engineers, man-power is released from handling labor.

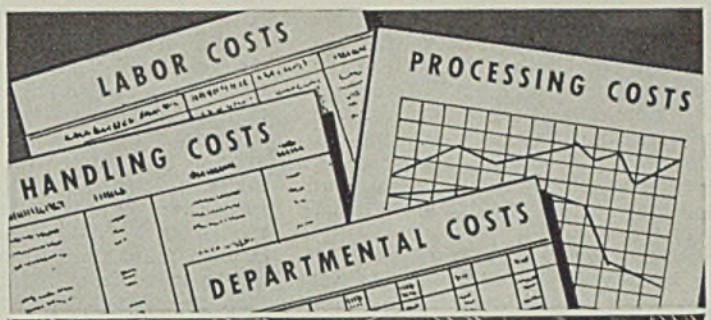
Mechanized methods for lifting and carrying reduce fatigue so that operators can apply full time and skill to production—

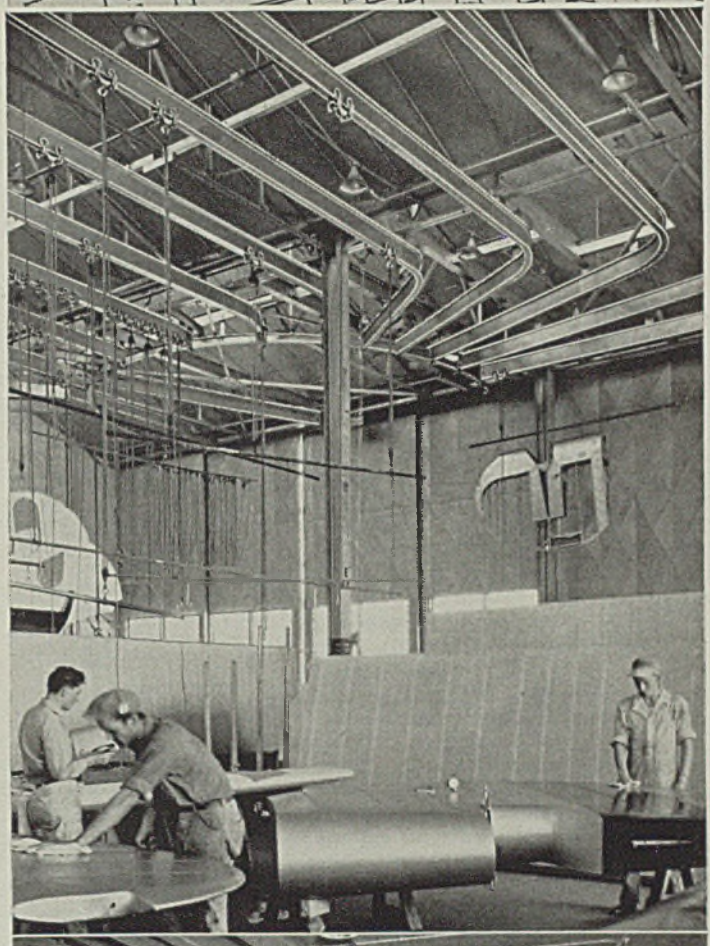
Loads are proportioned equally with process capacity—

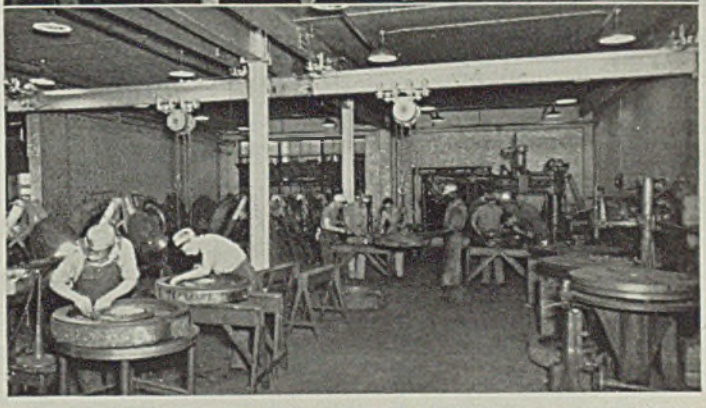
Rehandling from unit carriers often is eliminated—

Materials and products kept on scheduled routes free from congestion or damage in transit.

Maximum return from skilled wages is therefore obtained only with a carefully planned handling system. Many such installations of American MonoRail show immediate savings large enough to pay their cost within a short time. Write for a copy of 254 page book illustrating hundreds of applications.







Engineering service with unbiased recommendation is available without obligation.

THE AMERICAN MONORAIL COMPANY

13102 Athens Ave. Cleveland, Ohio

group are sponsored by the navy's bureau of yards and docks and are located in California. One calls for an expenditure of $1,000,000 at the Mare Island navy yard for the construction and rehabilitation of buildings, improving quarters at the marine barracks, riprapping the seawall and extending electrical services.

At San Diego $900,000 will be spent in constructing and rehabilitating numerous buildings and storehouses, extending rifle ranges, improving landing fields and laying railroad tracks at the marine corps base and the naval air station, supply depot, training station and destroyer base. Other navy projects in California contemplate similar work at the fleet training base, San Clemente Island, and the fleet air base, Terminal Island.

WPA Funds Widely Used

Other important projects sponsored by the navy are located at Pensacola, Fla., where $700,000 will be spent for improvements to the naval air station; improvements at the Great Lakes naval training school, Waukegan, Ill., costing $300,000; construction work at the Boston, Brooklyn, Philadelphia and Charleston navy yards, costing $600,000 each, and improvements at the United States naval academy, Annapolis, Md., totaling $250,000.

Largest of the projects approved for the army is that at Fort Knox, Ky., costing $750,000 in WPA funds. This calls for the construction and improvement of numerous buildings, extension of utility systems and improvements to roads and walks.

Another important project is that at Lowry field, near Denver, for the army air corps. This calls for an expenditure of $350,000 for construction and repair work on buildings and utility systems and upon the drainage system of the airfield. Since 1937 more than $5,000,000 of work relief funds have been allocated for the development of this key site in the nation's military air system.

Other important projects approved for the army include construction and rehabilitation work at Fort Sill, Okla., costing $350,000 in WPA funds; similar work at Fort Bragg, N. C., costing $250,000, and at the Edgewood arsenal, near Baltimore, costing $250,000. Projects at eight army posts and airfields in Texas will involve a total expenditure of $825,000 in WPA funds.

BRAZIL IMPORTS MORE AMERICAN MACHINERY

European war has resulted in improving substantially the position of American industrial machinery in the Brazilian market, according to a report from Assistant Commercial Attache A. W. Childs, Rio de Janeiro. The elimination of Germany as a supplier of items in this category is reflected in import statistics for 1939, during which total arrivals of industrial machinery items in Brazil showed a decline of 10 per cent in value. Imports from the United States, however, increased more than 50 per cent, rising in value from 105,769 contos in 1938 to 158,633 contos last year, with the ratio of American participation advancing from 24 to 42 per cent in the two periods.

While the present outlook for American machinery exporters in the Brazilian market is promising, it is the belief in some local trade circles that should the European war end soon, determined European competition must be looked for before the end of 1940.

Indications are that the war situation has given some impetus to increased local production of industrial machinery. Regardless, however, of developments in the domestic field, it is probable that the bulk of the country's requirements for some time will be obtained from foreign sources.

NELSON APPOINTS FOLSOM AS PURCHASING ASSISTANT

Donald M. Nelson, now co-ordinator of national defense purchases, has announced appointment of Frank M. Folsom, vice president, Goldblatt Bros. Inc., Chicago, to assist him.

Leon Henderson, commissioner in charge of industrial price stabilization, has received from the Controller's Institute of America a list of ten members who stand ready to act individually in an advisory capacity whenever they may be called upon.

The ten members are: E. R. Baines, vice president and controller, Underwood Elliott Fisher Co., New York; Stanley W. Duhig, vice president and treasurer, Shell Union Oil Co., New York; F. Eakin, vice president and controller, A. E. Staley Mfg. Co. Consolidated, Decatur, Ill.; Robert E. Frederickson, secretary and treasurer, The Symington-Gould Corp., Rochester, N. Y.; H. H. Hollinger, controller, Firestone Tire and Rubber Co., Akron, O.; Charles C. Jarchow, controller, American Steel Foundries, Chicago; L. D. McDonald, vice president, the Warner & Swasey Co., Cleveland; Roscoe Seybold, vice president and controller, Westinghouse Electric and Mfg. Co., Pittsburgh; H. T. Warshow, controller, National Lead Co., New York; Harry H. Weinstock, auditor, *New York Times*, New York.

Ralph Budd, commissioner in charge of transportation, has appointed Alex W. Dann of the Union Barge Line Corp. Pittsburgh; Fayette B. Dow, Washington representative of the American Petroleum Institute; J. M. Hood, president, Shortline Railroad association; and Thomas P. Henry, president, American Automobile association, as advisors.

Joseph D. Keenan, secretary, Chicago Federation of Labor, and member of the International Brotherhood of Electrical Workers, has been named as assistant to Sidney Hillman, commissioner in charge of labor supply and labor training.

WHITE HOUSE POINTS TO LABOR'S CO-OPERATION

Communication was sent to President Roosevelt last week signed by labor officials of the labor policy advisory committee, national defense commission, pledging co-operation.

This letter was signed by many labor executives and has led to the feeling on the part of some that the fight between the CIO and AFL may be patched up because of the needs of national defense.

"Full and unstinted devotion to our country and to the program of national defense," the labor officials' letter stated, "we and our membership are united in our effort and determination to give effective and expeditious co-operation in the fulfillment of the defense program and to contribute to a free and secure democracy."

Attention was called at the White House to the fact that the labor policy advisory committee which drafted the letter is not a group which had been called together by the President, but was organized recently by Sidney Hillman, of the defense commission. Members of the committee had expressed the belief that it may be able to help adjust many of labor's grievances without strikes.

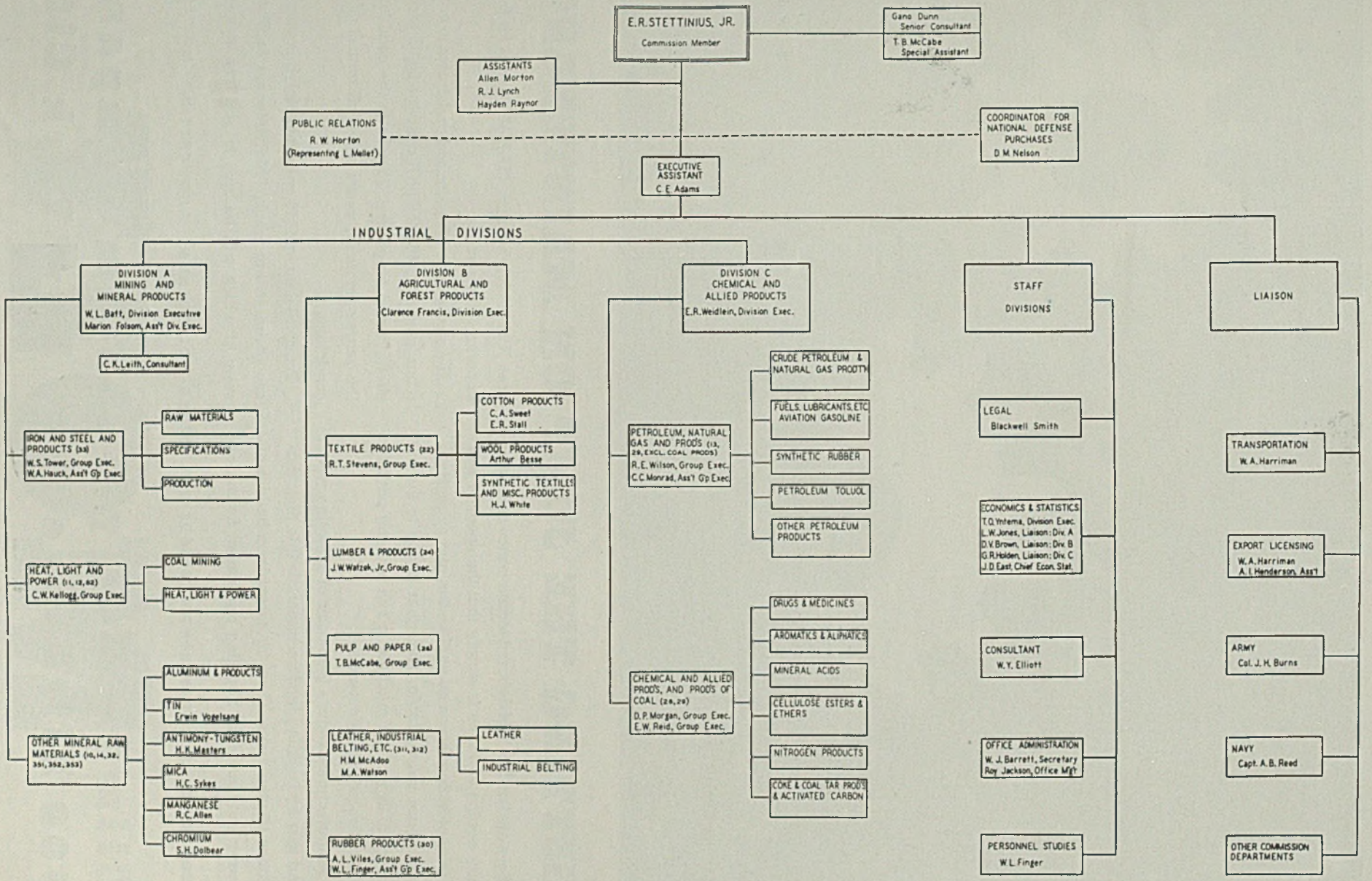
ASK IF ARMOR PLATE IS UNDER WALSH-HEALEY ACT

Public contracts division of the labor department has been asked for an interpretation of its definition of the steel industry under the Walsh-Healey act. Both the navy department and the Midvale Co., Nicetown, Philadelphia, want to know whether heavy armor plate is included in the definition.

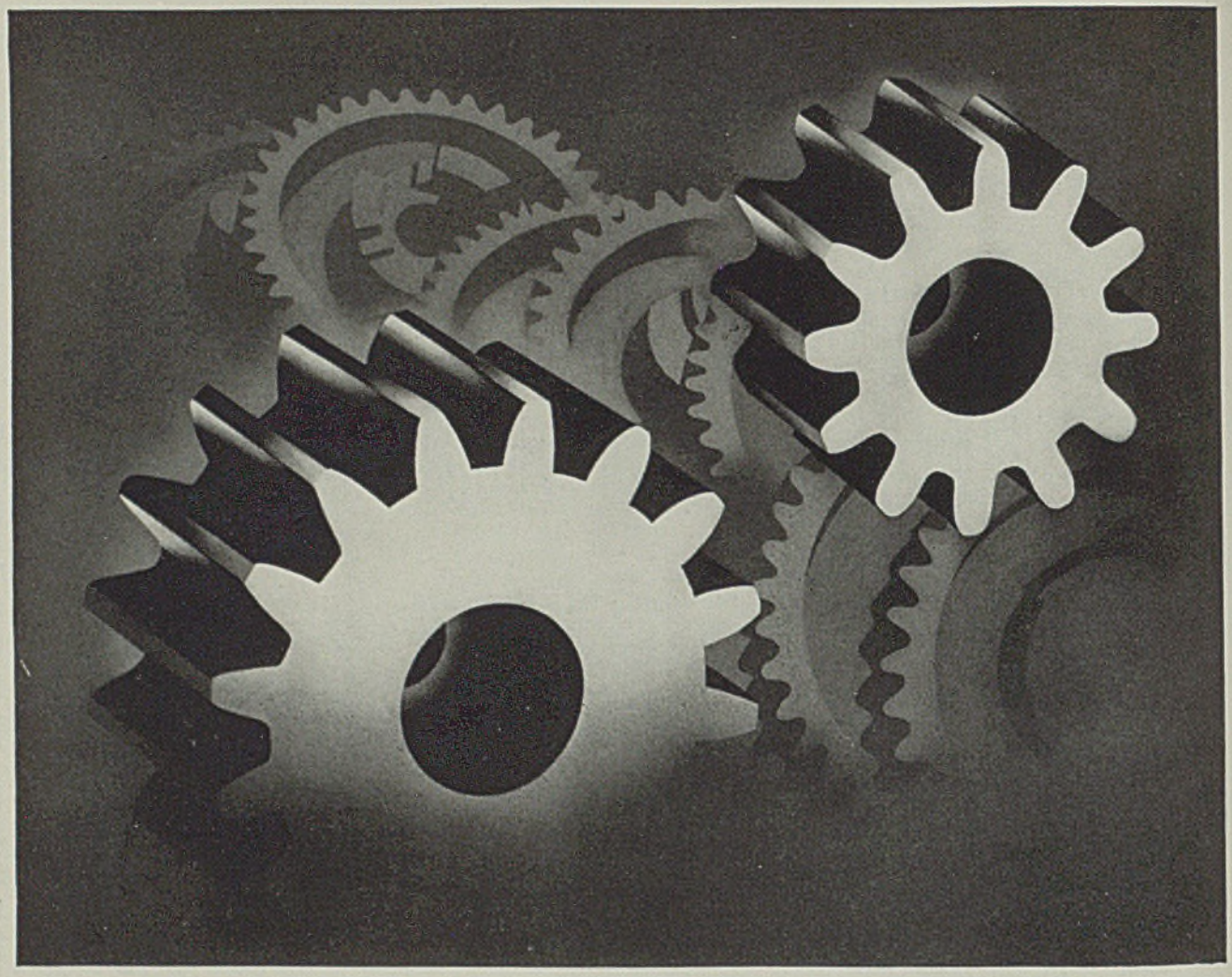
The labor department's definition of the steel industry, issued in January, 1939, when minimum steel wages were announced, does not mention armor plates but does include plates.

L. Metcalfe Walling, administrator of the public contracts division, is studying the question, but until late Friday had reached no decision.

Formation of Defense Commission's Industrial Materials Department



■ Official outline of positions, functions and appointees in the division under supervision of E. R. Stettinius Jr. Though showing the organization set-up as it has progressed thus far, the chart was released last week by Mr. Stettinius with an imprint: "Tentative Draft"



GETTING THE JUMP ON MAINTENANCE

There are two kinds of deferred maintenance on heavy duty equipment. One is simply that the operator has a way of letting things go until major, and expensive, repairs are unavoidable. The other is due to the inherent ability of the machine to run for long periods without requiring maintenance.

Manufacturers reduce the effects of operating wear and tear by building modern materials into their machines at vital spots. Thus, for example, a builder of heavy duty material handling equipment for mines uses Nickel-Molybdenum (SAE 4640) steel for the all-important drive gears.

The steel can be oil quenched and drawn to produce a hardness from 400-450 BHN combined with excellent strength and toughness. Thanks to the combination, the gears operate for years under all sorts of adverse conditions.

Practical data on 4640 and other Molybdenum steels are given in our book, "Molybdenum in Steel," a copy of which will be sent to you free on request.

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MOLY

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Changeover to 1941 Models To Be Effected Quickly.

Ford Will Build 6-Cylinder, 75-Horsepower Engine.

Retail Sales in July Improve Contraseasonally.

Chrysler Studies Tank Production, but Has No Orders.

Two-Tone Bodies Widely Adopted in New Models.

DETROIT

■ ONE of the speediest model changeovers on record has been effected this year by the Ford Motor Co. Final 1940 models were scheduled to come off assembly lines here last Friday; first of the 1941 model production starts this week at an initial rate of 2500 jobs per day. Naturally there will be no assembled cars coming off lines as yet, but a good start on engines, bodies and subassemblies will be made and by mid-September it is expected 50,000 cars will be in the hands of dealers.

Suppliers have been asked to have first shipments into the Ford plant this week. The initial budget for 1941 production, issued a month ago, calls for material for 150,000 cars which roughly should carry production through to about Nov. 1. Steel has been placed on this first budget to supplement supplies from the Ford steel mill which has been operating right along for the past several months on the basis of about 14,000 tons per week.

Summary of Ford production of 1940 models shows a total of 816,495 cars and trucks. This is broken down into 28,430 of the standard and deluxe "60" models, or 3.5 per cent; 527,835 of the standard and deluxe "85" models, or 64.7 per cent; 80,900 of the Mercury models, or 9.9 per cent; and 179,330 commercial cars and trucks, or 21.9 per cent.

These figures, which do not include the Lincoln Zephyr, attest to the dazzling rise in popularity of the Mercury model which outstripped the 60 model nearly 3 to 1. As might be expected, the 85 model is still the best seller; combined with commercial cars and trucks it accounts for nearly 87 per cent of Ford output.

A larger assortment of models will be available to Ford buyers this fall. Three main types will be the Mercury, a deluxe and a superdeluxe. Three types of engines will be the Mercury or 95-horsepower engine, the present 85, and a new 75-horsepower 6-cylinder engine taking the place of the 60 for both passenger cars and certain trucks.

The first budget of 150,000 cars breaks down into 15,000 Mercurys, 40,000 deluxes, 62,500 superdeluxes and 32,500 trucks and commercial cars. It is not known definitely whether there will be complete interchangeability between body types and engine sizes, but it is stated reliably that a buyer will be able to get a Ford, with either 75, 85 or 95-horsepower engine.

Ford To Make 6-Cylinder Engine

Revival of the Ford 6-cylinder engine, which a few weeks ago supposedly had been set aside, indicates how fast changes are made by this large producer. The present six, currently being produced at the rate of about 10 a day, with a goal of 600 per day late in August, is not the same version which seemed near the production stage a little while back. The latter was designated the 0MA engine, the current one being the 1GA. Chief difference is that the first one was of the overhead camshaft type, the present one a standard L-head type.

It is interesting to note how Ford designates various engines and models to suppliers. Combinations of usually three, sometimes four, numbers and letters are used. The first digit indicates the year of the model. Thus the "0" in the 0MA job represents 1940. Current models all start with the figure 1, indicating 1941. The next figure or letter indicates the engine type, M indicating the 60, now seemingly out for 1941; G the new 6-cylinder job; 9 the 95-horsepower engine or Mercury; 1 the 85-horsepower engine. The third letter designates the type of car—A for passenger car; W, T and Y trucks and commercial cars; B for bus, N for tractor. A final suffix, F, sometimes is used, indicating a model for a foreign destination.

These designations are familiar to all those receiving the yellow material authorization sheets released by Ford at regular intervals, but the combination of figures and letters often have been puzzling to others.

■ VIRTUALLY all plants in the industry have made a start on 1941 model production, and pilot cars will be coming down assembly lines in the next week or two. Some of these first assemblies already have traversed lines and engineers are in process of giving a last-minute dose of "flit" to various production "bugs." Hudson and Packard are under way; likewise Buick and Pontiac, Olds, Cadillac and Chevrolet will be going shortly. Plymouth will lead the Chrysler caravan. Studebaker and Nash are stepping up output or early assemblies.

Many production chiefs are wishing they could have stretched 1940 model output another two weeks, so good has retail demand been holding up. From Pontiac, it is reported another 15,000 cars could have been absorbed by dealers without difficulty, and there appeared to be a definite shortage of 1940

Pontiacs in Wayne county here. Buick reports sales for the first ten days of July totaling 7992 units, a record for this period and more than double the same period last year. The total was 19 per cent ahead of the first ten days of June. Used car sales by Buick dealers in the same period totaled 14,291, comparing with 9010 in the same interval last year.

Pontiac dealers report almost a similar situation, with total sales of 6643, which were 98 per cent ahead of last year and a record for the company since 1928.

Sales reports like these explain the extra pressure being placed on getting into production on 1941 models. Follow-up men from the auto plants are constantly hounding die shops, suppliers to ship in material and complete work in process. One plant here at least has been dispatching follow-up men to die shops every few hours, even during the night, to make sure there is no suspension of work on urgently needed dies. The "heat" is on in no uncertain fashion.

■ WITH the green light showing brightly on the 1941 models, the national defense program takes a subsidiary position here in Detroit, although plants are anxiously awaiting word on what they will be expected to do. Actual orders are few, but there is a disposition on the part of managements to take stock of all production facilities and to have them in readiness when the releases come from Washington. Plant modernization and expansion projects have turned upward again, featuring many of the smaller manufacturers hereabouts.

Gairing Tool Co. is building a $250,000 new plant. Standard Steel Treating is making a $20,000 addition, Wilson Foundry & Machine is expending $200,000 on modernization, Soss Mfg. Co. is putting up a new stamping plant, Wilcox-Rich is completing an expansion of its aviation valve and valve train manufacturing plant at Battle Creek. The latter program involves 30,000 additional square feet of floor space, $150,000 worth of equipment to provide a 50 per cent increase in capacity, to meet expected increased demand for sodium-cooled valves for aircraft engines.

Chrysler has built up some light tank models and is studying manufacturing problems involved. No orders have been received, but Chrysler's special ordnance manufacturing division is familiarizing itself with requirements. Torch cutting and welding of armor plate up to 3 inches in thickness is one phase of this study.

Experience of one manufacturer in this district supplying aircraft parts to the government is an example of the perils along the strange paths of armament manufacture. This company proposed to build certain "units" (identity cannot be divulged) for the government which preliminary cost estimates indicated could be produced for $16,000 apiece. A bid of $20,000 was submitted and the company was awarded three units. These were built and shipped, but during this period a considerable outlay was required for experimental work and overcoming production difficulties. When a final reckoning was made and proper allowances made for taxes, amortization of equipment and other attendant charges it was found that the three units cost the company a neat $161,000. Deducting the $60,000 received for them meant an indicated loss of just over $100,000.

Later the government asked for bids on ten more "units." The manufacturer realized some savings could be effected on a larger number, but knew that some way had to be found to make up the $100,000 loss previously suffered. So he decided the only way to do this was to raise the price tag to $30,000, which was done. The government agency was horrified at this and threatened dire consequences. But the manufacturer stood firm and said he could take no more orders at $20,000 under any circumstances.

Multiply these instances by hundreds and you may have an inkling of some of the difficulties attendant to the defense program—not insurmountable of course, nevertheless they make for delay and conflict of opinion.

There is a wild rush developing to get shipments of automotive steel out of mills by July 31, the deadline on tonnage placed earlier in the year at price concessions. While mills are anxious to cooperate they cannot ship material until they know details of sizes and in many cases the customer cannot determine his sizes until die tryouts have been completed. Every effort is made to save even the fraction of an inch of length on steel sheets and until these minimum lengths have been determined it is impossible to specify sizes. Hence there will undoubtedly be some slopping over of steel tonnage into August, deadlines notwithstanding.

First releases have been normal in nearly all cases and no decision to take in heavy stocks of steel has been evident. Higher steel costs in later releases seem inevitable, undoubtedly will be passed along to car buyers this fall.

Two-tone paint jobs, an innovation which first proved widely popular with the 1940 models, will find much broader adoption in the 1941 cars. Optional at extra cost on most makes this year, the logical trend would be to make them standard. Pontiac figures 10 per cent of all 1940 model purchasers specified two-tone paint, the most popular combination being Renfres gray body with dark Glacier blue fenders.

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	*366,800
6 mos.	1,305,501	2,055,744	*2,543,674
July	150,450	218,494	.....
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.

Estimated by Ward's Reports

Week ended:	1940	1939†
June 22	90,060	81,070
June 29	87,550	70,663
July 6	51,975	42,784
July 13	62,176	61,610
July 20	53,020	47,420

†Comparable week.

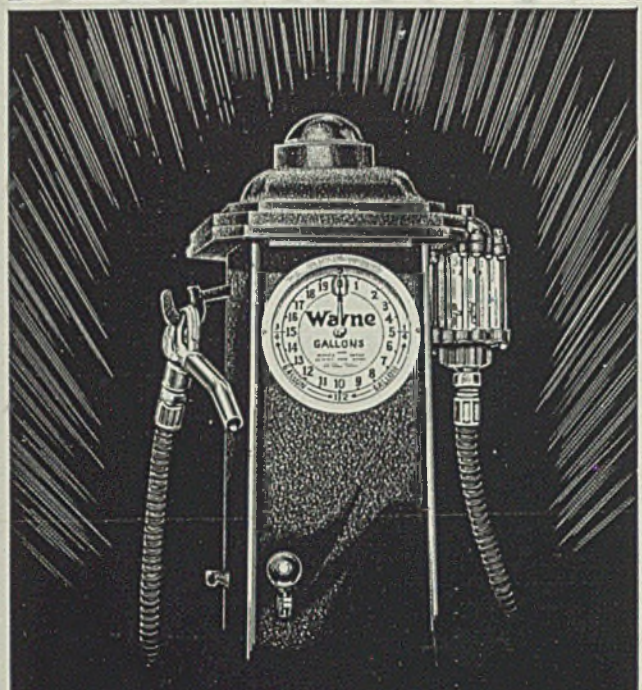
Urges Industry To Spend 2% of Income for Research

■ Spending 2 per cent of gross income for research to create new jobs and goods was urged upon industry by Dr. Karl T. Compton, president, Massachusetts Institute of Technology, Boston, and chairman, National Association of Manufacturers advisory committee on scientific research.

The recommendation resulted from a survey of 186 manufacturers which revealed that ten companies spent over 10 per cent of their gross income for research while the average was 2 per cent. Dr. Compton estimated that if all companies were to spend 2 per cent the total expenditure would exceed a billion dollars a year and research would be increased 500 per cent.

■ Service medals were awarded last week to 47 American Steel & Wire Co. employes at Donora, Pa., whose records ranged from 25 to 50 years. Testimonial speeches were made by officials at a dinner given by the company, attended by C. F. Hood, president; and H. B. Jordan, vice president.

DEPENDABILITY —DIE CASTING'S UNSEEN ADVANTAGE



10 DIE CASTINGS SPECIFIED IN 1929

—RESULTED IN THE USE OF 96 IN 1940

● When ZINC Alloy Die Castings are repeatedly selected for parts production there is a determining factor that does not show up on the cost comparison sheets—dependability. Although ZINC Alloy Die Castings are frequently proved in on a cost basis alone, the dependability established through performance keeps them definitely in the product year after year.

For example: A leading manufacturer of gasoline pumps employed 10 ZINC Alloy Die Castings for structural and mechanical parts of a pump produced in 1929. Not only are the equivalent parts still die cast on the 1940 model, but the intervening years have witnessed the introduction of a cost computing mechanism for these pumps which alone embodies 48 different ZINC Alloy Die Castings. In all, the 1940 pump has 96 different parts produced by this metal and method.

This is the seventh advertisement in a series* designed to illustrate the widespread acceptance and increased use of ZINC Alloy Die Castings in most of today's major industries. If you are not thoroughly informed on the physical and economic advantages offered with ZINC Alloy Die Cast parts, we suggest that you consult a commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York City.

*Copies of earlier advertisements in this series gladly mailed on request.

ZINC
ALLOY DIE CASTINGS

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

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

MEN of INDUSTRY

■ C. O. BARTLETT has been appointed manager, Detroit territory, for C. O. Bartlett & Snow Co., Cleveland. Mr. Bartlett, son of the founder and organizer of the company, was graduated from Case School of Applied Science in 1916, following which he held positions in the company's engineering and erection departments. He served with the United States air corps during the World war, returning to Bartlett-Snow. He has been associated with the American Agricultural Chemical Co. for some time, following its purchase of a Bartlett-Snow built plant, his most recent position being manager of its Gelatin division in Detroit. Mr. Bartlett has been a director of Bartlett & Snow the past 20 years.

♦

W. B. Wilkins has been named sales manager, American Manganese Bronze Co., Philadelphia.

♦

W. Leslie Lawrence was recently elected secretary, Alexander Milburn Co., Baltimore, to succeed the late Harvey H. Johnson.

♦

Robert W. Knapp has joined Aluminum Co. of America as fabrication metallurgist at its plant in Massena, N. Y. He is a graduate of the Colorado School of Mines.

♦

C. M. Weaver, formerly superintendent of maintenance, United Air Lines, Chicago, has joined the manufacturing department of Boeing Aircraft Co., Seattle.

♦

J. F. Brendlinger is now associated with United States Steel Export Co., New York, in the merchandising service of the sales department.

♦

John F. Lebor has joined York Ice Machinery Corp., York, Pa., as assistant to executive vice president. He formerly was with RKO Corp., New York.

♦

Simpson C. Leonard, secretary-treasurer, Western Bar Iron association, is reported to be seriously ill at his home in Detroit where he has been confined several months after an operation.

♦

Theodore J. Kauffeld has been appointed manager, products division, American Type Founders Inc., Elizabeth, N. J. From 1924 to 1927 Mr. Kauffeld was associated with Walter Kidde & Co. Inc., New York, as an engineer. He then joined DeLaval Separator Co., New York, representing that firm in Pittsburgh. He went to England in 1936 as consultant to the Alfa Laval Co. Ltd., London, subsequently becoming chairman of the board and managing director. Inter-Continental Engineering Co. Ltd., London. He was responsible for the formation of Steelworks Design Ltd., London, in which firm he also held the position of chairman and managing director.

C. O. Bartlett

♦

L. H. De Wald is now sales metallurgist for Fansteel Metallurgical Corp., in the Cincinnati office. He formerly was on the research staff of Vascoloy-Ramet Corp., North Chicago, Ill.

♦

Joseph E. Bayne, the past year assistant sales manager, Plymouth division, Chrysler Corp., has been advanced to general sales manager. He succeeds L. D. Cosart, who will take up new duties with the Dodge division of Chrysler.

♦

W. H. Aubrey, vice president, Frick Co., Waynesboro, Pa., and sales manager of the ice and refrigerating department, has been elected a director. He has been with the Frick company about 23 years, serving as sales manager since 1932.

T. J. Kauffeld

♦

J. B. Johnson, director of purchases, Hercules Powder Co., Wilmington, Del., has been appointed assistant general manager, explosives department. K. W. Jappe, heretofore manager of the company's plant at Port Ewen, N. Y., has been named director of purchases, to succeed Mr. Johnson.

♦

Tom H. Jones has joined Bradshaw & Co., Pittsburgh, as sales engineer for boiler plant equipment. He formerly had been with the Ohio Leather Co., Girard, O., in connection with the company's new steam generating unit, and before that was combustion and sales engineer for Johnston & Jennings Co., Cleveland.

♦

John H. Alfes has been appointed chief inspector, Olds Motor Works, Lansing, Mich., to succeed K. C. Plasterer, who will handle special assignments, reporting directly to C. L. McCuen, general manager. Mr. Alfes has been associated with the automobile industry 21 years, joining Oldsmobile engineering department in 1925. Since 1933 he has been production engineer.

♦

Glen F. Jenks, colonel, ordnance department, United States army ordnance office, Washington, has been nominated for president, American Welding society for 1940-41. K. L. Hansen, consulting electrical engineer, Milwaukee, was named for first vice president; and David Arnott, vice president and chief surveyor, American Bureau of Shipping, New York, for second vice president.

For district vice presidents, one-year terms, the following were nominated: New York and New England, P. J. Horgan, engineer, General Electric Co., Beverly, Mass.; Middle Eastern, E. T. Scott, president, Cleveland School of Welding Inc., Cleveland; Middle Western, D. H. Corey, welding engineer, Detroit Edison Co., Detroit; Southern, O. T. Barnett, metallurgist, Black, Sivalls & Bryson Inc., Oklahoma City, Okla.; Pacific Coast, L. W. Delhi, manager, Western Pipe & Steel Co., San Francisco.

Nominated for directors-at-large, three-year terms, are: H. O. Hill, assistant chief engineer, fabricated

steel construction, Bethlehem Steel Co., Bethlehem, Pa.; J. H. Deppeler, chief engineer and works manager, Metal & Thermit Corp., New York; E. L. Mathy, first vice president Victor Welding Equipment Co., San Francisco; and A. G. Bissell, senior welding engineer, bureau of construction and repair, navy department, Washington.

Following election, the new officers will be inducted at the annual meeting of the society in Cleveland, Oct. 21-25.

♦

Frederick M. Feiker, recently named dean of the school of engineering, George Washington university, Washington, resigned as executive secretary, American Engineering council, Washington, effective July 1. Dean Feiker has had wide experience as an engineer, publisher and executive, and has served successively as assistant secretary of commerce; vice president, Society of Electrical Development; director, United States bureau of foreign and domestic commerce; and in 1934 was named executive secretary, American Engineering council.

F. M. Feiker

Last fall he joined the faculty of George Washington school of engineering as professorial lecturer in management problems, having taught in summer sessions in previous years. Being appointed dean of engineering in December, he assumed the post in March. He is a member American Institute of Electrical Engineers, American Society of Mechanical Engineers, American Academy of Political and Social Sciences, American Association for the Advancement of Science (secretary of the engineering section), and Society for the Promotion of Engineering Education.

♦

William W. Barnes has retired as manager at Philadelphia for Air Reduction Co. Inc., New York. He became associated with the oxyacetylene industry in 1910 when he joined Davis-Bournonville Co. as Philadelphia sales manager. He held that position until 1922 when Davis-Bournonville merged with Air Reduction. He then became Airco's manager at Philadelphia.

H. R. Salisbury

Howard R. Salisbury has been named manager of Air Reduction at Philadelphia, succeeding Mr. Barnes. Mr. Salisbury has been with Airco 15 years; was manager at Bettendorf, Iowa, two years, and assistant manager at Philadelphia the past six years. H. B. Seydel, heretofore assistant sales manager, New York district, has been transferred to Philadelphia as assistant manager.

♦

H. H. Krause, associated with National Screw & Mfg. Co., Cleveland, 20 years, has been appo nted purchasing agent, Pump Engineering Service Corp., Cleveland.

♦

Charles H. Herty Jr., research and development department, Bethlehem Steel Co., Bethlehem, Pa., has been nominated for chairman, Iron and Steel division, American Institute of Mining and Metallurgical Engineers.

Named to be vice chairmen are: William A. Haven, vice president, Arthur G. McKee & Co., Cleveland; Earle C. Smith, chief metallurgist, Republic Steel Corp., Cleveland; and Jerome Strauss, vice president, Vanadium Corp. of America, New York.

Chosen for the executive committee for three years are: A. L. Boegehold, metallurgist, General Motors Research Laboratories, Detroit; W. E. Brewster, assistant general superintendent, Wisconsin Steel works, International Harvester Co., Chicago.

D. K. Crampton, director of research, Chase Brass & Copper Co., Waterbury, Conn., received the nomination for chairman of the institute's Institute of Metals division.

Cyril S. Smith, research metallurgist, American Brass Co., Waterbury, Conn., and Carl E. Swartz, metallurgist, Cleveland Graphite Bronze Co., Cleveland, were named to be vice chairmen.

Executive committee members for three years include: William C. Ellis, metallurgist, Bell Telephone Laboratories Inc., New York; Alan Morris, chief metallurgist, Bridgeport Brass Co., Bridgeport, Conn.; and Kent R. Van Horn, research metallurgist, Aluminum Co. of America, Cleveland.

Julian E. Tobey, manager of fuel engineering division, Appalachian Coals Inc., Cincinnati, was nominated for chairman of the institute's Coal division. Newell G. Alford, mining engineer, Eavenson, Alford & Auchmuty, Pittsburgh, was named vice chairman.

The following were selected for the executive committee for three years: Joseph Pursglove Jr., assistant general manager, Pursglove Coal Mining Co., Pursglove, W. Va.; H. S. Salmon, Salmon & Cowin Inc., Birmingham, Ala.; and Paul Weir, mining engineer, Chicago.

After election by mail ballot, the new officers will assume their posts at the close of the institute's annual meeting in February.

Machine Tool Building Steady at High Level

■ Machine tool builders' operations in June averaged 92.3 per cent of capacity compared with 92.5 per cent in May, according to National Machine Tool Builders' association, Cleveland. June, 1939, operations were at 65.6 per cent.

Capacity of the industry, measured in payroll hours, has increased steadily and now stands at 127.5 per cent, based on capacity in September, 1939, as 100 per cent. May payroll-hour capacity was 125 per cent.

May Porcelain Enameled Refrigerators Up 83.9%

■ Shipments of porcelain enameled household refrigerators in May totaled 18,010 units, 83.9 per cent above April, while total household refrigerator shipments were 376,609 units, 14.1 per cent above April, according to Porcelain Enamel institute, Chicago.

April shipments of porcelain enameled refrigerators was 9793 units; total shipments, 330,008. Most of the May increase in the porcelain enameled models was in the 6-cubic-foot size, which increased 111.3 per cent from 6437 to 13,602 units.

Activities of Steel Users, Makers

■ CALLITE TUNGSTEN CORP., Union City, N. J., has purchased Harris Alloys Inc., Newark, N. J., as the first step to expand wiremaking facilities, according to Charles H. Kraft, president. The company will manufacture brush and Fourdrinier wire and wire of stainless steel, monel, phosphor-bronze, beryllium-copper and special alloys.

The company states its business in the first half of 1940 greatly exceeded that of the first half last year and current backlog of orders is well above that of a year ago.

♦

Warner & Swasey Co., Cleveland, is moving equipment into its newly completed plant addition, and rearranging production facilities throughout the plant. "By taking advantage of the regular two-weeks vacation period for this purpose we avoid a shutdown and speed the production of turret lathes for national defense," said Charles J. Stilwell, president. "Our production has already more than doubled over a year ago."

♦

Albert Kahn Inc., Detroit, announces the formation of a new corporation, Albert Kahn Associated Architects & Engineers Inc., in which employes will be stockholders. Albert Kahn Inc. will complete the work it now has on the boards, but all future commissions will be undertaken by the new corporation, which will be headed by Albert and Louis Kahn.

♦

Hydraulic Compressed Metals Inc., Indianapolis, has changed its name to General Metals Corp.

♦

Edward H. Sykes, advertising agency, has changed its name to Sykes Advertising Agency, and has moved to new and larger quarters at 700 American Bank building, Pittsburgh.

♦

Brooke L. Jarrett & Co., Pittsburgh, announces consolidation of its engineering office and mechanical development laboratory and removal to new quarters in the Oliver building.

♦

F. L. Fosnight, for more than 24 years sales manager, USL Welder division, Electric Auto-Lite Co., has acquired complete control of the USL Electric Welder division and incorporated a new company known as the US Electric Welder Corp., with offices at 1224 West Bancroft street, Toledo, O. Mr. Fosnight is president and general manager of the new company.

♦

Amsler-Morton Co., Pittsburgh, has received orders for four recuperative pit-type furnaces for Lehigh works, Bethlehem Steel Co., Bethlehem, Pa., and two recuperative furnaces for McDonald works, Carnegie-Illinois Steel Corp., Youngstown, O.

♦

Medart Co., St. Louis, has purchased the entire wood pulley stock of the Reeves Pulley Co., Columbus, Ind. Medart Co. will serve all dealers and customers of the Reeves company as well as Medart dealers and customers.

♦

Henry Walke Co., Norfolk, Va., has been appointed by Michigan Tool Co., Detroit, to handle sales of Michigan gear finishing and lapping equipment, Sine-line gear checking equipment and the Mitco line of metal cutting tools, in the eastern half of Virginia and Washington.

♦

Manning, Maxwell & Moore Inc., Bridgeport, Conn., has changed the name of its Ashcroft American Gauge division to Ashcroft Gauge division; products heretofore merchandised under the trade name Ashcroft American will be known as Ashcroft.

♦

Twenty-gage stainless steel produced by Republic Steel Corp., Cleveland, was used to cover boiler, runway and cylinders of each of two engines recently built for the Minneapolis & St. Louis railroad. Republic reports this is the first instance of freight locomotives ever to be sheathed with stainless steel.

Rehabilitating Armor Plate Plant

■ BUILT during the first World war, but idle until the launching of this country's current armament program, the United States navy's armor plate plant at South Charleston, W. Va., is being rehabilitated as rapidly as possible.

Heat treating facilities at the plant were used last fall by Carnegie-Illinois Steel Corp. and have been operated since. It is presumed the company will co-operate with navy authorities in operating the remainder of the plant.

Dravo Corp., Pittsburgh, has been awarded a contract for steam boilers and accessories, and will install Lee unit heaters in the machine shop.

Plant originally was served by small coal fired boilers. These were removed and Dravo is installing two 90,000-pounds-per-hour, 250 pounds pressure Riley boilers. The new boilers will be fired with natural gas, which is abundant and cheap in the South Charleston area.

The boiler plant will provide steam required for the operation of giant presses. Included in the contract are a Cochrane water softener, Cochrane de-aerating heater, forced draft fans, boiler feed pumps, Hagan combustion control, foundations, and complete piping. The Riley gas burners are arranged for future adaptation to oil burning.

A feature in the rehabilitation was the segregation of the large machine shop from the boiler house insofar as heating is concerned. Since gas is used to fire the boilers, it was deemed advisable to use this fuel for direct firing of unit heaters in the machine shop. It will be possible to operate and heat the machine shop without operating the boiler plant.

The size of the machine shop—500 feet long, 300 feet wide and 70 feet high, 11,000,000 cubic feet—was another factor in this decision. A total of 22 Lee heaters, each rated at 1,000,000 B.t.u. output per hour each, are to be installed.

Lee heaters of the floor type will be arranged along the outside of the huge shop so that cold air will be taken from the floor by the fans of the units and blown up past the heating elements. The temperature of the air will be raised about 80 to 100 degrees. The heated air will then be discharged in a horizontal manner toward the center of the shop. This method will enable the large room to be heated uniformly without overheating the top portion of the building. It is a method used with oil and gas fired heaters quite generally in large industrial plants.

Reference to the Lee heater as a direct-fired unit leads to some misconception, which it is desired to correct. In a system sense, the reference is appropriate because the building to be heated receives the heat directly without the medium of steam. The fuel used in firing the Lee heater is not burned in the air stream, however, and the products of combustion have no opportunity to contact the heated atmosphere.

MEETINGS

CLEVELAND METAL SHOW TO BE LARGEST IN HISTORY

■ "NEW AIDS to Production" will be the theme of the National Metal exposition to be held in Public Auditorium, Cleveland, Oct. 21-25, in connection with the twenty-second National Metal congress. This theme is regarded as particularly appropriate in view of rapidly increasing activity in connection with national defense and industrial expansion.

With over 235 exhibitors having reserved 90,000 square feet of exhibit space, the exposition already is the largest in the long history of the show. Unprecedented demand for space reservations thus far has required three extensions to the exhibit area.

Chief sponsor of the exposition and congress, the American Society for Metals, is scheduling an imposing array of papers at 14 technical sessions at Hotel Statler during the week. The society's program also includes numerous educational lectures.

Programs of societies co-operating in the congress are well advanced. American Welding society will feature 55 papers at sessions of its annual meeting at Hotel Cleveland. Annual meeting of the Wire association will be conducted at Hotel Carter. American Institute of Mining and Metallurgical Engineers will hold the fall meetings of its Iron and Steel Institute of Metals divisions at Hotel Statler.

NEED FOR REHABILITATION SEEN BY STEEL ENGINEERS

Annual convention and Iron and Steel exposition of the Association of Iron and Steel Engineers at the Stevens hotel, Chicago, Sept. 24-27, will focus attention on the rehabilitation problem now facing the steel industry. The program is being arranged with an eye to the future as well as present-day demands.

It is pointed out that with a total annual capacity of 80,600,000 net tons, the industry over the past ten years has produced an average of only 37,600,000 tons per year. This means that much of the installed equipment has lain idle and has suffered marked deterioration and obsolescence. Thus, the current heavy demand for steel incident to the national defense program is presenting a serious problem.

Convention sessions and the exposition are being geared to this problem. In anticipation of the renewed interest in steel mill equipment, over 100 manufacturers have reserved 85 per cent of the available exhibition space.

Two inspection trips are being planned—one to the recently completed hot and cold continuous strip mill of Youngstown Sheet & Tube Co. at the Indiana Harbor works; and Wisconsin Steel works of International Harvester Co.

CHEMICAL SOCIETY PLANS DETROIT MEETING PROGRAM

Charles F. Kettering, vice president in charge of research, General Motors Corp., Detroit, has been appointed honorary chairman of the 100th national meeting of the American Chemical society in Detroit, Sept. 9-13. William P. Putnam, president and founder, Detroit Testing Laboratories, will be general chairman.

More than 4000 chemists, industrialists, educators and representatives of allied fields are expected to participate in sessions at which the role of chemistry in national defense will be the dominant theme. All of the society's 18 professional divisions will convene. Special topic for the gas and fuel chemistry division will be "Atmosphere Conditioning for Metallurgical and Chemical Processes."

Cites Copper-Silicon Substitute for Tin Bronze

■ Revere Copper & Brass Inc., New York, has conducted research over a period of years which has prepared it to meet emergency shortages of imported metals, according to C. Donald Dallas, president.

"As a result of this effort, we have in our research department at Troy, N. Y., studies relating to the substitution of copper silicon alloys (silicon bronzes) for tin bronzes in which ordinarily from 2 to 10 per cent of tin is employed," he said.

Silicon bronze alloys could supplant the tin bronzes in a wide variety of products including recoil cylinders of field artillery pieces, hub liners for locomotives, welding rod, valve diaphragms, spring and switch clips, forgings and sand castings. Mr. Dallas added that in some cases the copper silicon alloys are superior in corrosion resistance to the tin bronzes and are readily welded.

Died:

■ JOSEPH STELWAGON, 54, president, Stelwagon Mfg. Co., Philadelphia, July 13. Mr. Stelwagon was a member of the executive committee and chairman of the prepared roofing committee, National Association of Sheet Metal Distributors, Philadelphia.

♦

Edward N. Corning, 65, sales engineer with Everlasting Valve Co., Jersey City, N. J., over 20 years, at his home in Nutley, N. J., July 6.

♦

C. Arthur Burgess, Cleveland district sales manager, Kennedy Valve Mfg. Co., Elmira, N. Y., July 11 in Lakewood, O.

♦

Augustus B. Nolte, 85, president and founder, Nolte Brass Foundry Co., Springfield, O., at his home in that city, July 11.

♦

George H. Hamlin, for a number of years secretary-treasurer in Cleveland for Glascote Co., now Glascote Products Inc., tank manufacturer, recently in Detroit.

♦

Irving S. Robeson, 68, former president, Robeson Cutlery Co., now the Robeson-Rochester Corp., Rochester, N. Y., July 9 in Perry, N. Y.

♦

Shindel G. Case, 62, representative in Albany, N. Y., for Phoenix Iron Co., Phoenixville, Pa., July 16 at Rutland, Vt., while on a business trip. He had been with Phoenix 40 years.

♦

Thomas Halliday, 63, former manager, export division, Ingersoll-Rand Co., New York, in Weehawken, N. J., recently. Mr. Halliday, who retired ten years ago, was with Ingersoll-Rand 40 years.

♦

Francis A. Herendeen, 74, July 14 at his home in Geneva, N. Y. He was a co-founder and director-secretary of the Herendeen Mfg. Co., Geneva, which later was merged with United States Radiator Corp., Detroit. He also was a vice president and general manager, Abendroth & Root Mfg. Co., New York.

♦

John T. Seaver, 47, sales manager, General Metal Powder Co., Akron, O., at his home in Cleveland, July 13. A native of Cleveland, Mr. Seaver's father was one of the founders of Wellman-Seaver-Morgan Co., now Wellman Engineering Co., and at one time Mr. Seaver worked in the construction department of the company which his father helped to organize.

♦

Frederick J. Elliott, 46, Cleveland district sales manager for Rustless Iron & Steel Corp., Baltimore, July 10 in Cleveland.

♦

Thomas I. Cochran, district sales manager of Saginaw Sheet Metal Parts Corp., in Detroit, July 6. He also was representative in Detroit for Charles E. Crofoot Gear Co., Fostoria Pressed Steel Corp. and Radiator Specialty Corp.

Western Hemisphere Cartel

■ ONE of the most grandiose and ambitious of the many startling ideas that have emanated from or been espoused by this administration is that under which a western hemisphere cartel would be created. Under it the United States, starting with a fund of some two billions, would buy up all surplus products of the Americas and, as a United Press despatch recently expressed it, "force German-dominated Europe to deal with the western hemisphere on the hemisphere's own terms, rather than those dictated by the third Reich."

The proportions and implications of the scheme stagger the imagination. Boiled down to its essence it means that we, the government and people of the United States, would assume direction and supervision of the economy of the entire western hemisphere. We, who have bungled in handling our own surpluses, propose to buy all the coffee the Brazilians raise but do not consume themselves, all the meat and grain the Argentinians produce but do not themselves consume. That would mean responsibility for the maintenance of sound economies in those American countries which to a large extent live on their exports. We, who have not yet solved the problem of enabling every one of our citizens to earn a good living, would undertake to do this job for the entire western hemisphere.

Proposal Is Disturbing to Business; Implications Are Stupendous

From a business point of view the proposal is disturbing. For one thing there is the likelihood that higher taxes would be necessary to permit continued purchase of surpluses from countries whose production could not easily be controlled and which, having a guaranteed market, would be encouraged to produce more goods than could be bought and paid for by ultimate consumers. On several occasions, for example, Brazil has solved the problem of coffee surpluses by burning them. It is conceivable that we might do the same, to our cost rather than Brazil's, setting up on a much larger scale, the same sort of sorry mess into which we have been led through our silver buying policy.

Even more disturbing is another factor. Many American manufacturers over the long years have developed a large volume of business in Europe and, if permitted to do so, undoubtedly will seek to regain markets, now closed by the war, where their products are well known and accepted. The effect of a western hemisphere cartel under United States government control, they well may fear, would evoke European retaliation—for no major nation lightly will abandon the privilege of doing business directly rather than through a self-appointed go-between nation.

Hemisphere Control Implies Threat To Industrial Free Enterprise System

Surely, an attempt to force Germany—or any other important country—to buy western hemisphere products through the United States would bring about a sequence of events that eventually would place under full government direction all of our export business and, later, all of our domestic business. Adoption of the scheme would herald definitely the demise of our system of free enterprise.

The scheme probably will come to nothing for the simple reason that it is not practicable. At the same time, it is being discussed and fondly examined in high circles in Washington—so that it seems slated for considerable further publicity. The scheme is one that should have the fullest condemnation on the part of business. That is not the way to solve our western hemisphere problem. Rather, it would create new problems.

The BUSINESS TREND

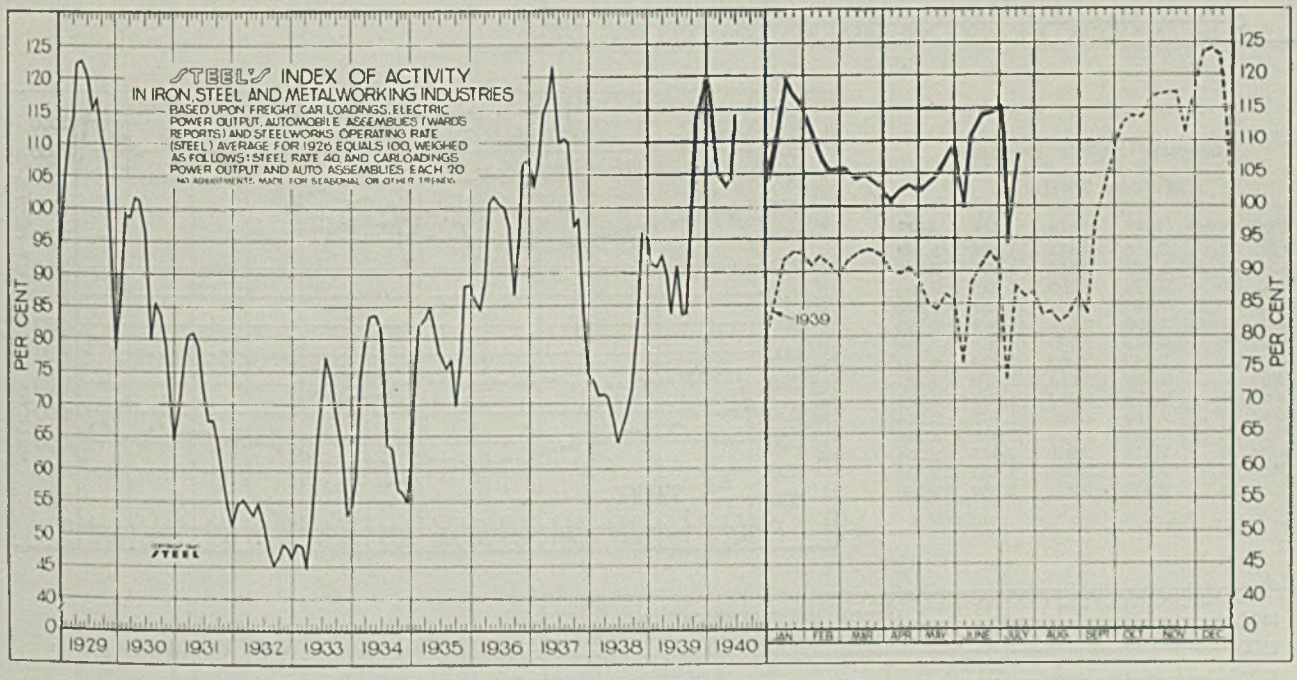
Activity Index Rebounds From Holiday Low

■ INDUSTRIAL activity shows indications of leveling off, at least temporarily. Some business indicators have failed to regain fully the ground lost during the week of July 6. However, backlogs built up in recent months in many industrial lines assure a steady rate of production. In some industries such as steel, machine tools, aircraft and shipbuilding, demand resulting from the rearmament program should provide still further impetus.

For the week ended July 13, STEEL'S index of activity in the iron, steel and metalworking industries stood at 107.7, up 13.5 points from 94.2 recorded in the week ended July 6. Despite this gain the index was substantially below 115.3 registered for the week of June 29. In the comparable post-holiday period in 1939, 1938 and 1937, STEEL'S index rose 14.4, 12.8 and 12 points, respectively.

All industrial indicators composing STEEL'S index failed in the week ended July 13 to snap back to their pre-holiday levels.

With the close of the 1940-model production year approaching, motor car output in the weeks immediately ahead is expected to decline seasonally. Retail automobile sales have recorded further gains.



STEEL'S index of activity gained 13.5 *points to* 107.7 *in the week ended July* 13:

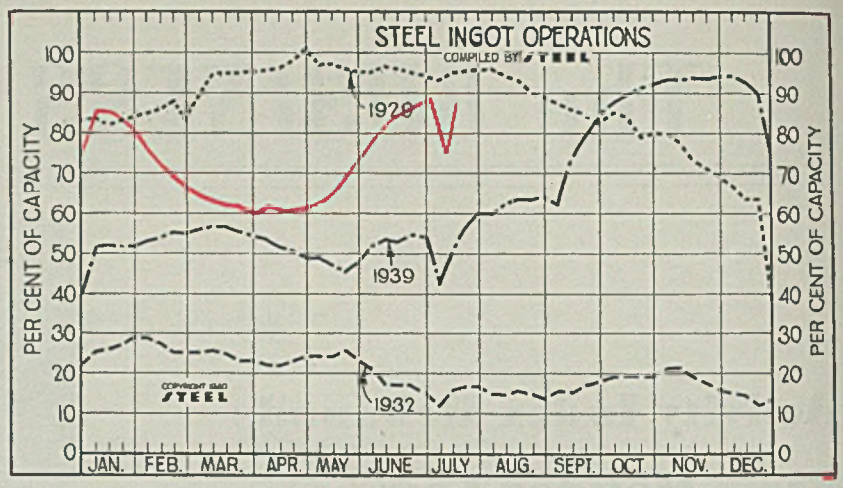
Week Ended	1940	1939
May 4	103.3	85.1
May 11	104.8	84.2
May 18	106.8	86.6
May 25	109.1	85.4
June 1	99.2	75.9
June 8	111.9	88.2
June 15	114.6	90.9
June 22	114.8	93.0
June 29	115.3	91.0
July 6	94.2	73.4
July 13	107.7	87.8

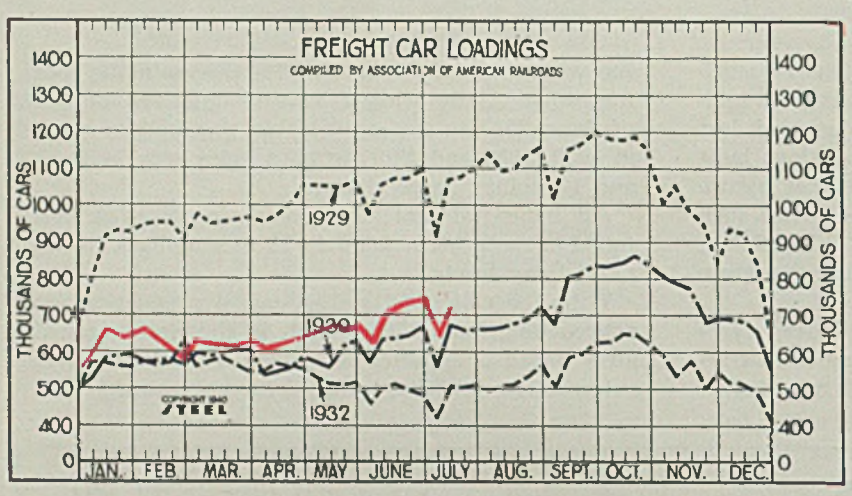
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	102.7	89.8	70.8	116.6	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	114.2	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	.....	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	.....	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
Apr. 13....	61.0	51.5	32.0	91.5
Apr. 20....	61.5	50.5	32.5	91.5
Apr. 27....	61.5	49.0	32.0	91.0
May 4....	63.5	49.0	31.0	91.0
May 11....	66.5	47.0	30.0	89.0
May 18....	70.0	45.5	30.0	91.5
May 25....	75.0	48.0	28.5	75.0
June 1....	78.5	52.0	25.5	75.0
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





Freight Car Loadings

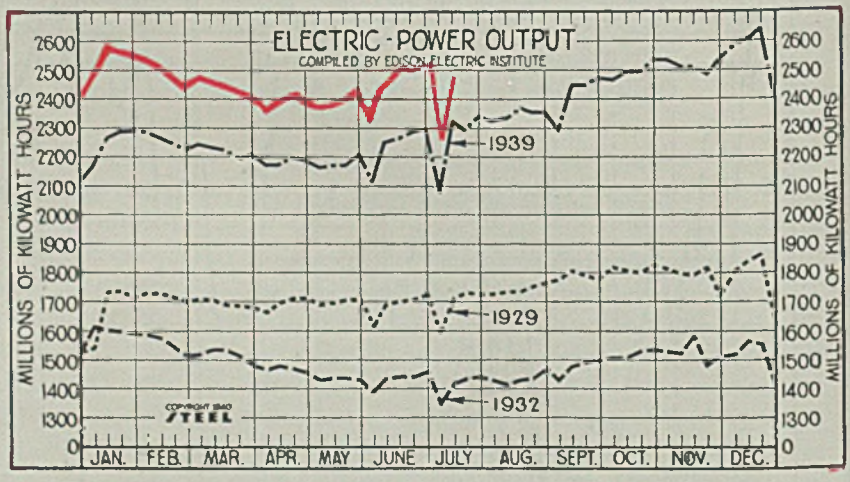
(1000 Cars)

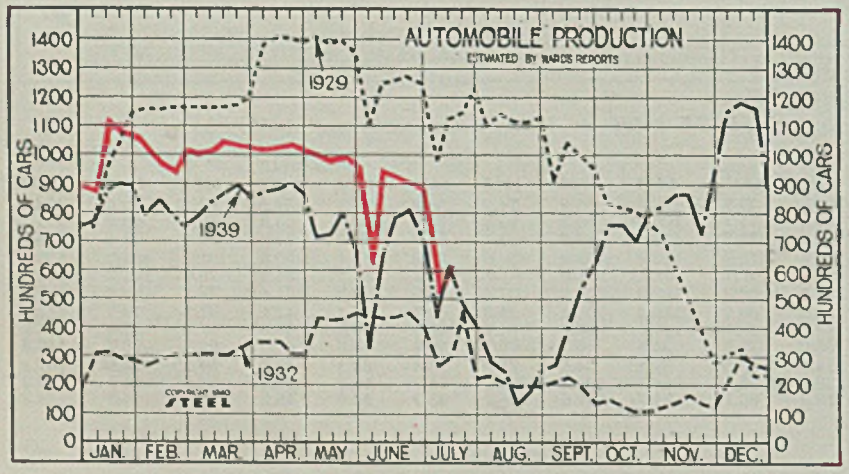
Week ended	1940	1939	1938	1937
Apr. 13.....	619	548	538	751
Apr. 20.....	628	559	524	761
Apr. 27.....	645	586	543	782
May 4.....	666	573	536	767
May 11.....	681	555	542	774
May 18.....	679	616	546	779
May 25.....	687	628	562	795
June 1.....	639	568	503	692
June 8.....	703	635	554	754
June 15.....	712	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

Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Apr. 13...	2,418	2,171	1,958	2,173
Apr. 20...	2,422	2,199	1,951	2,188
Apr. 27...	2,398	2,183	1,939	2,194
May 4....	2,386	2,164	1,939	2,176
May 11...	2,388	2,171	1,968	2,195
May 18...	2,422	2,170	1,968	2,199
May 25...	2,449	2,205	1,973	2,207
June 1...	2,332	2,114	1,879	2,131
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

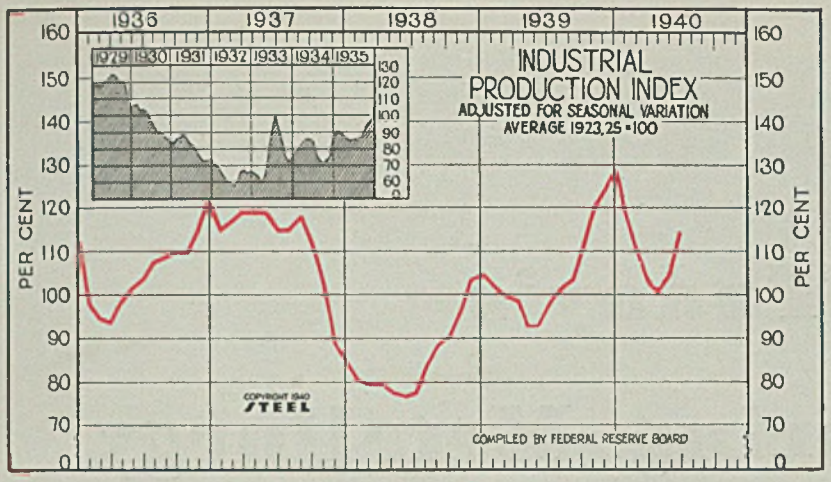




Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Apr. 13....	101.9	88.0	62.0	125.5
Apr. 20....	103.7	90.3	60.6	133.2
Apr. 27....	101.4	86.6	50.7	139.5
May 4....	99.3	71.4	53.4	140.2
May 11....	98.4	72.4	47.4	140.4
May 18....	99.0	80.1	46.8	131.3
May 25....	96.8	67.7	45.1	131.4
June 1....	61.3	32.4	27.0	101.7
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



Industrial Production
Federal Reserve Board's Index

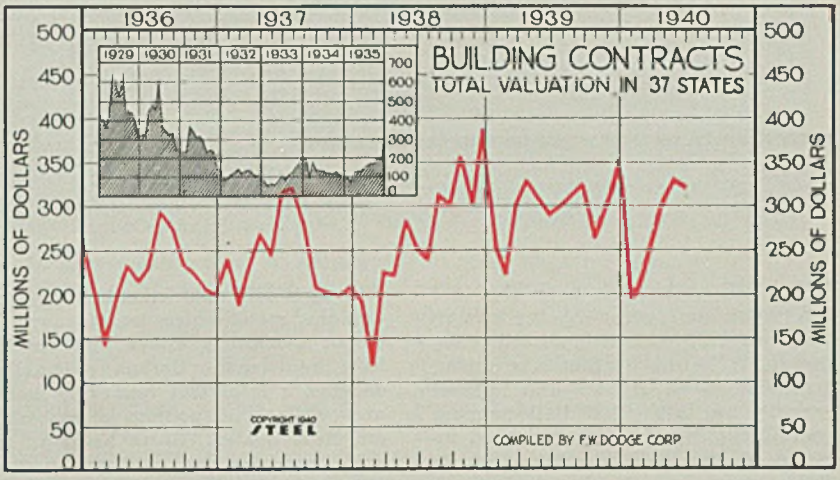
(1923-25 = 100)

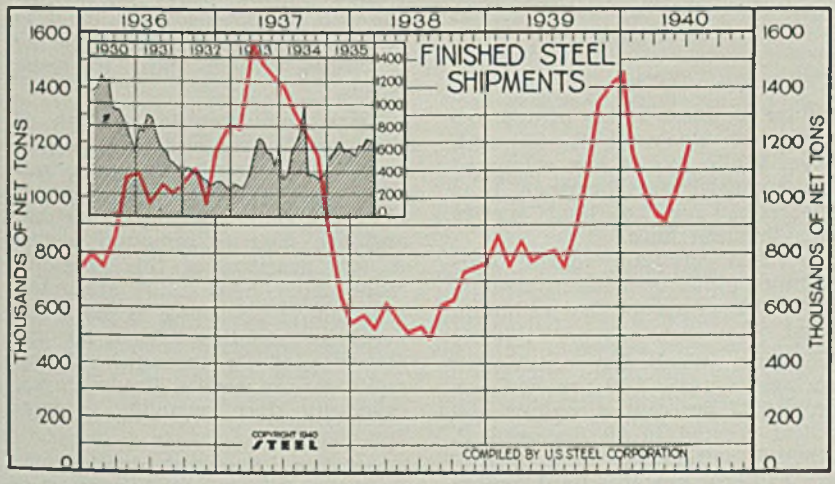
	1940	1939	1938	1937	1936
Jan.	119	101	80	114	98
Feb.	109	99	79	116	94
Mar.	104	98	79	118	93
April	102	92	77	118	98
May	106	92	76	118	101
June	115	98	77	114	103
July	...	101	83	114	107
Aug.	...	103	88	117	108
Sept.	...	111	90	111	109
Oct.	...	120	96	102	109
Nov.	...	124	103	88	114
Dec.	...	128	104	84	121
Ave.	...	106	86	110	105

Construction Total Valuation
In 37 States

(Unit: $1,000,000)

	1940	1939	1938	1937	1936
Jan.	$196.2	$251.7	$192.2	$242.7	$204.8
Feb.	200.6	220.2	118.9	188.3	142.1
Mar.	272.2	300.7	226.6	231.2	199.0
April	300.5	330.0	222.0	269.5	234.8
May	328.9	308.5	283.2	243.7	216.1
June	324.7	288.3	251.0	317.7	232.7
July	.....	299.9	239.8	321.6	294.7
Aug.	.....	312.3	313.1	281.2	275.3
Sept.	.....	323.2	300.9	207.1	234.3
Oct.	.....	261.8	357.7	202.1	225.8
Nov.	.....	299.8	301.7	198.4	208.2
Dec.	.....	354.1	389.4	209.5	199.7
Ave.	.....	$295.9	$266.4	$242.8	$222.3





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	.....	745.4	484.6	1315.3	1050.1
Aug.	.....	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

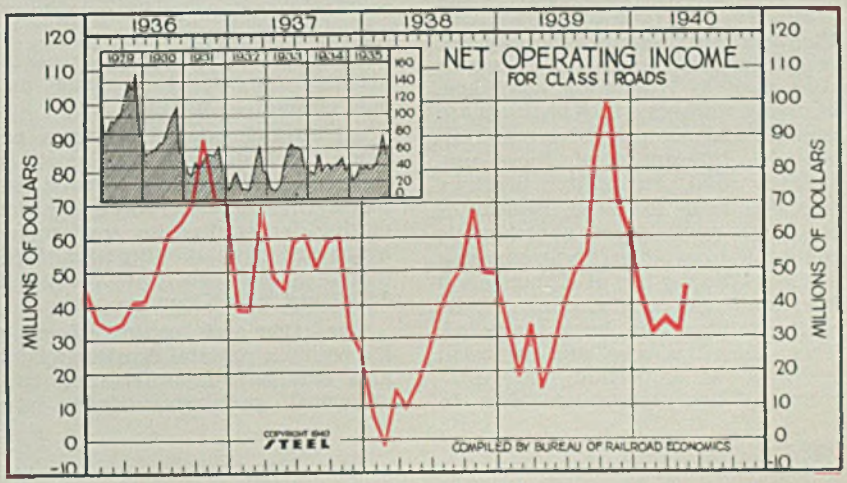
†After year-end adjustments.

Class I Railroads
Net Operating Income

(Unit: $1,000,000)

	1940	1939	1938	1937
Jan.	$45.57	$32.89	$7.14	$38.87
Feb.	32.62	18.59	1.91*	38.78
Mar.	36.73	34.32	14.73	69.88
April	33.82	15.32	9.40	48.36
May	47.08	25.10	16.67	44.24
June	.....	39.10	25.16	59.35
July	.....	49.01	38.43	60.99
Aug.	.....	54.59	45.42	50.76
Sept.	.....	86.43	50.36	59.62
Oct.	.....	101.62	68.57	60.86
Nov.	.....	70.35	49.67	32.44
Dec.	.....	60.95	49.37	25.99
Average	.....	$49.02	$31.02	$49.18

*Indicates deficit.



Today's Ball-Bearing Metallurgy

By C. T. HEWITT
Chief Metallurgist
The Fafnir Bearing Co.
New Britain, Conn.

With up to 1100 antifriction bearings per airplane, metallurgists had to develop proper nonferrous alloys and special heat treatments. Certain assemblies demand a steel that retains its hardness while other portions of assembly are heat treated. Some bearings require precision be held to hundred thousandths of an inch with balls gaged as closely as five millionths of an inch

■ IF WE look back over the last ten years and compare the metallurgy of 1930 with that of today we find not only improvements resulting from added experience and normal growth but also that ball bearing metallurgy has branched out to include fields little dreamed of in those days.

Several things are responsible for this expansion but most notable is the rapid development of aircraft. As the automobile gave tremendous impetus to metallurgy about 1910 and as did the World war in 1917-1918, so the aircraft industry has speeded up and expanded metallurgical research. Aeronautical engineers have demanded lighter and stronger metals for aircraft construction to keep pace with increasing ship size and more powerful motors.

Increased engine power plus decreased weight-per-horsepower (the criterion of aircraft builders) also involves closer and closer working tolerances in the manufacture of parts, requiring machine tools of equal or greater exactness.

Modern airplanes utilize antifriction bearings extensively in engines, propellers, instruments and controls —as many as 1100 in a single plane. In many instances such bearings are special, and some involve materials entirely different from those universally used. Antifriction bearings installed near magnetic compasses must be made from nonmagnetic materials to avoid errors in compass readings. So the use of K monel and beryllium copper for rings, balls and retainers has been perfected. These bearings also are corrosion resistant—an important feature.

Special heat treatments have to produce hardness values of approximately 40 Rockwell C in such alloys. While this is low compared with standard steel bearings, it is satisfactory for the light service loads involved here.

To resist corrosion, control bearings must either be made from stainless steel or must be cadmium plated.

Stainless steel for antifriction bearings contains 1.10 per cent carbon and 17 per cent chromium and is heat treated to 60 Rockwell C. Although softer than steel in ordinary ball bearings, it is hard enough to furnish extensive life-expectancy where loads are not too high. Its resistance to corrosion is excellent, being nearly equal to K monel, and it is cheaper to produce.

All aircraft control bearings not made from stainless steel must be cadmium plated on all exposed surfaces. The highest type of precision plating is required to conform to army and navy specifications. Plate thickness must be held to between 0.0003 and 0.0005-inch.

One type of control bearing, known as a rod and bearing, Fig. 1, also entails some interesting metallurgical problems. Made from SAE 4620 steel, the outer raceways are integral with the housing and only the bore of this housing is hard. This is accomplished by copper plating the housing before the hole is drilled and the races and seal grooves formed. Subsequent carburizing takes effect only at these points, leaving about one-half of the wall thickness soft and tough to resist failure in service while the raceways remain hard to resist wear.

Tests show tensile strength of this uncarburized section to be well over 150,000 pounds per square inch after heat treatment. The copper plating is removed after carburizing and the part is cadmium plated. A few bearings of this type are made from SAE 52100 steel, but much lower resistance to shock and breakage resulting from its use (because of its through-hardening qualities) are decided disadvantages, especially since reliability is paramount.

Another interesting development is the roller thrust bearing that permits the feathering of controllable pitch propellers. This bearing, Fig. 2, is located on the shank of the blade to permit rotation of the blade on its axis under the high thrust load developed from centrifugal forces which may reach 150,000 pounds in some sizes.

Manufactured by Hamilton Standard Propellers, a division of United Aircraft Corp., the shank hub of these duralumin blades is upset after the blade itself is forged. The thrust bearing washers must be placed on the shank before upsetting and thus are subjected to the precipitation hardening treatment used

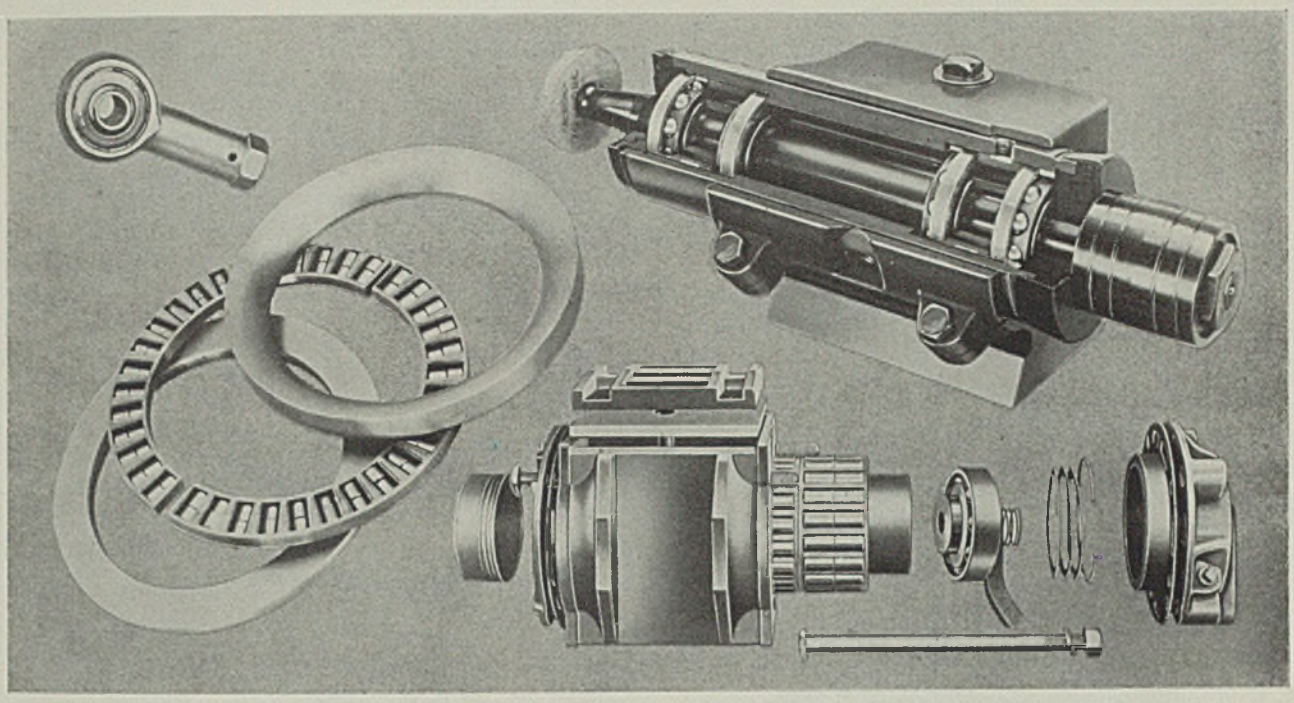


Fig. 1. (Upper left)—One of several types of rod-end bearings used extensively in aircraft controls. Fig. 2. (Lower left)—Bearings for full-feathering propellers must operate under heavy centrifugal loads. Fig. 3. (Upper right)—Grinding spindle with superprecision ball bearings, preloaded for extreme accuracy. Outer rings are cut away to show construction. Fig. 4. (Lower right)—Modern railway roller bearing employs cast steel housing, SAE 52100 rolls, cast bronze cages, SAE 4615 inner sleeves. Heavy-duty ball bearings take the thrust load

to develop the necessary physical properties of duralumin. This includes a soak for 10 hours at 960 degrees Fahr., a water quench and seasoning for 14 hours at 340 degrees Fahr. A special steel was required for washers that would retain their hardness after undergoing these heat treatments.

The steel developed for this unusual application contains 0.55 per cent carbon, 1.00 per cent silicon, 0.60 per cent manganese, 7.50 per cent chromium and 7.50 per cent tungsten. Its characteristics are similar to some of the tungsten hot-work steels. In addition to its red hardness qualities, it possesses considerable corrosion resistance. Proper heat treatment plus a draw at 1000 degrees Fahr. produces a hardness of about 60 Rockwell C with excellent toughness and resistance to abrasion. Since the roll assembly is built in two halves and thus can be placed between the washers at any time, standard SAE 52100 steel is used for the rolls.

Accurate machinery requires precise tools. Obviously if an airplane engine cylinder must be bore-ground to an accuracy of 0.0002-inch from end to end, the bore grinder must be accurate to at least this degree. It is here that the superprecision ball bearing enters the picture.

In making such bearings, only special-precision machine tools are used for finish grinding. Extremely accurate lapping machines control the widths to especially close tolerances while outside diameters, bore diameters and race diameters are held to tenths of tenths of thousandths instead of the usual tenths used in commercial bearings.

Specially selected balls are gaged as closely as five millionths of an inch, because it is necessary that all the balls in any bearing be as nearly alike in size as possible. Finished bearings made under such close size control will be true as to radial concentricity and will insure perfect operation in service when assembled in machine tools with a predetermined amount of preload. Fig. 3 illustrates a grinding spindle equipped with such bearings.

Any changes in dimensions after the rings and balls are assembled into a unit must be prevented as this would nullify all the care taken originally. All hardened steels are, more or less, in a condition of stress dependent upon the type of steel and method of quenching. Some but not all of these stresses are released during the drawing operation and it is these residual stresses plus additional stresses produced by grinding that must be relieved.

Aging over long periods of time will eventually remove these stresses but production does not permit such procedure so artificial aging is provided. Two commonly used methods are either a series of alternate heatings and coolings between the range of plus 200 or 300 degrees Fahr. and minus 40 degrees Fahr. or heating from 2 to 4 hours at a temperature of 250 to 300 degrees Fahr. This latter treatment is easy to accomplish and works exceptionally well on bearing steel, tools and gages.

Developments in roller bearings for railway journals include the use of cast steel for the housings, replacing alloy cast iron and the substitution of bronze for the roll cages in place of built-up steel sections.

Housings that formerly were made from chrome nickel cast iron had chilled bores on which the rollers revolved, as well as external surfaces subjected to wear. While these housings stood up well in service, a lighter and tougher housing was desirable—especially for the high speed trains—and thus the cast steel housing, Fig. 4, was tried. Since the housing bore forming the outer raceway for the rolls is SAE 1025, it is necessary to carburize and harden the bore as well as the outer wear areas.

This is accomplished by heating the bored castings in a carburizing atmosphere at 1700 degrees Fahr. for about 30 hours and then quenching in water. A case depth of 3/16-inch results, giving excellent wear resistance with a soft core for toughness. Surfaces to be left soft are painted with Sauereisen cement which resists carburization.

Material for inner sleeves, which are shrunk onto the axles, is SAE 4615. These are carburized in butane gas to a depth of about 0.080-inch,

(*Please turn to Page 76*)

HEAT and CORROSION Resistant Castings

Part I

By D. W. TALBOTT*
Assistant Superintendent
Ohio Steel Foundry Co.
Springfield, O.

Variety of chrome-nickel-iron alloys is available to meet special requirements for metals to withstand attacks of high temperature and corrosive media in equipment for use in different industries

■ IN THE alloy casting industry, stainless or heat and corrosion-resisting alloys are classified into two divisions; one covering the alloys for service temperatures below 1200 degrees Fahr. and the other for temperatures above 1200 degrees Fahr. In either case, the corrosive media may be liquid or gaseous. This classification has been confusing at times since many so-called heat-resisting alloys are subjected to corrosive atmospheres at elevated temperatures.

In the heat-resisting group, these classifications are considered each with its own particular field of application.

Group I

Chromium	Nickel	Carbon	Fahrite Grade*
	Per Cent		
10-14	59-62	0.75 max.	N-61
17-20	37-40	0.75 max.	N-51
13-17	34-37	0.75 max.	N-1

*Fahrite is tradename for alloys produced by Ohio Steel Foundry Co.

Group II

These alloys are also essentially of the austenitic type in which the element chromium predominates and ranges from one and one-fourth to three times the nickel percentages.

Chromium	Nickel	Carbon	Fahrite Grade
	Per Cent		
26-30	7-9	0.50 max.	N-73
23-27	19-20	0.50 max.	N-63
23-28	10-13	0.50 max.	N-3
28-32	19-21	0.60 max.	N-43

Group III

These alloys are of the ferritic type with chromium the predominating element.

Chromium	Nickel	Carbon	Fahrite Grade
	Per Cent		
16-24	3 max.	0.50 max.	C-18
25-30	3 max.	0.50 max.	C-28
25-30	3 max.	1.00-1.80	HC-28
25-30	3 max.	1.80 min.	HC-28A

The twelve alloys listed above do not include all types proposed and occasionally used for some specific application, but they represent those satisfactory for the greatest number of installations. From a tonnage standpoint, the following three alloys predominate.

Type	Chromium	Nickel	Fahrite Grade
	Per Cent		
24-12	24-27	10-12	N-3
15-35	13-17	34-37	N-1
12-60	10-14	59-62	N-61

*The author wishes to thank L. E. Welch, metallurgist of the Fahrite division, and other employes of Ohio Steel Foundry Co. for their valuable contributions and criticisms incident to preparation of this discussion.

As a group, the heat-resisting alloys are higher in alloy content than the corrosion-resisting alloys, with chromium being the essential alloying element.

Chromium is distinctive in its remarkable power to improve the properties of iron-base alloys; for its corrosion, abrasion, oxidation and shock resistance and slower growth in high temperatures.

The chromium-nickel-iron alloys here being considered are of the austenitic type, possessing a microstructure having austenite as the predominating phase.

They are considered to be stable since the structure obtained in the as-cast condition is not changed appreciably by heat treatment such as the Strauss treatment used for 18-8. Therefore, the heat-resisting alloys are used mostly in the as-cast condition.

Physical Properties. The physical properties of the three heat-resisting alloys which constitute the bulk of the tonnages sold are shown in Table I, page 44.

Short-Time Strengths. The short-time high-temperature tensile strengths of the 24-12 and 15-35 type alloys are shown in Figs. 1 and 2. Specimens for these tests were standard 0.505-inch tensile bars threaded to fit into the grip of an Amsler hydraulic testing machine. Bars were enclosed in an electric heating furnace and brought up to required testing temperature. After being held at temperature for one hour, they were pulled at a speed of 0.03-inch per minute, the procedure being that set forth in A.S.T.M. specification E-21-37T.

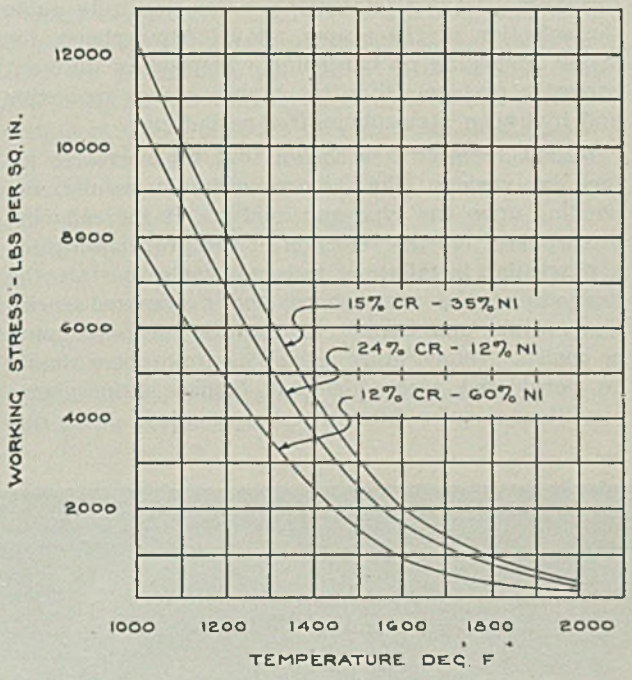
Design strength curves for alloys 24-12, 15-35 and 12-60 are given in Fig. 3. These curves have been developed from creep tests as well as from data obtained from close observation of actual installations.

Design stresses for heat resisting alloys should be used judiciously and it is advisable to consult the supplier whose store of accumulated information on individual installations will help toward obtaining satisfactory service life for castings subjected to temperature and stress conditions.

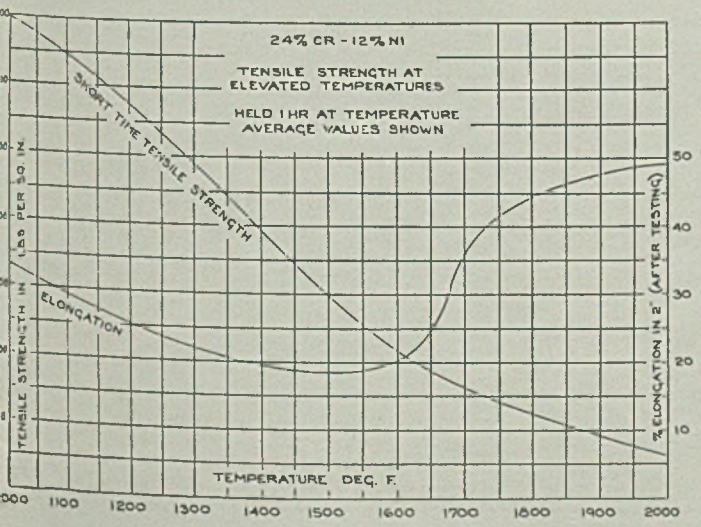
Satisfactory application of design strength must provide a factor of safety to care for short periods of overloading or overheating. Values shown in Fig. 3 can be relied upon for calculating working stresses for the majority of installations.

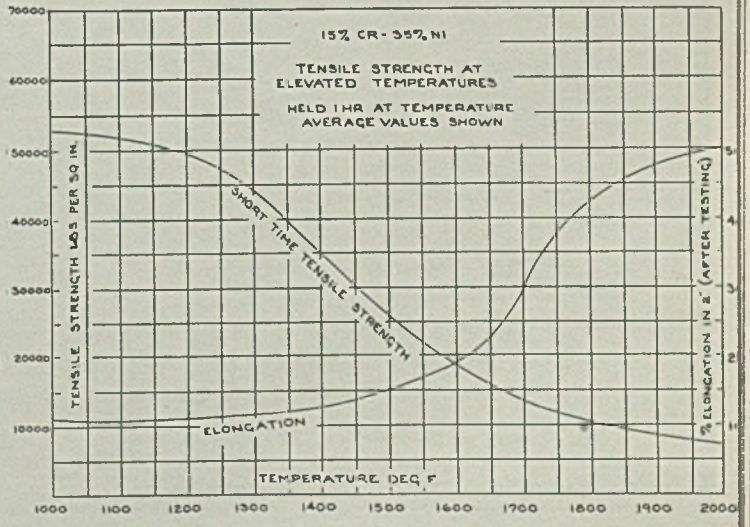
Type of alloy to be selected for a particular job will be determined not alone by its strength at room or elevated temperature, but also by its ability to withstand corrosion. In the case of heat-resisting alloys, the term "corrosion" is used to designate the effect produced by various atmospheres or liquids to which the alloy casting may be subjected.

The important atmospheres at elevated temperature are oxygen-bearing or oxidizing, sulfur-bearing, reducing, carburizing and combinations of these with or without water vapor. Such atmospheres are encountered in controlled atmosphere furnaces for



Page 40. Upper Left—One of the unusual types of alloy tube supports for an upshot heater in refinery service. Below, Left, Fig. 1—Short-time tensile strength of 24 per cent chromium, 12 per cent nickel alloy at elevated temperatures. Below, Right, Fig. 2—Same curve for 15 per cent chromium, 35 per cent nickel alloy. Right, Fig. 3—How working stress changes with operating temperatures is shown in this comparison of 15-35, 24-12 and 12-60 heat-resisting alloys





bright annealing and hardening of carbon steels; in carburizing furnaces, either pack or gas, and in flue gases. Corrosive liquids are encountered in heat-treating baths.

Due to the affinity of nickel for sulfur, alloys containing chromium in excess of nickel will give better high-temperature service in high-sulfur atmospheres. This is due to the tendency of chromium to inhibit the reaction of sulfur with nickel in the alloy. It is important to consider whether the sulfur is present in a reducing atmosphere as hydrogen sulfide or in an oxidizing atmosphere as sulfur dioxide. In the case of sulfur dioxide as in flue gases, the attack on the nickel-bearing alloys is more severe than when the atmosphere contains hydrogen sulfide.

In selecting alloys for carburizing furnaces or parts, the process should be taken into consideration. In pack carburizing, the lower-chromium higher-nickel alloys, 15-35 or 12-60, have been more satisfactory than alloys containing higher percentages of chromium. In gas carburizing, the 24-12 type alloys are in some instances equal to the 15-35 or 12-60 in performance. General statements cannot entirely guide the selection of the proper alloy. Atmospheres for bright annealing or hardening will produce different corrosive problems than the higher carbon monoxide and hydrogen atmospheres for carburizing.

Recent research has shown that the corrosive attack on various alloys shows different results, depending upon the type and analysis of the reducing atmosphere. In the selection of the proper alloy for a particular installation, it is advisable to state the analysis of the atmosphere, the maximum service temperature and the speed at which the parts must be cooled. Temperature as well as atmosphere should be considered since identical furnace atmospheric conditions require different types of alloys under different thermal conditions. Wherever practical, installations of test specimens are suggested as the best method to determine the correct alloy for special services.

For oxidizing service conditions encountered in some furnaces, the higher chromium alloys like 24-12, 29-9 or 28 chromium will be found satisfactory, provided they are not subjected to rapid heating and cooling cycles. In the latter case the 15-35 alloy will be found more suitable.

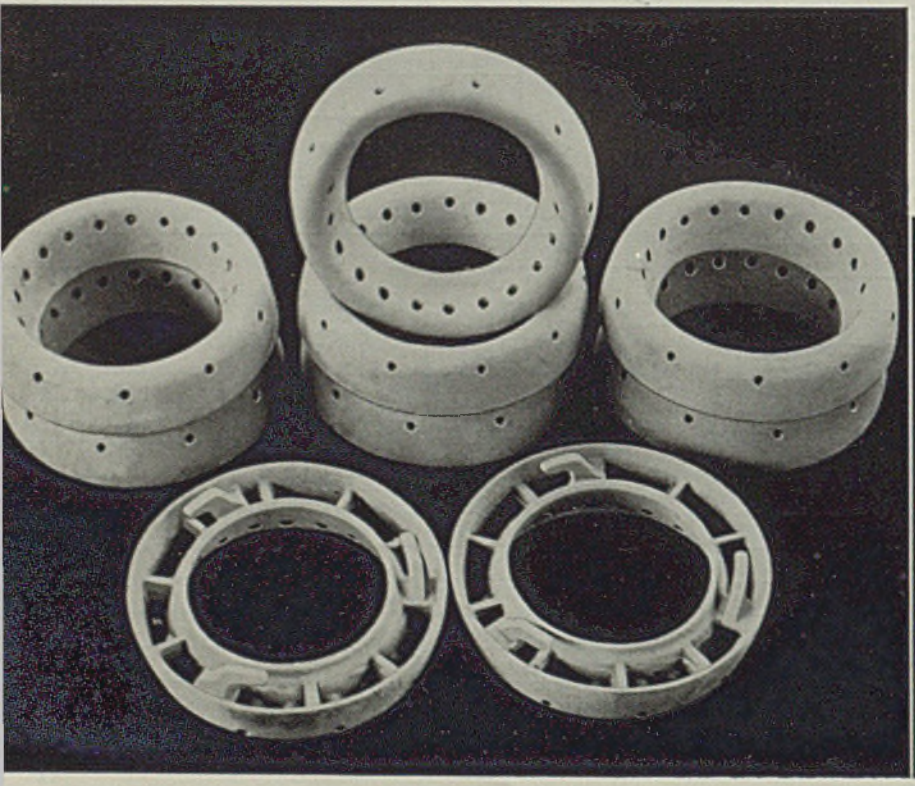
Straight 28-per-cent chromium alloys have been used in castings subjected to dynamic loads, especially in high-sulfur atmospheres encountered in ore roasting. This alloy is not popular because it has a tendency toward grain growth and brittleness at room temperature, low strength at high temperatures.

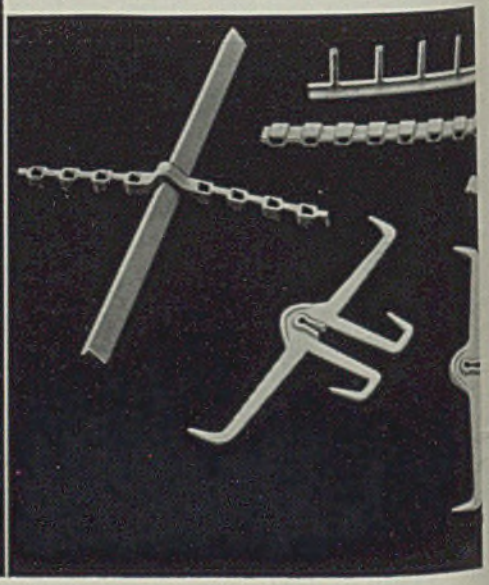
Although the 24-12 alloy has been mentioned as one of the popular alloys from a tonnage standpoint, it can be said that the 29-9 type has essentially similar properties and is substituted for 24-12 installations where sulfur in the atmosphere is abnormally high. The 24-12 alloy shows high tensile strength in short-time elevated temperature tests as indicated in Fig. 1, and design strength only slightly below the 15-35 alloy as shown in Fig. 3.

24-12 Alloy Improved

In the past, one of the disadvantages of the 24-12 alloy was its loss of ductility when heated at intermediate temperatures, 1400 to 1600 degrees Fahr. Research at individual laboratories and through the Alloy Casting Research institute has resulted in remarkable improvements in the physical properties of this particular type of alloy.

Another austenitic alloy that can be classed in the group with the 15-35 alloy is the 25-20 alloy which has proved successful in wrought products. This al-





Left, alloy retorts for high-temperature service in domestic stokers. Below, burning tools for batch or continuous

loy has good physical properties and high oxidation resistance. In all probability it will be used more widely in the future as its merits in castings become further established.

Of the two higher-nickel alloys, the 12-60 type is capable of withstanding a greater amount of thermal shock. Due to its high cost, however, its position in the alloy casting industry is being gradually displaced by the 15-35 alloy. While the life of the 15-35 casting may not be as great as the 12-60 casting, the cost per hour to the user will be less in many cases. When considering the cost per hour it has been found in many applications that the still cheaper 24-12 casting will have an advantage over the 15-35 casting.

We have been discussing the use of heat-resisting alloys as they pertain to the casting industry but no discussion would be complete without stressing the importance of design on the satisfactory service life of castings. Careful and intelligent designing is of economic importance to the user because it saves in weight and lengthens service life. Designing to eliminate surplus metal is important in heat-resisting alloys because a saving of a few pounds of metal may mean an appreciable cost saving to the user.

All heat-resisting alloys have high coefficients of expansion coupled with low thermal conductivity. This increases the possibility of internal shrink cavities. The low thermal conductivity causes heavy sections to remain liquid for a relatively long time while the solid contracting metal is drawing from the liquid reservoir.

Uneven temperature distribution caused by slow heating or cooling of the heavier sections causes internal casting stresses due to differential expansion or contraction. The following design points should be considered:

Uniform sections wherever possible.

Proper weight distribution.

Rounded sections with generous radii for repeated heating.

Hot spots at intersections lessened by staggered ribs.

Small cored holes at intersections for sounder castings.

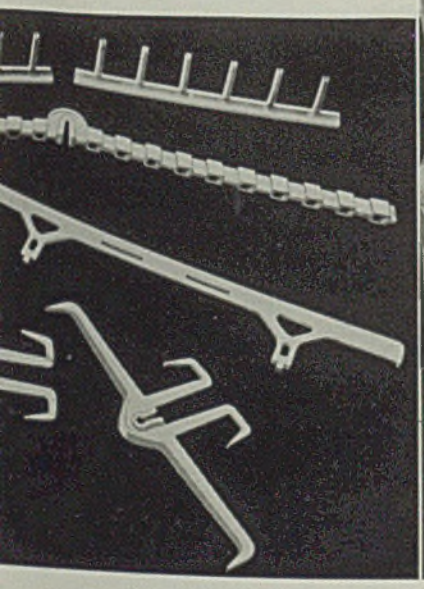
Eliminate metal that adds little to the strength of the casting since the initial alloy cost is high and the fuel loss from heating is important in continuous operation.

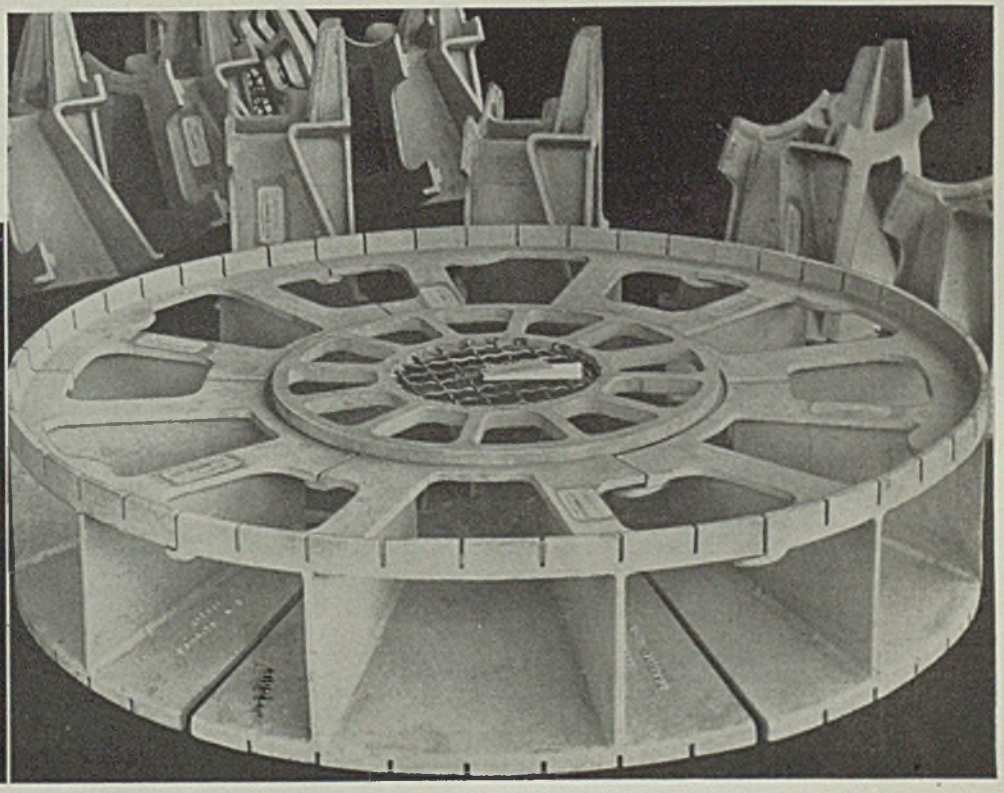
When castings are placed in service, it is important that they be uniformly heated, particularly long castings which are apt to warp due to uneven expansion or contraction. If possible, an assembly of free moving parts should be used instead of long rigid castings. In all installations sufficient space should be allowed to take care of the expansion. Restriction would cause high indeterminate stresses resulting in possible warpage or failure of the structure.

Application of Heat Resistant Alloys. In the enameling industry, burning tools which scale and fleck, thus marking vitreous ware, must be avoided. Whether cast iron or rolled sheets are being enameled, burning tools of high heat resistance are essential. Tools are designed to suit either batch type or continuous furnaces. Castings range from heavy bucks to support cast iron bath tubs to small unit suspension bars to carry pots and pans through continuous furnaces. As a general rule, high alloys such as 12-60, 15-35 and 30-20 are used.

Industrial Furnaces. The wide ranges of heat treating and industrial furnaces necessitate the use of many differently designed castings. In general the castings can be classified as to stationary or moving types.

Some of the applications of heat resisting alloy castings for furnace parts are:





type porcelain enameling furnaces. Right, chrome-nickel alloy hearth assembly for rotary heating furnace

Moving
Chain
Conveyor rolls and disks
Sprockets
Revolving retorts
Walking beam rails
Stationary
Rails and skids
Lintels
Solution pots
Hearth plates
Burners
Muffles
Radiant tubes
Radiant tube supports
Brick and tile supports
Wall ties
Annealing and carburizing containers

Varying fuel conditions make it impossible to state what alloy should be used, although in general the majority of the tonnage used is 24-12 or 35-15.

Power Plants. Increasing amount of heat-resisting alloy is being used in superheater and boiler units due to the higher temperatures now being used and for eliminating costly delays from failure of ordinary metals. Some of these applications are tube supports of many designs, hanger bolts, brick and tile supports, dampers, nozzles, beams, side guards and end plates.

Due to the wide variation in sulfur content of the fuels, several grades of heat-resisting alloy are used. For this application the coal analyses and maximum exposed temperature should always be given to determine the correct alloy analysis. In the majority of the applications, the 24-12 alloy has been successfully used.

Ore Roasting, Pigments. The roasting of high-sulfur ores, best done by utilizing some mechanical stirring arrangement, requires a heat-resisting alloy capable of withstanding sulfur atmospheres at high temperatures. Long stirring arms with plows or rabbles are used to move and stir zinc, lead, or other ores to give maximum air exposure. Best results are usually obtained from the straight chromium alloys such as the 25 per cent chromium.

Automotive, Heat Treating. The constant drive in the automotive industry to give a better product at a lower cost has brought specialization in mass production heat treatment of many parts. In most applications, the operating conditions demand the utmost in alloy performance. The most drastic applications are in carburizing. Not only must the alloy withstand the carburizing effect of the compound (gas or solid) but also it must withstand high thermal shock.

The controlled gas carburizing process using alloy muffles has created new problems in alloy research both from a chemical analysis and design standpoint. In general the castings used by the automotive industry for heat resisting application may be classified as follows: Carburizing containers, solution pots, muffles, trays and fixtures, retorts.

For the greatest number of installations in this industry, the 15-35 alloy has been found most suitable in parts that must withstand high thermal shock, such as carburizing boxes, trays, fixtures and muffles.

Steel Industry. The steel industry uses many special industrial furnaces for its high-temperature applications and needs a considerable number of heat-resisting alloy castings. Production of high-grade sheet of better finish and deep drawing properties has brought about the use of continuous furnaces requiring many alloy parts.

Heat-resisting alloys have made possible the gas-fired radiant heaters for annealing sheet. Alloy dampers and dry valves have eliminated, in many cases, the high cost of using water-cooled units. Majority of steel plant high-temperature alloy requirements can be met with a 24-12 alloy.

Some of the types of castings used are: Conveyor rolls and disks, alloy chain, conveyor fingers, mushroom valves, slide dampers, retorts, radiant tubes, recuperators, skids and furnace rails, open-hearth reversing valves.

Oil Refining. The refining industry is a large user of high-alloy castings in heat and corrosion resisting grades. The present high-pressure and high-temperature units would not be possible without high-alloy supports and other castings able to withstand excessive heat and corrosion.

Practically all refinery cracking units use tube supports of 24-12 alloy. Generally burners, nozzles, wall ties, arch supports, lintels and dampers are made from the same alloy.

Space does not permit discussion of the many corrosion-resisting alloy applications, some of which are: Pump parts, 12-14 chromium, or 18-8; return bends and fittings, 18-8; return bend plugs, 10-20; sludge pumps, 15-35 or 24-12 with Mo valves, 18-8.

Wherever there is heat up to 2000 degrees Fahr., there is likely to be use for heat-resisting alloys. This takes in almost all industries. A brief list of some typical castings: Coal stoker parts such as tuyeres and grates, valves for glass furnaces, oil burning pots, containers for hydrogen reduction of iron oxide, gas cracking retorts, tar burners, alloy weights and fixtures for hydrogen copper brazing, gold platers' clamps and soldering plates.

(*Concluded next week*)

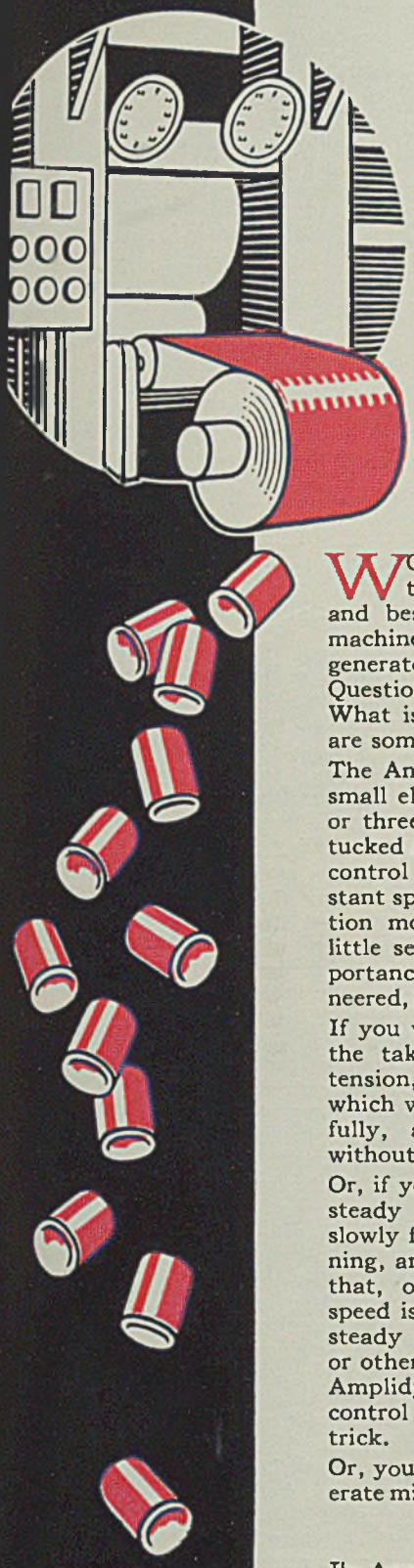
TABLE I. Physical Properties of Heat-Resisting Alloys as Determined by Room-Temperature Test in As-Cast Condition

	Type 24-12	Type 15-35	Type 12-60
Chromium range	23-28	13-17	10-14
Nickel range	10-13	34-37	59-62
Yield strength, lbs./sq. in.	40-55,000	35-45,000	30-40,000
Tensile strength, lbs./sq. in.	80-100,000	60-75,000	60-75,000
Elongation in 2 ins., per cent	15-25	6-12	4-7
Reduction in area, per cent	15-25	6-12	4-7
Brinell hardness	165-175	165-185	175-185
Charpy impact, ft. lbs.	12-18	4-8	5-7
Tests made at 1800 degrees Fahr.			
Yield strength, lbs./sq. in.	75-9,500	7-8,500	5-7,000
Tensile strength, lbs./sq. in.	11-15,000	8-11,000	9-11,000
Elongation in 2 ins., per cent	35-45	35-45	40-50
Reduction of area, per cent	35-45	35-45	40-50
Brinell hardness	40-60	35-45	30-35
Charpy impact, ft.-lbs.	10-15	8-11	5-10
General properties			
Specific gracity	7.7	7.9	8.1
Modulus of elasticity	24,200,000	21,000,000	24,400,000
Coef. of expansion 75 to 1800° F.	0.0000105	0.0000098	0.0000089
Max. operating temperature, degrees Fahr.	2,000	2,000	2,000

New Lead-Base Alloy Has Many Applications

■ Bermax, an improved lead-base alloy for use on gasoline and diesel engine bearings and other general purpose bearings is announced by Federal-Mogul Corp., Shoemaker and Lillibridge streets, Detroit. Its melting point is slightly higher than that of tin-base metals and it can be cast by any method without segregation. It also is so positioned in the ternary system, lead—tin—antimony, that the best compromise of desirable properties, is effected. Also it is not brittle nor subject to oil corrosion.

The alloy is recommended for rebabbitting steel back or bronze back bearings or housings of cast steel or cast bronze, into which the babbitt is poured or cast direct; that is, provided the surfaces to be babbitted are tinned or soldered prior to pouring to obtain a chemical bond.



WHAT IS *an* AMPLIDYNE?

WORD is getting around that the real "brains" of the latest and best tin-plate mills is a new machine known as the Amplidyne generator "amplidyne" for short. Questions are being asked about it. What is it? What will it do? Here are some of the facts.

The Amplidyne generator is a very small electric machine—like a one- or three- or five-kilowatt exciter—tucked away somewhere next to the control board and driven at a constant speed by a squirrel-cage induction motor. One can pass by this little set and never suspect its importance. But, when properly engineered, it really does miracles.

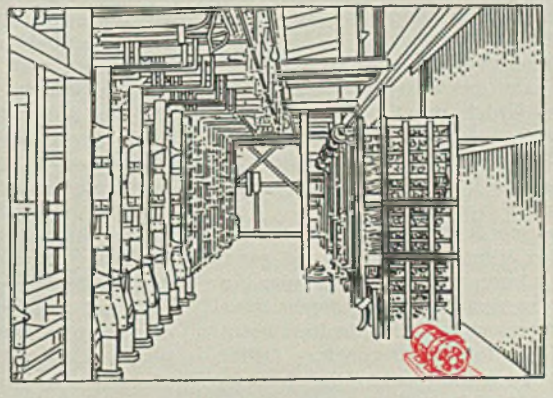
If you want to wind the strip onto the take-up reel with a constant tension, "tell it to the amplidyne," which will do the job for you faithfully, accurately, and steadily—without any regulator.

Or, if you wish to run the mill at a steady speed, any speed, either slowly for threading or fast for running, and want to be sure that, once selected, this speed is held constant and steady regardless of load or other variables, another Amplidyne generator in the control system will do the trick.

Or, you may want to accelerate mill and reel very rapidly in order to reduce scrap losses. This remedy, however, may be worse than the disease unless the inertia of the accelerated motors is compensated for. You can entrust this task, too, to the amplidyne.

The versatility of this machine is amazing. It will maintain almost any electrical or mechanical value you may choose—voltage, speed, or tension. You can change this value at will, and as often as you like. But, once chosen, this value is maintained.

Of course, cold-strip has been rolled successfully without Amplidyne generators, but there may be significance in the fact that they are being used today on mills that are outstanding in the industry for large-tonnage production and low scrap losses. The "amplidyne" supplies new evidence of the steel industry's continued reliance on electrical developments for further advance in economical steel rolling. General Electric, Schenectady, N. Y.



The Amplidyne generator sits unobtrusively next to the cold-strip mill control, its small size hardly indicating its importance

GENERAL ELECTRIC

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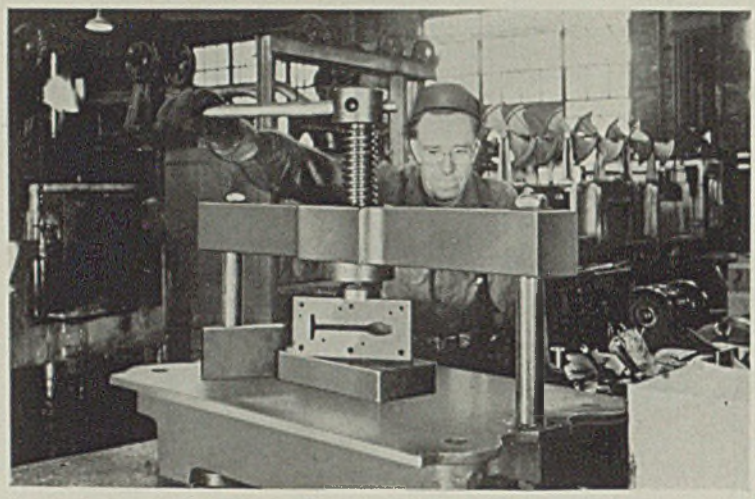


Straightening Hardened Parts

Oil-hardening die removed from quench at 450 degrees Fahr. is straightened immediately while still at that temperature and with no appreciable loss in hardness. Die allowed to cool to 300 degrees under press, then transferred to draw. Die and author above

By W. P. BOYLE

Lindberg Steel Treating Co.
Chicago

■ A MAJOR heat-treating problem is how to maintain the original shape and straightness of tools and machine parts. Prevention of distortion depends not only on proper manipulation of heating rates and proper support while in the furnace, but also on adequate control of cooling stresses.

Differences in cross section often cause a relatively thin section to pull a larger section with it as it cools. While external pressure, if applied with large doses of horse sense, may be a good corrective measure in many cases, a practical knowledge of hardening is a most valuable asset in attempting to control the shape of the work either while cooling or after normal temperatures have been reached.

Amount of pressure to be applied in straightening is influenced mainly by type of steel, cross section and temperature at time the pressure is applied. It is impossible to make any cut-and-dried rule. Also fixtures and presses used in straightening have peculiarities and eccentricities which must be known intimately to use them to best advantage. Even then the amount of pressure is something which must be learned by experience.

Some steels straighten better with repeated light applications of pressure whereas others require a steady pressure. Some steels have to be pressed past the desired point to allow for springback. Other steels will take a set without pushing by the desired point. Some steels will continue to harden after being withdrawn from the quench and others must be "chilled stiff." Tolerances in hardness limits may influence the choice of method to be used in straightening some steels.

The problem is to control cooling to produce the least amount of distortion and then apply pressure correctly to bring the part back to its original shape.

Quenching parts of uneven section so the heavy section enters the quench first will help to maintain the shape. Allowing some steels such as high speed types to cool in air until the heat has dropped several hundred degrees before oil quenching will help to reduce the drastic effects of the quench and will not appreciably affect hardness. Such procedures, however, do not guarantee a straight tool so it is necessary to consider what can be done when the part distorts.

The first possibility is that of straightening during the quench. Air hardening steels in the shape of rods not too large in diameter often can be rolled between two flat heavy plates by hand by moving the top plate back and forth while the round rod is cooling. Such steels as stainless, high-carbon, high chromium and high speed also fall into this class. Reamers, broaches and similar parts having flutes or teeth are sometimes placed in a chuck vertically and spun in air or lowered while spinning into an oil bath. Machines have been built with motor-driven rollers between which the round is placed and lowered into the quenching medium. Such a device can be used with many oil-hardening alloy steels.

Steels alloyed so they harden all the way through can generally be removed from the quench at temperatures of 400 to 500 degrees Fahr. and immediately put under the press for straightening without any noticeable drop in hardness. These include SAE alloys other than the straight carbon series, the oil-hardening tool steels, high-carbon high-chromium steels, stainless and high-speed steels. When removed from the quench hot, these steels will be in a semihardened state so remember while applying pressure that hardening continues as the temperature drops.

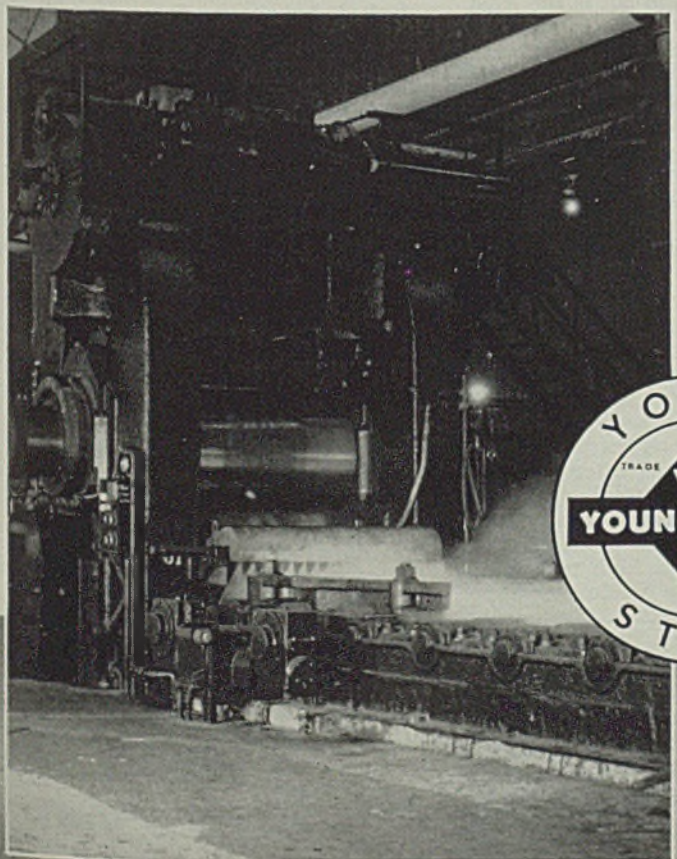
Manipulation of the press is extremely important. The usual straightening press permits the part to be supported at two points with pressure applied between these points to straighten the part. See accompanying diagrammatic illustration. It is here that the "feel of the press", well known to heat treaters, becomes so vitally important. With the high spot or high side determined by revolving the part in centers or on V-blocks, pressure is applied to the high side with care. Various results can be obtained by changing the distance between the supporting blocks and the width of the point of pressure. Teeth and sharp corners can be protected by using copper blocks to take up the pressure.

(*Please turn to Page 77*)

"Mack Bulldog"

. . STAYS TOUGH WITH "YOLOY"

THE Bulldog trademark of the International Motor Truck Company has long stood as a symbol of the staunch stamina of their widely-known line of Mack Trucks and Buses. Yoloy makes an important contribution to the toughness and durability of Mack construction and has been used for body framing and chassis on jobs such as this United Traction Company bus for the City of Albany.



Yoloy is a high tensile, low alloy steel developed by Youngstown. Compared to regular materials Yoloy will reduce weight 25% to 40% for equal strength, has a corrosion resistance 4 to 6 times greater. In addition Yoloy has excellent welding properties, forms well, yet has a high impact resistance.

Investigate Yoloy for your products now. Yoloy will cut down dead weight, increase payloads and insure better profits for transportation vehicles.

YOLOY TRADE MARK YOUNGSTOWN STEEL

High Tensile Steel Yoloy is available in sheets, strips, plates, bars, shapes, manufacturer's wire, welding wire, seamless pipe, and electric weld pipe.

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THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO

If Your Wire Rope Gives Short Service

. . . . . *Know Why*

By F. L. SPANGLER, M. E.

■ EACH year American industry buys approximately $40,000,000 worth of wire rope. It is really a conservative statement to say that several million dollars of this amount is literally wasted because of lack of knowledge on the part of users of how to select and care for rope. Moreover, the waste of productive time on the part of equipment operated by all this rope is enormous and would probably reach into the tens of millions of dollars. This appalling waste can be greatly reduced.

There are many conditions that increase the destruction of wire rope, and any one of these may lead to premature replacement. Short rope life may be the result of using a rope not suited for the job, or misaligned sheaves, or sheaves and drums that are too small, or lack of lubrication, or carelessness in installing or operating the rope, or any one of many other causes.

The most important causes of wire-rope destruction are brought out in the following questions. Study your rope and the conditions under which each operates until you can give the answers to each of these questions. You may find conditions leading to rope destruction that you never thought existed. Once you know what the trouble is, then correct it and watch your rope service life go up.

ROPE

Are you using the wrong kind of rope for the service? There are a great many different constructions of wire rope, designed to meet the varied requirements of industry. The construction that is best for one job may not be suitable for another. Where sheaves and drums are comparatively small in diameter, a flexible construction should be chosen, preferably of preformed types. Where the rope runs through sand or is subjected to coke dust or is used under some other abrasive condition, the rope should have large outer wires made of tough steel. Where loads are very heavy, or the rope winds more than one layer on the drum, the rope should be designed to resist crushing.

Hemp Unsuitable for Heat

Ropes used in foundries frequently are subjected to intense heat; hence the rope center should be of wire, as a hemp center quickly deteriorates when exposed to high heat. The most popular construction for working ropes is 6 x 19, which means 6 strands of 19 wires each, with a rope center usually of hemp. The most common arrangements of wire and wire sizes are those known as Seale, Warrington and filler wire. Of these three, Seale rope is least affected by abrasion but is the least flexible. Filler-wire rope is most affected by abrasion and is the most flexible. The characteristics of the Warrington construction fall somewhere between these two.

Are you using rope of the wrong material, considering the service requirements? The wires of steel ropes range in grade from improved plow steel, having an ultimate tensile strength between 220,000 and 240,000 pounds per square inch, down to so-called iron rope whose ultimate strength is about 100,000 pounds per square inch. The resistance to abrasion ranges in the same order. Where the rope must grip a traction drum as on many elevators, one of the softer steels—traction steel, cast steel, or iron—is generally used. Of these three grades of steel rope, traction steel and cast steel show high resistance to bending fatigue while iron rope is poor in this respect. . . . Ropes subjected to sea spray, brine, or other corrosive agent should be made of some corrosion-resisting material.

Are you using non-preformed rope where preformed rope will last longer? Preformed rope was not known before 1924. In the 16 years since it was originated, it has become popular for elevators, rotary oil-field drilling, cranes, shovels and many other applications where a fatigue-resisting rope is needed to overcome the disadvantage of small sheaves or drums. A preformed rope has virtually no internal stresses introduced by the manufacturing operation, and therefore the strands and wires lie dormant and do not tend to fly out and unlay if the end of the rope is not serviced with a seizing. Besides being more flexible and being less subject to fatigue than non-preformed rope, preformed rope also has the advantage of always being easy to handle, even in the Lang lay construction or when provided with an independent wire rope center.

Are you using rope of the wrong diameter? Oversize rope will be pinched by sheave flanges, resulting in wear and rapid fatiguing. In undersize rope, loads produce greater stresses and strains resulting in faster wear. Also, when undersize rope has been used long enough to wear its own groove, a new rope of proper diameter will not fit the smaller groove and will quickly deteriorate in use unless the sheave is regrooved.

SHEAVES AND DRUMS

Are your sheaves and drums of too small diameter for the size and construction of the rope you are using? For 6 x 19 rope, the tread diameter of the sheaves and drums should preferably not be less than 30 times the nominal diameter of the rope, where the rope is in frequent operation. Smaller sheaves or drums will greatly reduce the life of the rope through the destructive action of fatigue. Such a stiff rope as 6 x 7 should never be operated over sheaves or drums unless of large diameter.

Do the sheave or drum grooves fail to fit the rope? Grooves are often worn by rope that has stretched and become undersize. A

new rope, with its larger diameter, will be pinched by the worn groove, causing premature destruction of the rope. By regrooving the sheave or drum, rope life will be increased.

Is the angle of lead too great? The angle of lead, which is the deviation of the rope from the center plane of the sheave, should never be more than 1½ degrees. If this angle is greater, undue wear will occur between the rope and the side, or flange, of the groove to cause frequent replacement of both rope and sheave. Where the rope leads from a drum to a sheave, fixed in position, the sheave should be located centrally with respect to the drum and the distance between the axes of the sheave and drum should be at least 40 times the drum length.

Are the sheaves out of alignment? Wear between the rope and the sides of the sheave groove results when the sheave is out of alignment. Abrasion and fatigue are increased and rope life reduced.

Are the sheave bearings worn, or do they stick? Worn or sticking bearings are the indirect cause of many early rope replacements. Worn bearings destroy ropes and sheaves by causing misalignment. When bearings stick, abrasion takes place between one spot on the sheave groove and the rope. A groove with a flat spot either should be regrooved or discarded. Rope replacement is apt to be frequent if bearings run dry or do not rotate freely.

Does the rope slip on the sheave due to lack of traction? If the inertia of the sheave is too large for the traction provided by the rope, slippage will occur every time the rope is started in operation or is stopped. Slippage causes wear of both the sheave and the rope. It may be reduced by making the sheave smaller or of lighter material, by increasing the arc of contact of the rope around the sheave, by using a rope construction that will provide greater traction such as a preformed Lang lay rope, by using a V-shaped groove, or by employing a rope dressing or lubricant that allows less slippage.

INSTALLATION

Was the rope taken off the coil or reel in the wrong manner? Use a turntable or jack the reel up on a shaft and allow the coil or reel to turn as the rope is led off. If this is not a handy method to use, anchor the free end of the rope and then roll the coil or reel along the floor. Don't lay the coil or reel on its face and pass each loop over the coil as it is taken off because this causes kinks in the rope. Once a kink has formed, the rope is permanently damaged and its life is considerably shortened.

Was the rope damaged against the sharp edges of beams or other structures, or by tools, during course of installing? Any sharp object that the rope is apt to come against while being installed should be covered with burlap or a wooden guide installed nearby to keep the rope away from the sharp edge. A little act of carelessness may do more damage to a rope than years of service. When wires are nicked or forced out of their proper position, destruction of the entire rope is hastened greatly, particularly at that location.

OPERATION

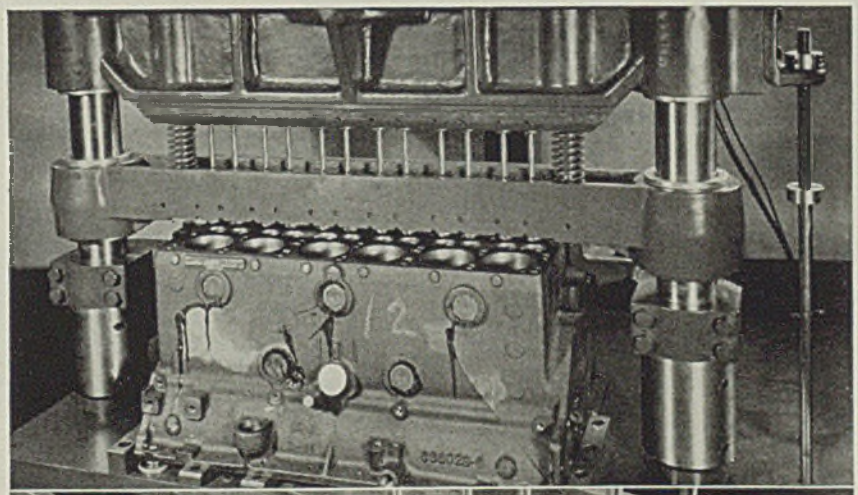
Has poor handling caused kinks in the rope? When loops form in the rope, slack should be taken up carefully to prevent kinks from forming. If the loop is jerked out, a kink will likely result. Some

(*Please turn to Page* 68)

Machine Both Burnishes and Prelubricates Valve Stem Guides

■ SPECIAL machines at the plant of Chrysler Corp., 341 Massachusetts avenue, Detroit, both burnish and prelubricate valve stem guides in 6-cylinder engines for easier "running in." Operation consists of pressing steel balls through the valve stem guides to burnish them for fine surface finish. As the balls are forced through, Fig. 1, the balls and guides are given a shot of colloidal graphite suspended in oil. The guide provides a certain amount of prelubrication. The machines are operated hydraulically and are built with beds at conveyor height so cylinder blocks slide into them readily.

When the block is in place, the operator merely presses a foot pedal. This releases a steel ball from a tube immediately over each valve guide. A shot of graphite oil is squirted simultaneously into each valve stem guide. A row of plungers then moves down, pushing the ball through the guide. The balls drop out through the bottom into a reservoir containing graphited oil and are carried back up into the hoppers, Fig. 2, in the machine fixture, ready for reuse. Several balls can be pushed through in turn by merely depressing the trip release a second or third time. Hoppers prevent too frequent reuse of the same balls.



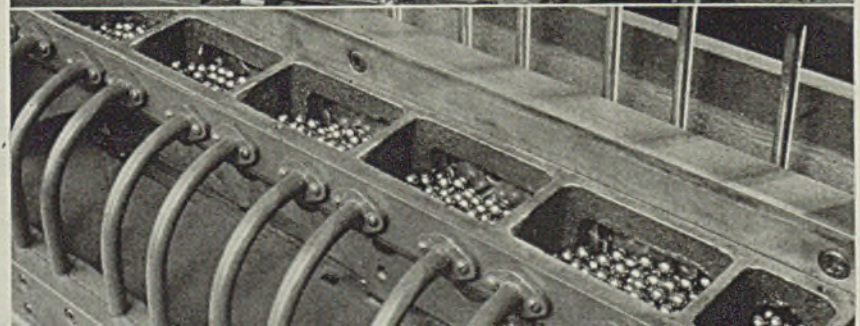


Fig. 1. (Upper)—In this special machine hydraulic plungers force steel balls through guides after they are given a "shot" of colloidal graphite. Fig. 2. (Lower)—Closeup of rear view of machine. Balls are released one at a time from hoppers shown and returned automatically to the hoppers. Courtesy Acheson Colloids Corp., Port Huron, Mich.

Special Hydraulic Presses Built Easily

■ DEMONSTRATION of how welded rolled steel construction is adapted readily to the building of special types of machinery is seen in a vertical 250-ton hydraulic die tryout press recently assembled by Epworth Mfg. Co., Detroit, for the American Forging & Socket Co., Pontiac, Mich. For a press of this capacity, the unit is exceptionally compact in dimensions, and the welded construction lends itself to minimum cost.

Shown in an accompanying illustration, the vertical press has two side members of 4-inch SAE 1020 steel plate flame cut to shape and held together by rigid cross members also of steel plate. Table is 28 x 42 inches in size; clearance under the ram plate is 20 inches; housings are set 30 inches apart.

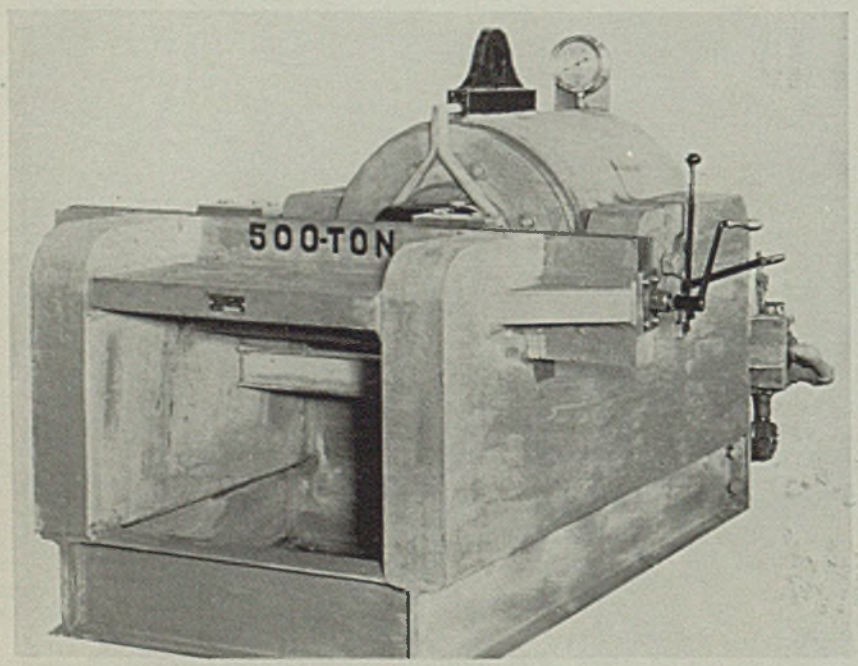
After the various sections were cut to size they were fitted together and welded, using Lincoln Electric shielded arc welding equipment. Two main load carrying members, 2 x 7 x 42 inches, are of heat-treated alloy steel and fit into slots at the top of the housing. Wedge blocks are driven into place to hold these members securely.

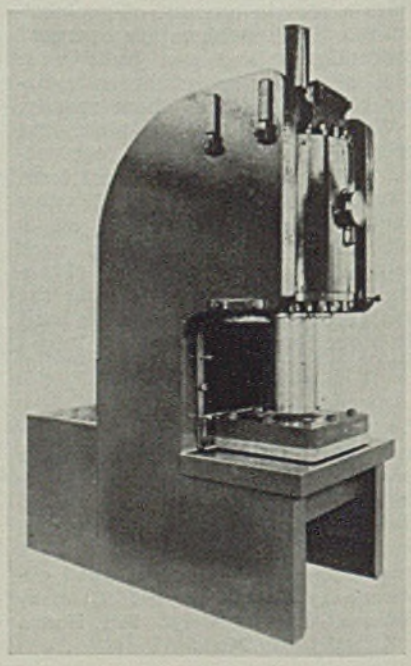
Cylinder is a tubing section 18 inches in diameter with 7/8-inch wall, with heads bolted on. Ram is a solid piece of steel 10 inches in diameter. Hydraulic power is supplied to the ram by a 10-horsepower motor mounted at the rear of the press and driving two Vickers pumps, one delivering 1000 pounds per square inch pressure and the other 2000 pounds. Oil reservoir containing 50 gallons is provided. Through suitable valving, exceptionally close control of the ram is possible, down to a few thousandths of an inch. Speed of ram travel is 6 inches per minute, although a high-speed approach speed of 1 inch per second also can be used.

Tryout operations on new dies often are laborious and slow, involving the use of arbor presses or other hand equipment. With this new hydraulic equipment, operators are relieved from tedious work and the process of spotting up new dies is considerably speeded. The press also can be used for stamping samples or for limited stamping runs, although of course it does not operate rapidly enough for production work.

A second illustration shows a 500-ton horizontal billet straightening press recently built by Epworth along the same lines as the tryout press. Installed at Rotary Electric Steel Co., Detroit, it will handle up to 6 x 8-inch billets. It is another example of specialized equipment, built at low cost and readily adaptable to miscellaneous straightening.

Right, vertical 250-ton hydraulic tryout press. Left, horizontal 500-ton unit of similar construction used in straightening billets—both welded from heavy plate





Sweetser Volume Covers Blast Furnace Practice

■ *Blast Furnace Practice*, by Ralph H. Sweetser; cloth, 356 pages, 6 x 9 inches; published by McGraw-Hill Book Co. Inc., New York; supplied by STEEL, Cleveland, for $4; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W. 1.

A comprehensive, practical manual on all aspects of the production of pig iron, not only for those engaged in the field but also for all concerned with production and use of iron and steel products. It covers the blast furnace plant, equipment and raw materials, operating practice, character and utilization of products and by-products, theories of the process, commercial aspects and obsolescence.

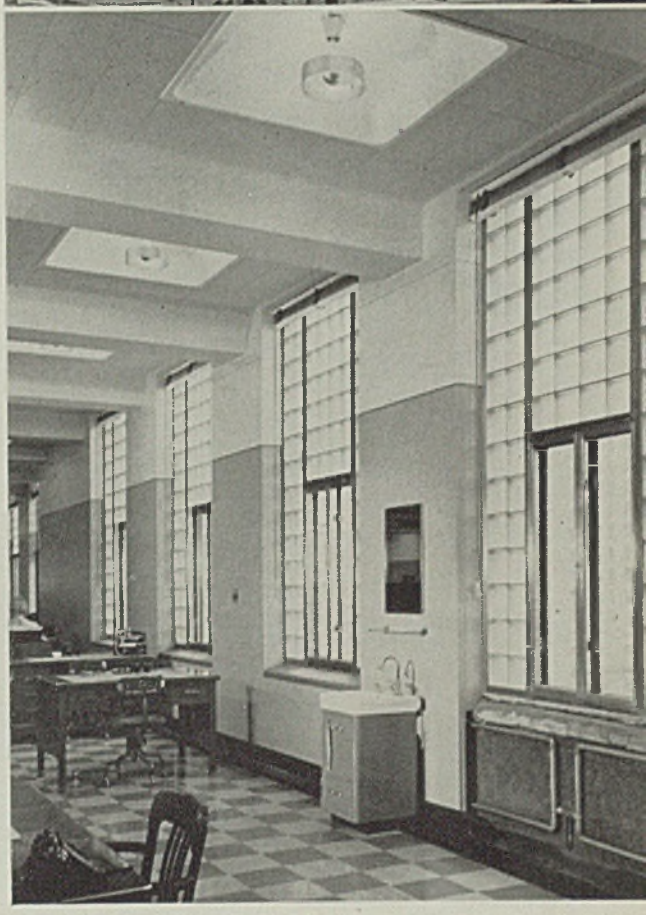
The volume is the result of many years of operating practice and research and makes use of copious extracts from publications of contemporary furnacemen and research men who have helped bring the art of making pig iron to its present advanced condition.

One aim of the author has been to call attention to the need for further research in the fundamentals of ferrous metallurgy and to point the way to co-operative investigations of the reactions inside the furnace. While high production is still demanded, quality of product is becoming increasingly desirable.

The book is written for the increasing number of men engaged in production and use of pig iron, in mining and preparing raw materials and building of blast furnace plants and equipment. It also may be used as a reference book.

New Design Features . . .

Steel Wall Surfaces No Interior Columns



■ MORE than 88,000 square feet of 18-gage steel panels form the interior walls on five floors and the basement of the new $2,000,000 home office building of Bankers Life Co., shown in Fig. 1, recently dedicated in Des Moines, Iowa.

Maintenance of the panels is expected to cost less than one-fifth of that of traditional wall materials. They are finished with gray-green baked enamel, Fig. 2. Pipes concealed by the paneling carry hot water in the winter and cold water in the summer, maintaining a wall temperature of approximately 70 degrees the year around.

Floor Space Increased 20 Per Cent

A total gain of about 20 per cent of usable floor space resulted in the elimination of supporting columns within the building itself. From the first through the fifth floors, the spans are 53 feet in width with beams spaced on 9-foot 8-inch centers throughout the 235-foot length. Fig. 3 shows one corner of the U-shaped rooms on four floors without an obstructing column, radiator or permanent partition.

Air ducts, pneumatic conveyor tubes, wiring and plumbing pass through webs of girders. Floors in the central tower of the building contain elevators, air ducts and stairs, are reinforced concrete slab and beam construction. The paneling, partitions, accoustical ceiling, sheathing on exposed beams, the office furniture and recessed coffers for lighting are all steel.

The 3500 tons of structural steel used in the building was fabricated by Pittsburgh-Des Moines Steel Co., the original suppliers being Carnegie-Illinois Steel Corp., Bethlehem Steel Co. and Inland Steel Co.; steel paneling work by E. F. Hauserman Co., Cleveland; steel for panels by American Steel & Wire Co., American Rolling Mill Co., Carnegie-Illinois Steel Corp., and Republic Steel Corp. Architect, Leland A. McBroom, McBroom & Higgins, Des Moines, Iowa.

Fig. 1—Certain pieces bake in 8½ minutes in oven at right, emerge to be wrapped at stations on left. Pusher used on this portion of conveyor

A Conveyor-Baking Setup

New infra-red oven and chain conveyor reduce baking time to 8½ minutes. Previous method took as much as 30 minutes. Conveyor also stores parts, freeing floor areas for production

By WALTER L. SEELBACH

Secretary and Treasurer
Forest City Foundries Co.
Cleveland

■ FABRICATION of sheet-metal furnace and air-conditioning cases at the plant of Forest City Foundries Co., Cleveland, involves a special problem and the manner in which it has been effectively solved indicates the considerable improvement that often the addition of only the simplest mechanical handling equipment makes possible — yes, even in plants of only moderate size.

In this plant it was found that the sheet metal sections took up considerable floor space when handled by ordinary methods. Also stock would pile up and bottleneck the entire production line due to the time consumed by baking the enameled sheet metal sections by ordinary methods. This baking often took as long as 30 minutes. The problem was solved successfully by rearranging the machinery and installing a chain conveyor system part of which carries work automatically through a new infra-red electric baking oven. The entire layout shown in Fig. 2 comprises approximately 8000 square feet of floor space.

The sheets handled run from 20 to 24 gage and average 4 x 5 feet. After the stock is received, it is stored in a convenient rack. The first step in fabrication after stock is drawn from storage is to cut the sheets to the required dimensions under a power shear. Next the stock is taken to a marking bench where it is marked for punching by means of templets. Two punch presses are utilized to make various holes.

After punching, the sections go to a power bending brake where the edges are flanged or case sides formed. Fig. 3 shows the bending brake at left and power presses at right. From the time stock is cut to size under the power shear until it has been through the bending brake, it is conveyed from place to place on bench dollies fitted with castors so the dollies can be moved about readily. At the same time, the dollies provide storage space for the stock before and after each operation.

The next step in fabrication consists of electric welding done by a battery of four resistance-type spot welders. Stock being welded rests on a table support which can be moved about readily as occasion requires. This helps considerably in handling large sheets, the overhanging portion of which would make it hard to maneuver the work if not supported.

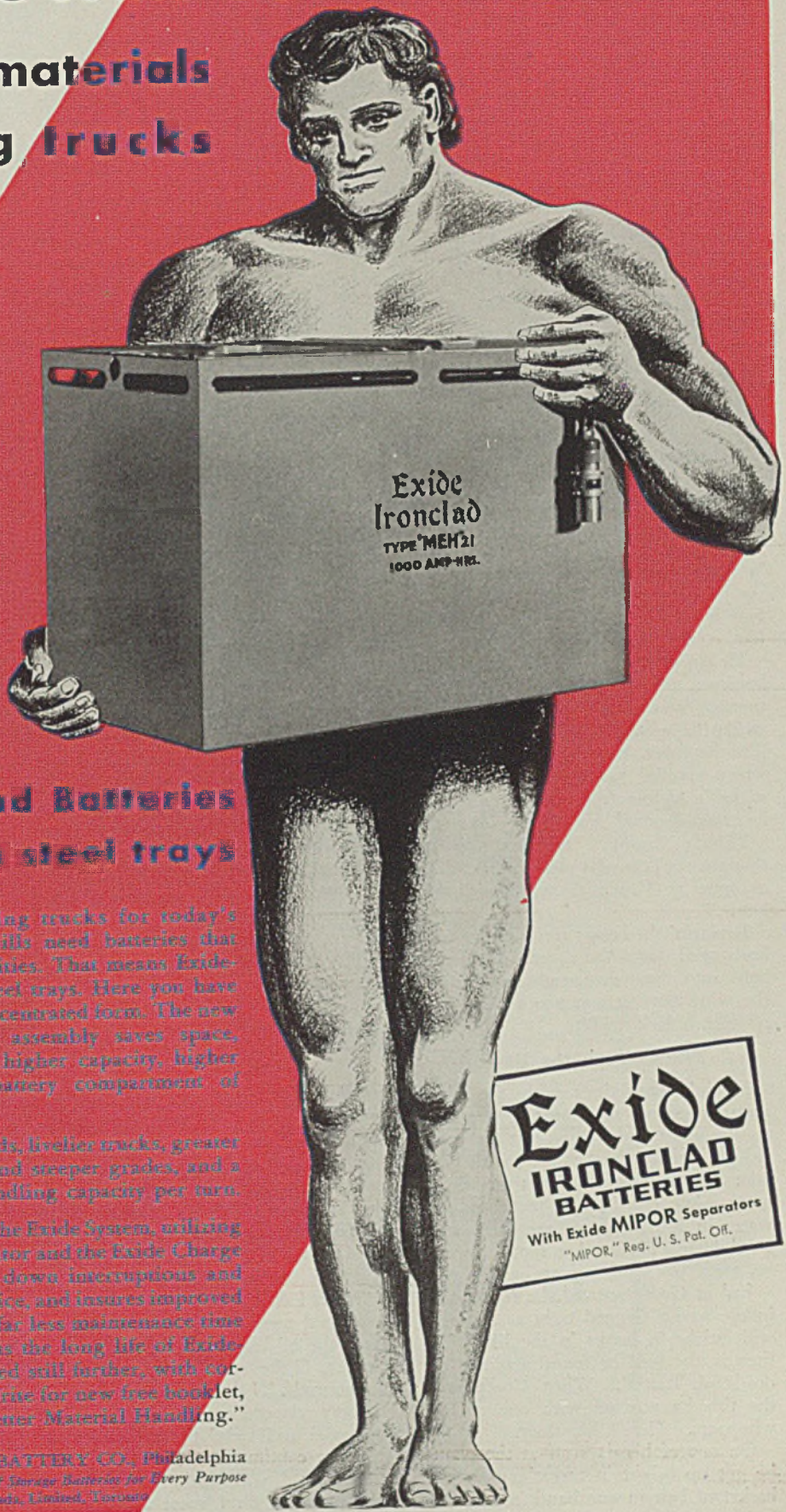
After the sections are welded, they are hung on a manually operated monorail-type chain conveyor, a portion of which is shown in Fig. 1. Note the special hooks that carry the stock. A chain pusher is employed to carry work over part of the monorail, see layout Fig. 2.

The conveyor permits the opera-

(*Please turn to Page* 66)

GIANT POWER CONCENTRATED

for your materials handling trucks



...Exide-Ironclad Batteries assembled in steel trays

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The result is higher speeds, livelier trucks, greater power for heavier loads and steeper grades, and a substantial increase in handling capacity per turn.

To help further, there is the Exide System, utilizing the Exide Discharge Indicator and the Exide Charge Control Unit, which cuts down interruptions and delays in the handling service, and insures improved battery maintenance with far less maintenance time and trouble. By this means the long life of Exide-Ironclads can be prolonged still further, with corresponding economies. Write for new free booklet, "The Exide System for Better Material Handling."

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Exide Batteries of Canada, Limited, Toronto

BETWEEN HEATS WITH *Shorty*

■ Say fellers:

We gotta pump tender over at the pump house that kin tell 'em 'bout as good as any of the boys who belong to the "tall story" club. Fac' is, I sometimes believe he kin put a few streaks o' pink on their cheeks. The pipefitters were workin' on one of the double-actin' pumps awhile ago when Goofy Lewis, the pump tender, sprung one on 'em. The boys over in the pipe shop wanted me to tell y' so as to show y' we gotta bang-up organization at the plant.

Seems as though the signal on the standpipe started ringin' the other day 'n when Goofy began his 'vestigation the indicator was registerin' only a 55-foot head of water instead of the 80-foot colum'.

He climbs down the ladder in the pit, by-passes the water on the pump he thought was makin' the trouble, untwirls the wing nut on the screen box, lifts the cover, 'n pulls out the basket screen spectin' to find a lotta leaves, sticks 'n debris from the river. But he was doomed for disappointment.

"That's funny," he sez. "Sorta thought she'd need a cleanin' but she's as open as Tony's place after closin' hours."

Replacin' the basket screen in its box he banged down the cover, swung the bolts into their slots, tightened down the wing nuts 'n was up 'n outta the pit like a jack rabbit.

Takes 'er on the Run

Makin' connections with the pipe shop by phone, he shouts to the one on the other end: "Son, git on your old gray bonnet and make for the intake house over at the river right away. We only got 55-foot head of water in the standpipe and she's still goin' down. Shake a leg, son, and we'll be seein' y' at the river bank."

Jus' as Goofy spected, he found the intake screen clogged tight as a drum with sticks 'n leaves 'n the like. 'N then in the well he found a bunch of dead fish floatin'. When Goofy saw the fish he was off with one of his whoppers. Here's his story.

On one of his days off at the plant he got up bright 'n early 'n with his basket of bait in one hand 'n a hook, line 'n sinker in the other he travels far out on the breakwall and proceeds to fish.

"Boy they were bitin' that day," Goofy sez. "I was ketchin' 'em all 'round me. Jus' 'bout the time I decides I got 'nough mess to suit me, out goes the line. I tried to grab it but wasn't quick 'nough. Jus' as I leaned down I saw somethin' shiny fall into the lake. Whaddaya think it was?"

One of the pipefitters, "Hump" Campbell, spoke up and sez: "One of your old teeth, huh, Goofy?"

"Naw," he answered. " 'Twas my watch that my Grandad brought over from Switzerland for me. Fine time piece 'twas too. Tried lookin' down in the water to locate it but 'twasn't any use. She was gone fer good. 'N I sez to myself 'That's what y' git for tryin' to hog all the minnies in the lake.' So I packed up the mess I got 'n started home."

Hump sez, "I spose that's your alibi for not relieving your buddy on time each mornin', heh, Goofy?"

"Naw, y' see I bought a dollar Ingersoll watch and she's clickin' off the minutes in good shape."

Next day Goofy standin' in the door of the pump house spies Hump crossin' the yard 'n by whistlin' 'n signalin' that only the guys out in the mill understand he high-signs him to stop in on his way back to the shop.

* * *

"Y' see, Humpy, yesterday I didn't get time to tell y' the rest of the story but I'll slip it to y' now. 'Bout a year later I dusted off my fishin' pole agin and spent a few hours enjoyin' myself on the breakwall pullin' 'em in . . ."

"Yeh, I know what you're goin' to say, Goofy. This time y' dropped your Ingersoll into the lake, huh?"

"Naw, I didn't, Hump, I jus' pulled in a good mess of fish 'n when I got home the ol' lady spies the ketch and she sez, 'Take em outside and clean 'em yourself. 'N that's jus' what I did."

Goofy glanced up at his gages on the panel and seein' the pressure was O.K. he continued.

"Jus' as I was slittin" a good un that weighed, oh I spose a couple o' pounds, my knife hit somethin' hard on the inside, 'n whaddaya spose?"

"Go ahead, Goofy, out with 'er, whadja hit?"

"Boy, y' won't believe it, I betcha, but I reached my hand inside a nice 2-pound bass and pulled out my Swiss watch my ol' Grandad brought over to this country."

"Y' don't mean to tell me."

"Yep, Hump, there she was. 'N what's more she was still goin' and never lost a minute."

"S'long, Goofy. Your jus' as screwy as ever."

"S'long, Hump. Same to y' and many of 'em."

* * *

Well, fellers, that's the kind of stuff that's castin' its shadows all over Europe today. Y' can't believe all their tellin' y'. Cut in half some of the stories comin' from over there, take 66 per cent of that and then if it don't smell fishy perhaps there may be a snitch of the remainder that can be taken with a grain of salt. They're doin' a lot of spoutin' but the information is too salty. Y' understand, don't y'? It 's a whale of a good story they're tellin' but a lot of it 's mackerel.

Well, s'long fellers. I'll be seein' you.

"Shorty" Long

Stretcher Facilitates Removal of Injured

■ A stretcher which permits more comfortable handling of injured persons is announced by Industrial Products Co., 800 West Somerset street, Philadelphia. As the patient is strapped in, it can be used in inaccessible places and carried through narrow, crooked passageways up or down ladders or circular stairways.

Chief feature is the Talon zipper which runs the length of the stretcher and eliminates the necessity of lifting the patient from the stretcher to the cot. A special fastener safeguards against opening of the zipper.

New Finish Prolongs Life of Water Tanks

■ A new porcelain finish for hot water tanks, Saty-Nite, announced recently by Porcelain Enamel & Mfg. Co., Eastern and Pemco avenues, Baltimore, is said to prolong threefold the usefulness of the tanks. It prevents the accumulation of silt and rust-laden water, and is especially recommended for areas having water of high corrosive content.

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Improving Stainless by a Low-Temperature Treatment

New heat-treating cycle for 18-8 greatly increases the proportional limit and yield strength while holding maximum modulus of elasticity. Fatigue resistance increased, toughness improved

By RUSSELL FRANKS
and
W. O. BINDER
Union Carbide & Research Laboratories Inc.
Niagara Falls, N. Y.

■ IN RECENT years, especially in aircraft work, much 18-8 stainless has been used for lightweight, high-strength structures which must resist deterioration under atmospheric conditions. As these steels are austenitic in character, their strength can best be increased by cold working. While a marked increase in tensile strength is thus obtained, it has been claimed that cold-worked metal does not possess fully satisfactory elastic properties.

Although this has caused no great concern, it is generally agreed that the fabrication of thin sections of cold-rolled 18-8 steels by spot welding would be more satisfactory if higher elastic properties and a higher modulus of elasticity could be obtained. As far as mechanical properties go, straight chromium stainless steel appears superior to cold-worked 18-8. It has been proposed that columbium bearing or titanium bearing cold-rolled 18-8 steels be given a heat treatment for about 1 hour at 400 to 600 degrees Cent. to precipitate carbides to obtain better mechanical properties . . . Too, a number of investigators have pointed out that ultimate tensile strength of 18-8 steel can be increased to 200,000 pounds per square inch or higher by cold rolling. However, elastic properties of such cold-rolled material appear to be a most critical factor.

Studies made at the Union Carbide & Carbon research laboratories on a typical 18-8 steel containing 18.95 per cent chromium, 7.69 per cent nickel and 0.07 per cent carbon with normal percentages of manganese and silicon show normal properties as follows. Proportional limit of the annealed 18-8 steel is 18,300 pounds per square inch; tensile strength is 84,200 pounds per square inch; modulus of elasticity is approximately 28,000,000 pounds per square inch. Tensile strength of this material is raised by cold working, to 140,000 pounds per square inch, the proportional limit is slightly reduced and the calculations of modulus of elasticity give values of 25,000,000 to 26,000,000 pounds per square inch. This means that after cold working, the steel elongates or slips even when low stresses are applied. While a definite explanation for this effect cannot be given, it is probable that the slip is due to internal stresses which causes the cold-worked metal to elongate under lower additional stress.

Experiments Conducted

Thus actual modulus of elasticity of the steel appears reduced by cold work. It was realized that if internal stresses were responsible for the difficulty, they would have to be removed without reducing corrosion resistance, strength, fatigue resistance, ductility or toughness. Therefore it was decided that relief from the stresses might be accomplished by proper application of heat which would not scale the cold-rolled steel excessively or render it subject to intergranular corrosion.

Accordingly, a number of experiments were made to determine the best procedure, including treatments for various periods at temperatures between 120 and 1110 degrees Fahr. Except where extremely short heating periods were involved, the steels lost ductility and became subject to intergranular corrosion at all temperatures between 750 and 1110 degrees Fahr. Also under these conditions the improvement in elastic properties was not always consistent. And invariably the metal became covered with an oxide that could not be removed without destroying the cold-rolled surface.

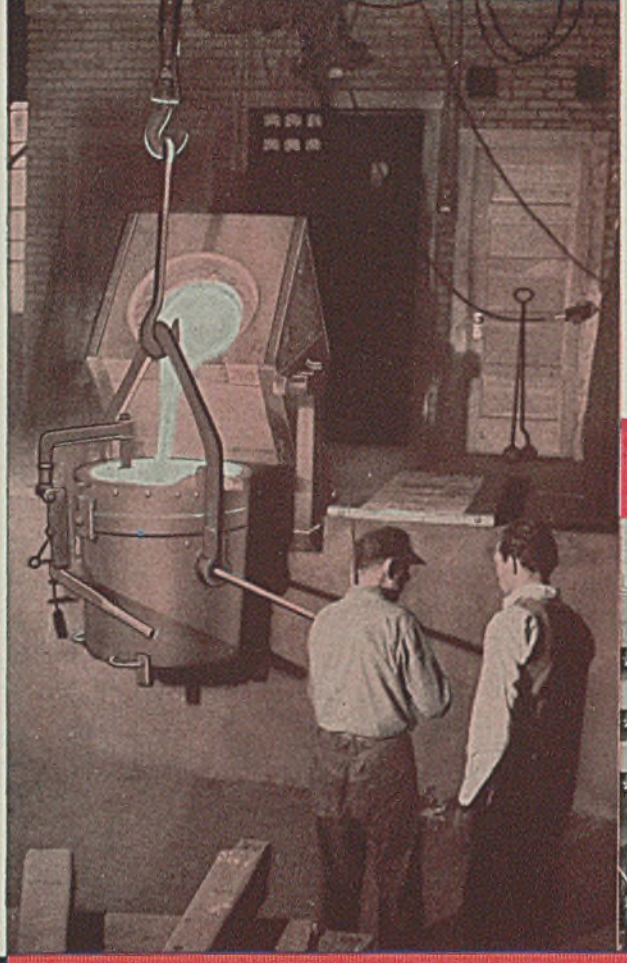
When the temperatures, however, approached 572 degrees Fahr., better results were obtained but even these were not considered altogether satisfactory.

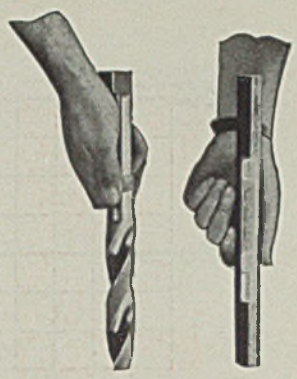
On heating to still lower ranges, down to 212 degrees Fahr., greatly different results were obtained. Time was found to be especially important in bringing about uniform results as regards elastic properties. Tests showed that for short heating periods extending up to a matter of several hours, extremely little improvement in elastic properties was obtained.

However, when heating periods were extended to from 8 to 168 hours at a temperature of 390 degrees Fahr. (200 degrees Cent.), for example, a decided improvement in elastic properties took place. Uniform results were obtained at this temperature by using a period of

From a paper presented at American Institute of Mining and Metallurgical Engineers, New York, February, 1940.

A TEST SAMPLE OF 1000 POUNDS *with* AJAX-NORTHRUP FURNACES





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large as 1000 pounds each.

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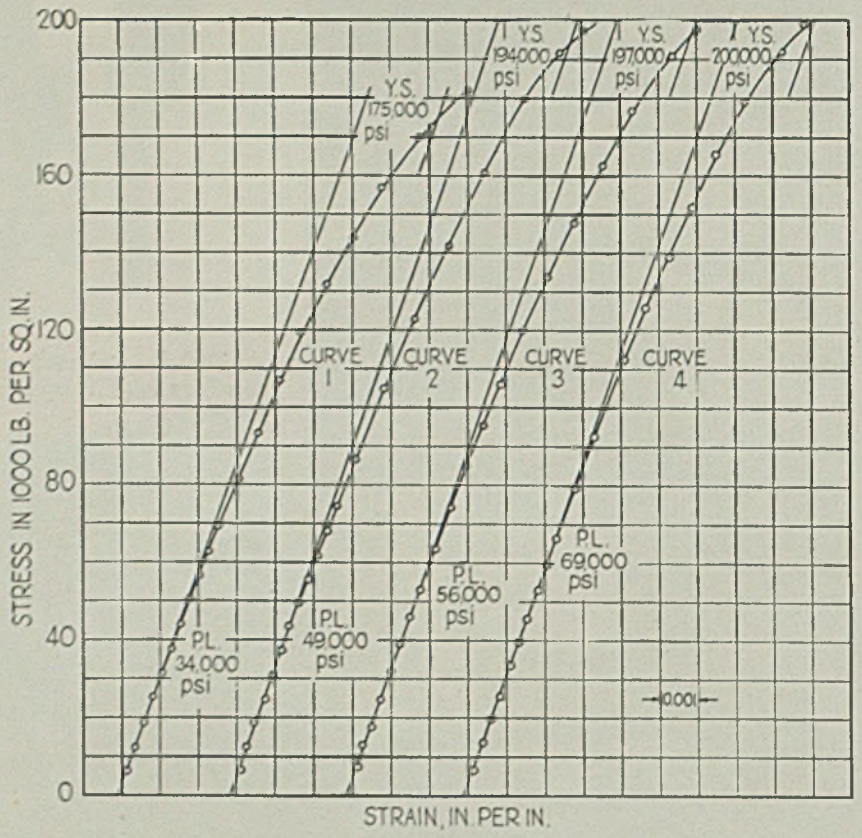

Stress-strain curves for 0.03-inch thick strip reduced 40 per cent by cold rolling steel containing 17.43 per cent chromium, 7.75 per cent nickel, 0.11 per cent carbon. Samples tested in direction of rolling: Curve 1, as cold rolled; curve 2, heated 8 hours at 392 degrees Fahr. and air cooled; curve 3, heated 24 hours at same temperature; curve 4, heated 72 hours at same temperature

16 hours. Extending the period beyond 72 hours produced no further improvement.

A sample of the previously mentioned cold-worked 18-8 steel was investigated for elastic properties in the annealed state and as cold-worked. While the modulus of elasticity of the cold-worked material is 25,000,000 to 26,000,000 pounds per square inch, this value was raised to about 28,000,000 pounds per square inch by heating at 392 degrees Fahr. (200 degrees Cent.) which corresponds to the modulus of elasticity of the steel in the annealed condition.

Further, the proportional limit of the cold-worked steel is increased from about 13,000 pounds per square inch to somewhat over 30,000 pounds per square inch by the heat treatment at 392 degrees Fahr. Neither the tensile strength nor the percentage of elongation of the cold-worked steel changed appreciably, showing these properties are not materially affected even though an important improvement in elastic properties is obtained.

Another experiment was made to determine the effect of heat treatment on a prestressed sample. A tensile sample 0.475-inch in diameter and from the same 18-8 steel bar previously used was stressed in the cold-worked condition beyond the proportional limit to a total elongation of 0.0018-inch per inch and the elastic properties measured during elongation. Load then was released and the sample heated for 16 hours at 392 degrees Fahr. and air cooled. The sample was restressed and the strain measured. Data obtained illustrate clearly the effect of heating at 392 degrees Fahr. on the elastic properties of the cold-rolled 18-8 steel, inasmuch as they were obtained on a single sample before and after heat treatment. As in previous tests, the modulus of elasticity was increased to approximately 28,000,000 pounds per square inch and the proportional limit raised from 14,200 to 47,100 pounds per square inch.

Then stress-strain measurements were extended sufficiently to determine the yield strength of the steel at 0.20 per cent permanent set which is specified by the United States navy for determining yield strength of cold-rolled 18-8. After yield point was reached, the sample was fractured.

Resulting curves show that in the cold-rolled condition, the medium carbon 18-8 steels begin to elongate permanently when low stresses are applied and continue to do so until the metal fractures. The curves obtained by testing the same steels heat treated at 392 degrees Fahr. for periods between 16 and 168 hours exhibit a higher proportional limit and no difficulty is encountered in determining the slope of the modulus line from the experimental points. Based on slope of the modulus line, modulus of elasticity of the cold-rolled steels after heat treatment is approximately 28,000,000 pounds per square inch. Improvement secured on heating occurs in both directions of rolling and makes the elastic properties of the steel more uniform in both directions. A comparison of curves shows that unstressed, the 18-8 steel samples act more like 13 per cent chromium steel containing 0.16 per cent carbon than like cold-rolled 18-8 steel.

The improvement in elasticity is brought about without materially affecting either the tensile strength or ductility. In addition, the surfaces of the thin cold-rolled strip are not covered with a heavy oxide coating but are tinted slightly yellow and, unless they are compared side by side with an unheated sample, it is difficult to tell whether the color of the cold-rolled surface has changed. The slightly yellowish oxide is readily removed by dipping in a hot 20 to 30 per cent nitric acid solution.

Withstands Greater Stress

Thus far nothing has been said about the effect of the 392-degree Fahr. treatment on properties other than those described by the tensile test. However, many lightweight high-strength structures are subject to fatigue failure, so fatigue strength was investigated. Where cold-worked 18-8 steel with a tensile strength of 140,300 pounds per square inch successfully resisted a fatigue stress of 85,000 pounds per square inch, the same steel after treatment at 392 degrees Fahr. withstood a stress of 92,000 pounds per square inch. The test was discontinued at this point because it represented the capacity of the machine at hand. Results, however, are sufficient to show that the fatigue resistance of the metal is not impaired but is substantially improved by the heat treatment.

Impact toughness tests show that a 72-hour treatment at 392 degrees Fahr. increases Izod impact value from the 33-to-35-foot-pound range in cold-worked material to 38-to-40-foot-pound range in the heat-treated steel. At the same time the hardness is raised from 302 to 311 brinell.

Corrosion tests on thin sections with various solutions revealed that no difference in corrosion resistance could be observed in the heated and unheated samples. Particular attention was paid to the possibility of intergranular corrosion.

(Please turn to Page 78)

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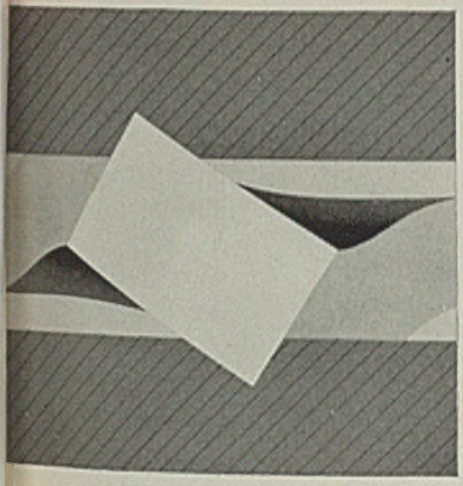

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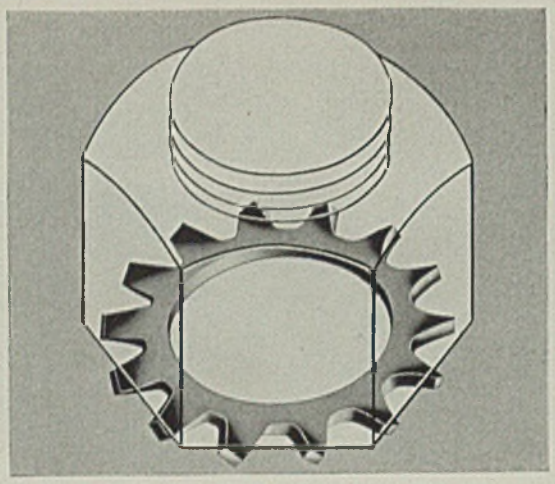

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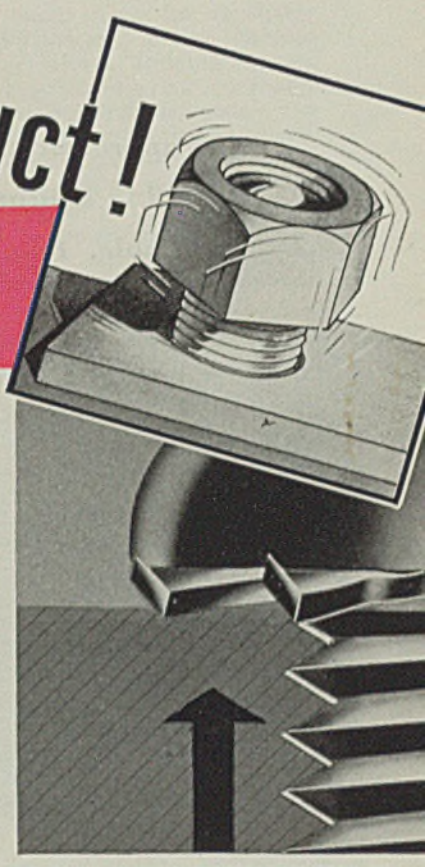

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Instrumentation In Arc Welding

To approach the maximum production and quality possible with arc welding equipment, studies in operator behavior prove extremely valuable. Point way to increasing output as much as 50 per cent

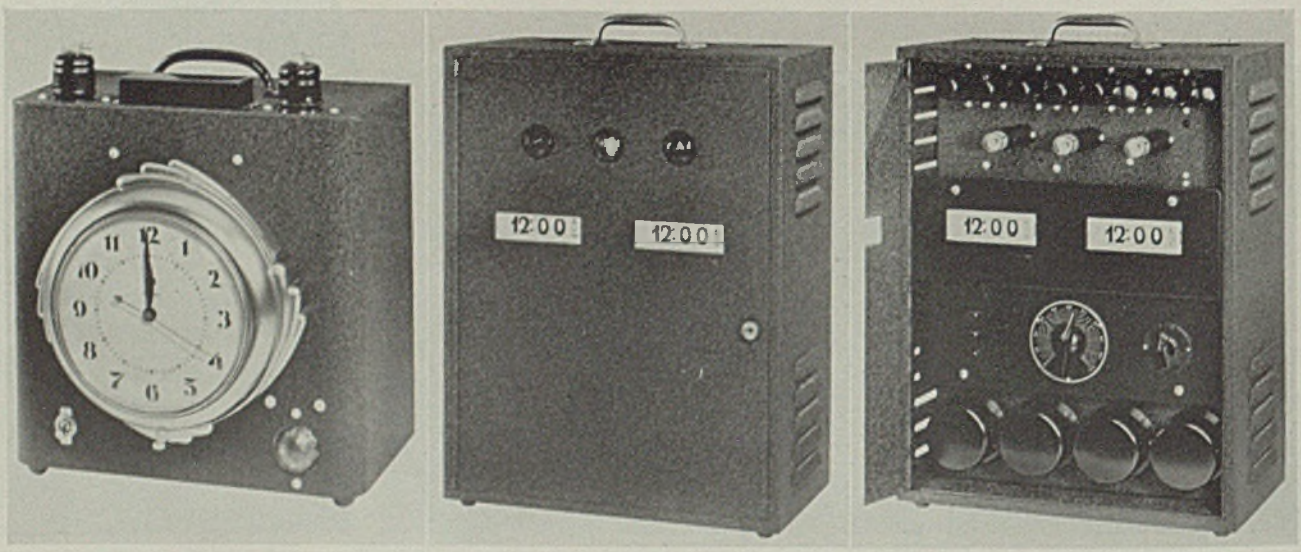


Fig. 1. (Left)—Front view of instrument for checking time operator has arc in normal operation. Fig. 2. (Center)—Front view of instrument for recording both normal and abnormal time of arc operation. Fig. 3. (Right)—Same instrument with door open to show, at top, row of vacuum tubes, indicator lights, clocks, controls, relays at bottom

By ROBERT E. KINKEAD
Consulting Engineer, Welding
Cleveland

■ THE PURPOSE of instrumentation in manual arc welding is to study the behavior of the man, not the machine. This is in contrast to the instrumentation of an automatic process like Unionmelt or spot welding of aluminum and stainless steel in which the instruments are used to tell what the process is doing and the man is only a factor insofar as he sets the instruments according to a table.

Since more than 95 per cent of all arc welding is carried out by manual operation, the problem of studying operator behavior is important. Welding machines and welding rods have operating characteristics which are built into them and so do not change. The operator, on the other hand, has a behavior pattern which is *the great variable* in the production of an arc-welded construction.

Steady improvement in welding machines and welding rods has given a fair degree of uniformity as regards the weld quality obtainable. The problem of instrumentation of manual arc welding is mainly one of studying operator behavior with the end in view of approaching as closely as possible to the maximum inherent possibilities of the equipment as to production and quality. Improvement in quality of work due to instrument checking is well known. The principle applies to welding as well as to any other production operation.

The old idea of getting production by setting piece work rates and paying a bonus for all production over a minimum is not as satisfactory as it might be. Under such circumstances, it frequently happens that the rate is set too high because insufficient information is available as to what can be accomplished. The operators then start earning large bonuses, necessitating resetting the rate two or three times within a year and thereby disturbing labor relations to a punishing degree. A man with a stop watch and usual time study methods but without a background of welding knowledge can get management into a great deal of trouble in a short length of time. It has happened often within the personal

experience of the writer, although it is only fair to state that one of the highly developed systems for paying bonuses has been applied successfully to manual arc welding practice.

It is the author's belief that the knowledge of what can be accomplished in terms of increased production should be more widespread among employers of manual arc welding operators, and that this knowledge can be obtained more accurately and for less cost by instrumentation and by study of the employers' own problems than by any more-or-less-fixed system. Nothing succeeds like increased knowledge on the part of large numbers of people.

It is only necessary to mention briefly some of the things that have been found to affect operator production to reach the conclusion that some means of measuring the effect of these variables has been needed.

consequent difficulties in getting the initial beads welded in will use up the operator's energy at an extremely high rate and pull his production down to low levels, purely aside from the loss due to the extra weld metal required by poor fit-up.

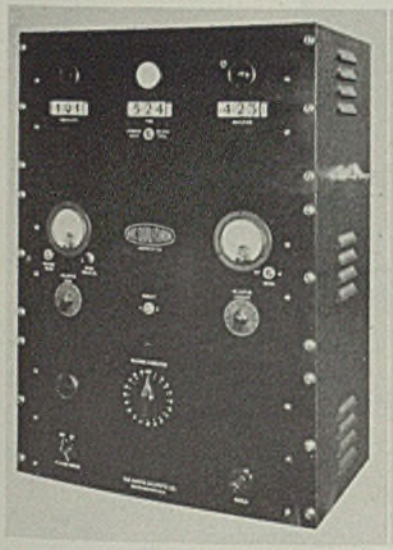
Lack of incentive to get high production, is of course, a dominating factor. So far as my observation goes, the manual welding operator is actuated by the same incentives as the president, the general manager or any other official of a company. He will do a comfortable day's work, and it will be a very comfortable one, unless there is some incentive to do a good day's work. But in providing an incentive to do a good day's work, safety lies in the direction of dealing with measurable factors rather than blunderbuss methods which lead to dissatisfaction on the part of the operator as well as the management.

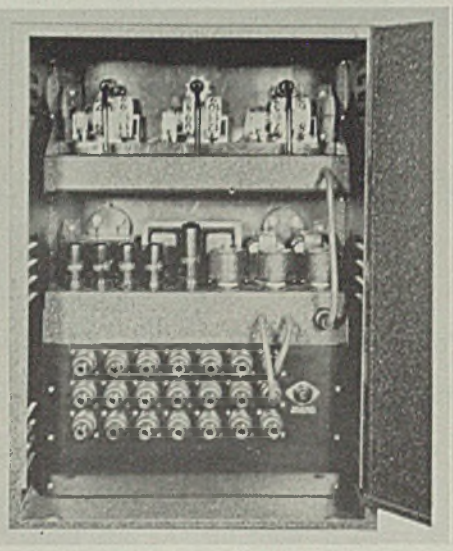
Readily observable variations in

operator is wasting 15 per cent or 18 per cent of his welding rod in stub ends, or whether he is saving power by shutting his welding machine down when he is not using it

It is all very well to give a man a large rod and tell him to use all the heat the job will stand, but from the management point of view, the important factor is to get the most production from the amount of effort the operator may reasonably be expected to expend on the job. Within the experience of the author, many shops fail to realize the production that can be obtained with high-current welding merely because they have no way of measuring operator behavior under the conditions surrounding the work. Instruments have been developed for this purpose in addition to improving quality by continuous checking as described below.

One of the simplest methods of beginning a study of operator be-





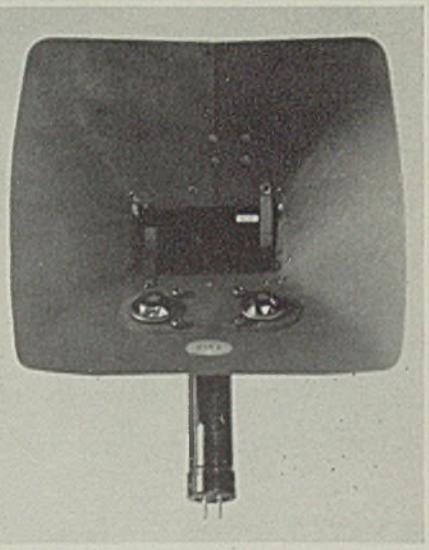


Fig. 4. (Left)—Front view of precision instrument for recording normal and abnormal time of arc operation as well as total time. Controls permit setting limits as desired. Any one of 19 circuits can be checked. Fig. 5. (Center)—Back view of same instrument showing counters in top section, vacuum tubes and relays on center section with plug-in board at bottom for 19 welding circuits. Fig. 6. (Right)—Hand shield has green and red lights to indicate normal and abnormal operation—helps in training new operators

For instance, an operator working in a closely confined space will deposit on the average from 30 to 35 per cent less metal per work hour than he will in an open space. Speed of production is reduced in many cases as much as 80 per cent by changing from the straight down position of welding to vertical or overhead welding. The length of the welding rod in relation to the current being used for a given size will change the operator's production as much as 20 per cent.

A hot holder or a shield which does not give proper ventilation may cut an operator's production 25 per cent in an 8-hour period. Improper body protection, including gloves, may produce nervous fatigue during the first 4 hours of a shift which will pull the operator's production down as much as 30 per cent during the second 4 hours of the period. Poor fitting-up of the work with

production from shop to shop of as much as 300 per cent may be found. What this wide variation means is that one operator in a certain shop is getting as much work done as three operators in another shop and he may not be working any harder to do it. It seems that this is a far more important factor than whether an

havior is to put an instrument on the machine that will record accurately the time the operator has the arc in normal operation. Such an instrument is illustrated in Fig. 1. It affords hour-by-hour records of operator behavior throughout the day. It also permits the study of the effect of having the operator do fitting-up work in addition to welding.

From such studies, the economical balance can be established between operation of the arc and other manual labor connected with fitting up. Increases of production per man hour of as much as 50 per cent may easily be the outcome of such studies. It is well known that there is a limit to how many hours per 8-hour turn an operator can hold an arc. While this factor varies between individuals, no incentive system will ever have a

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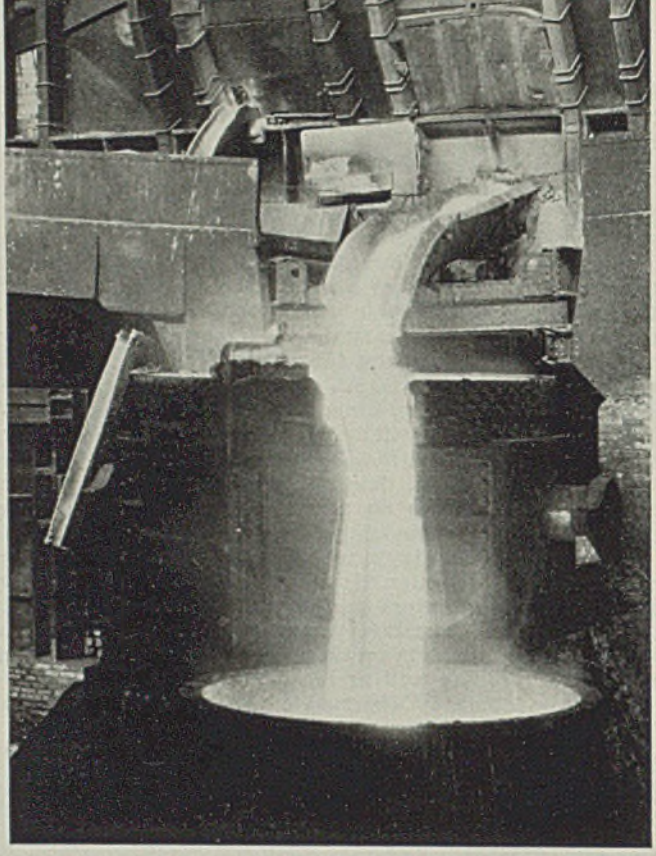

By W. J. REAGAN
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Tapping a 150-ton heat from a modern basic open-hearth furnace

Open-Hearth Trends

PART I

Capacity of new furnaces perhaps will remain at 150 tons for many years in view of high building and maintenance costs. Basic refractories and instrumentation used on wider scale

■ MANY FACTORS tend to influence the product of the open hearth, and when the word open hearth is used in this article it will refer to the basic open-hearth process, which in recent years has accounted for about 95 per cent of all steel produced in this country.

The exigency of the occasion often produces results of striking values. As an example let us look into the history of the iron industry. The beginning of this industry in Eastern Kentucky is attributed, not for commercial purposes, but for the purpose of making salt, or aiding in its manufacture. The story relates that a man of all trades, a tanner, preacher, dentist, statesman and a manufacturer of salt, conceived the idea of making iron in a small furnace and casting it into pots of 40 inches diameter, called, "salts" to be used for evaporating salt. He built a small furnace and produced about a ton of iron per day, later increasing its output by the aid of a water wheel and a wooden blowing tub. At one time he attained the "enormous" output of 6 tons per day. In this case the demand for iron containers resulted in the start of the blast furnace industry in that section of the country.

In the case of open-hearth trends the demand for a radically different type of product has resulted in marked changes in the type of product, both from the chemical, metallurgical and mechanical view. This change in product has resulted in changes in open-hearth furnace design, furnace practice and changes in the rolling procedure that have resulted in millions of dollars being invested in new installations of strip mills.

For example, in 1922 the railroads, the large tonnage consumer, accounted for 25 per cent of all steel produced. In this same year the automotive industry consumed 9 per cent. In 1939 the automotive industry consumed 18 per cent, or the largest single item of tonnage for that year, while the railroads consumed 9¼ per cent, a tremendous decline in about 17 years. During this time the trend of steel consumption by the two largest consumers of steel has been reversed, the automotive industry now consuming approximately as much tonnage as the railroads did in their gala period. In 1935 the automotive industry consumed 24 per cent of all steel, as compared to 7¼ per cent for the railroads, or over three times as much. Incidentally during this same period, the building industry has shown little change in the per cent of tonnage consumed, the figure for 1922 being 15 per cent as compared to 13.13 per cent in 1939. Needless to say this trend in steel consumption has resulted in marked changes in the steel industry, both in the product produced in the open hearth and the rolling mill equipment to handle it from the open hearth to finished

*From American Iron & Steel Institute.

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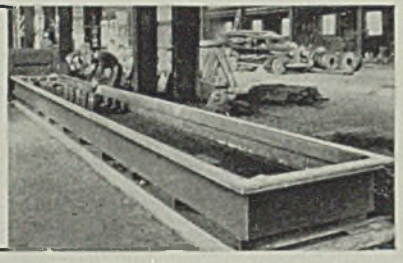

Carbon and Graphite Brick, Flat Tile, Blocks, Beams and other structural shapes are used for the construction or lining of many types of processing equipment because of their high resistance to corrosion and their ability to resist the destructive effects of severe thermal shock. Graphite construction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

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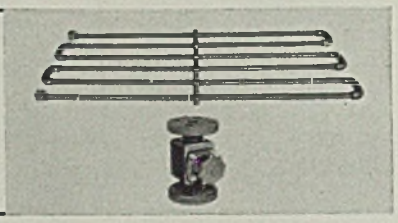
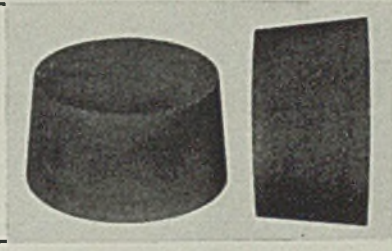


Carbon, Graphite and "Karbate" pipe and fittings are available in sizes from ½ inch to 6 inches I.D. Saunders type valves of "Karbate" construction are also available. These corrosion resistant products are used for the construction of drain lines, heating coils — both steam and gas-flame types, and 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.

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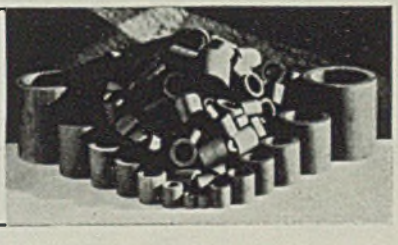

Carbon Raschig Rings provide an efficient and economical packing material for gas scrubbing towers. They are mechanically strong and highly resistant to both the thermal shock and the corrosive materials encountered in this service. Their low weight per unit of volume reduces cost of tower construction.

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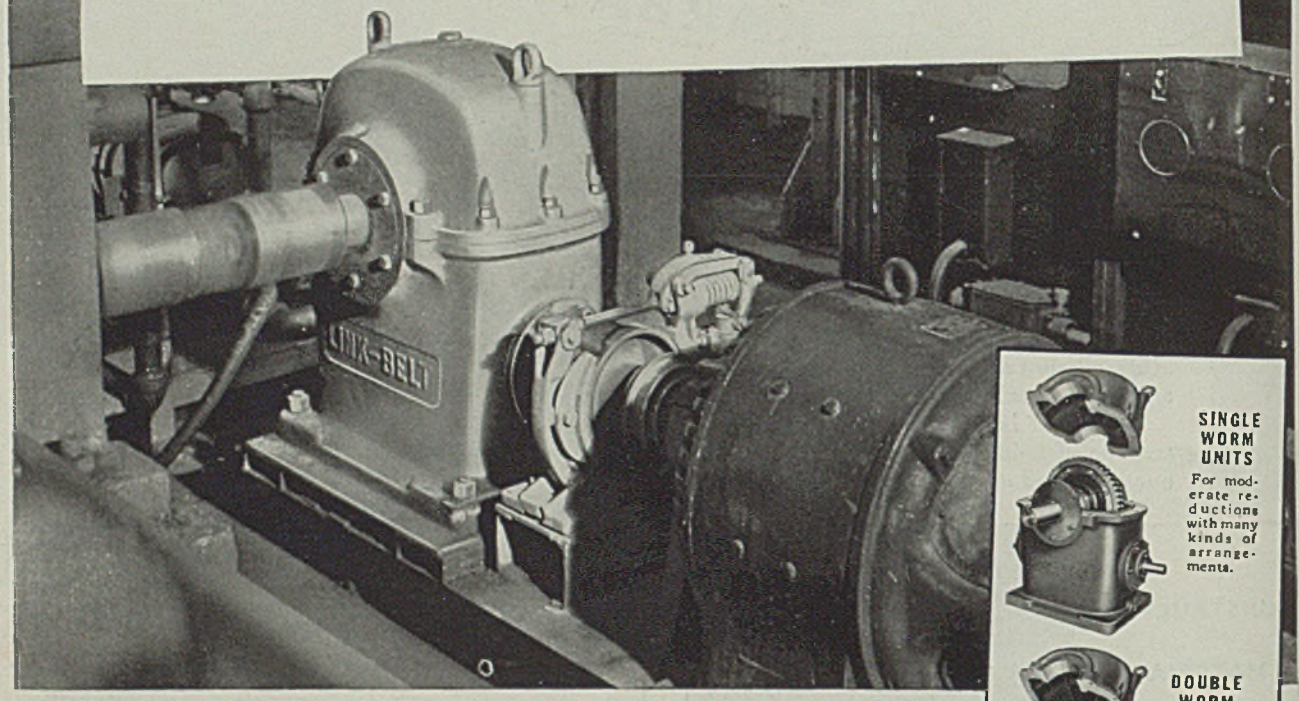

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product. A few figures in Table I* will give some idea of the change in tonnages of a few most important items:

From these figures it might be fair to predict a continued increase in the demand for large tonnages

Table I

Production of Finished Products
Net Tons

Product	1922	1939
Sheets	3,267,304	9,978,637
Black plate	1,826,990	795,607
Strip	718,267	1,826,696
Structural shapes	3,045,020	3,358,985
Rails	2,432,389	1,312,647

of materials going into the automotive industry and a lowered demand for heavy steel production consumed by the railroads and similar industries provided the preparedness program does not interfere. Just where these trends will lead to is problematical and outside the scope of this paper.

Quality, Quantity Demanded

What do these trends portend in the open hearth? The demand for this new type of product requires a product (autobody sheets for example) that has to withstand an entirely different type of rolling and drawing operation than heavy rails, structural, etc. Autobody sheets demand the utmost in steel quality. Larger furnace capacities are in demand, sharper working furnaces, and a better knowledge of the steelmaking process is needed. Large tonnages of this material have been made from "rimming steel" but the immediate trend is to a "killed" steel. Also large tonnages have been made in top cast ingots, but recent trends are to bottom poured ingots with a resulting improved surface. This demand for quality and quantity in steel production makes itself felt back where all steel production originates, i.e., in the blast furnace. Therefore, it would seem pertinent to start this picture of open-hearth trends with a short resume of blast furnace possibilities.

Demands upon the blast furnace for larger tonnages and better iron is the rule today with still further increasing demands a possibility in the future. A recent writer stated that sulphurs of 0.050 per cent were acceptable in the open hearth a few years ago, but 0.040 per cent is the general limit today and in many plants under 0.030 sulphur is required. In addition, low silicons are required, usually about 0.90 per cent. Iron to the above specifications and also maintaining high tonnage and low-coke rates indicates a definite trend and advance in the art of blast furnace operating.

A recent paper described an increase in the output of a blast furnace, of approximately 100 tons per day, by the use of acid slags. This definite increase in tonnage by slag manipulation, when badly needed, pictures some of the possibilities and a number of interesting studies of blast furnace slag control are at present under way. One of the notable advances is the new installation in the Corby plant in England where low-grade ores of 23 to 30 per cent iron are utilized and the outstanding results may be typical of American blast furnace practice before many more years have passed.

In our own country at least one producer is installing an ore crushing and blending system, somewhat similar to the English installation.

Interesting possibilities for the blast furnace may be visualized from a new method devised in Sweden for decarburizing pig iron. In this case the iron is shotted in water and the resulting granulated iron decarburized, without melting, in a furnace under an atmosphere containing CO and CO_2, in the correct proportions, so that decarburization takes place without the simultaneous oxidation of Fe or other metallic elements. Carbons below 0.10 per cent are available, and as a possible source of supply of scrap of *known* chemical analyses the method holds unlimited promise.

Air conditioning is the latest addition to give more efficient furnace operation. Blast furnace efficiency has increased to such an extent that nearly 2,000,000 gross tons of iron has been produced on a single lining. Unquestionably the start of good open-hearth operation is the production of good quality iron, of constant analyses.

Open-hearth furnace capacity apparently has reached a fixed figure of from 150 to 175 tons, based on the new installations. The largest unit in operation is of about 425 net tons. While size has increased over the past few years, indications are that furnaces of about 150 tons capacity will maintain for some time, as building and maintenance costs for the larger units are extremely high. In 1936 the following figures regarding furnace size were obtained from 94 plants in this country:

Furnace capacity, tons	No. of furnaces
Up to 50	103
50 to 80	276
80 to 100	383
110 to 150	82
150 to 200	63
Over 200	11
Tilting	32
Total	950

Open-hearth furnace design has not seen any radical changes for some time. Roof, ports, uptakes, etc. usually are dependent upon the type of fuel in use. In a survey made a short time ago covering 29 plants, 17 of the group, or about 60 per cent used fuel oil for their open-hearth operation, the balance using various combinations of natural gas and coke plant gas, tar, producer gas, powdered coal, etc. The present price of fuel oil warrants its continued use.

Sloping backwalls are standard

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Taking a preliminary test sample of an open-hearth heat

Conveyor Baking Setup

(*Continued from Page 52*)

tor to move work into the spray booth as wanted. As the conveyor runs through the booth, it is not necessary to unload and reload the parts before or after enameling. An air gun is used to apply the enamel. A water curtain at back of the booth and a ventilating system with a strong suction are provided to carry away all superfluous enamel so the operator does not have to wear a respirator or other air-filtering device.

Sections are enameled in various colors. Also quite popular is a so-called "splatter finish", really a second coat sprayed in place. Its composition is such that it is not absorbed by the first coat which of course still is a semiliquid state when the splatter finish is applied.

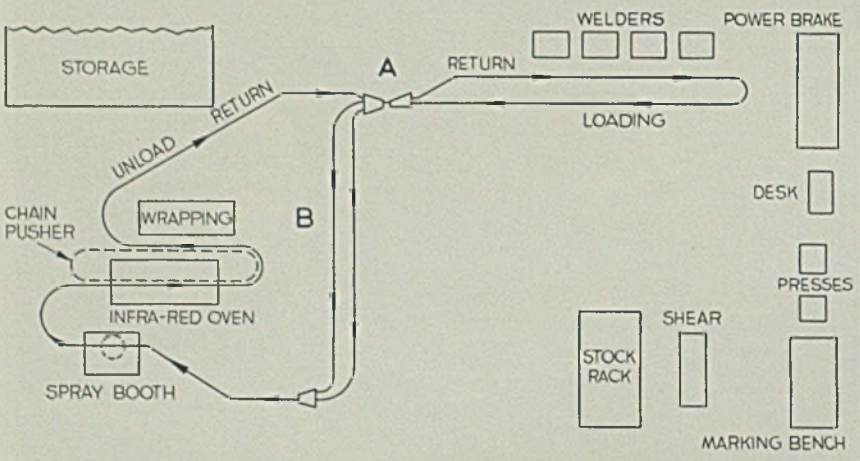
From the paint booth, the operator moves the work on the conveyor to a point where the chain pusher engages the hook carrier to take the parts through a continuous type infra-red baking oven, illustrated in Fig. 1. The sections to be baked go past 128 infra-red lamps, each rated 250 watts. Lamps are arranged in four banks—two banks of 32 lamps each with 10-inch gold plated reflectors on each side of the oven. These produce a watt density of 1.95 watts per square inch with a temperature of 325 degrees Fahr. on the metal.

The power-operated chain pusher conveys the sections through the baking oven and past the unloading and wrapping station shown at left in Fig. 1. The chain pusher is necessary because it would not be practical to push the sections through the oven manually on account of the heat. Also a steady rate of progress is necessary to insure proper baking. This oven is 15 feet long and 6 feet high. It has reduced baking time from as long as 30 down to 8½ minutes on certain work.

Each side of the oven is mounted on tracks so the frames carrying the lamps can be closed in or pushed

(*Please turn to Page 77*)

Fig. 2. (Upper)—Diagram shows layout of fabricating equipment, chain conveyor, spray booth and oven. Fig. 3. (Lower)—View in fabricating department



Porcelain Enameling Standard Accepted

■ At a general conference called by the national bureau of standards, June 26, in Washington, the proposed standard for porcelain enamel on the exterior and interior of refrigerators was adopted with minor modification, and its circulation for formal acceptance was recommended, according to Porcelain Enamel institute, 612 North Michigan avenue, Chicago.

This standard provides minimum specifications, which include inspection rules and methods of tests. The aim of this standard is to improve the quality of porcelain enameling and to aid buyers in identifying the finish.

Equips Band Saws With Hydraulic Brakes

■ As an added safety measure and to protect equipment from damage, Tannewitz Works, Grand Rapids, Mich., now are equipping their high-speed band saws with hydraulic 2-wheel brakes.

Much similar to modern automobile brakes in construction, these brakes bring both wheels to a complete stop automatically, within an instant after the saw blade breaks, thereby completely eliminating the hazard of a whipping blade.

The brakes are controlled by a saw tension lever which snaps back the instant the breaking saw relieves the tension, at the same time pressing a switch button which shuts off the current. The brakes go into action as soon as the current is cut off.

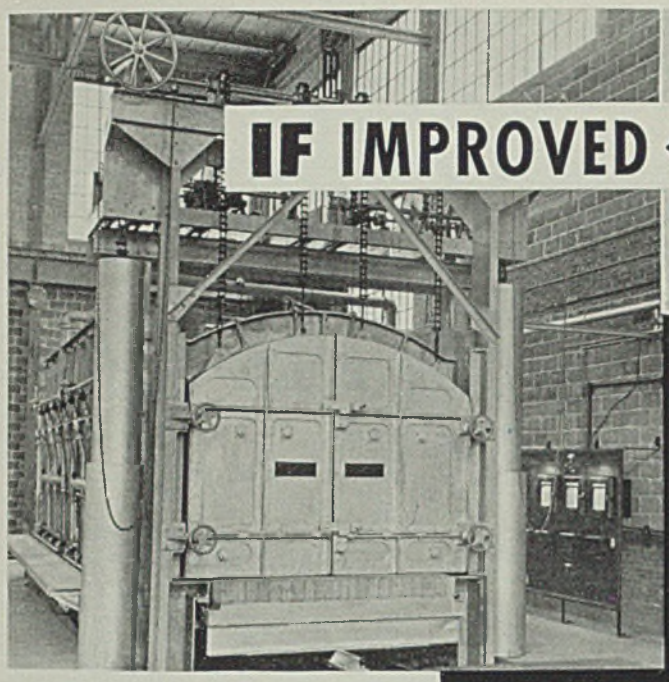
An additional feature of this braking system is that both wheels may be stopped immediately at the will of the operator without throwing the least strain on the thin saw blade.

Importance of Chemical Coatings Shown in Film

■ How chemical coatings are vital considerations in modern industry is explained in the new all-color, sound movie, "More Than Meets the Eye," released recently by Interchemical Corp., 75 Varick street, New York.

The picture describes the processes and research back of the manufacture of these coating materials and shows how the requirements of the ultimate consumer must be taken into account in the manufacturing operations.

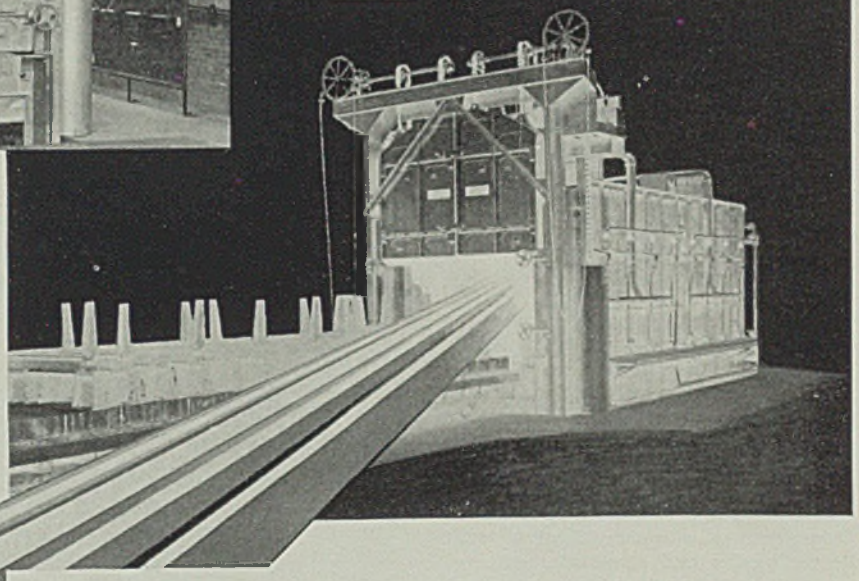
This movie is available for showings to manufacturers, associations or groups interested in chemical coatings.



IF IMPROVED { Machinability / Uniformity / Physicals or / Structure } IS REQUIRED

specify . . .

B ANNEALED BAR STEELS



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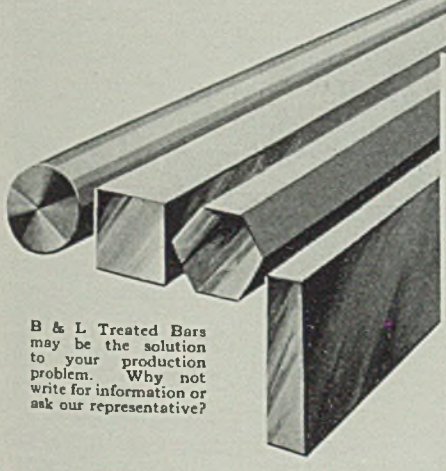

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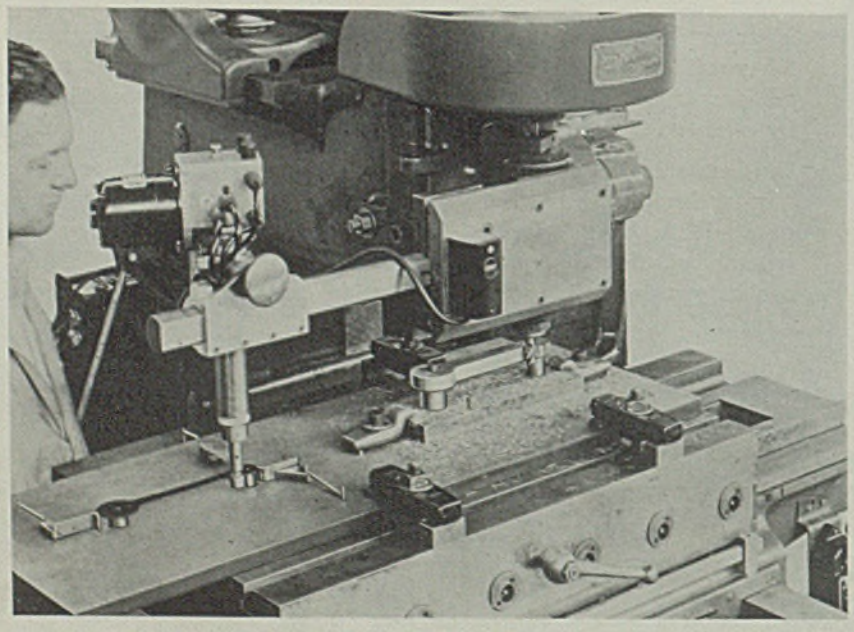
■ Continuous milling of irregular contours such as articulate connecting rods for aircraft engines is an entirely automatic operation through use of a setup employing a standard duplicator control unit with a standard vertical milling machine.

The control, developed by Detroit Universal Duplicator Co., 253 St. Aubin street, Detroit, is shown in the accompanying illustration as applied to a Reed-Prentice vertical miller. Besides the duplicator unit and tracer head, a table-mounted plate, with guides adjustable for work of varying size, permits setup to mill the exterior of the connecting rods to within 0.0015-inch in approximately 6 minutes. Speeds of both the table and cross feeds are held in close proper relation by means of a solenoid controlled clutch mechanism. This is connected to a table feed and is actuated by the superimposed impulse control of the tracer head. Work is clamped on the same plate which carries the templet. The tracer head follows the templet and, through the duplicating control unit which actuates the cross feed of the table, moves the work in exact relation to the templet. Two escapment guides and a movable stop mounted on the templet in proper relation to the templet, provide change in direction required to encompass the entire outside of surface of connecting rod.

In operation the tracing finger encounters the first escapment thus guiding it into contact with the templet. F nger follows the templet until it reaches the extreme end of the work, at which point it passes between the second escapment guide and the templet. Motion continues until tracer finger encounters a movable stop which sends the tracer to the right to clear the work amply. As it passes the movable stop a switch reverses the direction to a forward-left motion. The tracing finger returns to strike the second escapment which guides it onto the templet to begin the second portion of the cut. Operation is completed after the tracer passes between the first escapment and templet.

Illustrated table mounted plate with tracer guides and standard duplicator control can be applied to any standard milling machine. Hydraulic down feed drive mounted on milling machine head permits quick changeover for die sinking operations



Wire Rope

(*Concluded from Page* 49)

ropes, when given slack, tend to form loops. This is especially true of non-preformed Lang lay rope and is also characteristic to some degree of all non-preformed ropes. The best insurance against loops and kinks is preformed rope. Once a kink is formed, the rope is permanently damaged and its strength reduced. A kinked rope should never be used as a working rope nor where strength is an important factor.

Does your rope spool badly on the drum? Poor spooling increases the crushing effect and the abrasion on the rope owing to the uneven winding of the first and subsequent layers onto the drum. Spaces between wraps on the first layer result in succeeding layers crowding down into these spaces to cause nicking and abrasion to the rope. Also under heavy loads, wraps in the upper layers will become wedged tight into the lower layers, resulting in quick destruction to the rope.

Is the equipment handled in a jerky manner, throwing shock loads onto the rope? If ropes are to give long life, they should not be subjected to severe acceleration and surge loads. An easy application of power and a proper handling of the brake will prolong rope life.

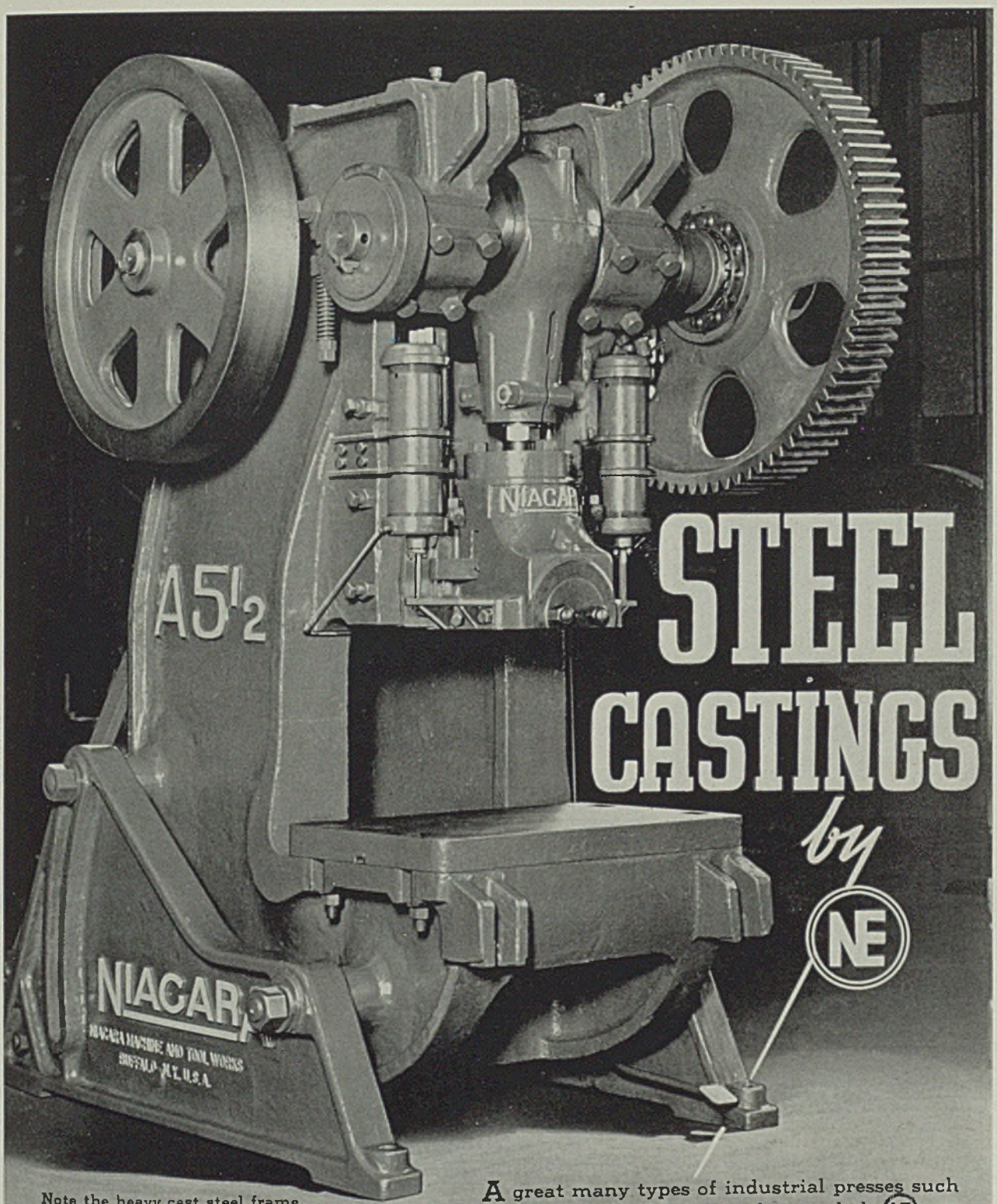
Does the load spin and twist the rope? Unduly high stresses are introduced into the rope by twisting and untwisting caused by a spinning of the load. Every wire rope is made with a certain length of lay. Twisting of the rope changes the lay length, making it impossible for the rope to give its best performance.

Does the rope rub against any part of the equipment? Abrasion against metal quickly destroys wire rope. It is especially important to watch fairway leads for evidence of rope wear. Worn sheaves or bearings or misalignment of drums and sheaves, sometimes results in wear of the rope against metal frames, cast housings, or sheave blocks. The rope should be kept taut enough so it does not drag against any part of the equipment.

MAINTENANCE

Has lubrication been neglected? The lubricant lost from the rope during operation should be replaced periodically. In a rope that is not lubricated, friction develops between the wires and the strands and the hemp center quickly deteriorates due to absorption of moisture. Such a rope has no resistance against corrosive agents.

Does the rope corrode? Brine, salt sea spray and alkalis are destructive to ropes. Where corrosive agents are present, it is often desirable to use galvanized rope or rope made of stainless steel or other corrosion resisting material. Ropes have occasionally been known to corrode on the inside, resulting in a weakened condition that may not be apparent in a superficial inspection. Where corrosion is suspected, cut an end from the rope periodically, unlay the strands and wires in the cropped-off piece and examine for evidences of corrosion.



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Note the heavy cast steel frame . . bearing caps . . gears, guides and flywheel. . This giant Niagara Press is equipped with cast steel parts by National-Erie where strength and resistance to wear are vital to machine life.

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· CORPORATION ·
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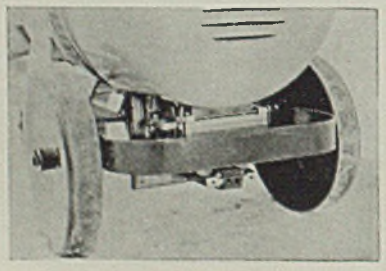
Respirator

■ American Optical Co., Southbridge, Mass., announces a light weight respirator to protect the respirator system against dust, pollen and certain bacteria. The device weighs only 1½ ounces and excludes particles as small as a micron. Respirator features a new filter unit, self-equalizing double headband which holds the device securely against the face.

Automatic Start, Stop Device for Arc Welders

■ Wilson Welder & Metals Co. Inc., 60 East Forty-second street, New York, announces a new automatic start and stop device for arc welders for use on any magnetic starter, motor generator arc welder which is driven by an alternating current motor. With this device, operator starts the welding unit by touching the work with his electrode holder. As long as he is welding, the unit keeps running; when welding is interrupted, the machine stops automatically after a time delay which may be set between ½ to 1½ minutes. The time delay prevents frequent stoppings in case of a tacking job. Device is reconnectable for 220 or 440 volts, or it may be supplied for other alternating current voltages, 60 cycles only.

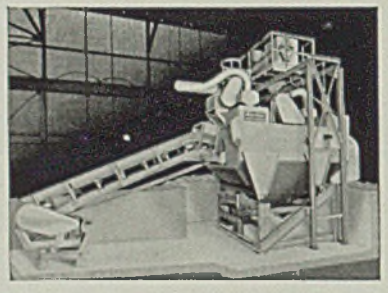


Drying Lamps

■ Westinghouse Lamp division, Bloomfield, N. J., has four new infra-red drying lamps in 250 to 1000-watt sizes, designed for industrial or commercial drying and heating jobs. Line includes a 250-watt lamp with pear-shaped clear glass bulb and medium screw base; a 250-watt reflector drying lamp with inside-frosted R-40 bulb, also with medium screw base; and 500 and 1000-watt lamps in clear glass, globular bulbs, both with medium and bipost bases, for heavy-duty work. All are designed for use on 105 to 120-volt circuits. Reflector drying lamp is a self-contained lamp and reflector, incorporating a metallic reflecting coating which is applied to inside of specially shaped blown glass bulb, then hermetically sealed in the bulb. Rated laboratory life of all the new drying lamps is in excess of 5000 hours.

Wheelabrator Tum-Blast

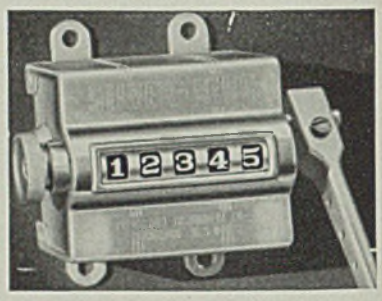
■ American Foundry Equipment Co., Mishawaka, Ind., announces a new continuous Wheelabrator Tum-Blast of high production for every type and size of work to be cleaned. It features a barrel which can be tilted to any angle in order to regulate the flow of work, insuring full exposure of the work to the blast. The loading and discharge end of the unit can be arranged for nearly all types of conveying systems. Work is carried through the blast barrel on an endless apron type conveyor which constantly tumbles and cascades the work. Abrasive is fed by gravity from an overhead storage hopper through a chute and control cage to the center of the Wheelabrator which rotates at high speed.



The abrasive is thrown by centrifugal force upon the products being cleaned. Direction of the blast may be changed by turning the control cage which changes position of the opening. Type of finish desired upon the work can be obtained by regulating size of abrasive.

Mechanical Counter

■ Production Instrument Co., 704 West Jackson boulevard, Chicago, announces a newly designed Silver King mechanical counter which features bakelite number wheels. The unit is mounted on a steel base. Its unbreakable windows of plastic material are designed to avoid shadows.



The counter is capable of counting as high as 60,000 pieces per hour.

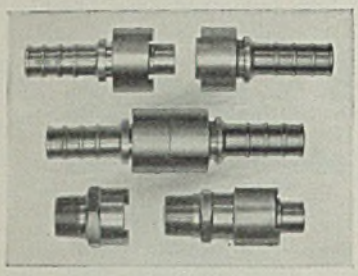
Metal Cutting Saws

■ E. C. Atkins & Co., 402 South Illinois street, Indianapolis, has developed a new line of power metal cutting saws for cutting all types of machineable material. Feature of these power saws is a completely new tooth design. The tooth is formed with an inward curved cutting edge which produces a curled, clock-spring-like chip in cutting. Other important improvements include a large size gullet, accommodating a large volume of material and "buttressed" tooth construction. The entire line is identified as the "curled chip system of cutting."

Hose Couplings

■ Pittsburgh Brass Mfg. Co., 3254 Penn avenue, Pittsburgh, has developed a new line of cast bronze hose couplings for joining similar or dissimilar sizes of rubber hose on air, water, steam and gas lines operating up to 200 pounds pressure per square inch. Marketed under the name of Fuline, the hose couplings employ a positive locking device. Illustrations show male and female hose couplings ready for connecting

and also connected, as well as male and female pipe ends. Standard sizes



are available for ⅜, ½ and ¾-inch hose. Larger sizes can be built to specifications.

Heavy-Duty Cleaner

■ Ideal Commutator Dresser Co., Sycamore, Ill., announces a silent commercial type cleaner for heavy duty, all purpose cleaning. All fan and motor hum has been eliminated to the extent that it is suitable for use in offices, waiting rooms and sales rooms. Cleaning power is furnished by a full-horsepower motor directly connected to a series of three fans. The exhaust air is filtered and all dirt and dust trapped in a large 7½ gallon tank. Unit weighs only 60 pounds and is portable.

Standard attachments include 10

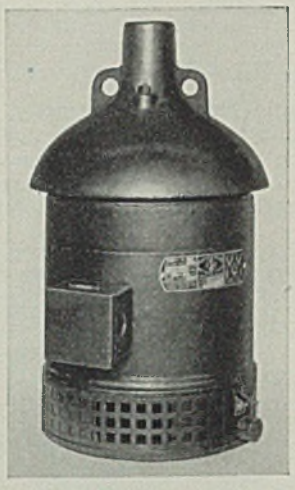
feet of rubber covered hose, double curved steel extension tubing, swivel floor and carpet nozzle, furniture nozzle with detachable brush and flat fiber crevice tool.

Ball Bearing

■ McGill Mfg. Co., Valparaiso, Ind., announces a new maximum-capacity double-row ball bearing featuring extra balls in each row supporting the races to allow more liberal load ratings. The balls are assembled through filling slots in the faces of both the inner and outer race. During operation the slots cause no ball interference, inasmuch as the rigidity resulting from the angular contact fit-up does not allow race displacement. The land-riding feature of this company's retainers is maintained in the new design to relieve the balls of wear. The ball pockets are cylindrical in contour.

Single Phase Vertical Motors

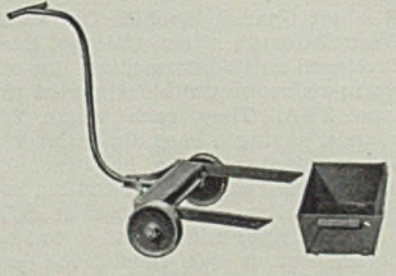
■ Fairbanks, Morse & Co., 600 South Michigan avenue, Chicago, announces a new line of vertical single phase motors in sizes from ¾ to 5



horsepower adaptable to operate in isolated localities. They can be furnished in either solid or hollow shaft modifications. The solid shaft units are connected directly to a pump or machine through a flexible coupling. The hollow shaft unit is particularly adapted to vertical pump applications. A 2-jaw clutch disengages the motor from the pump should the motor be accidently connected for reverse rotation. Motors are available with operating speeds of 1200, 1800 and 3600 revolutions per minute. All 1800-revolution per minute and lower speed motors are built in the repulsion-start induction-run type.

Tote Box Truck

■ Barrett-Cravens Co., 3250 West Thirtieth street, Chicago, has intro-



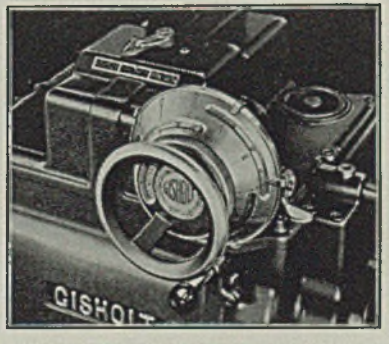
duced a tote box truck to support any weight that can be carried in a tote box 22 x 11 inches. Arms or prongs on these units are spaced to engage the handles on a standard tote box. After the prongs have been made to straddle the tote pan, a slight pressure on the handle lifts the tote box off the floor and it can be trucked to any location. Two-wheel suspension provides flexibility that permits tote boxes to be jockeyed into close quarters. Trucks are available for tote boxes of a size other than 22 x 11 inches and for tote boxes or pans of unusual shape.

Pyrometer Controller

■ Bristol Co., Waterbury, Conn., has introduced a new electronic pyrometer controller, chief feature of which is the elimination of moving parts in the switches, etc. Its pointer of the Weston millivoltmeter movement is not engaged or retarded at any point within its normal operating range, thereby leaving it free to indicate continuously the temperature under control A cold-end compensator insures high accuracy. Control is by means of a new electronic circuit, using a single high-output all-metal vacuum tube. A milliammeter on the front of the instrument indicates the condition of the control circuit at all times. The controller is extremely sensitive to changes in temperature at the thermocouple.

Speed Selector for Turret Lathes

■ Gisholt Machine Co., Madison, Wis., announces a speed selector

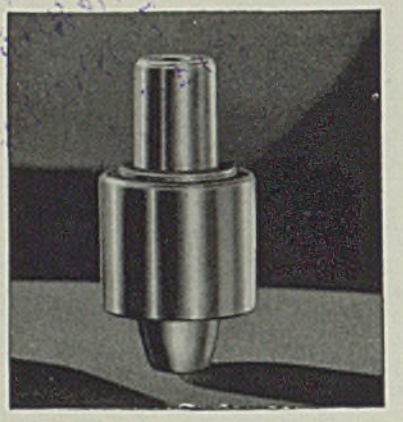


for high production turret lathes. It operates by merely turning the speed selector dial to the graduation corresponding to the diameter of the work. The device permits the selection of any of the 12 available spindle speeds. The change in speeds is accomplished without slowing down the machine.

Tension Bearing

■ New Departure, division General Motors Corp., Bristol, Conn., announces a new vertical tension TP-

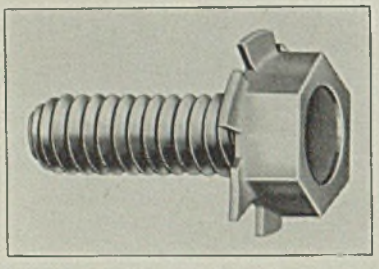
13-500 bearing for textile machinery. It not only provides a vertical stub shaft on which the pulley is mounted, but it contains its own oil circulating system for speeds of 3500



to 15,000 revolutions per minute. Thus, oil is drawn from a reservoir below the bearing and is passed in a fine spray directly to the balls and races. Bearing is of the self-sealed type with all-metal seals and the oiling system is completely enclosed. It requires no locknuts, screws or other parts when mounting.

Lock Screws

■ Continental Screw Co., New Bedford, Mass., has introduced Holtite Lock-Tite screws for metal to metal fastening. It embodies in one unit all the advantages of separate locker washers and screw assemblies, and drives like an ordinary screw. Design of washer teeth, type of ma-



terial, hardening and tempering can be regulated to obtain the most suitable locking or binding application required for the purpose.

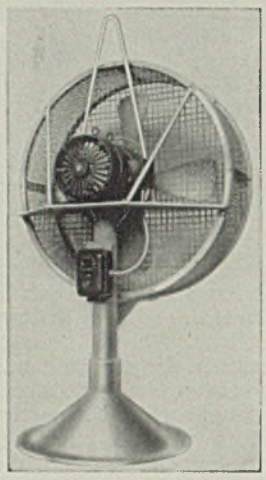
Cherrying Attachment

■ Aber Engineering Works, Racine, Wis., announces a new cherrying attachment that fits most milling machines, both vertical and horizontal, making it possible to cut sharp corners, channels, undercuts, hollows and concave areas in dies and odd shapes in a variety of depths and diameters. The attachment is graduated 360 degrees around an individually calibrated scale. Clear vision is afforded at all times, from all angles. The only part requiring lubrication is the worm driving gear. Its spindle fits the standard mill spindle.

Two bolts loosen cutter driving gear housing to accommodate different diameter cutters. Cone pin bearing points can be separated to accommodate cutters from ¼ to 3 inches in width. Special form cutters for finishing odd shaped work also can be accommodated. Tooth cutters for use with the attachment are available in a wide variety of sizes.

Cooling Fans

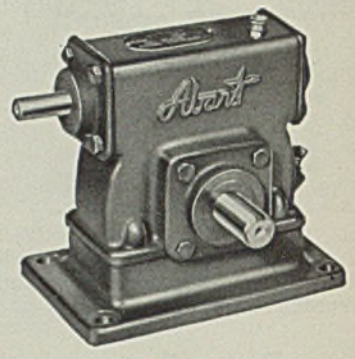
■ Truflo Fan Co., Harmony, Pa., announces a series of portable cooling fans available in sizes ranging from 12 to 36 inches in diameter. Illustration shows a 36-inch fan. It



is 48 inches high to center line of fan wheel, and has a 32-inch diameter cast iron base and 4-inch pipe stand. A special ¾-inch round steel bar is electrically welded to motor base and bolted to top of guard for handling with overhead crane. Fan employs a 3-horsepower motor. All units in this line are so designed that flow of air does not play directly on worker.

Worm Speed Reducer

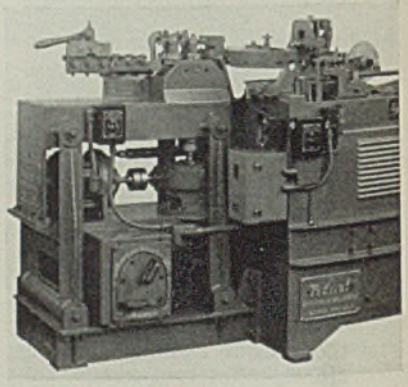
■ Abart Gear & Machine Co., 4832 West Sixteenth street, Chicago, has developed a new intermediate line of worm reduction units designated as type 2⅝A. They each weigh 22 pounds, having a base dimension of 7½ x 5 inches and a height of 7 inches, being capable of handling inputs from ¼ to 2 horsepower at 1800 revolutions per minute and ⅛ to 1½ horsepower at 1200 revolutions per minute. Ratios range from 4 5/6:1 to 100 : 1. The worms are of alloy steel with hardened and ground threads. Shaft mountings are on full ball bearings. Gears, wheel and worm, are assembled in a semisteel, oil tight housing with bearing supports for both worm and worm wheel ma-



chined in one casting. The output shaft of these units can be made to project either right or left, or input and output shafts can be made to project at both ends.

Hoop Forming and Welding Machine

■ Federal Machine & Welder Co., Warren, O., has developed an automatic hoop forming and welding machine which takes wire from a supply reel at a uniform speed of approximately 150 to 175 feet per minute. Wire is drawn through 2-plane, quick straightening rolls by a double set of spring-loaded pinch or drive rolls. It then passes through



three adjustable forming rolls and into a sizing ring, where it is formed into a hoop. After the hoop has been formed, it is sheared cleanly to the exact circumferential length, welded and then automatically ejected on a stacking fixture. A special arrangement for counting the hoops as they are ejected from the welder on to the stacking fixture is tripped automatically and a new stack starts to pile up without holding up production. The machine will weld rings of 10 or 11 gage wire, 14 to 15½ inches in diameter. It produces 1500 to 1800 hoops per hour.

<< HELPFUL LITERATURE >>

1. Bearing Lubrication

Tide Water Associated Oil Co.—16-page illustrated booklet, "Principles of Plain Bearing Lubrication", discusses in detail bearing design and grooving, method of oil application, selection of lubricants, grease lubricated bearings, fundamentals of lubrication, and diagnosing bearing troubles.

2. Plant Heating

Surface Combustion Corp.—16-page illustrated bulletin No. SP-223 is entitled "The A B C of Plant Heating." Application of "Janitrol" automatic gas-fired unit heaters to office and factory heating is shown. Various models of these unit heaters are described.

3. Dust Control

W. W. Sly Manufacturing Co.—20-page illustrated bulletin No. 98 contains information on practical solution of dust problems, value of complete dust collection, and benefits derived from proper dust control. Described are the "Sly" dust control systems, filters, control equipment, motors, piping and methods of installation.

4. Cardoor Bracing

Signode Steel Strapping Co.—4-page illustrated bulletin, "Cardoor Bracing Solid Carloads with Signode Anchor Strapping", is a pictorial demonstration of method of protecting carloads of cartons, boxes or bags in transit. Shipments cannot be damaged by jamming against door, nor can cartons or cases fall out of car when door is opened.

5. Packings

Belmont Packing & Rubber Co.—Illustrated catalog describing mechanical packings. Selection of packing is simplified as each page contains complete data regarding a particular product. Recommendation charts, engineering data, and a complete index are included.

6. Foaming Compound

William M. Parkin Co.—4-page booklet, "Making Acid Behave with Sumfoam", describes a product which develops a heavy white blanket of foam on surface of pickling tanks and suppresses a major portion of acid spray and excess steam.

7. Blast Cleaning

Pangborn Corp.—8-page illustrated bulletin No. 212 gives complete details of "RF Rotoblast" centrifugal cleaning unit which incorporates an improved method of feeding abrasive onto blades without crushing. Stated advantages are better abrasive distribution, greater cleaning impact, and less wear to parts.

8. Metal Treatment

Monsanto Chemical Co.—12-page illustrated bulletin, "Ferrisul for Metal Treatment", outlines the uses of this product which is a commercial anhydrous ferric sulphate, containing a minimum of 90 per cent soluble ferric sulphate. Pickling stainless steel, copper and copper alloys, and etching steel are explained. Full details on application of "Ferrisul" are given.

9. Transmission Unit

Lenney Machine & Manufacturing Co.—12-page illustrated bulletin, "The Lenney Variable Speed Transmission", gives complete data on this compact, self-contained, speed-reducing transmission with speed infinitely and instantly adjustable. Details of operation, speed control, motorized unit, speed range and application are included.

10. Vacuum Cleaners

Invincible Vacuum Cleaner Manufacturing Co.—8-page illustrated bulletin, "The Dollars and Sense of Modern Cleaning for Industry", includes performance reports on savings effected through use of industrial vacuum cleaners. Advantages of plant cleanliness are explained.

11. Hose Fittings

C. B. Hunt & Son—4-page illustrated bulletin No. 104 describes "Quick-As-Wink" valve and hose couplings, hose nipples, and hose clamps for air, water and oil transportation. With these fittings, it is stated, the seal becomes tighter as the pressure increases.

12. Fluorescent Luminaires

Westinghouse Electric & Manufacturing Co.—4-page illustrated booklet No. F-8500 presents design features, operating details and application data on twin lamp "RLM" fluorescent type luminaire. This fixture makes possible high intensity glareless illumination without harsh shadows or heat radiation.

13. Centerless Grinders

Cincinnati Grinders Inc.—16-page illustrated bulletin G-456 contains complete specifications on "Cincinnati" No. 2 centerless grinding machine. Design and operating features, dimensional and indexed drawings, and accessories and attachments are included.

14. Cranes and Shovels

Manitowoc Engineering Works—8-page illustrated catalog No. 20-38 describes models 2000-A and 2000-B "Speedcrane—Speed Dragline—Speedshovel". Complete specifications are given on these units which have capacities of 40,000 and 45,000 pounds, respectively.

15. Steel Stock Coating

American Lanolin Corp.—8-page illustrated booklet, "Only Paralan Can Do All that Paralan Does," describes a mill coating which protects sheet steel, strip or wire against rust and corrosion. It is said to be possible to lacquer or japan right over stock coated with this product.

16. Dust Collector

American Foundry Equipment Co.—Illustrated circular No. 32 is descriptive of the new "American" high efficiency, long cone cyclone dust collector for all types of industrial applications.

17. Rust Proofer

American Chemical Paint Co.—4-page bulletin No. 7-8 gives complete data on "A C P Rust-Proofer" which is applied to new or old steel structures preparatory to painting. It is said to minimize need for repainting and add to paint protection.

18. Carbon Tool Steels

Allegheny Ludlum Steel Corp.—6-page illustrated folder No. TS-1 contains suggested uses and shop data applying to "Pompton" straight carbon tool steels. Available types, their application, and suggested heat treatment are covered.

19. Electric Furnaces

Ajax Electrothermic Corp.—16-page illustrated bulletin No. 11 deals with motor generator type furnaces and equipment. Principles of operation, motor generator sets, furnace types for steel and non-ferrous melting, controls, typical installations, and other data are included.

20. Electrodes

Great Lakes Carbon Corp.—72-page illustrated bulletin, "Electrodes, Carbon and Graphite" presents complete data on carbon and graphite electrodes, graphite anodes, and petroleum carbon. One section is devoted to general engineering data and tables.

21. Flow Meters

Cochrane Corp.—4-page illustrated bulletin No. 2100 outlines advantages of integrating, recording and indicating "Linameters" which are designed to measure the flow of fluids having characteristics of viscosity, corrosiveness, and solubility which are beyond scope of orifice type flow meter.

22. Automotive Parts

Alloy Manufacturing Co.—16-page illustrated catalog, "Alloy Automotive Products", describes line of automotive replacement parts, including cylinder heads, water pumps, fans, and starter parts.

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HELPFUL LITERATURE

(Continued)

23. Nickel Alloy Steels

International Nickel Co.—16-page illustrated bulletin, "The Working of S. A. E. Nickel Alloy Steels", includes data compiled from practice of 34 leading fabricators. Effects of alloying elements, characteristics and applications, and heat treatment are covered. Also given are practical instructions for machining, grinding, welding, and gas cutting.

24. Immersion Heaters

General Electric Co.—4-page illustrated bulletin No. GEA-214D gives complete specifications for "G-E Calrod" immersion heaters of all types for heating water and oil. Application, installation, design and prices are detailed.

25. Ball Bearings

Torrington Co.—36-page spiral bound illustrated catalog No. 404 contains complete data on inch dimensioned, aircraft type, magneto type, metric dimensioned radials, and snap ring radial ball bearings. Included are tables of bearing tolerances, shaft and housing fits, bearing selection, interchangeability, and transversion.

26. Wire Drawing Compounds

Magnus Chemical Co.—22-sheet looseleaf folder, "Wire Mills Performance Reports", is a series of detailed performance reports from ferrous and non-ferrous wire mills outlining improvements and economies effected by the use of properly selected wire drawing compounds, contrasted with previously used methods.

27. Plating Cleaners

Hanson-Van Winkle-Munning Co.—Bulletin No. C-104 describes a complete line of cleaners for removing greases, oils, polishing and buffing residues from metal surfaces of all types, preparatory to plating and finishing. Eight cleaners and three soaps are covered.

28. Insulation

Okonite Co.—34-page illustrated bulletin, "Okonite Insulation", describes insulation and protective coverings. Tables include insulation resistance and correction factors, thickness and test voltages, diameter and weights of cables, standard wire, stranding, conduit sizes, cable selection, and other helpful data.

29. Hammermills

Pennsylvania Crusher Co.—4-page illustrated bulletin No. 1030 describes the two-way, central-feed "reversible" hammermill. Features of machine include primary and secondary crushing zones, impact batting, tramp iron pocket, accessibility, damp feeds and speed range from 600 to 1800 revolutions per minute. Units are designed for secondary reductions of limestone and cement rocks, coal and chemicals.

30. Pig Iron

Jackson Iron & Steel Co.—6-page folder, "Jisco Silvery Pig Iron" gives analysis range and physical properties of this pure pig iron for use in all types of mixes. Cost analyses of typical charges are given.

31. Variable Transmission

Ideal Commutator Dresser Co.—4-page illustrated bulletin, "2 Ways to Force Costs Down", describes the "Select-O-Speed" variable speed transmission, an infinitely adjustable unit, and the "Ideal Automatic" motor base which is designed for low cost short center drives up to 15 horsepower.

32. Mechanical Rubber Goods

B. F. Goodrich Rubber Co.—24-page illustrated catalog, "Mechanical Rubber Goods", is a condensed catalog, engineering data book and guide to selection of various mechanical goods products. Rubber transmission belting, pulley data, V-belt drives, conveyor belts, hoses and fittings, packings, rubber linings, paints, putties and vibration insulators are a few of the products covered.

33. Rotary Pumps

Geo. D. Roper Corp.—40-page illustrated plastic-bound catalog No. 939 contains basic facts on the new "Roper" rotary pump line. How to determine proper pump size, compute suction lift and discharge head, estimate horsepower required, install, locate trouble and other points are covered. Nineteen data tables are included.

34. Crawler Cranes

Bucyrus-Erie Co.—36-page illustrated bulletin No. LCC-1 lists as advantages of crawler cranes for material handling, —speed, mobility, flexibility, steadiness, smoothness, accuracy and dependability. Applications of these cranes are shown and features of design of the units are illustrated and described.

35. Milling Machines

Kearney & Trecker Corp.—16-page illustrated bulletin No. 45 presents graphic and pictorial highlights in the 42-year history of this company in building "Milwaukee" milling machines. Included is a large chart showing production routing in the plant.

36. Alloy Steels

Republic Steel Corp.—16-page illustrated bulletin No. 364 contains description, analyses, physical, mechanical and electrical properties, working instructions, heat treatment and other data on "Enduro" corrosion and heat-resisting steels, types HCN, NC-3 and HC. Charts and tables are included.

37. Ball Bearings

New Departure Div., General Motors Sales Corp.—Bulletin VIII-15; covers mounting of self-sealed ball bearings on eccentric of a small air compressor of diaphragm type. Lubrication fittings are eliminated, thus permitting a cover of attractive design.

38. Forging Hammers

Erie Foundry Co.—16-page illustrated bulletin No. 335 presents description, complete specifications, and installation and operating instructions on "Erie" single frame forging hammers of self-contained and standard types.

39. Electric Fans

Emerson Electric Co.—64-page illustrated spiral-bound catalog, "Emerson-Electric Fans for 1940", contains descriptions of a complete line of electric fans for ventilation, cooling and air circulation purposes. Engineering data, prices, typical applications and installation data are included.

40. Insert Chaser Die Heads

Eastern Machine Screw Corp.—4-page illustrated bulletin No. 12 contains engineering data and description of "H & G" insert chaser die heads for turret lathes, hand screw machines, and other units on which the die head does not rotate.

41. Pulleys and Couplings

Congress Tool & Die Co.—8-page illustrated catalog No. 140 presents specifications, revised prices, and full information on line of V-grooved pulleys, variable pitch pulleys, flexible couplings, V-step cone pulleys and crown face pulleys.

42. Switch Actuator

Micro Switch Corp.—Illustrated data sheet No. 11 presents full information on the type J actuator attachment for open top die cast metal clad and regular "Micro" switches with spring plungers. This attachment makes possible a compact and low-priced limit switch.

43. Electric Products

BullDog Electric Products Co.—84-page illustrated catalog No. 402 gives prices, dimensions and description of electric service equipment, lighting panels, fuse panels, ducts and fittings, circuit breakers and miscellaneous electrical materials.

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Open-Hearth Trends

(*Continued from Page 65*)

construction, many operators stating that they have a sufficient return on their investment to pay for the installation in one year. Insulation is largely used below the floor level, with its use above that point showing a gradual increase. Roof insulation has proved of value in some plants while in others its value has been questionable. In one plant figures were obtained showing a 50 per cent increase in roof life after insulation.

Perhaps the most outstanding advance in furnace design is the increased use of basic refractories in furnace construction. Of particular interest is the large use of chrome refractories in open-hearth bottoms with fine results being obtained. The future should show continued trends along this line. Chrome, Kromag, Metal-kase and Rytex are all basic bricks used in back and frontwalls and bulkheads with good results. Basic brick in roof construction is talked about but results have not as yet been advanced. The possibility that by the use of large quantities of basic refractories, it will be possible to increase the operating temperature of the bath several hundred degrees, leads to some interesting conjectures on what effect it will have on many sides of the open-hearth process.

Remarkable strides are being made in controlling the reactions in acid open-hearth work, simply by controlling temperature and similar possibilities may be in store for the basic open-hearth process. One of the factors that we probably know less about in the open-hearth process is temperature and its effect upon the many reactions, and some of the studies at present under way on measuring temperature hold promise of valuable returns for the money invested in this problem.

Instrumentation

Some method of regenerator control seems to be in use generally. Either an indicator for manual reversal of the furnace, or the more elaborate job that reverses the furnace and fuel automatically is found in nearly all plants. In one system the "differential" method is used, maintaining a constant differential between the hot and cold readings on each regenerator chamber, and in the other system by setting the system at a predetermined temperature, an indicator, either a light or a horn signals the operator that the furnace should be reversed. Unquestionably automatic control of reversal, maintains a much more uniform furnace than the old style system of depending upon the operators eye, and the value of this system has increased as more and more insulation is added to the furnace system, especially around the regenerators.

Furnace atmosphere control is still on the fence, some operators swearing by it and others at it. It has not shown the savings predicted and as is the case with automatic fuel-air ratio, some of the "bugs" still have to be eliminated. It would appear that many times the individual savings from installations of various instruments are hidden, especially when a number of installations are made at one time. Large scale use of instruments in the open-hearth has a bright future and unquestionably trends are towards more instrumental control of furnace operation. Possibly some of the trouble with the various instruments is mechanical and possibly some of it is in the lack of a "yard stick" to determine the values obtained.

A recent example of mechanical control is the development of the Carbanalyser for determining carbon. This device, described in the Oct. 2, 1939 issue of STEEL, page 20, transfers to a machine the work usually done in the chemical laboratory. Possibility of similar devices for phosphorus, manganese, sulphur, iron oxides, etc. seems not too far fetched.

Much progress has been made in the study of the steelmaking process, during the past 10 years, and trends indicate more rapid progress during the next decade.

(*To be continued next week*)

♦

"Curve" Principle Used in Stainless Tank

■ Recent construction of a huge twenty-foot, 6000-gallon stainless steel dyeing machine, claimed the largest in the world, by Rodney Hunt Machine Co., Orange, Mass., was made possible by a patented method which provides maximum strength and rigidity. This strength is obtained by a curve built into the sides of the tank according to calculated data so that flexing or bending of the tank sides when loading or emptying is eliminated.

Simplified Practice Files, Rasps Printed

■ Printed copies of the first revision of Simplified Practice Recommendation R6, Files and Rasps, are now available, according to the division of simplified practice, national bureau of standards.

Copies of this recommendation, which is designated as R6-40, may be obtained from the government printing office, Washington, at 5 cents each.

Battery of basic open-hearth furnaces with raw materials in foreground

Bearing Metallurgy

(*Concluded from Page 39*)

and oil quenched direct from the furnace. This procedure is made possible by the use of controlled-grain-size steel.

Roll cages are cast bronze, 88 per cent copper, 10 per cent tin and 2 per cent zinc. This material has excellent physical properties as well as being a good bearing metal.

Heating by high-frequency induction at higher and higher frequencies has been developed until now a unit operates at 250,000 cycles. This compact and self-contained piece of hardening equipment heats and quenches a piece of steel automatically in a surprisingly short time. Properly shaped coils can heat varying shapes and selected areas. Heating and quenching cycles can be regulated to a tenth of a second.

The rod-end control unit, Fig. 1, is SAE 4620 steel carburized in the bore of the bearing end only. This carburized section, 1/32-inch deep, must be hardened without affecting the shank which is of proper hardness for drilling and tapping. Localized hardening in a salt bath is slow and may result in a soft spot next to the shank or undesirable increase in hardness in the shank as a result of heat conduction. Induction heating permits full hardening of the raceways without undesirable run-up of heat on the shank and results in extremely close uniformity from piece to piece. The cycle for each rod end is about three seconds, which includes the quench.

Tinning Bath Blanket Reduces Tin Dross Loss

■ The liquid blanket for molten metal baths announced by W. H. Spowers Jr., 551 Fifth avenue, New York, last October, is now being used successfully in the process of tinning copper and steel wire. It forms an effective and economical fluid blanket when placed on the surface of tin baths and prevents the formation of any oxides. Its use in no way interferes with the normal technique of the operation, and a more brilliant and smoother coating on the wire is claimed.

Due to the cost of tin per pound, the prevention of loss in this operation is interesting. For example, in tinning 18-gage wire on one molten tin bath 18 inches wide and 5 feet long, the consumption of tin was found to be reduced from 103 to 58 pounds per week, a net saving of 5.5 pounds per ton of finished product. In dollars and cents, this is a saving in oxides of $25 per week on this one bath. On another bath of about the same size, the cost per 100 pounds of wire applied was reduced from 85 cents to 43 cents, with savings over a period of five weeks amounting to $172.15. The formula used for this blanket is simple and it may easily be made up by the operator in the shop.

Develops Steel Pallet For Fork Trucks

■ A new sectional-face, all-steel pallet for use with fork trucks is announced by Palmer Shile Co., 7100 West Jefferson avenue, Detroit. It is made up of 6-inch channels with a heavy corrugated center rib. The formed sections are stronger and allow the use of lighter gage material.

The opening between sections is of sufficient width, on the bottom face, to allow the small roller wheels on the truck to touch the floor. For this application these same sections are filled with wood to provide an even surface for the wheels to roll over as they load and unload the pallets.

The pallet may be built in any size to handle almost any kind of load. It only requires strip steel 10 inches wide, in the construction of the formed sections.

Conveyor-Baking Setup

(*Concluded from Page* 66)

apart to obtain the correct distance between the lamps and the stock being baked.

Voids between reflectors are eliminated by polished aluminum working faces which cut loss of radiant energy and make possible a more uniform cure of the work. In addition to levelling off high and low heat spots, these sheets control convection currents which tend to cool the work in any open-type oven. These working faces do not show in Fig. 1 as they had not been installed at that time.

Not all sections are shipped as they come from the oven and are wrapped. Some are stored in a nearby area, see Fig. 2.

Note the 3-way switch installed at the point A, Fig. 2. The object is to switch work onto the monorail track at B. This is necessary when the spray booth cannot take care of the parts as fast as they are loaded on the loop near the welders.

Installation of the infra-red baking oven and the monorail conveyor here solved a serious materials handling problem successfully. Now the parts go through fabricating, enameling, baking and wrapping with no delay as all operations are synchronized. Absence of bottle necks assures a good steady rate of production.

Installation of the chain conveyor also permits parts to be stored efficiently during production as it eliminates rehandling. Heretofore it was necessary to stack them on trucks or in piles on the floor. This of course took up valuable floor space in a shop where such space was somewhat limited. The chain-type conveyor conserves floor space as all parts are off the floor from the time that they are welded until the wrapped pieces are stored or shipped.

Straightening Parts

(*Concluded from Page* 46)

If the warp is in a general long sweep, the supports can be spread fairly wide and a wide point of pressure can be used.

When relatively short areas are warped more than the average of the full length, the distance between the supporting blocks can be shortened and the "kinks" taken out first. Often the overall straightness will be found to be okay after the short high spots are removed. If a long warp then persists, however, the supports can be spread to take care of that. Generally it is necessary to push the tool "by" or past the center to obtain the required set.

While the temperature of the piece can be judged during straightening by touching with the hand, a newer method is the use of a surface pyrometer. The amount of pressure must be decreased as the temperature drops so by the time the tool can be barely handled, extreme caution must be observed as it is becoming fully hardened and is apt to snap.

If the hardened piece is a reamer, for instance, with a heavy shank and a light reamer section, it is best to take each part separately, finishing up with the stepped-down portion unless the indicator shows warp to be in the stepped-down portion alone. If the tool is still quite hot when straightness has been reached, it can be set aside or should be checked occasionally while cooling as it may have a tendency to resume its original warped shape, in which case the part can be replaced under the press and re-straightened.

When straightening flat pieces on a block, it often is advisable to shim up the edges so the parts can be pressed slightly "by" in the center portion without the danger of going so far as to cause breakage.

Improving Stainless

(*Concluded from Page* 58)

After several hundred hours exposure to a boiling acidified copper sulphate solution, no instance was noted in which a sample heated at 392 degrees Fahr. exhibited any signs of susceptibility to intergranular attack. This is important as it shows the treatment can be applied to plain cold-rolled 18-8 steel which does not include stabilizing elements.

Samples of cold-rolled 18-8 steels containing columbium and molybdenum also were investigated. Improvement in the elastic properties obtained with these steels at the 392-degrees Fahr. treatment was as great as with plain 18-8 steels. The cold-rolled 18-8 steels containing molybdenum are more resistant to pitting than plain 18-8 and with the improved elastic properties are far more suitable for use in lightweight construction when resistance to sea water is needed.

Summary

These tests show modulus of elasticity of normal wrought annealed 18-8 steels is approximately 28,000,000 pounds per square inch, the proportional limit near 20,000 pounds per square inch with tensile strength between 80,000 and 90,000 pounds per square inch.

In confirmation of work of other investigators, it was found that even though tensile strength of the annealed 18-8 steel can be increased greatly by application of cold work, the indicated proportional limit of the metal remains low and the modulus of elasticity somewhat lower than that of the annealed steel, especially in the direction of rolling. In the transverse direction of rolling, cold-rolled steels have a somewhat higher proportional limit with a modulus of elasticity equal to that in the annealed condition.

Further, it was shown that if cold-worked metal is heated to 392 degrees Fahr. (200 degrees Cent.) and air cooled, it will act more normally when stressed and exhibit a considerably higher observed proportional limit and yield strength (0.20 per cent set) with a modulus of elasticity approximately 28,000,000 pounds per square inch at room temperature. The treatment also produces increased fatigue resistance and improved toughness without rendering the steel subject to intergranular corrosion or reducing its resistance to general corrosion.

This treatment does not impair tensile strength, ductility or the bright cold-rolled surface. The slight yellowish discoloration developed is readily removable.

Elastic properties of cold-rolled 18-8 containing columbium or molybdenum likewise are improved by this heat treatment.

It must be emphasized that the time factor is most important in bringing about the improvement. Unless the heating period is long enough, the improvement in elastic properties will be neither substantial nor uniform. It is suggested the heating period consume at least 8 hours but no more than 100 hours. Treating plain or modified cold-rolled 18-8 steel in this manner gives a material without peer for use in lightweight high-strength structures.

♦

Instrumentation

(*Concluded from Page* 61)

sound basis unless factual information of this kind is available.

Figs. 2 and 3 show an instrument which records the time of normal arc operation of the manual operator and the time in which he had the arc in operation, but was not operating the arc in a normal manner. Such an instrument is used in studies of the effect of positioning on welding operator production; studies of the progressive effect of highly fatiguing welding operations, etc.

Figs. 4 and 5 show an instrument for precision measuring of operator performance with any kind of welding rod. It records elapsed time, time arc is in normal operation and time it is in abnormal operation.

Lights Aid Beginner

The hand shield in Fig. 6 has a red light and green light. These lights may be attached to the type of instrument shown in Fig. 2 or Fig. 4. In training a beginner, the instrument will show him when he is operating in a normal manner by flashing the green light. As soon as he operates the arc in an abnormal manner, the green light is extinguished and instantly the red light comes on. This has been found particularly valuable in training operators, but its main purpose is in making precision measurements for studies on welding operations involving large numbers of pieces, where an error in setting a rate or lack of information as to the easiest way of doing the job, might result in a very large increase in labor cost.

These instruments have been developed over a period of years (Pat. 2027224) and field tested for a wide variety of conditions. In principle, the instruments utilize vacuum tubes to pick up oscillations of voltage arising from the transfer of metal across the arc from the electrode to the work. These oscillations are filtered out from other extraneous oscillations which occur in an arc-welding circuit and are then amplified to operate relays which in turn operate the indicating or recording devices. The instruments in Figs. 2 and 4 are provided with a receptacle for attaching a chart-drawing recording instrument of the usual kind in addition to the self-contained clocks.

It may properly be said that the instruments are merely tools to be used in the study of operator behavior. The instruments merely record how the operator behaves. Then time studies and procedure studies are made, based upon the recordings of the instruments.

♦

New Taxes Cut Profits

(*Concluded from Page* 21)

income over last year was largely due to earlier start of this year's shipping season.

M. A. HANNA CO.

M. A. Hanna Co., Cleveland, iron ore and coal operator, reports $714,069 net profit earned in quarter ended June 30, after all charges and provision for federal income taxes. This was equal, after preferred dividend requirements, to 54 cents per common share. In corresponding 1939 period net income was $315,104 or 15 cents a share on common. Indicated net profit for quarter ended March 31, based on second quarter and six months' statements, was $390,238.

Net income for first half this year totaled $1,104,307, equal to 76 cents a share on common, against $487,210 or 16 cents per common share in same period last year.

"Sell Self-Government" Sales Executives Advised

■ More emphasis must be placed on economic recovery lest, failing to achieve it, we are forced to abandon the past decade's social advances, warned Philip D. Reed, chairman, General Electric Co., Schenectady, N. Y., speaking before the Sales Executive Club of New York recently.

"The fact is that the economic record of the past ten years is just as disappointing as the social record is gratifying. . . . Our national income is back to 1919, our unemployment problem completely unsolved, our national debt up 19 billions. . . . Comparing the period 1933-39 with 1923-29, the only significant increases among 22 basic economic measurements were in population, strikes, strikers, federal taxes, federal expenditures and national debt," said Mr. Reed.

Demand for Heavy Steel Products Is Outstanding

Lighter items quieter but large backlogs help to sustain mill operations. Construction work requires more steel

MARKET IN TABLOID ★

Demand
Expanding for heavy items, slower for light products.

Prices
Generally firm; scrap still tending downward.

Production
Unchanged at 88 per cent.

■ MODERATE slackening in orders for certain steel products is without important effect on backlogs. Unfilled business will help to sustain heavy production for an extended period.

Most districts showed only minor changes in steelmaking last week, leaving the national average unchanged at 88 per cent. A year ago operations were climbing rapidly, advancing 6 points to 56½ per cent.

Domestic buying still is active, but in some cases—principally in lighter products—previous heavy coverage is causing consumers to withdraw at least temporarily from the market. In sheets and strip, for example, substantial specifications had been entered in recent weeks against contracts placed this spring and there is now less occasion for buyers to order ahead.

Improved demand from several sources is indicated for coming weeks. These include the automotive industry, railroads, building and heavy engineering construction and the defense program. Automobile production declined about 9000 units to 53,020 last week, influenced by model changes which will restrict output for several weeks. Late August is expected to see an upward trend in assemblies, with a number of plants scheduled to be back in production early next month.

Railroads appear unlikely to support exceptionally large equipment buying programs but have been buying repair material and freight cars at an improved rate lately and have additional purchases pending. Recent orders include 1000 box cars and a seven-car, diesel-driven passenger train from the Illinois Central and 1000 hopper cars from the Norfolk & Western. Locomotive inquiries are expanding.

Large lots of plates, shapes and piling will be required for pending and prospective construction work, an important part of which has some relation to preparedness measures. Among the largest of these projects are 35,000 tons for drydocks at Philadelphia and Norfolk, Va., 18,000 tons for a Rhode Island air station and 12,000 tons for extension of ship ways and other work at Newport News. Other pending business includes 15,000 tons for the Panama Canal and 27,000 tons for six cargo vessels on which the maritime commission is taking bids. The large volume of such work is throwing a heavy load on design, drafting and estimating departments of construction firms, a situation which gives signs of becoming intensified in the future.

British purchases continue to dominate iron and steel export business, orders from England having expanded further so far this month. Demand from South America has been sluggish recently, caused not only by heavy buying early this year but also by the disappearance of certain European markets for South American products.

Orders for manufacture of defense equipment still are relatively light, although aircraft builders and government shops continue important outlets for certain steel products, particularly specialties. More than 4000 tons of heavy plates will be required for the 627 light army tanks placed recently with American Car & Foundry Co.

Tin plate production was off 3 points last week to 75 per cent. This partly reflects plant vacations, since specifications are holding. Prospects for heavier export demand are regarded favorable.

Iron foundry operations show some seasonal slackening, but merchant pig iron shipments compare favorably with the June rate, being slightly heavier in some districts. A higher melt is indicated for August.

Lake Superior iron ore shipments continue close to the carrying capacity of lake vessels. Despite this heavy movement the high rate of consumption is causing iron ore stocks at blast furnaces and lower lake docks to increase at a slow rate. Stocks on July 1 were 23,515,802 tons, compared with 25,861,237 tons a year ago.

Mills continue inactive in scrap buying, pending absorption of material on previous orders, and prices in dealer trading continue to settle. The steelworks scrap composite was off 41 cents last week to $18.42.

Most changes in ingot production last week were upward, including gains of 1 point to 81 per cent at Pittsburgh, 2 points to 86 in eastern Pennsylvania, 6½ points to 84 at Cincinnati and 3 points to 95 at Detroit. These were offset by a 14-point loss to 63 at Cleveland, caused by a vacation shutdown, and a 10-point drop to 75 in New England. Unchanged were Chicago at 95, Wheeling at 94, Buffalo at 90½, Birmingham at 88, Youngstown at 84 and St. Louis at 65.

COMPOSITE MARKET AVERAGES

	July 20	July 13	July 6	One Month Ago June, 1940	Three Months Ago April, 1940	One Year Ago July, 1939	Five Years Ago July, 1935
Iron and Steel	$35.57	$37.68	$37.72	$37.69	$36.69	$35.82	$32.44
Finished Steel	56.60	56.60	56.60	56.60	55.90	55.62	54.00
Steelworks Scrap	18.42	18.83	18.83	19.03	16.00	14.72	10.64

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

COMPARISON OF PRICES

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

Finished Material

	July 20, 1940	June 1940	April 1940	July 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	2.47	2.47	2.47
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	2.00	2.00
Sheets, cold-rolled, Pittsburgh	3.05	3.05	2.95	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	1.95	2.00
Sheets, cold-rolled, Gary	3.05	3.05	2.90	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 9/32-inch, Pitts.	2.00	2.00	2.00	1.92

Pig Iron

	July 20, 1940	June 1940	April 1940	July 1939
Bessemer, del. Pittsburgh	$24.34	$24.34	$24.34	$22.34
Basic, Valley	22.50	22.50	22.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	24.21	22.21
No. 2 foundry, Chicago	23.00	23.00	23.00	21.00
Southern No. 2, Birmingham	19.38	19.38	19.38	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	22.89	20.89
No. 2X, del. Phila. (differ av.)	25.215	25.215	25.215	23.215
Malleable, Valley	23.00	23.00	23.00	21.00
Malleable, Chicago	23.00	23.00	23.00	21.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	28.34
Gray forge, del. Pittsburgh	23.17	23.17	23.17	21.17
Ferromanganese, del. Pittsburgh	125.33	115.33	105.33	85.33

Scrap

Heavy melt. steel, Pitts.	$19.25	$19.90	$16.45	$15.55
Heavy melt, steel No. 2, E. Pa.	17.25	18.10	15.50	13.55
Heavy melting steel, Chicago	17.25	18.00	15.20	13.55
Rails for rolling, Chicago	21.25	22.25	18.65	17.75
Railroad steel specialties, Chicago	20.25	21.40	18.05	15.50

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	2.70c

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	$4.20
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

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40
Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

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.
⅛-inch and less	67	70
¼-1-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
⅛-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.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	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	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

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	10.23	11.79
1¾" O.D.	13	11.64	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—Pet 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. fitgs., 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 ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-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.	5.00- 5.75
Connell, prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

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)	13.75c

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, 84c, and $1.24 freight.			
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	21.00
Do. barge	21.00
No. 2 lump	22.00

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 ⅛-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	4.25	3.31	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	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	7.10
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	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	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	4.10	....	....	....	....
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; 10 to 24 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 Rates of Exchange, July 18

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.	$22.98 6 0 0*	$33.23	3 16 0
Basic bessemer	....	....	....
Hematite, Phos. .03-.05	23.94 6 5 0*	....	....
Billets	....	$31.95	3 15 0
Wire rods, No. 5 gage	....	60.71	7 2 6
Standard rails	$40.22 10 10 0	$48.99	5 15 0
Merchant bars	2.51c 14 15 0	2.77c	7 6 0
Structural shapes	2.34c 13 15 0	2.83c	7 9 0
Plates, ¼ in. or 5 mm.	2.53c 14 17 6	3.53c	9 6 0
Sheets, black, 24 gage or 0.5 mm	3.21c 18 17 6	2.98c	7 17 0*
Sheets, gal., 24 ga., corr.	3.76c 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.	$ 5.65 1 9 6	....	....

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	$21.26 5 11 0(a)	$17.18	788	$31.44	930	$25.33	63
Basic bess. pig iron	20.11 5 4 6(a)	....	....	29.79	900	27.94	(b) 69.50
Furnace coke	6.06 1 11 8	4.91	225	10.92	320	7.64	19
Billets	35.91 9 7 6	26.62	1,221	42.20	1,275	38.79	96
Standard rails	1.90c 11 3 0	1.69c	1,692	2.06c	1,375	2.38c	132
Merchant bars	2.38c 14 0 0††	1.33c	1,330	2.06c	1,375	1.98c	110
Structural shapes	2.11c 12 8 0††	1.49c	1,487	2.06c	1,375	1.93c	107
Plates, ¼-in. or 5 mm.	2.13c 12 10 6††	1.95c	1,951	2.42c	1,610	2.29c	127
Sheets, black	2.98c 17 10 0§	2.30c	2,295‡	2.85c	1,900‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.53c 20 16 3	3.59c	3,589	4.80c	3,200	6.66c	370
Plain wire	3.31c 19 10 0	2.34c	2,340	3.00c	2,000	3.11c	173
Bands and strips	2.51c 14 15 0††	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. *Pig iron export reported stopped. **Gold pound sterling not quoted. ‡‡No quotations.

of September, with no sheets available for spot delivery. Overflow, which runs to fairly large tonnage, is going to the United States. The automotive industry as well as the electrical equipment makers are important buyers at this time, and inquiries indicate there will be no early let-up in sheet demand.

Plates

Plate Prices, Page 80

New York — Plate specifications are well sustained. Some sellers report better activity than in June. Building requirements are expanding and industrial tank and boiler work is holding up well. More than 4000 tons of plates will be required for 627 light army tanks awarded to American Car & Foundry Co. It is understood the steel will be from one to three inches in thickness, largely electric furnace steel and will be heat-treated by the fabricator.

Philadelphia—Miscellaneous plate buying has increased but there is no inclination to build up stocks. Several mills can promise deliveries on small tonnages within a week or so. Larger mills are quoting about four weeks. A 160-inch mill outside this district is booked through August.

Birmingham, Ala. — Plate production is being pushed to capacity, largely because of demand from shipbuilders. Considerable tonnage is going to tank manufacturers, with some export bookings.

Seattle — Local shops have accumulated orders following idleness last month from labor troubles. No announcement has been made regarding Richfield Oil Co.'s Seattle plant expansion involving about 5000 tons of plates for storage tanks.

Toronto, Ont.—Plate demand continues high. With the only producer booked solid to the end of the year, demand is being filled largely in the United States. Boiler makers are calling more extensively for plate in connection with shipbuilding work as well as for gasoline and oil storage tanks.

Plate Contracts Placed

4200 tons, gasoline storage tanks, 50,000-gallon capacity, for delivery to Alaska and Panama, to Bethlehem Steel Co., Bethlehem, Pa.; bids received July 1 by quartermaster depot, Washington.

246 tons, Puget Sound Sheet Metal Works, Seattle, Wash., to Lukens Steel Co., Coatesville, Pa.

150 tons, sheets, appraisers store, San Francisco, to Bethlehem Steel Co., San Francisco.

125 tons, three 6000-barrel tanks, Humble Oil & Refining Co., Baytown, Tex., to Chicago Bridge & Iron Co., Chicago.

120 tons, eight gasoline fuel tanks, Hickam Field, T. H., to Western Pipe & Steel Co., San Francisco.

110 tons, standpipe, Lynnfield, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

Plate Contracts Pending

16,560 tons, six C-3 cargo vessels for United States maritime commission; bids July 29.

15,000 tons, fabricated steel plates, bolts and miscellaneous parts, Panama, schedule 4171, bids July 29, general purchasing officer, Washington.

5000 tons, Shasta dam, Central Valley project, California; material to be furnished by government.

3764 tons, cyclotron radiation laboratory, University of California, Berkeley; bids in.

3500 tons, schedule 37-SC, Orange county feeder line metropolitan water district, Los Angeles; general contract to Macco Construction Co., 815 Paramount boulevard, Los Angeles.

2000 tons sheets, liners for Orange county feeder line, metropolitan water district, Los Angeles; general contract schedules 34,35,36-P, to American Concrete & Steel Pipe Co., South Gate, Calif.

1000 tons or more, 15 open hopper barges, with or without barge covers, and separate proposals for 165 hopper covers for same barges; bids Aug. 5, Inland Waterways Corp., New Orleans.

354 tons, armor plate, bureau of ordnance, navy department, Washington, Carnegie-Illinois Steel Corp., Pittsburgh, only bidder, $300 per ton on 301 tons, and $332 a ton for remainder; bids July 10.

Bars

Bar Prices, Page 80

Pittsburgh—Slight decline in new bar bookings has been evident, but sellers are inclined to believe this is temporary, fostered largely by seasonal factors.

Cleveland—Bar mill backlogs still are growing as deferred deliveries induce additional buyers to seek protection. At the same time some important consumers are maintaining only small stocks. With automotive requirements and demand for defense purposes slated for expansion, bar producers see no early relief for the tight supply situation.

Chicago—Alloy bar demand has improved at some mills. Carbon bar sales generally show a recent tapering off, due mostly to previous heavy purchasing. Slight easing of demand has resulted in better deliveries in some cases, with common sizes reported available in three to five weeks.

Boston — Gradually mounting consumption of bars, notably alloys, is reflectetd in steady releases against orders and sustained new buying covering a broader range of users. Most tonnage being moved through secondary distributors, inventories of the latter are being kept well balanced, and, while deliveries on most small sizes and special finishes are somewhat further extended, supplies for fabricating consumers are ample.

New York — While there has been little variation so far this month, domestic bar specifications are expected to expand. Railroad specifications are picking up. The situation in heat treated alloy bars is increasingly complicated. Deliveries of 15 weeks or more are being quoted, with heat treating facilities becoming a real bottle-neck, it is pointed out. Alloy bar deliveries range approximately seven to nine weeks and plain carbon bars four to five weeks and beyond in some cases, depending upon specifications.

Pipe

Pipe Prices, Page 81

Pittsburgh — Oil country goods shipments have dropped slightly and new bookings are off somewhat, although it is possible the end of the month will show tonnage equivalent to that of June. Business in standard pipe continues to increase; backlogs are heavy in special items and mechanical goods.

Boston — With few large tonnages involved, increasing number of building projects and defense program expansions are beginning to influence merchant steel pipe demand. Piping for small engineering projects, including pumping station equipment, is more active. Shipyard requirements are maintained and are likely to increase shortly.

New York—Cast pipe inquiry is slightly heavier, but few large projects are included. Awards involve close to 600 tons for two water lines, New Jersey, and White Plains, N. Y., Stamford, Conn., and Hartford, Conn., are taking bids on moderate lots, the latter being for a flood control project on the Connecticut river.

Birmingham, Ala. — Pipe output is well maintained by virtue of miscellaneous utility and municipal buying. Most orders are for smaller sizes. Operations are five days a week.

San Francisco — Activity in cast iron pipe was not pronounced and only two awards over 100 tons were reported placed. Awards aggregated 565 tons and brought the year's total to 20,490 tons as compared with 17,424 tons for the corresponding period in 1940.

Cast Pipe Placed

190 tons, 6-inch, Inv. 6899-105, MacDill Field, Tampa, Fla., to United States Pipe & Foundry Co., Birmingham, Ala., bids July 9.

Cast Pipe Pending

430 tons, mostly 8 and 12-inch, Willowbrook state hospital, Staten Island, N. Y.; bids July 24.

300 tons, 6 and 8-inch for Portland, Oreg.; H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J., low.

200 tons, 4 to 12-inch, with fittings, White Plains, N. Y.

150 tons, mostly 10 and 12-inch, Stamford, Conn.

100 tons, 6-inch, procurement division, treasury department, Harrisburg, Pa.; bids in.

Rails, Cars

Track Material Prices, Page 81

Norfolk & Western has awarded 500 steel hopper cars to Bethlehem Steel Co., for Johnstown, Pa., shops and 500 to Virginia Bridge Co., Roanoke, Va. These will require about 19,000 tons of steel, including wheels and axles. This road has 550 box cars still on inquiry. Illinois Central has awarded 1000 box cars to Pullman-Standard Car Mfg. Co. for its shops at Bessemer, Ala. The company has also given Pullman five coaches and the Chicago, Rock Island & Pacific has let five stainless steel coaches to the same builder.

Illinois Central and Chicago, Rock Island & Pacific have each placed one 2000-horsepower diesel-electric locomotive with Electro-Motive Corp., LaGrange, Ill.

Car Orders Placed

Chicago, Rock Island & Pacific, five stainless steel coaches, including two baggage and express cars, a chair car, a standard sleeper and a dining-observation-lounge car, to Pullman-Standard Car Mfg. Co., Chicago.

Illinois Central, 1000 forty-foot steel box cars to Pullman-Standard Car Mfg. Co.; also five coaches, one diner and one club car, streamlined type, to same builder.

Norfolk & Western, 1000 fifty-five-ton hopper cars, 500 each to Bethlehem Steel Co., Bethlehem, Pa. and Virginia Bridge Co., Roanoke, Va.; action is yet to be taken on 550 box cars, bids already in on one lot of 50.

Locomotives Placed

Chicago, Rock Island & Pacific, one 2000-horsepower diesel-electric locomotive, to the Electro-Motive Corp., La Grange, Ill.

Illinois Central, 2000-horsepower diesel-electric locomotive, to Electro-Motive Corp., La Grange, Ill.

Locomotives Pending

Port of Tacoma, Washington, one 50-ton diesel-electric locomotive; bids July 23 to S. J. Maxwell, commissioner.

Duluth, Missabe & Iron Range, eight steam locomotives.

Union Pacific, contemplating purchase of 25 steam locomotives.

Wire

Wire Prices, Page 81

Pittsburgh—Manufacturers' wire items are moving less rapidly than in June, although production has not declined and backlogs remain fairly high. Export market continues active, although the blockade of the Mediterranean has created some delivery problems.

Cleveland—Buying of wire and wire products is fair, although not markedly changed since a month ago, and output of these items and wire rods remains active. Prior coverage has some restricting effect on demand for merchant products. Automotive wire buying has yet to assume major proportions.

Chicago—Business continues at a satisfactory summer rate and generally shows gradual improvement. More decided upturn pends renewal of automotive needs, expected first of next month. Merchant product demand is reported holding remarkably well.

Boston—Incoming wire volume continues heavy. While in spots there is some leveling off in buying and a decline in demand for spring

wire, heavy inquiry and prospective tonnage with consumption on the uptrend precludes the likelihood of any material slackening in the near future.

Shapes

Structural Shape Prices, Page 80

Pittsburgh — Construction inquiries continue in the heaviest volume in years. Mills report large backlogs, with deliveries farther delayed. The situation is most difficult on heavy structurals and special sections, with reasonable delivery time available on standard material.

Chicago — Awards have eased slightly, following a period of noticeable improvement. Fabricators are busier, both in shops and in figuring new projects. Many are of substantial proportions, though most are small.

Boston—Structural contracts are the heaviest of the year, involving more than 5000 tons for hangars, Chicopee Falls, Mass., and 1000 tons for shipyard expansions, Bath, Me., the former going to Bethlehem Steel Co. Inquiries for industrial plant expansions, most of them small, continue in fair volume, but the big lift to tonnage in the near future will be from additional shipbuilding capacity and other government projects connected with the defense program, including the air station at Quonset Point, R. I.

New York—Structural steel contracts substantially heavier, are overshadowed by thousands of tons going on the boards for estimates on government projects, contracts for which are being placed on a cost-plus-fixed-fee basis. These are being rapidly closed, several hundred million dollars worth of construction being placed already, while the total may reach $1,500,000,000, exclusive of housing.

Drydocks at Philadelphia and Norfolk, general contracts for which have been placed under negotiated cost-plus, will take close to 35,000 tons of miscellaneous steel; air station at Quonset Point, R. I., which is being especially expedited, will take an estimated 18,000 tons and first inquiries are appearing. Extension of shipways and other work at shipyard at Newport News will require about 12,000 tons of piling alone.

Seattle — Third quarter outlook is promising, with several important army and navy projects placed or pending, largest being $8,000,000 air defense job placed with the Austin company. Truscon Steel Co., Youngstown, has been awarded 500 tons for doors, windows and sash, including 300 tons for Kodiak and Sitka, Alaska, hangars, 100 tons at Boeing aircraft plant addition, Seattle, and 100 tons for the Perry trade school, Yakima, Wash.

San Francisco — Structural lettings were the second largest this year, 8445 tons. This brought the aggregate to 116,293 tons, compared with 71,083 tons for the same period last year. Bethlehem Steel Co. took 2921 tons for four land-plane hangars for the naval air base, Alameda,

Shape Awards Compared

	Tons
Week ended July 20	47,479
Week ended July 13	18,795
Week ended July 6	23,619
This week, 1939	27,937
Weekly average, year, 1940	19,035
Weekly average, 1939	22,411
Weekly average, June	18,059
Total to date, 1939	654,517
Total to date, 1940	562,035

Includes awards of 100 tons or more.

Calif. Consolidated Steel Corp. is low on 4000 tons for an addition to Lockheed Aircraft Co., Burbank, Calif. Bids open July 29 for 11,040 tons for six C-3 type cargo vessels for the United States maritime commission.

Shape Contracts Placed

10,000 tons, grade crossing elimination, section 4, Long Island railroad, Rockaway, N. Y., to Harris Structural Steel Co., Plainfield, N. J.; Charles F. Vachris Co., New York, contractor.

5500 tons, grade crossing elimination, Long Island railroad, Atlantic avenue, Brooklyn, to Bethlehem Steel Co., Bethlehem, Pa.

5000 tons, five air corps hangars, Westover field, Northeast air base, Chicopee Falls, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Tuller Construction Co., Red Bank, N. J., contractor, $1,623,300, bids, July 9, constructing quartermaster, that station.

3581 tons, four welded gates, 120 x 48 x 15 feet, for third set of locks, Panama Canal, schedule 4085, bids June 21, to U. S. Steel Export Co., Washington, $872,264; American Bridge Co., Pittsburgh, to fabricate.

2921 tons, four landplane hangars, specification 9185, naval air base, Alameda, Calif., to Bethlehem Steel Co., San Francisco.

1125 tons, bridge ERP, Fayette county, Texas, 945 tons, trusses, to Illinois Steel Bridge Co., Jacksonville, Ill.; 180 tons, beam spans, to Austin Bros., Dallas, Tex.

1000 tons, fabricating shop and shipway extensions, Bath Iron Works, Bath, Me., to American Bridge Co., Pittsburgh; Morton C. Tuttle Co., Boston, contractor.

850 tons, extension to power house, for Ohio Power Co., Philo, O., to Fort Pitt Bridge Works, Pittsburgh.

810 tons, addition, power station, Stamford, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa.; Stone & Webster Corp., New York, contractor.

700 tons, buildings, Mead Corp., Chillicothe, O., to Bethlehem Steel Co., Bethlehem, Pa.

650 tons, subway section S-1-A, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

630 tons, Eugene G. Grace Hall, Lehigh University, Bethlehem, Pa., to Bethlehem Steel Co., Bethlehem; direct bids.

625 tons, phenolic plastic molding materials plant, Monsanto Chemical Co., Springfield, Mass., to Belmont Iron Works, Eddystone, Pa.

610 tons, boiler house addition, Public Service Co. of Northern Illinois, to Mississippi Valley Structural Steel Co., Decatur, Ill.

523 tons, steel piling, flood walls and sills, United States engineer, Kansas City, Kans., to Inland Steel Co., Chicago.

500 tons, doors, windows, etc., for navy air bases in Alaska and other jobs, to Truscon Steel Co., Youngstown, O.

482 tons, racetrack grandstand, Albany, Calif., to Moore Drydock Co., Oakland, Calif.

470 tons, carbon baking building, Aluminum Co. of America, Vancouver, Wash., to American Bridge Co., Pittsburgh.

450 tons, six steel dolphins, Cape Cod canal, Massachusetts, to Bethlehem Steel Co., Bethlehem, Pa., through Merritt-Chapman & Scott, New London, Conn.

450 tons, addition to power plant, for Union Electric Light & Power Co., St. Louis, to Mississippi Valley Structural Steel Co., Decatur, Ill.

400 tons, state bridge, Indian river, Cocoa, Fla., to Bethlehem Steel Co., Bethlehem, Pa.

380 tons, tunnel ribs, Grand Lake project, bureau of reclamation, spec. 912, Denver, to Colorado Fuel & Iron Corp., Pueblo, Colo.

365 tons, addition, George Washington hotel, Jacksonville, Fla., to Aetna Iron & Steel Co., Jacksonville, Fla.

350 tons, eight buildings, air base, Mobile, Ala., to Southern Steel Works, Birmingham, Ala.; 60 tons reinforcing bars to Truscon Steel Co., Youngstown, O., through Beers Construction Co., Atlanta, Ga.

330 tons, alterations to office building for Insurance Co. of North America, New York, to Ingalls Iron Works, Birmingham, Ala.

310 tons, grade crossing elimination over Lehigh Valley railroad, state highway project RC-40-38, Erie County, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Bison Contracting Co., Snyder, N. Y., contractor, $112,208, bids June 12, Albany.

300 tons, addition, Waterside No. 2 station, Consolidated Edison Co., New York, to American Bridge Co., Pittsburgh.

279 tons, joggled and bent plates, Pa-

chie Car & Foundry Co., Seattle, Wash., to American Bridge Co., Pittsburgh.

275 tons, state bridges WPGH-25-B and C, Minturn, Colo., to Kansas City Structural Steel Co., Kansas City, Kans.

260 tons, additions, Niagara and Pingree exchanges, Detroit, to Whitehead & Kales Co., Detroit.

250 tons, bridge, Forty-ninth and Kingsessing, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa., through Summit Construction Co., Philadelphia.

250 tons, bridge over Frankford creek, Philadelphia, to American Bridge Co., Pittsburgh, through Kaufman Construction Co., Philadelphia.

250 tons, St. Gabriel school, New York, to Schact Steel Construction Co., New York.

250 tons, steel piling, flood protection project, section 1, United States engineer, Binghamton, N. Y., with work at Corning, N. Y., to Carnegie-Illinois Steel Corp., Pittsburgh, through Cleverock Inc., New York.

240 tons, state highway bridge, Hancock, Md., to Bethlehem Steel Co., Bethlehem, Pa.

235 tons, bridge FAGM-88-A(1) Wichita county, Texas, to Austin Bros., Dallas, Tex.

230 tons, building, Continental Can Co., Chicago, to Wendnagel & Co., Chicago.

220 tons, state bridge FB-1 of 82-22-4, Detroit, to Wisconsin Bridge & Iron Co., Milwaukee.

220 tons, store building, Montgomery Ward & Co., Cumberland, Md., to Ingalls Iron Works Co., Birmingham, Ala.

215 tons, reconstruction bridge H-40-B, East 204th street, New York, for state, to Fort Pitt Bridge Works, Pittsburgh.

215 tons, bridge contract H-9, Hutchinson river parkway, New York, to American Bridge Co., Pittsburgh.

201 tons, steel piling, Lewis river bridge, Woodland, Wash., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, building McCabe Powers Auto Co., St. Louis, to Stupp Bros. Bridge & Iron Co., St. Louis.

200 tons, bridge reconstruction, for New York Central railroad, Kingston, N. Y., to American Bridge Co., Pittsburgh.

190 tons, state bridge, contract 1975, Columbus, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

185 tons, store building, Chittum Motor Co., Morgantown, W. Va., to Ingalls Iron Works Co., Birmingham, Ala.

180 tons, state bridge PSC-6004, Jamison road, New York, for state, to Bethlehem Steel Co., Bethlehem, Pa.

180 tons, plant addition, LaSalle Steel Co., Hammond, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

180 tons, Jacobs No. 1 drawbridge near Stockton, Calif., to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

175 tons, underpass FAGM-9 (1), Casper, Wyo., for state, to Bethlehem Steel Co., Bethlehem, Pa.

170 tons, state bridge, contract 1979, Cloverdale, Ind., to Central States Bridge & Structural Co., Indianapolis.

165 tons, bridge FAGM-803-B1, Fannin county, Texas, to Virginia Bridge Co., Roanoke, Va.

162 tons, steel piling, grade separation, Chicago park district, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

155 tons, state bridge, contract 1972, Plainfield, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

155 tons, addition, Harrisburg Steel Corp., Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, state bridge over Weber river, Ogden, Utah, to American Bridge Co., Pittsburgh.

150 tons, nurses' home, Morton hospital, Taunton, Mass., to James E. Cox & Co., Fall River, Mass.

150 tons, power house, Henry Disston & Sons Co., Philadelphia, to Belmont Iron Works, Philadelphia.

147 tons, Louise street bridge, Glendale, Calif., to Consolidated Steel Corp., Los Angeles, and not to Bethlehem Steel Co. as previously reported.

140 tons, trestle and bins, Ohio Valley Coal Co., Elm Grove, W. Va., to Riverside Steel Co., Wheeling, W. Va.

140 tons, plant building No. 1, for B. F. Goodrich Co., Niagara Falls, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, shop building, The Bullard Co., Bridgeport, Conn., to Lehigh Structural Steel Co., Allentown, Pa., through Turner Construction Co., New York.

135 tons, state bridge FAS-373-G (1), Idledale, Colo., to Midwest Steel & Iron Works, Denver.

135 tons, bridge, Wyoming county, Pa., to Pine Brook Iron Works, Pine Forge, Pa.

130 tons, state bridges RC-40-50, Candor, N. Y., to American Bridge Co., Pittsburgh.

130 tons, Erie railroad bridge, Bellwood Park, N. J., to American Bridge Co.,

Pittsburgh, through Hogan & Gaul, Newark, N. J.

120 tons, state bridge B-1 of 77-17-23, Port Huron, Mich., to Yeager Bridge & Culvert Co., Port Huron, Mich.

115 tons, highway bridge, FARC-40-50, Tioga-Tompkins counties, New York, to American Bridge Co., Pittsburgh; J. F. Morgan Co., Ithaca, N. Y., contractor, $164,267.83, bids June 26, Albany.

115 tons, highway bridge WPA-1943-C, White county, Georgia, to Kline Iron & Metal Co., Atlanta, Ga.

110 tons, building addition, Mine Safety Appliance Co., Pittsburgh, to American Bridge Co., Pittsburgh.

110 tons, state highway bridge, Steuben county, New York, to American Bridge Co., Pittsburgh, through E. W. Foley Inc. Brooklyn, N. Y.

110 tons, dormitory, Westminster College, New Wilmington, O., to Pittsburgh Bridge & Iron Co., Pittsburgh.

100 tons, miscellaneous steel trusses in several local jobs, to Standard Steel Fabricating & Boiler Co., Seattle.

100 tons, Hylebos waterway crossing towers, Tacoma, Wash., to Bethlehem Steel Co., Seattle.

Shape Contracts Pending

11,040 tons, six C-3 cargo vessels, United States maritime commission; bids July 29.

4700 tons, power plant No. 2, for Union Electric Co. of Illinois, Venice, Ill.

4000 tons, addition to Lockheed Aircraft Co., Burbank, Calif.; Consolidated Steel Corp., Los Angeles, low.

3700 tons, Kings Boro houses, Brooklyn N. Y., for New York City housing authority.

2475 tons, including 1275 tons sheet piling, Caddoa Dam, Colorado; W. E. Callahan, Gunther & Shirley, 206 South Spring street, Los Angeles and Rohr-Connolly, 4351 Valley boulevard, same city, low on general contract at $7,160,755.

2200 tons, 150,000 feet curbing, Manhattan and Brooklyn, N. Y., for city of New York.

2000 tons, addition, Aluminum Co. of America, Los Angeles; bids July 29.

1525 tons, including 1300 tons sheet piling, East River drive, Thirtieth to Thirty-sixth street, New York; bids July 25.

1425 tons, including miscellaneous metal and piling, units 6 to 10, powerhouse foundations, Bonneville project; bids to Maj. R. H. Elliott, United States engineer, Bonneville, about Aug. 20.

1100 tons, state highway bridges and grade eliminations, New York; bids July 24, Albany.

1100 tons, hangar, air base, Quonset Point, R. I.; bids being taken.

750 tons, grade separations, New York, for Triborough bridge authority.

700 tons, addition to power plant, for Consumers Power Co., Comstock, Mich.

600 tons, three Indiana state highway bridges; bids July 23.

600 tons, mill building, Triangle Conduit & Cable Co., New Brunswick, N. J.; Brown & Matthews Co., New York, contractor.

550 tons, flue system for American Smelting & Refining Co., Barber, N. J.

550 tons, grade crossing elimination, Clinton county, New York; bids July 24.

540 tons, extension to buffing shop, for navy, Washington.

500 tons, shop, specification 9906, navy yard, Bremerton, Wash.; bids July 31.

440 tons, two state highway bridges, Lake Forest and Orland Park, Ill., bids in.

410 tons, I-beam bridge, Erie county, Pennsylvania; bids to state highway department, Harrisburg, Pa., July 26.

400 tons, addition, post office and courthouse, Little Rock, Ark.; bids Aug. 7, Washington.

400 tons, state bridge PSC-8758, Johnson City, N. Y.

400 tons, building for Bakelite Corp., Bound Brook, N. J.

400 tons, grade crossing elimination, Broome county, New York; bids July 24.

365 tons, A. C. hangar, Anchorage, Alaska, for United States government.

360 tons, state highway bridge, Columbia, Mo.; bids in.

330 tons, state bridge F-38-206-F-11), Artesia, N. Mex.

320 tons, office, factory and boiler buildings, for Jacobs Mfg. Co., West Hartford, Conn.

300 tons, shop building, Aberdeen proving grounds, Aberdeen, Md.; John F. Ruff, Baltimore, low.

300 tons, Sixty-third street trestle repairs, Chicago Rapid Transit lines, Chicago; bids in.

275 tons, post office garage, Detroit, bids July 18.

275 tons, store building, Hotel Statlers Inc., Buffalo.

Behind the Scenes with STEEL

Too Many Mikes

■ The stage whispers and asides that floated out over the air during the recent political conventions were better than a ringside seat: *"Have you seen Joe? . . .* Ladies and gentlemen . . . *Psst, make that guy quiet down . . .* We are gathered here tonight . . . *My gash, it's hot in here . . . Yeah, but who's the alternate?* . . . Alabama casts four votes for . . . *Harry wants you right away at the hotel . . .* Pennsylvania passes . . . *I knew it . . .* The delegates will please be in order . . . *Oh Lord, New York's goin' to poll their delegates!* . . . A man of valor, a man of virtue . . . *Boo! Boo! We want Yahootie!*

Distinctive

■ Congratulations are certainly in order for Mackintosh-Hemphill for adorning this week's issue with one of the most attractive front covers in a long, long time.

Puzzle

■ For midsummer madness try this old timer: Three missionaries and three cannibals have to cross a river. They can't swim, but do find a boat which will carry only two. It is also found that each of the missionaries can row a boat but only one of the cannibals can do so. Furthermore, a missionary can't be left with two cannibals or he'd be gobbled up. How would you arrange it so they all get across safely?

Bouquet of Orchids

■ If we repeated here all the nice little things said about STEEL we'd need pages each week. Donald L. Benton of Los Angeles just wrote such a soothing letter, though, we can't resist: *I am pleased to say that* STEEL *magazine keeps me reliably informed not only regarding progress, changes and news in relation to actual production and manufacturing but is a current business paper second to none. I am indeed grateful such a publication is available.*

Inserts Available

■ If you would like any extra copies of the insert in last week's issue analyzing industrial taxes, they are yours for the asking.

In The Mail

■ Two airmail letters from South America in this morning's mail. *From Brazil*: "There is quite a movement down here towards making our own steel products, importations of which have been about 25 millions a year. The Brazilian government is very much determined to carry on with a national steelmaking program and have it concluded within 5 years. It is therefore time for the American manufacturers of steelmaking equipment to start getting busy on the requirements that will be made from here." *From Chile*: "We plan on installing a coke factory to supply coke for a blast furnace here and recuperate the by-products. We have no coking coal in this country and shall have to import it." A real South American market in the making?

Notes On Gossips

■ Some people will believe anything you say—if you whisper it.

90 In The Shade

■ We're hot and grouchy, our collar is wilted, our mosquito bites itch, and we've got a touch of poison ivy. On a hot Friday afternoon the only good thing about working in the summer is that in the winter you wish it were as warm as.

SHRDLU

—*The Market Week*—

250 tons, grade elimination over New York Central railroad, highway project RC-40-59 and 60, Dutchess county, New York; D. W. Winkelman Co., Syracuse, N. Y., low, $235,440.15.

220 tons, addition to library, Wright field, Dayton, O., for government.

205 tons, bascule bridge, Dewey Beach, Sussex county, Del., bids July 22; also involves 80 tons bars, 30 tons machinery, 7 tons floor plates.

200 tons, two hangars and a shop building, Phoenix, Ariz.; bids July 22.

200 tons, buildings 60 and 68, for Orford Soap Co., Manchester, Conn.

200 tons, theater, Passaic, N. J., Central Amusement Co. of N. J., bids July 29.

200 tons, army school building, Lowry Field, Denver, Colo., bids in.

180 tons, substructure, power house, Fort Peck dam, Montana.

180 tons, for reinforcing roof and dome of Capitol Building, Washington.

175 tons, bridge, route 49, section 16, New Jersey state highway; Harry Eisenberg, Collingwood, N. J., low.

175 tons, laboratory building, Du Pont de Nemours & Co. Inc., Niagara Falls, N. Y.

175 tons, state bridge, route 49, section 16, South Dennis, N. J., relocation; Harry Eisenberg Inc., Collingswood, N. J., low, $228,355.24, bids July 12, Trenton.

160 tons, grade crossing, highway project RC-40-53, Erie county, New York; Border Building Co., Buffalo, low, $120,054.95.

150 tons, stability wind tunnel, Langley Field, Va., bids in; includes 100 tons bars in addition.

150 tons, state highway bridge RC-40-61, Van Etten, N. Y.

150 tons, building for Federated Metals Corp., Los Angeles; bids opened.

150 tons, telephone exchange building, Quincy, Mass.

150 tons, grade crossing elimination, Chemung county, New York; bids July 24.

140 tons, building, for Tabernacle Christian church, Columbus, Ind.

140 tons, state bridge FAP-163-C (1), Roswell, N. Mex.

130 tons, bridges, Iowa and Minnesota, for Chicago Great Western railroad.

125 tons, bridge, Compo Road, Westport, Conn.; bids in.

125 tons, highway project, RC-40-58, Seeley Creek-Steuben county line, New York; Dalrymple Gravel & Contracting Co. Inc., Elmira, N. Y., low, $48,812.15, bids July 10, Albany.

120 tons, ice rink, Stockton, Calif.; bids pending.

120 tons, alterations to school, for St. Patrick's Roman Catholic church, Troy, N. Y.

118 tons, draft tube gates and hoisting equipment, Wilson power plant, units 9 and 10, bids July 31, Tennessee Valley Authority, Knoxville.

110 tons, addition to building, for Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

Unstated, shop building, 360 x 140 feet, Puget Sound navy yard; bids to Com. R. T. Thomas, July 31.

Unstated, doors and miscellaneous steel for Boeing Aircraft Co. plant addition, Seattle; Austin Co., Seattle, general contractor.

Reinforcing

Reinforcing Bar Prices, Page 81

Pittsburgh—Except for some jobs in the Middle West, all concrete bar contracts are now on the 2.15c level. Where shading has occurred, the lowest recorded price is approximately 1.85c and the exceptions are few. New business is heavy, although there is still ample capacity.

Chicago — Total pending tonnage is unusually heavy, involving an increased number of small-lot jobs, and also a number of more substantially-sized projects. Most pending jobs are in lots of 40 to 50 tons each.

Boston—Reinforcing steel buying is heavier, 2000 tons of rods for large-diameter pipe fabrication, installation at Hartford, Conn., being placed with American Steel & Wire Co. Prices are steadier, but shading still crops out frequently.

Philadelphia—The 2.15c, base, on reinforcing bars has been applied on several small lots but so far has not encountered adequate test. However, it is indicated that the higher price probably will be fairly well maintained, due to demand for other types of bars now occupying mill capacity.

San Francisco — Reinforcing bar awards were the third largest this year, totaling 8059 tons, bringing the aggregate to 89,578 tons, compared with 89,451 tons for the same period a year ago. This is the first time this year that the total of 1940 lettings has exceeded the total for the same period last year.

Reinforcing Steel Awards

2000 tons, rods for reinforcing large-diameter by-pass pipe lines, (section C), Metropolitan District commission project, Hartford, Conn., to American Steel & Wire Co., New York, through Lock Joint Pipe Co., Ampere, N. J., contractor at $939,305.50, bids June 24, Hartford.

990 tons, bureau of reclamation, invitation B-38,318-A, Odair, Wash., to Bethlehem Steel Co., Seattle, Wash.

586 tons, buoys for submarine net across Golden Gate, San Francisco, to Columbia Steel Co., San Francisco.

520 tons, bureau of reclamation, invitation B-38,273-A, Odair, Wash., to Bethlehem Steel Co., Seattle, Wash.

485 tons, units of Coulee project, to Bethlehem Steel Co., Seattle.

434 tons, Missouri highway project 78-B, to Laclede Steel Co., St. Louis.

400 tons, bureau of sewers, Chicago, to Republic Steel Corp., Cleveland.

375 tons, five air corps hangars, Westover field, Northeast Air base, Chicopee Falls, Mass., to Truscon Steel Co., Youngstown, O.; Tuller Construction Co., Red Bank, N. J., contractor, $1,623,300, bids July 9, constructing quartermaster, that station.

325 tons, housing project, Fall River, Mass., to Concrete Steel Co., Boston; M. Spinelli & Sons Co., Inc., Boston, contractor, $731,500.

260 tons, mesh, state highway project RC-40-48, Palmyra-Newark, Ontario and Wayne counties, New York, to American Steel & Wire Co., New York; John Bellardino, Inc., Seneca Falls, N. Y., contractor, $274,757.25, bids June 26, Albany.

200 tons, highway project, East Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

180 tons, packing plant for Swift & Co., Seattle, to Bethlehem Steel Co., Seattle.

150 tons, state highway project, Lynnfield-Wakefield, Mass., to Northern Steel Co., Boston; C. Bianchi & Co.,

Concrete Bars Compared

	Tons
Week ended July 20	8,402
Week ended July 13	8,585
Week ended July 6	1,765
This week, 1939	7,529
Weekly average, year, 1940	8,177
Weekly average, 1939	9,197
Weekly average, June	10,377
Total to date, 1939	293,127
Total to date, 1940	237,149

Includes awards of 100 tons or more.

Inc., Framingham, Mass., contractor.

150 tons, highway project, contract 427, Westchester county, New York, to Truscon Steel Co., Youngstown, O.

150 tons, state hospital buildings, Deer Park, N. Y., to Igoe Bros., Newark, N. J., through P. J. Carlin Construction Co., New York.

144 tons, bureau of reclamation, invitation 32,205-A, Ignacio, Colo., to Colorado Fuel & Iron Corp., Pueblo, Colo.

142 tons, bridge, Park county, Wyoming, to Colorado Fuel & Iron Corp., Pueblo, Colo.

138 tons, bureau of reclamation, invitation 27,692-A, Deer Creek, Utah, to Colorado Fuel & Iron Corp., Pueblo, Colo.

138 tons, seaplane hangar, Midway Island, to Columbia Steel Co., San Francisco.

115 tons, bureau of reclamation, invitation 46,246-A, Kremling, Colo., to Colorado Fuel & Iron Corp., Pueblo, Colo.

110 tons, bridge near Safford, Ariz., to Bethlehem Steel Co., Los Angeles.

110 tons, Ford-Miller road grade separation, Detroit, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, filtration plant, West Hartford, Conn., to Bethlehem Steel Co.; F. H. McGraw Co., Hartford, contractor.

100 tons, project 2489, Shawnee county, Kans., to Sheffield Steel Corp., Kansas City, Mo.

100 tons, Bonneville project control house and untanking tower, Chehalis, Wash., to Bethlehem Steel Co., Seattle; S. S. Mullen, Seattle, general contractor.

Reinforcing Steel Pending

7000 tons, foundations for units 7 to 10, Bonneville power house; bids to Maj. R. H. Elliott, United States engineer, Bonneville, about Aug. 20.

2375 tons, Caddoa dam, Colorado; W. E. Callahan, Gunther & Shirley, 206 South Spring street, Los Angeles, and Rohr Connolly, 4351 Valley boulevard, same city, low on general contract at $7,160,755.

2235 tons, schedules 34,35,46-P, Orange county feeder line, metropolitan water district, Los Angeles; general contract to American Concrete & Steel Pipe Co., South Gate, Calif., at $999,328.

1900 tons, technical school building, Northwestern university, Evanston, Ill.

920 tons, purchasing agent, bureau of reclamation, Denver, inv. B-42493-A, bids July 23.

750 tons, addition to postoffice, Spokane, Wash.; James Leck Co., Minneapolis, general contractor.

700 tons, housing project, Newark, N. J.; Fatzler Co. Inc., Newark, low.

637 tons, housing project at Springfield, Ill.; bids July 15.

325 tons, highway project, Windsor, Conn.; bids in.

325 tons, highway project RC-40-57, Orange county, New York; Frank Stento & Son, Binghamton, N. Y., low, $432,551.25, bids July 10, Albany.

300 tons, superstructure, office building, E. I. du Pont de Nemours & Co., Wilmington, Del.

240 tons, city bridge, Elgin, Ill., bids in.

230 tons, East River drive, Thirtieth to Thirty-sixth street, New York; bids July 25.

226 tons, recreation building, naval air base, Alameda, Calif.; general contract to Robert & Moore, 693 Mission street, San Francisco.

210 tons, court house, Appleton, Wis.

210 tons, grade separation, contract E-2, Belt Parkway, Brooklyn, Triborough bridge authority project; Mill Basin Asphalt Co., New York, low.

200 tons, rebidding, three men's dormitories, University of Illinois, Champaign-Urbana, Ill.

200 tons, Call building, San Francisco; general contract to Cahill Bros., San Francisco.

175 tons, central heating plant, Westover field, northeast air base, Chicopee Falls, Mass.; George A. Bass, 2832 East Grand boulevard, Detroit, low, $404,281, bids July 17, to constructing quartermaster.

155 tons, bridges, Grafton and Merrimack counties, New Hampshire.

150 tons, contract E-1, Belt Parkway, Brooklyn.

150 tons, addition, Rhode Island hospital, Providence, R. I.

143 tons, operators' building and control towers, naval air base, Alameda, Calif.; bids opened.

125 tons, highway project RC-40-59 and 60, Dutchess county, New York; D. W. Winkelman Co., Syracuse, N. Y., low, $235,440.65.

125 tons, addition, Bakelite Corp., Bound Brook, N. J.; bids July 22; also involves 75 tons shapes.

125 tons, highway project RC-40-54, Seneca county, New York; John Bellardino Inc., Seneca Falls, N. Y., low, $129,039.45.

110 tons, plastics molding plant, Monsanto Chemical Co., Springfield, Mass.

105 tons, convent for Home of Good Shepherd, San Francisco; bids in.

100 tons, fish rearing ponds at Entiat, Wash.; materials by reclamation bureau; W. T. Butler Co., Seattle, general contractor.

100 tons, control house and untanking tower at Vernita, Wash.; bids to Bonneville project, Portland, Aug. 5.

100 tons, highway project RC-40-52, Cayuga county, New York; Rochester Concrete Const. Co. Inc., Rochester, N. Y., low, $125,412.65.

100 tons, highway project, Harriscena-Fort Ann, N. Y.; Belmar Co., Troy, N. Y., low, $107,112.60.

100 tons, low cost housing project, Beverly, N. J.; bids July 25.

100 tons, sewage disposal plant, New Holland, Pa.; bids July 26.

Unstated tonnage, housing project, Detroit, bids July 27.

Unstated tonnage, post office garage, Detroit, bids July 16.

Pig Iron

Pig Iron Prices, Page 82

Pittsburgh—Iron production continues to increase with demand showing fair expansion. There has been a slight upturn in export iron business. National Tube Co. has blown in its fourth stack at McKeesport, Pa., making 40 stacks active in the district.

Cleveland—Gain in pig iron shipments is indicated this month, despite seasonal slackening in oper-

ations of some plants. Deliveries for automotive use shortly will be expanded in anticipation of needs for new models.

Chicago — Shipments approximate those of June. Automotive and agricultural foundry needs have lessened, but have been supplanted by increased requirements for railroad and specialty foundries. Coke shipments continue virtually unchanged, holding to the rate of previous months. Iron buying is at a minimum, involving only occasional small lots.

New York—Foundry melt recently has been about on a parity with the June rate, although shipments have shown some increase. There has even been some buying, notwithstanding the heavy coverage in May and June.

Philadelphia—Pig iron shipments this month are at the most active pace so far this year. Export movement to England has been expedited, due to increasing requirements

Buffalo—Sentiment among producers is buoyed by shipments for the current month, slightly better than in June. Sellers report releases indicate practically all third quarter substantial bookings will be cleared.

Cincinnati—Shipments of pig iron are slightly below the high June level, but still above the early months. Foundry operations continue at about 60 per cent, with stove foundries improving to offset smaller jobbing melt.

St. Louis — Shipments and consumption hold near the June average. Operations of jobbing foundries are somewhat spotty, with new orders lighter but backlogs still large. Steel foundries are busier, but stove plants are working only two to three days weekly.

Scrap

Scrap Prices, Page 84

Pittsburgh — After prolonged quiet the market showed a little activity last week and some sales were made below quoted ranges. As a result, the list generally has been marked down, led by a cut of $1 in heavy melting steel, to a $19-19.50 range. Available quantities remain relatively small, and the undertone is firm.

Cleveland — Quiet in mill purchases is expected here and in the Valley for at least the remainder of this month. Major consumers are protected for several weeks by previous commitments and show little interest. Prices are lower.

Chicago—Range of $17 to $17.50 on No. 1 steel is established by mill purchases at the latter figure. Dealer-broker trading involves the same grade at $17.25, though activity is light. Market was dull last week, with some prices lower and others become nominal.

Boston — Scrap buying is slack with prices marking time on most grades with some scattered, but less sharp reductions. Most demand is for No. 1 machinery cast, foundries paying $18 and upward, delivered, dependent on freight cost.

New York — Domestic buying is slow, most tonnage moving from northern New Jersey. Prices generally are unchanged and somewhat steadier. Japan has placed 300,000 tons, about one-third of the tonnage with one broker. Prices paid were $1 to $1.50 lower than the last export sale. Three boats are loading close to 15,000 tons for England, and a 6000-ton cargo left late last week for Japan.

Philadelphia — Further weakness has developed in scrap prices despite present active rate of consumption. Material is coming out fairly freely and one or two mills have restricted shipments. Some additional business has been placed. Ex-

port buying continues with $17.50, Port Richmond, paid for No. 1 steel, and $16.50 for No. 2.

Detroit—Prices on a number of grades have been reduced 50 cents, although some dealers detect traces of underlying strength. A recent list of compressed sheets brought 50 cents below the previous market. Automotive scrap tonnages should increase rapidly after Aug. 15.

St. Louis—Prices continue to decline, most grades being lower. Trading has been light, but several large inquiries are pending. Exceptions to the weaker market are short and rerolling rails and certain railroad specialties, which are slightly higher. Railroad offerings are light.

San Francisco — Scrap prices are unchanged with a tendency towards weakness. Little of importance has developed in the export market. No. 1 heavy melting steel is quoted at $13.50 to $14 a net ton f.o.b. cars, metropolitan areas of Los Angeles and San Francisco, with No. 2 priced $12.50 to $13 and compressed sheets at $10.50 to $11. Borings and turnings hold at $5 to $5.50.

Warehouse

Warehouse Prices, Page 83

Chicago — Demand is slightly improved, returning to pre-holiday levels. This month may not exceed June in total business, but may be the best July in ten years. Orders are from usual sources, which are widely-diversified.

New York — Warehouse volume shows improvement, tonnage and sales being slightly ahead of last month. Individual orders tend to be somewhat heavier and demand is well distributed as to products, improvement most pronounced in shapes and galvanized sheets.

Buffalo — Better sentiment is apparent as July sales are about 10 per cent ahead of the same period in June. Distributors report consumers buying to fill defense needs and a gain in movement of reinforcing steel is also noted.

Cincinnati — Jobber demand in July is only a trifle off from the June level, largely because of the holiday period. Industrial use continues to exceed constructional demand.

St. Louis — Business is holding better than usual for this period, although late harvests tended to hold down demand from rural areas. Recovery in the latter is expected shortly. Miscellaneous buying of sheets and strip and business in oil country goods continue active.

Iron Ore

Iron Ore Prices, Page 84

Cleveland — All but three of the 297 Great Lakes bulk carriers were engaged in iron ore transportation July 15, according to a compilation by C. C. Lindeman, M. A. Hanna Co. This represents 99.13 per cent of the total trip capacity of 2,717,040 tons. A month ago 291 ships were active, or 98.44 per cent of total capacity, while a year ago 206 vessels were in commission, or 70.74 per cent, and of this total only 180 were in the ore trade. Inactive boats July 15 were three, of the Columbia Transportation Co.

Consumption of Lake Superior iron ore in June totaled 5,212,699 tons, against 4,566,200 tons in May and 2,829,667 a year ago, according to the Lake Superior Iron Ore association. Consumption of 27,332,666 tons for the year to July 1 compares with 16,970,886 tons a year ago. Stocks at furnaces and on Lake Erie docks July 1 totaled 23,515,820 tons, against 19,603,350 tons a month ago and 25,861,237 tons a year ago.

Tin Plate

Tin Plate Prices, Page 80

Pittsburgh — Mills report slight declines in operations, estimated this week at 75 per cent. This is partially due to vacations and does not necessarily indicate decline in specifications. With inventories high, current operating rate does not directly reflect releases on previous commitments. Export buying has been active and is increasing.

Steel in Europe

Foreign Steel Prices, Page 83

London—(*By Cable*)—Increasing deliveries of semifinished steel from the United States is relieving the situation in Great Britain but more tonnage is wanted. Practically all steel output is being used for war requirements and export trade is almost entirely suspended. Coke prices have been increased following the recent advance in steel prices. Domestic tin plate trade has been affected by cancellations of Continental contracts but there is good colonial and South American demand. Tin plate price has been lowered 1s per base box, to £1 9s 6d.

Ferroalloys

Ferroalloy Prices, Page 82

New York—Consumption of ferroalloys continues heavy, due to the high rate of steel production. Shipments are relatively light, because of the large movement last month in ferromanganese and other manganese and silicon alloys and certain specialties on which contract prices were increased July 1. Sellers look for a relative lull in this respect for another few weeks.

Nonferrous Metals

New York—Weakness in the domestic copper market was the chief development in nonferrous metal markets last week. Consumer demand generally was light.

Copper—Kennecott Copper Corp. was the apparent low bidder on two government inquiries for ingot copper at 10.75c, delivered. Other mine producers also made price concessions to the government but continued to quote 11.50c, Connecticut, in the open market. Resellers lowered electrolytic prices to 10.62½c and custom smelters were expected to meet that competition, although they reported no sales at the latter level. The export market remained dull, closing at only 10.10c, f.a.s. New York.

Lead—Sales again were light and below both the rate of shipments and sales. Prices held steady, however, at 4.85c, East St. Louis.

Zinc—Unfilled orders on sellers' books declined further as shipments continued well above new bookings. Galvanized sheet output has risen to a new high since mid-January which has tended to firm the market at the 6.25-cent level.

Tin—Purchases by the Metals Reserve Co. at 50.00c tended to stabilize the market at that level. Consumers are well covered and found no incentive to make any substantial new commitments.

Antimony—Only routine business was placed on the basis of 14.00c, New York, for American spot.

Manganese Ore Imports Present Supply Problem

New York—Although the steel industry is estimated to have on hand 14 to 15 months' supply of manganese ore, or about 1,000,000 tons at the current rate of consumption, prospects for continued heavy demand and uncertainty as to shipments from Russia, principal source, is focusing attention on the problem of future supply.

Caucasian manganese shipments are still moving through the Mediterranean and some observers believe they will continue. Some sellers are willing to contract well into the future but the situation is increasingly difficult. American ships are barred by the neutrality act, British ships are not able to engage in this trade and Russian ships are not carrying this ore. Most tonnage is handled by ships owned in Greece and other small countries. Much depends on eventual control of the Mediterranean by England or Italy.

The Gold Coast in Africa is the next largest supplier, last year making the largest shipments to the

Nonferrous Metal Prices

July	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
13	*10.87½	11.50	10.50	51.25	50.05	5.00	4.85	6.25	19.00	14.00	35.00
15	*10.87½	11.50	10.50	51.25	50.05	5.00	4.85	6.25	19.00	14.00	35.00
16	*10.75	11.50	10.50	51.00	50.00	5.00	4.85	6.25	19.00	14.00	35.00
17	*10.75	11.50	10.50	51.00	50.00	5.00	4.85	6.25	19.00	14.00	35.00
18	*10.75	11.50	10.50	51.00	50.00	5.00	4.85	6.25	19.00	14.00	35.00
19	*10.75	11.50	10.50	51.00	50.00	5.00	4.85	6.25	19.00	14.00	35.00

*Based on sales by custom smelters; mine producers unchanged at 11.50c.

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)	18.56
Copper, hot rolled	20.12
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	11.50

Tubes

High yellow brass	21.31
Seamless copper	20.62

Rods

High yellow brass	13.55
Copper, hot rolled	16.62

Anodes

Copper, untrimmed	17.37

Wire

Yellow brass (high)	18.81

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	6.87½-7.12½
Cleveland	8.00-8.25
Chicago	6.75-7.00
St. Louis	7.75

Heavy Copper and Wire

New York, No. 1	8.50-8.75
Cleveland, No. 1	9.00
Chicago, No. 1	8.12½-8.37½
St. Louis	8.75

Composition Brass Turnings

New York	6.50-6.75

Light Copper

New York	6.50-6.75
Cleveland	7.00
Chicago	6.12½-6.37½
St. Louis	6.75

Light Brass

Cleveland	4.25-4.50
St. Louis	4.25
Chicago	4.12½-4.37½

Lead

New York	4.50-4.60
Cleveland	3.90-4.15
Chicago	3.90-4.10
St. Louis	4.00-4.25

Zinc

New York	3.50-3.75
Cleveland	3.00-3.25
St. Louis	3.25-3.50

Aluminum

Misc., cast, Cleveland	8.00
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	11.50
Standard No. 12 aluminum	14.25-14.75

United States, accounting for 39 per cent of total imports of 627,129 tons, approximately 244,580 tons of 35 per cent or more manganese content. This compares with 126,858 tons in 1938 and 254,547 tons in 1937, the highest figure in recent years.

Cuban shipments reached a peak of 131,423 tons in 1938 and dropped to 106,610 tons last year. A new record may be made this year, although concentrating capacity of the leading producer, accounting for most Cuban production, is about 110,000 tons annually.

Brazilian shipments of 43,900 tons in 1939 gained over 29,698 tons in 1938, both well below 110,018 tons shipped in 1936. British India has supplied moderate tonnages to this country in recent years but is selling more aggressively this year. She shipped 126,913 tons in 1936, compared with 70,380 tons in 1937 and 25,480 tons in 1938. In 1939 her shipments were 43,900 tons, comparable with Cuba's total that year.

Domestic production of 35 per cent ore has been light, about 30,000 tons in 1939, compared with 40,241 tons in 1937. In five months this year production was 20,700 tons, close to an annual rate of 50,000 tons. In 1918 output was 305,869 tons. The highest mark in later years was 98,324 tons in 1925.

Imports in 1936 were 813,362 tons of 35 per cent or higher, 911,919 tons in 1937 and in 1939, 627,129 tons. In five months this year imports totaled 441,889 tons, an annual rate of 1,060,536 tons. In this period Russian shipments were about 169,000 tons. Government buying is said to total about 80,000 tons with larger tonnages under consideration.

Construction and Enterprise

Pennsylvania

ALTOONA, PA.—B. H. Schwan, city engineer, will undertake improvements at the municipal airport, to cost about $125,000, including hangars, service shops, floodlighting. Airport is at Pinecroft, a suburb.

ERIE, PA.—Erie Enameling Co., D. I. Goldberg in charge, 1400 West Twentieth street, is building a one-story 80 x 120-foot plant, general contract to J. C. Hammond, 224 Lincoln avenue.

FRANKLIN, PA.—Franklin Plastic & Die Casting Co., care Baldwin Laboratories Inc., Saegertown, Pa., W. S. Perry, vice president, will build a one-story plant on Grant street, 50 x 150 feet, to cost $40,000 with equipment.

NEW CASTLE, PA.—Johnson Bronze Co., P. J. Flaherty, president, will let contract soon for a one-story addition to cost about $45,000.

PHILADELPHIA—Rohn & Haas Co., 222 West Washington square, will let contract soon for an eight-story 55 x 75-foot chemical plant addition costing $100,000. Tilden & Pepper, Lewis Tower building, are architects.

PHILADELPHIA—Bids will be taken soon on a pumping station at Torresdale, first unit in the $18,000,000 waterworks program.

PITTSBURGH—Kerotest Mfg. Co., E. S. Mueller, president, 2525 Penn avenue, A. W. Anderson, purchasing agent, is having plans made by S. L. Rousch, 1210 Chamber of Commerce building, for a one-story manufacturing building costing $45,000.

PITTSBURGH—Mackintosh Hemphill Co., J. S. Ervin, president, F. K. Archer, purchasing agent, 901 Bingham street, is building a one-story 80 x 90-foot addition, general contract to Pittsburgh Bridge & Iron Works, Union Bank Building. C. V. Wilt, 901 Bingham street, is plant manager.

POTTSTOWN, PA.—Jacobs Aircraft Engine Co., Queen and Madison streets, J. S. Smith, president, is building one-story additions to cost about $100,000.

SCRANTON, PA.—Heat Exchangers Corp., care L. J. Boust, 329 Taylor avenue, is remodeling and improving former Finch Mfg. Co. plant on West Linden street at cost of $40,000.

YORK, PA.—Benjamin Foster Co., Philadelphia, has been awarded a $1,631,373 contract for channel work on Cororus creek at York, requiring 398 tons reinforcing steel.

Massachusetts

ASHLAND, MASS.—Warren Telechron Co. will build a plant addition and boiler plant addition at cost of about $40,000.

ATHOL, MASS.—L. S. Starrett Co., D. M. Findlay, president, 121 Crescent street, plans a one, two and four-story addition to cost $75,000. C. T. Main, 201 Devonshire street, Boston, is engineer.

BOSTON — Mason-Neilan Regulator Co., 1190 Adams street, has given contract to Austin Co., 16112 Euclid avenue, Cleveland, for design and construction of a plant addition.

INDIAN ORCHARD, MASS. — Monsanto Chemical Co., Worcester street, will let contract soon for a four-story manufacturing unit and two-story warehouse, at cost of about $250,000. I. R. Worcester & Co., 79 Milk street, Boston, are engineers.

LYNNFIELD, MASS.—Lynnfield Center water district has awarded a 450,000-gallon steel water standpipe to Bethlehem Steel Co., Bethlehem, Pa.

MALDEN, MASS.—Howland Co., Green street, plans a four-story paint manufacturing addition and alterations to plant, at cost of $40,000. Francisco & Jacobus, 511 Fifth avenue, New York, are engineers.

New York

LOCKPORT, N. Y.—Harrison Radiator Corp., F. N. Hardiman in charge, will build a two-story plant 240 x 350 feet, costing over $200,000.

SALAMANCA, N. Y.—Rathbun Moulding Corp., R. Rathbun, general manager, Rochester street, will build a one-story plant addition costing $40,000.

SYRACUSE, N. Y.—Spicer Mfg. Co., 4100 Bennet road, C. A. Dana, Toledo, O., president, will build a two-story factory on Geddes street, costing $50,000.

New Jersey

CALDWELL, N. J.—Curtis Wright Aeronautical Corp., 132 Beckwith avenue, Paterson, N. J., will let contracts soon for a one-story and balcony 225 x 600-foot propeller factory on Fairfield road adjacent to Caldwell airport. Albert Kahn, New Center building, Detroit, is architect. (Noted July 8.)

CAMDEN, N. J.—National Waterproofing Co., Front and Pine streets, is having plans prepared by A. B. Gill, Market street, for a one-story warehouse 60 x 127 feet.

CLIFTON, N. J.—Fritsche Bros., 86 Third street, will let contract soon for a three-story chemical plant, 50 x 137 feet, costing $200,000. Epple & Kahrs, 5 Washington street, Newark, N. J., are architects.

Ohio

CINCINNATI—City, John E. Root, director public works, will open bids July 23 for one mobile yard crane, one truck crane and one clamshell bucket for division of highway maintenance.

CLEVELAND—Steel Storage File Co., 2216 West Sixty-third street, Walter F. Regenhardt, president, will erect a plant with 24,000 square feet floor space on East Bowman street, Wooster, O., to which its operations will be removed. (Noted June 10).

CLEVELAND—Lindsay Wire Weaving Co., 1402 Aspinwall avenue, will build a further addition of 2000 square feet on two floors, costing $8000. A. F. Crossman is president. Another extension is already under way .

MIDDLEFIELD, O.—Johnson Rubber Co. is building 5400-square foot machine shop 45 x 120 feet. Alger Rau Inc., 12434 Cedar Road, Cleveland, is general contractor.

YOUNGSTOWN, O. — Albert Sheet Metal Co. has been incorporated to manufacture sheet metal products by John W. Albert, 120 East Woodland avenue, Youngstown, O.

Michigan

ADRIAN, MICH.—Stearns Mfg. Co., manufacturer of concrete block machinery, Eugene F. Olson, president, plans a factory addition 40 x 75 feet.

DETROIT—Magnetic Products Corp., 4821 Bedford road, has been incorporated with $1000 capital to deal in tools, magnetic and electrical testing machines, by Theodore B. Bindshedler, 40 Hampton road, Grosse Pointe Shores.

DETROIT—Detroit Tap & Tool Co., 8432 Butler street, is taking bids through Henry M. Freier, architect, for a plant addition.

DETROIT — Detroit Reamer & Tool Co., 6527 Russell street, has been incorporated to deal in cutting tools, capital $15,000, by Rudolph W. Andreasson, 8595 Cloverlawn avenue.

JACKSON, MICH.—John Crowley Boiler Works is having plans drawn by Frost & Snyder, Jackson, for a one-story boiler manufacturing plant, costing about $45,000.

MUSKEGON, MICH.—Lakey Foundry Co. will rebuild its burned foundry.

THREE RIVERS, MICH.—Dock Foundry Co. has been incorporated with $25,000 capital to operate a foundry, by Ralph G. Dock, Three rivers.

Illinois

CHICAGO—Barkowe Chemicals Inc., 1702 North LaSalle street, has been incorporated with 100 shares no par value by L. Kole and associates. Saul L. Corush, 111 West Monroe street, is correspondent.

CHICAGO—Campbell Soup Co., 2550 West Thirty-fifth street, is having plans prepared by Battey & Childs, architects, 231 South LaSalle street, for an addition 100 x 160 feet, costing $250,000.

CHICAGO—Bell & Gossett Co., 3000 South Wallace street, is building a one-story addition 200 x 210 feet costing $125,000.

CHICAGO—Illinois Meat Co., 3939 Wallace street, will ask bids soon for a four-story packing plant addition costing $50,000. H. C. Christensen, 616 South Michigan avenue, is architect.

CHICAGO — Sherwin-Williams Co., 115th street and Cottage Grove avenue, is having plans prepared by Albert Kahn, New Center building, Detroit, for a one-story plant 100 x 300 feet, costing $100,000.

ELGIN, ILL.—Elgin Machine Works, manufacturer of automobile piston pins, has given contract to Martin Skok for one-story plant addition 40 x 50 feet.

Indiana

LAFAYETTE, IND.—H. M. C. Inc., 606 Lingle avenue, has been formed to manufacture machinery and tools, with 600 shares class A and 400 shares class B no par stock, by Hubert M. Clark and associates.

MARION, IND.—Anaconda Wire & Cable Co., East Fifth street, plans an addition to cost $50,000 with equipment.

SHELBYVILLE, IND.—National Farm Machinery Co-operative Inc. has started construction of a $16,000 plant to manufacture a new-type farm tractor which will be put on the market about Sept. 1. Plant will be built by Shelby Industries Inc., formed by local capital to finance the project.

Kentucky

PADUCAH, KY.—Curtis Lighting Co., 1123 West Jackson boulevard, Chicago, will build a factory here for manufacture of commercial lighting equipment, costing $175,000.

Missouri

ST. LOUIS—Pittsburgh-Erie Saw Co., 1569 Tower Grove avenue, will build a one-story 42 x 54-foot plant addition, general contract to W. C. Harting Construction Co., 722 Chestnut street, at about $45,000.

Wisconsin

KENOSHA, WIS.—Arneson Foundry Co. has let contract to J. C. Tully Co. for foundry addition.

MADISON, WIS.—City will take bids in September for 100,000-gallon steel water tank on 100-foot tower and 10-inch pipeline to distribution system, at cost of about $25,000. A. W. Barels is city clerk.

MILWAUKEE—Falk Corp., 3001 West Canal street, is building a two-story 75 x 150-foot factory addition, general contract to Klug & Smith, 11 East Wisconsin avenue. (Noted June 24.)

MILWAUKEE—Seer Mfg. Co., 3241 North Thirtieth street, has been incorporated to manufacture electric lighting fixtures by Herman and Richard Seer and Emil Hrdlicka.

MILWAUKEE—Heil Co., manufacturer of hydraulic scrapers, hoists and other machinery, has given contract to Klug & Smith, 111 East Wisconsin avenue, for plant addition 45 x 225 feet for crane runway.

MILWAUKEE—Wadhams division Socony-Vacuum Oil Co. has awarded contract to Peters Construction Co., West Blue Mound road, for bulk oil plant on Jones island, main building 60 x 166 feet, warehouse 80 x 83 feet and pump house 20 x 60 feet.

WASHBURN, WIS.—Michela Coal & Dock Co. plans construction of 1100-foot railroad spur and ten steel coal hoppers. Fred C. Patzer is manager.

Minnesota

GRAND RAPIDS, MINN.—Dairyland Electric Co-operative, James F. Staebler, president, has been allotted $233,000 REA funds for 266 miles rural transmission lines in Itasca county.

HANSKA, MINN.—Village council, Glenn M. Anderson, recorder, opens bids July 25 for construction of waterworks system, including 50,000-gallon steel water tank on 100-foot steel tower and 12,000 feet water mains. Druar & Milinowski, 1411 Pioneer building, St. Paul, are engineers.

MINNEAPOLIS—Dayton Rogers Mfg. Co., manufacturers of metal stampings, has awarded contract to Splady & Haagenson, Pence building, for one-story plant addition 61 x 100 feet.

MINNEAPOLIS—Chicago, Milwaukee, St. Paul & Pacific railroad has given contract to Dunnigan Construction Co.,

Minnesota Mutual Life building, St. Paul, for a one-story locomotive machine shop at South Minneapolis yards, 16 x 200 feet.

ST. PAUL—Edward E. Johnson Inc., manufacturer of well screens and other water supply equipment, has given contract to F. J. Romer Construction Co., 190 Ramsey street, for a factory addition.

Texas

HOUSTON, TEX.—Chicago Bridge & Iron Co., 2919 Main street, has bought site in 5600 block Clinton Ave. and will erect small office building, machine shop and warehouse 60 x 200 feet, storage shed and open storage.

MINEOLA, TEX.—City, J. C. McGlothlin, mayor, votes August 5 on $247,242 bonds for construction light and power plant and distribution system. Albert C. Moore & Co., 2404 Smith-Young tower, San Antonio, Tex., are consulting engineers.

Iowa

CRESCO, IOWA — Howard County Electric Co-operative, E. G. Skarshoug, superintendent, has been allotted $343,000 REA funds for 377 miles of rural transmission lines in four counties.

IOWA FALLS, IOWA—Hardin County Rural Electric Co-operative, Ben Jaspers, superintendent, has been allotted $239,000 REA funds for 269 miles rural transmission lines.

WATERLOO, IOWA — John Deere Tractor Co., L. A. Rowland, general manager, has given contract to John G. Miller Construction Co., for seven-story addition, 120 x 200 feet.

WOODBINE, IOWA—Village council, C. S. King, clerk, will open bids August 5 on construction of municipal light and power plant 38 x 60 feet and power equipment, including three diesel generator units, and for electrical distribution system, total $115,000. A. S. Harrington, 501 Baum building, Omaha, Nebr., is consulting engineer.

Wyoming

CHEYENNE, WYO. — Eaton Metal Products Co., 400 Hynds building, has been incorporated to deal in iron, steel and other metals by Albert N. Eaton and associates.

Montana

ABSAROKEE, MONT.—Beartooth Electric Co-operative has been allotted $284,000 REA funds for 269 miles rural transmission lines in four counties. J. H. Wright is president.

California

BURBANK, CALIF.—Menasco Mfg. Co., A. E. Shelton, president, will build an aircraft engine factory at 805 East San Fernando road, containing 50,000 square feet floor space. Administration building will have 8500 square feet floor space.

LOS ANGELES—Douglas Oil & Refining Co., Donald W. Douglas, chairman, will build oil refinery costing $650,000 on 18-acre site at Main and East roads, Los Angeles county. Company will finance by issue of 130,000 shares $5 par preferred and 740,000 shares no par common.

LOS ANGELES—Byron Jackson Co., 2150 Slauson avenue, pump manufacturer, will build a pattern shop costing $65,000 at Huntington Park, a suburb.

LOS ANGELES—Fruehauf Trailer Co., 6137 South Boyle avenue, is building an additional crane runway at cost of $6800.

Oregon

PORTLAND, OREG.—Major R. H. Elliott, United States engineer, Bonneville project, will call bids about August 20 for units 7 to 10, Bonneville powerhouse, requiring 625 tons steel sheet piling, 7000 tons reinforcing bars, 700 tons shapes, and about 165 tons miscellaneous steel products.

Washington

BELLINGHAM, WASH. — Trustees Western Washington College of Education receive bids July 23 for concrete piling and foundations for $300,000 training school. Bebb & Jones, Seattle, are architects.

GOLDENDALE, WASH.—Special election will be held August 13 on proposal to issue $75,000 bonds for sewage disposal plant and water supply extension.

PUYALLUP, WASH. — Washington State College experimental station has a WPA allotment of $14,427 for construction of machine shop and other improvements.

SEATTLE — General Petroleum Co., 1516 Thurman avenue, plans extension of pier and oil storage warehouse, firewall enclosure and construction of three 20,000-gallon steel storage tanks.

SPOKANE, WASH. — Inland Empire Rural Electrification Inc. has started survey for proposed 500-mile power line extension, to cost $500,000. System now has 1200 miles in operation.

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Several territories are still available for the sale of Welded Steel Duplicate Parts. Manufacturers' agents with an engineering background and who are desirous of adding a fast growing line, are asked to write immediately. There is a greatly expanded market for these products but high calibre and energetic representatives are required in selling them. If you feel that you can secure a substantial volume of business in selling these parts, write Fusion Process Division, Box 358, Evansville, Indiana.

SALES REPRESENTATIVE — ILLINOIS, Wisconsin, Pacific Coast. Rapidly growing machine tool attachment sales already proving possibilities of $2000 machine tool attachment in coming defense program. Representative calling on tool and die shops and having knowledge of machine tools. Give lines now being handled, experience, engineering qualifications. Address Box 263, STEEL, Penton Bldg., Cleveland.

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WANTED—LABOR ESTIMATOR EXPERIenced in welded ASME Code tanks and pressure vessels as well as miscellaneous steel plate fabrication. Well established Ohio manufacturer. State experience, qualifications and salary. Permanent position, steady work. Address Box 268, STEEL, Penton Bldg., Cleveland.

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Bids Wanted

Federal Works Agency, Public Buildings Administration, Washington, D. C., July 3, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., Standard Time, Aug. 1, 1940, for construction of the U. S. P. O. at Belle Vernon, Pa. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

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P & H Crane, span 71' 10". 10-ton bridge; two 5-ton trolleys. Full eqpt. Price $2300.
P & H Crane, span 42' 2"; 3-ton bridge with one 3-ton trolley; full eqpt. Price $750.
6 Whiting 5-ton trolleys; full eqpt.; Price 4 each $1000; 2 each $850.
Bridge motor—$100.
1 enclosed heated cab with two trolleys and eqpt.—$300.
Parts for Whiting hoists—prices on request.
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2"-4"-6"-8"-12" Wm. Pipe Mach., M.D.
No. 5 H&J Gulll. Shear 4-1/2" rd., M.D.
10'x1/4" Bliss Sq. Shear 18" gap.
18" W-F & 36" Yoder Gang Slitters, M.D.
48" Aetna-Std. Straightener 17-3 3/4" M.D.

WEST PENN MACHINERY CO.
1208 House Bldg. Pittsburgh, Pa.

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SHEET MILL EQUIPMENT

1—Mesta 1500 H.P., Gear Drive, 9.75-1 Ratio.
1—G. E. 1500 H.P. Motor, 300 R.P.M., 4600 V, 3 Phase, 60 Cycle.
7 Pairs Mesta 28" Hot Mill Housings, 7 ft. 0" Spread.
5 Pairs Hyde Park 28" Hot Mill Housings, 7 ft. 0" Spread.
2—32" Mesta Picklers, Pneumatic, 6 Arms, 6 ft. 3" Stroke, 13 ft. 6" Radius.
1—No. 3 Mesta Lever Shear.
2—54" Mesta Steam Doublers.
2 Sets Wean Semi-Automatic Feeding and Catching Tables.
1—Schulte Sheet Grinding and Polishing Machine.
1—Aetna-Standard Automatic Top and Bottom Roll Polisher.
1—Freyn Electric Regenerative Mill Drag.
28" x 36", 44", 54" Freyn Electric Roll Heaters.
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MILL MOTORS

1—300 HP GECO	—MPC-L	230V 500 RPM
1—230 HP GECO	—MDS-109.5	500V 435 RPM
1—140 HP WECO	—MC90	500V 515 RPM
1—125 HP GECO	—MDS-108	230V 435 RPM
1— 75 HP GECO	—MDS-106	230V 485 RPM
1— 45 HP WECO	—K9	230V 515 RPM
3— 30 HP GECO	—MD-104	230V 750 RPM
8— 20 HP WECO	—K6	230V 515 RPM
20— 12 HP GECO	—MD-102	230V 875 RPM
1— 10 HP WECO	—K4	230V 890 RPM
3—6.5 HP WECO	—K3	230V 690 RPM

ADJUSTABLE SPEED MOTORS

WECO TYPE SK		GECO TYPE RF
5— 5 HP	230 VOLTS D.C.	3—25 HP
20—10 HP	2— 20 HP	8—30 HP
7—15 HP	1—100 HP	5—50 HP

UNEXCELLED STOCK!
CONSTANT SPEED A.C. & D.C. MOTORS
MOTOR GENERATOR SETS
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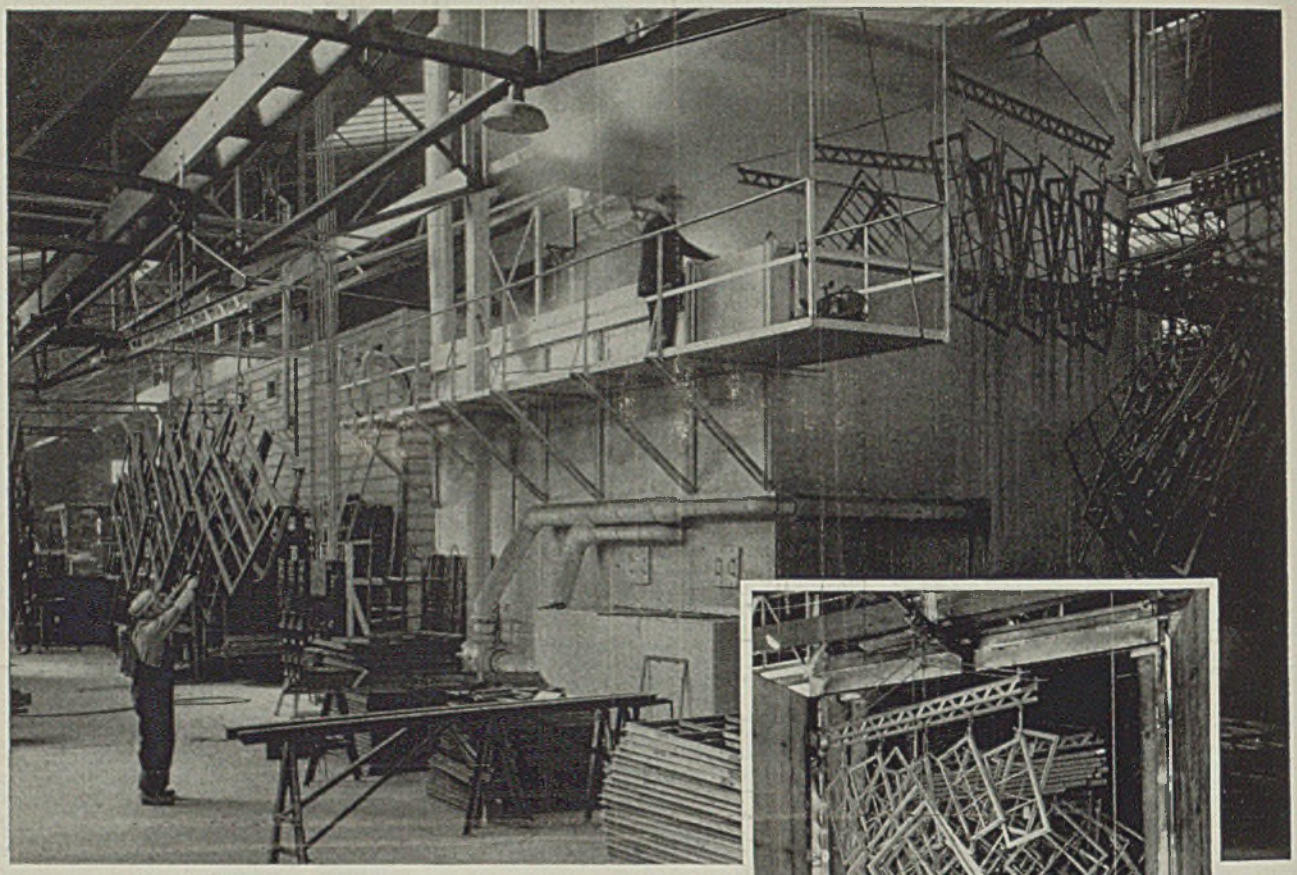
Where-to-Buy Products Index carried in first issue of month.



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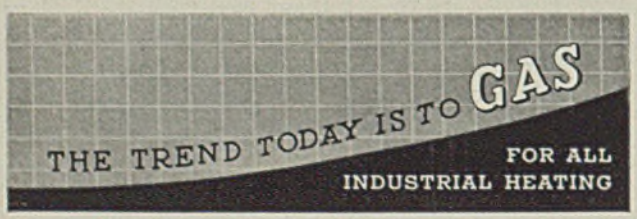

AMERICAN GAS ASSOCIATION

INDUSTRIAL GAS SECTION

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