STEEL

ESTABLISHED 1882

Contents

Volume 108—No. 24 **June 16, 1941**

PRODUCTION • PROCESSING • DISTRIBUTION • USE

PROGRESSIVE VISION

James Monroe

The Monroe Doctrine

Protection for the Americas

"PROGRESSIVE VISION"—is well defined in the principles of the "MONROE DOCTRINE." Although it was written over one hundred years ago, it still stands as a warning against foreign entanglements and aggressions in this hemisphere.

President James Monroe, author of this doctrine, gained immortality because of his contribution to the freedom of all American nations.

Respect for this nation and its ships at sea, by foreign nations, has been maintained by that historic document and the power behind it.

THERMALLOY *the "EYE" of QUALITY*

THE ELECTRO ALLOYS COMPANY

CASTINGS FOR HEAT CORROSION

ELYRIA, OHIO

QUALITY CASTINGS SINCE 1919

HIGHLIGHTING THIS ISSUE OF STEEL

■ J. LEONARD REPLOGLE, the War Industries Board's director of the steel supply in World war I, denounces the proposal of OPM **(p.25)** to increase the country's steel capacity by 10,000,000 tons as a move that would retard rather than accelerate our defense efforts. "I have no doubt," declares Mr. Replogle, "that it would meet with the complete approval of the much detested but tremendously efficient German high command." In response to OPM's request, steel producers last week reported on what they can do to increase steelmaking facilities by the desired amount. It still is possible that when OPM sees how such a program would cut into our present economy it may be sharply modified.

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Labor Leaders Now on "Spot"

Last week's swiftly moving events along the labor front **(p. 21)** led to hopes that at long last unpatriotic labor leaders are to be thrust from power. Use of the army in ending the strike at the North American Aviation Inc. plant, action by high CIO officials in purging Communists from their ranks and the bad temper increasingly displayed by Congress were signs of the trend. Industrial management, however, sees government taking over of struck plants as an expedient to avoid semblance of placing blame on guilty labor leaders. . . . Gano Dunn **(p. 25)** has resigned as special consultant to OPM's Production Division. . . . Coal in the Pacific Northwest **(p. 24)** is suitable for production of metallurgical coke.

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Zinc Under Full Priority

Thirteen steel sheet and strip producers have been asked **(p. 107)** to curtail production for nondefense. In fact, it now definitely is indicated that nondefense consumption will suffer. Difficulties from scarcities served as the main theme **(p. 31)** at last week's conventions of the electroplaters and the radio manufacturers. . . . High-speed steel **(p. 32)** is to be rationed. . . . Tungsten carbide now **(p. 34)** is on the critical list; zinc is under full priority control, as also is aluminum scrap; the copper priorities control has been revised; additional interpretations and instructions have been issued in connection with General Metals Order No. 1. . . . Steel distribution by consuming classifications in 1940 **(p. 40)** is announced.

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Metals As Catalysts

E. A. Arnold begins **(p. 54)** a series of three articles on how metals and their oxides are being used as catalysts in many new chemical processes which aid defense production. . . . A number of methods **(p. 62)** for preparing and joining tube ends are given. . . . Maxwell A. West tells **(p. 74)** about a new screw head recess and driver system that appears to have important possibilities. . . . A new source of heat **(p. 82)** for heating parts when making shrink fits is described. . . . Sound-deadening paint applied to one side of metal surfaces **(p. 100)** dampens vibrations and cuts resonance, thus reducing noise in many applications, especially in sheet metal work.

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Making Shell, Bomb Fuzes

This week, Professor Macconochie tells **(p. 56)** of production methods followed in making shell and bomb fuzes. Elaborate precautions are taken to minimize the risks in handling the highly explosive elements of the fuzes. A typical production line is described and illustrated. . . . Henry D. Hibbard discusses **(p. 69)** the effects of hydrogen and methods developed for controlling the hydrogen content of steel. . . . James H. Conniff and John Lawrence describe **(p. 84)** a number of innovations in finishing practice now used to aid more efficient application of paint on machine tools at plant of Jones & Lamson Machine Co., Springfield, Vt.

RYERSON CERTIFIED STEELS..ARE

"Handled with Kid Gloves"

● This picture symbolizes the precautions taken by Ryerson warehousemen to protect the fine quality of Ryerson Certified Steels. Nothing is left undone to insure their reaching you in perfect condition.

All Ryerson stocks are under roof; all loading and unloading is done inside. Many steels are kept in heated, humidity-controlled rooms. *Every ton* is carefully handled to safeguard its high uniform quality. In fact, stainless and other fine steels are actually handled with soft cotton gloves to protect the highly polished surfaces. The condition of all steels, their analyses, size, and surface finish are closely checked.

In times like these, many sizes of certain products are naturally low, some are out. But for the most part, you can depend on Ryerson for good service on thousands of different kinds, shapes and sizes of steel and allied products. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Philadelphia, Boston, Jersey City.

RYERSON *Certified* **STEELS**

RYERSON CERTIFIED STEELS

STEEL

Unruly Reds Boast It Took Power of U. S. Army To Put Them Down

Political strikes slow defense material production, despite "unlimited emergency" . . . Communistic infiltration into unions revealed to public . . . Administration turns from Wagner act to bayonets

■ SEEDS sown and cultivated by the New Deal are bearing bitter fruit.

The seeds were contained in the Wagner act — America's Magna Charta for the Communist and firebrand.

Its administration by the National Labor Relations Board, which until recently itself was saturated with left-wingers, fertilized and protected the growing plant.

Now in a time of "unlimited emergency" the plant has produced fruit—strikes, paralyzing defense; strikes described by strong friends of organized labor and by heads of the unions themselves as "vicious", "underhanded" and "communistic"—strikes of the "insurrection" type, which necessitate calling out the Army to permit industries to proceed with national defense.

Strikes last week were primarily political, virtually against and in defiance of the government.

These strikes and others recently, have occurred almost immediately *after* wage increases and other concessions demanded by workers have been granted. Some have been called in violation of signed contracts. Some have been ordered by local left-wing officials acting against orders from national union leaders.

Communistic penetration into the labor unions, apparent to careful observers for many years, has been brought home to the American public within the past fortnight. It now is admitted by union leaders.

Richard Frankensteen, national director of the aircraft division, United Automobile Workers-CIO, after being heckled by a group of communistic "goons" while urging North American Aviation Co. strikers to return to their jobs at the Inglewood, Calif., plant, stated: "Vicious underhand maneuvering of the Communist party is apparent in this strike."

Sidney Hillman, associate director

Our Boys See Service on the "CIO" Front

■ After the President's "fireside chat" May 27, wherein he said: "This government is determined to use all of its power . . . to prevent interference with production," apparently the word "POSITIVELY" was not passed along to the labor leaders. For, despite that speech, strikes were renewed, and increased in recklessness, until it became necessary to call these "regulars"—part of a force of 3500—to the North American Aviation plant. Still unconvinced, radicals proceeded to demonstrate their power; strikes, not the European war, were the blazing news headlines of the week. NEA photo

■ HAPPY TO RETURN TO WORK: 6000 employes who returned to their jobs of producing military planes after the United States Army broke the Communist-inspired strike at Inglewood, Calif., cheered the soldiers who made the resumption of production of defense weapons possible

general of the Office of Production Management, in commenting upon the North American strike situation said: "It became apparent that we were not dealing with a genuine labor organization but rather with an irresponsible group which had acquired certain key official positions in local 683 and had embarked upon a course of outrageous defiance. From the first their conduct spelled defiance of the charter under which local 683 operates as an affiliate of the United Automobile Workers of America.

"It is defiance of the duly constituted and responsible leadership of the United Automobile Workers of America. It is defiance of the only constituted leadership of the Congress of Industrial Organization which has co-operated wholeheartedly in the defense program.

"It is defiance of the National Defense Mediation Board in its effort to insure fair and equitable disposition of the demand of the North American workers for an increase in wages. It is defiance of the President of the United States and the United States government in their determined effort to build the strong defense of this nation.

"This defiance is a challenge that goes to the roots of the entire democratic system—and the efforts of this democracy to preserve itself. To such a challenge there can be only one answer, and that answer has been given in the form of the President's executive order."

Philip Murray, CIO president, and a member of the National Defense Mediation Board, said in reference to the International Woodcutters Association's strike in the West coast lumber district after the union's president had openly defied the Mediation board:

"Continuation of the strike under existing circumstances is no longer regarded as being directed against the employers but rather against the Defense Mediation Board.

Statements by these recognized union leaders confirm Communist infiltration into the organized labor movement. Students of labor relations long have decried left-wing penetration into unions. The Allis-Chalmers Mfg. strike at Milwaukee last January brought into the open the fact of Communistic influence. This strike, affecting a third of the nation's defense production, was staged by left-wingers as a dress rehearsal challenge to the American system. Wages, hours, working conditions were not real issues in the Allis-Chalmers strike; it was a Communist-concocted scheme to paralyze American defense production and to educate subversive leaders for a wider program of work stoppage.

A firm stand by the government in the early stages of the Allis-Chalmers strike might have done much to prevent the wildcat strikes which have followed. While pointing to the ominous tread of dictatorship abroad, the government has blinked at sinister forces at home.

Further evidence of Communist influence in current labor disputes is evident to all in the remarkably strategic points at which strikes break out. The Allis-Chalmers strike, affecting only 7800 workmen, blocked the production of work

■ STRIKERS DISREGARD CIVIL AUTHORITY: Los Angeles police officer is felled by vicious blows. This photo was snapped minutes before the United States Army moved in

Coddled Characters, and Muzzled Manufacturers

■ Paul Martin, president of the Cleveland local of the National Association of Die Casting Workers, at microphone, and Alex Balint, national organizer, right, prolonged the shutdown of Cleveland Aluminum Co. of America plants after national officers had signed an agreement in Washington. Martin is an alleged ex-convict (auto stealing and armed holdup) and Balint was accused before the Dies committee of being a Communist

■ An employer who, with complete truth but with intent to indicate his disapproval of a particular union, told his employes the union's leader was a Communist would be violating the Wagner act. Such was the testimony of J. Warren Madden, then chairman of the National Labor Relations Board, before a senate committee two years ago. That would be "coercion" under the board's interpretation of section 8 of the National Labor Relations Act

on more than a third of the nation's defense contracts. It lasted for 76 days.

North American Aviation strike stopped production of one-fifth of the country's military aircraft output.

A strike at the Cleveland plants of Aluminum Co. of America halted production of one of the most critical defense materials and extended into the aircraft and other armament industries.

Review of other strikes this year reveals they also occurred at too remarkably strategic points to be mere coincidence. Following the Allis-Chalmers walkout, Harvill Aircraft Die Casting Corp., Los Angeles, employing only a few hundred men but supplying vital airplane parts to major producers, was struck in what was termed in Congress as a "deliberate attempt to sabotage" the defense program.

Similarly, the vitally important plants of Universal-Cyclops Steel Corp., Bridgeville, Pa., producer of special steel for aircraft parts; Vanadium Corp. of America, New York, maker of alloy steels essential to toolmaking companies; International Harvester Co., holder of huge defense contracts, and numerous tool and equipment manufacturers were closed by strikes based on often trivial issues. In many of these cases the union agitators by calling out a comparatively small number of workmen was able to block work on a huge volume of defense material.

That some recent strikes are not "legitimate" is indicated by the fact that they have been called in defiance of the unions' national officers or have started while the Defense Mediation Board has had the issue under study. Last week's two major strikes are examples. At North American Aviation local union heads ordered a walkout in direct opposition to high CIO officials and the mediation board. At Cleveland local left-wing leaders ordered a strike while an agreement was being negotiated with the board and continued the work stoppage after the union's top officials had signed an agreement.

"Work or Fight"

So destructive to defense were these stoppages that the President took two firm moves. United States Army was ordered to the North American Aviation plant to take control for the government and reclassification of strikers in defense industries by the Selective Service Administration was authorized.

While aircraft production at the North American plant was resumed under Army control and the Aluminum company's strike settled at Cleveland under threat of similar control, many observers questioned the wisdom of government seizure of struck plants. Such action may be what is desired by the communistic element. Government operation under Army control, the communists believe, is a blow to the capital system and a step toward total control by the state.

Should wage increases be granted to workers in plants taken over by the government, labor agitators would gain a powerful weapon with which to inaugurate a wider wave of strikes in privately managed plants.

Substantiation of this reasoning was supplied by Philip M. Connelly, president of the California CIO industrial council who joined the North American strikers in defiance of national officers. After the Army had taken over the plant, Connelly said: "We had a hell of a time holding our lines until the Army got here, but we did, and that was what we were trying to do."

Tactics of the defense strike leaders have roused the ire not only of the public and the government, but also of legitimate organized labor. Officers of the CIO local which ordered the North American strike were dismissed by national leaders who subsequently started an overdue drive to purge the union of Communists.

In Congress many antistrike bills

were either revived or introduced.

Demands for antiwork stoppage measures in the defense industries were given impetus by the disclosure that strikes in private plants working on War Department orders caused a loss of 2,370,716 man-days of labor between Jan. 1 and June 10.

At the week's end the situation on the defense strike front was as follows:

North American Aviation Co. operating at capacity under army control.

Strike by CIO workers at Cleveland Aluminum Co. of America plants ended and work resumed. The two and one-half day shutdown of the aluminum plants caused a brief suspension at General Motors' Allison Division, Indianapolis, building aircraft engines for the government.

Threat of a strike at Consolidated Aircraft Corp., San Diego, Calif., was averted when employes ratified a new contract by 9 to 1 vote. Consolidated holds $700,000,000 in bomber orders for the Army, Navy and Great Britain.

American Federation of Labor national officials instructed striking machinists who are holding up $500,000,000 worth of defense shipbuilding in the San Francisco Bay area to return to their jobs. The machinists struck a few days after signing a new contract.

Pacific northwest lumbermen started a back to work movement to break a strike called by the IWA.

At Detroit a strike of 4000 men at Bohn Aluminum & Brass Corp., manufacturing parts for airplanes and submarine chasers, was ended after two days idleness. A five-week old strike affecting 1000 employes at the Detroit Steel Products Co. also was ended.

Demand Exceeds Supply of Skilled Metalworkers

Indicating the extent to which the skilled labor supply necessary for manning of defense plants lags behind demand is the experience of the nation's public employment offices, described by Dr. Floyd W. Reeves, OPM director of labor supply and training.

The offices in the two-month period ending June 1 received 7½ requests for machine shop die makers for each of such workers on their lists, said Dr. Reeves. In essential foundry skills the ratio was 2 or 3 to 1; in certain steel construction skills, it was 1½ to 1. Twelve toolmakers were requested for every one available.

Henderson Cites Steel in Appeal to Auto Builders

WASHINGTON

■ Federal Price Administrator Henderson has informed automobile manufacturers that if they are permitted to raise prices other industries operating under maximum schedules will be justified in protesting.

After sending telegrams to Ford, Chrysler, Nash-Kelvinator, Studebaker and Hudson, Henderson sent letters to the companies saying conditions "seem favorable" for withdrawal of the price increases.

"The increases apply to current production which has but a few weeks to run; only a relatively small number of units are therefore affected. Specific hardship for the smaller companies can be adjusted," he wrote.

The steel industry, with a much lower profits rate than the automobile industry, "has accepted without question a price ceiling that requires it to absorb certain increased costs," Henderson pointed out.

Committee To Search for Idle Machine Tools

DETROIT

■ Shortly to be announced by OPM is a committee of three, comprising representatives of the OPM, the Army and the Navy, which will visit industrial plants throughout the country to locate machine tools not operating 24 hours a day. Where possible such machines will be "taken over" by the government for use on defense production.

Final details of the system have not been worked out. This was revealed here last Friday by Mason Britton, chief, tools section, OPM, addressing a meeting of 200 advertising and sales officials. The meeting opened a half-day conference sponsored by the Adcraft Club and Industrial Marketers of Detroit.

Finds Washington Coals Suitable for Coking

■ Coals mined in the state of Washington are suitable for coking and favor establishment of an iron and steel industry in the Pacific Northwest, Dr. R. R. Sayers, director, Bureau of Mines, reported last week.

Intensive investigation by the bureau of coals in this area has revealed local sources can supply a sufficient amount of coke, which except for a higher ash content, is equal in quality to those commonly used in the iron and steelmaking centers of the East. Furthermore, Dr. Sayers said, the coke is suitable also for certain electrochemical and electrometallurgical industries which might be attracted to the region because of large sources of electrical energy from Bonneville and Grand Coulee.

■ **SITDOWN LEADER BOOED BY NEW BRAND OF STRIKERS:** Richard Frankensteen, national director of the aircraft division of the CIO-United Automobile Workers, and "boss" of the North American Aviation Co. strikers, is heckled by a group of husky communists before a background of opposition signs, when he advises the strikers to return to their jobs of making defense airplanes. Frankensteen achieved notoriety in 1937 as a leader in the automotive sitdown strikes, but apparently the present communistic influence in the CIO is too much for him. NEA photo

Dunn Resigns, Reply to Expansioneers; Replogle: "It Would Please Germany"

WASHINGTON

■ RESIGNATION of Gano Dunn as special consultant to the Office of Production Management's Materials Branch, last Friday, was interpreted as his reply to critics of his report to the OPM on steel capacities.

His findings that a large-scale expansion is not warranted were followed within two weeks by an OPM request to the industry to prepare for a 10,000,000-ton increase.

Reports that Mr. Dunn would leave the OPM to return to his post as president of J. G. White Engineering Co. were heard immediately after the expansion plan was announced here.

Several officials in the OPM and OPACS are understood to have criticized the second Dunn report, which contained a section answering criticisms of the first report.

Steel company officials last week were giving attention to the request, but pointed out that such a huge plan, involving an expenditure of more than $1,000,000,000, could not be formulated "over night."

U. S. Steel Outlines Plan

United States Steel Corp. has submitted a proposal to OPM for more than $50,000,000 expansion of its Homestead, Duquesne and Edgar Thomson works. This plan was drafted before the request, and probably will be revised upwards, it was reported.

T. M. Girdler, chairman, Republic Steel Corp., is reported to have informed Jesse Jones, Federal Loan Administrator, that his company is willing to expand capacity by 1,000,000 tons annually. Meanwhile, that company announced that construction will start immediately on a new unit for increased production of steel plate at the 98-inch strip mill. The addition, a building 75 by 700 feet, will house equipment which will more than double Republic's Cleveland plate capacity. New equipment will include a transfer table, a shearing line, a squaring shear, loading tracks and steel storage facilities.

About 300,000 tons of steel ingot capacity and some additional pig iron capacity will be added by Youngstown Sheet & Tube Co., through improving existing facilities. Construction will be divided between the Youngstown and Indiana Harbor works.

About 500,000 tons of electric steel capacity has been added by the industry since Jan. 1, making total capacity 3,200,000 net tons.

Gano Dunn

J. Leonard Replogle

NEW YORK

■ J. LEONARD REPLOGLE, in charge of steel on the War Industries Board, in World War I stated last Friday:

"The proposal of the Office of Production Management to increase the steel production in this country by 10,000,000 tons, instead of accelerating our defense efforts will greatly retard them. I have no doubt that it would meet with the complete approval of the much detested, but tremendously efficient, German high command."

Mr. Replogle added: "Are we doing everything necessary to put our country in the best defensive position at the earliest possible time, and to give Britain the all-out aid which was promised her by our President?

"We are not. And I predict if we do not immediately discard our 'business as usual' policy, our boasted assurances of adequate protection to this country and our all-out aid to England will be too little and too late."

New Steel Production Peaks Being Established

■ New production records are being established in nearly all major classes of steel products. During 1940 when total steel output exceeded largest previous year's tonnage by 6 per cent, new peaks were established in the production of sheet and strip steel, concrete reinforcing bars, sheet piling, wire and semifinished products for export, according to the American Iron and Steel Institute. For each of those products, except the last, output in the first quarter of 1941 has been at an even higher rate than in 1940.

In addition, 1941 production records indicate new peaks are now being reached in production of seamless pipe and tubes, bars, other than those for concrete reinforcement, heavy structural shapes, and tin plate, while production of steel plate this year is rapidly approaching the previous peak.

U. S. Steel Trains 15,000; "Largest" Industrial Project

■ FIFTEEN thousand employes of United States Steel Corp. subsidiaries now are in training for skilled defense jobs—one of the largest programs in the history of American industry.

The fact that training long has been in effect made it possible for these companies to increase their output in a little more than six months from two-thirds of capacity to full capacity.

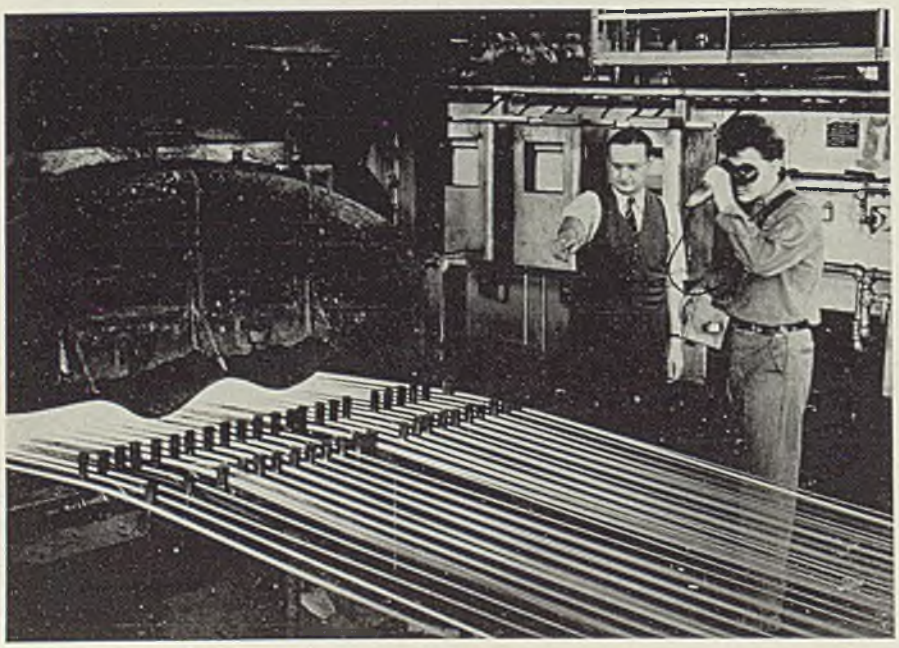
The need for skilled men, not only for the production of steel but for defense items such as cruisers, destroyers, merchant vessels, armor plate, shell forgings and bomb casings, made by United States Steel, is growing each day and many are receiving instructions on the job.

Training is of two kinds—to fit a man for the next higher job in regular mill operations, or to equip him for special defense operation.

Through this upgrading it is possible to expand from one shift to three or more shifts, using the original personnel as a nucleus.

In training men for special defense work, such as manufacturing armor plate, bombs and shells, it has been necessary to give large numbers instructions in operating single-purpose machines.

As a preliminary, many are given training in machine operations in public schools or in company machine shops. This kind of training, as well as the upgrading in regular mill operations, is separate from the subsidiaries' long-range apprenticeship program where more than 1300 apprentices now are taking four-year courses in steelmaking.



Heading the list of these subsidiaries in number of employes undergoing job training of all types are the Carnegie-Illinois Steel Corp. and the National Tube Co., with approximately 4000 each. American Bridge Co. is next with 2400, followed by American Steel & Wire Co. with 1500 and the Tennessee Coal, Iron & Railroad Co., 1500.

Many employes are supplementing their training by taking academic work. More than 5000 are receiving classroom instruction related to their jobs, on company time.

Nearly 10,000 are pursuing studies on their own time. More than 2500 of these are taking emergency defense courses in trade schools, high schools and colleges under the national defense training program.

Operating Costs 10% Higher Than in 1929

■ Payrolls, taxes, raw materials and other major steelmaking costs consumed 10 per cent more of the steel industry's sales dollar in 1940 than in 1929, according to the American Iron and Steel Institute. Last year those costs took 91 cents of each dollar received from the sale of iron and steel products, compared with 83 cents in 1929.

After meeting operating expenses in 1940, nine cents were left out of each sales dollar to pay interest to bondholders, dividends to stockholders and to help build up a surplus for future needs. In 1929, a total of 17 cents was available for those purposes.

Direct payrolls of steel companies last year accounted for 35 cents of each dollar of sales, while costs of materials, freight charges and other expenses reflecting indirect labor costs, took about 44½ cents of each sales dollar.

In 1929, about 35½ cents of each sales dollar went into payrolls, while costs of materials, freight charges and other expenses, took 38½ cents.

Taxes last year took nearly 6½ cents of each sales dollar, as compared with only 4 cents in 1929, reflecting sharply higher tax rates. Five cents of each dollar were set aside in each of the two years as a reserve for depletion and depreciation.

Four cents of each steel sales dollar in 1940 were distributed as dividends, compared with 6½ cents in 1929. Interest payments amounted to one cent per dollar in 1940, as against 1½ cents in 1929.

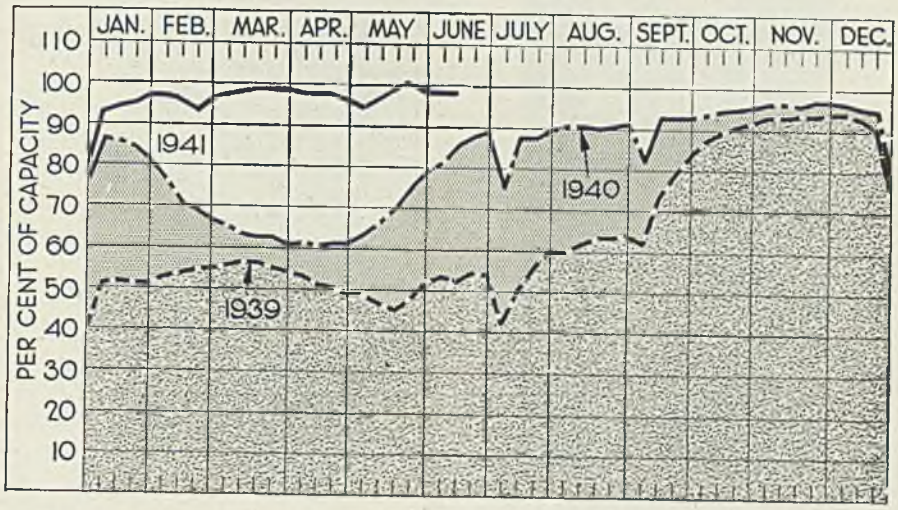
Approximately 4 cents of each dollar received last year were added to surplus, or less than half as much as in 1929 when 9 cents were left in the business after paying operating expenses, taxes, interest and dividends.

May Gear Sales Index 273, Down 7 Per Cent

■ Sales of industrial gears in May were 7 per cent lower than in April but 105 per cent greater than in May, 1940, according to the American Gear Manufacturers Association, Wilkinsburg, Pa. In the first five months this year, sales were 123 per cent above the corresponding period in 1940.

Comparative index figure of sales in May was 273, against 133 in the month last year. Index figure in April was 292; in March, 288; and 262 in February. The index is based on 1928 as 100.

Compilation applies only to industrial gears. Automotive gears and gears used in high-speed turbine drives are not included.



PRODUCTION . . . . Steady

■ STEELWORKS operations last week were unchanged at 99 per cent. Three districts reported higher rates, three declined and six were steady. A year ago the rate was 86 per cent; two years ago it was 52½ per cent.

Chicago—Up ½-point to 102 per cent, only ½-point below all-time high of 102½ in May. Four of six plants are at 100 per cent or higher.

St. Louis—Steady at 98 per cent for the eleventh week, with no change indicated the remainder of June.

Cincinnati—Loss of 2½ points to 89 per cent resulted from two open hearths being taken off for repair.

Detroit—Unchanged at 92 per cent for third consecutive week.

Central eastern seaboard—Continues at 97 per cent.

Pittsburgh — Maintained production at 100½ per cent for the fourth consecutive week.

Wheeling—Held at 88 per cent for the third week.

New England—Advanced 4 points to 94 per cent as an open hearth was returned to service after repair.

Birmingham, Ala.—Maintained 95 per cent operation, held back from capacity by relining of one blast furnace, which limits pig iron supply.

Buffalo—One open hearth taken off by Republic Steel Corp. caused decline of 2½ points to 90½ per cent.

Cleveland—Repairs by one interest caused a drop of 1 point to 92 per cent, which probably will be regained this week.

Youngstown, O.—Production advanced 1 point to 98 per cent with 77 open hearths and three bessemers active. Virtually all units are exceeding rated capacity. Outlook for this week is for the same rate. Shenango Furnace Co. lighted a stack that was idle 16 years. Heavy rains have eased the water situation.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended June 14	Change	Same week 1940	Same week 1939
Pittsburgh	100.5	None	81	40
Chicago	102	+ 0.5	91.5	49.5
Eastern Pa. ...	97	None	76	37
Youngstown ..	98	+ 1	70	52
Wheeling	88	None	90	73
Cleveland	92	— 1	82	55.5
Buffalo	90.5	— 2.5	90	44
Birmingham ..	95	None	88	71
New England..	94	+ 4	66	40
Cincinnati	89	— 2.5	76	73
St. Louis	98	None	68	42
Detroit	92	None	95	57
Average	99	None	86	52.5

Steel Mill Inventories Show Little Variation

■ Index of the value of steel mill inventories in April was 123.2 compared with 124.0 in March and 110.8 in April, 1940, taking Dec. 31, 1938, as 100, Department of Commerce reports.

Taking January, 1939, as 100 the index of valuation of new orders received by steel mills in April was 302 compared with 304 in March, and 104 in April, 1940.

The department's figures for the index of steel manufacturers' shipments was 214 in April compared with 210 in March, and 121 in April, 1940.

Value of steel mills unfilled orders increased 14 per cent in April over March, and increased 16 per cent in March over February. In April this year the increase in the value of these unfilled orders over the same month last year was 316 per cent.

MEN of

Stanley A. McCaskey

Alva Edison Radcliffe

R. D. Yoder

N. A. Woodworth

■ **STANLEY A. McCASKEY** has been elected assistant secretary, Allegheny Ludlum Steel Corp., Pittsburgh. A lawyer by profession Mr. McCaskey formerly served with the South Penn Oil Co., and later as vice president and general counsel, Six States Coal Corp. He then became chief counsel for the treasurer of the United States, and in 1938 went to San Juan as assistant general counsel for the Puerto Rico Reconstruction Administration. Returning to Washington in 1940 as assistant chief, Foreign Funds Control Division of the Treasury Department, he resigned in September of that year to join Allegheny Ludlum.

♦

R. D. Yoder has been transferred from the Milwaukee headquarters of Cutler-Hammer Inc., to the company's Cincinnati office.

♦

N. A. Woodworth, formerly with Ex-Cell-O Corp., Detroit, and for 18 years its president, has organized the Suprex Gage Co., Pleasant Ridge, Mich., a suburb of Detroit. Mr. Woodworth will continue to head the N. A. Woodworth Co. which he organized in July, 1939, to manufacture precision parts for aircraft engines.

William F. Klemm, associated with Mr. Woodworth when he was president of Ex-Cell-O, has been named general manager of the Suprex company.

♦

Norman D. Carpenter has been named district sales manager, Weirton Steel Co., Weirton, W. Va. He succeeds the late Louis T. Lott.

♦

Dr. Joseph Slepian, associate director, Westinghouse Research Laboratories, East Pittsburgh, Pa., has been elected a member of the National Academy of Sciences.

♦

George White and **Beryl Boyd** have been elected directors, Belknap Hardware & Mfg. Co., Louisville, Ky. Mr. White is in charge of buying of cutlery, and Mr. Boyd is manager of credits.

♦

Alva Edison Radcliffe has been named Cleveland district manager, Edison Storage Battery Division, Thomas A. Edison Inc., West Orange, N. J., succeeding the late Peter R. Nelson. Mr. Radcliffe has been a salesman in the company's Chicago office the past 15 years.

♦

W. McKean White Jr. has been elected vice president, White Mfg. Co., Elkhart, Ind. A graduate of Purdue University in mechanical engineering, Mr. White will be engineering assistant to his father, **W. McKean White,** president.

♦

Floyd C. Payne, formerly identified with the Denver office of Youngstown Steel Products Co., has been transferred to Kansas City, Mo., as district sales manager. He succeeds **Harry C. Ahl,** resigned.

♦

Willis J. Stoddard has been named sales representative, Pennsalt Cleaner Division, Pennsylvania Salt Mfg. Co., Philadelphia. He will cover territory including Columbus, Cincinnati, Dayton, and Indianapolis, with headquarters at Dayton, O.

♦

Laurence M. Ewell has been appointed general manager of eastern division operations, Link-Belt Co., Chicago, with headquarters in Philadelphia. Mr. Ewell, who has been export manager, and manager of the company's New York office, will be succeeded in that position by **Carl A. Woerwag.**

♦

R. M. Cleveland, associated with Worthington Pump & Machinery Corp., Harrison, N. J., 24 years, has been appointed manager of its Boston office. He succeeds **W. A. Finn,** who has been called to active duty with the navy in the rank of lieu-

INDUSTRY

E. W. Christener

William P. Hemphill
Who has been elected president, Laclede Christy Clay Products Co., St. Louis, as noted in STEEL, June 2, page 44

tenant. Mr. Finn had been associated with Worthington since resigning his commission as a naval officer in 1926.

♦

John B. Keeler, assistant general traffic manager, Koppers Co., Pittsburgh, was elected president, Traffic Club of Pittsburgh, at its annual meeting recently. Others elected: First vice president, **F. M. Garland,** general traffic manager, Pressed Steel Car Co.; second vice president, **Leroy Blue,** general freight agent, Pittsburgh & Lake Erie railroad; third vice president, **E. W. Saville,** division freight agent, Pennsylvania railroad; secretary, **J. V. Sevin,** general agent, Minneapolis, Northfield & Southern railroad; treasurer, **S. B. Duff,** traffic department, United States Steel Corp.

♦

George G. Whitney has resigned as advertising manager, Norge Division, Borg Warner Corp., Detroit, effective July 1.

♦

Dr. Joseph DuBose Clark has been named chemical director, Glyco Products Co. Inc., Brooklyn, N. Y., and will be in charge of research and development.

♦

W. L. Schneider has been elected a vice president, Falk Corp., Milwaukee. He will continue in a supervisory capacity in the sales, sales promotion and advertising departments, as director of sales. He is succeeded by **T. F. Scannell** as sales manager. **J. B. Kelley,** who has headed the coupling department, has been transferred to the general sales department as assistant sales manager.

♦

M. R. Crossman has been named director of the newly created Industrial Advertising Division of Cramer-Krasselt Co., Milwaukee. Associated with Mr. Crossman will be **T. C. Du Mond,** formerly with the Gorton Machine Co., Racine, Wis. Mr. Crossman has had 13 years industrial experience as a skilled worker, sales engineer, salesman, sales promotion manager and advertising manager. Since 1939 he had been advertising manager, Machine and Small Tool divisions, Barber-Colman Co., Rockford, Ill.

♦

E. W. Christener has been appointed sales manager, Chicago Reinforcing Bar Division, Joseph T. Ryerson & Son Inc., Chicago. Mr. Christener joined the Ryerson company in 1922, and since 1927 has been in the sales engineering department.

♦

Vernon R. Drum has been elected vice president in charge of manufacturing, Willys-Overland Motors Inc., Toledo, O. He formerly was operations manager. **Lester F. Lowry,** assistant treasurer, has been promoted to treasurer.

♦

Howard M. Givens Jr. has been appointed manager of tool steel sales, Allegheny Ludlum Steel Corp., Pittsburgh. He succeeds **A. F. Dohn,** who recently retired. From 1931 to 1936 Mr. Givens was employed in the research laboratory, rolling mills and tool steel sales department, Midvale Co., Nicetown, Philadelphia. He then joined the stainless bar and wire sales branch of the former Allegheny Steel Co., later becoming assistant sales manager of the department. He held that position through the company's merger with Ludlum in 1938, becoming assistant manager of tool steel sales a year later.

♦

Leslie S. Gillette, an executive of Chicago Pneumatic Tool Co., New York, has been re-elected president, New York Sales Managers' Club. **J. William Johnson,** sales manager, Dennison Mfg. Co., has been elected secretary. Other officers re-elected are: **William G. Arnold,** general sales manager, Underwood Elliott Fisher Co., as vice president, and **G. Lloyd King,** vice president, Lamont Corliss & Co., as treasurer.

♦

Frank B. Harrington, assistant plant manager, Lansing Fisher Body division, has been promoted to acting manager for Fisher Body's Flint division plant No. 2. **Louis P. Cramer,** since January, 1940, general plant superintendent at Lansing, succeeds Mr. Harrington. **George H. Cameron,** plant shift superintendent, becomes general plant superintendent, and **Leon E. Pender,** body shop superintendent, succeeds Mr. Cameron.

♦

A. R. Smith has been appointed sales manager, Ready-Power Co., Detroit. Mr. Smith formerly was manager, Industrial Sales Division, Continental Motors Corp., Detroit.

♦

Herbert J. Braun, formerly associated with Foote Bros. Gear & Machine Corp., Chicago, has been appointed Detroit sales representative for Kennametal steel cutting carbide tools and blanks by McKenna Metals Co., Latrobe, Pa. His offices are at 14425 Mark Twain avenue, Detroit, where **John S. Roney** is in charge.

♦

Ralph K. Rex, Cleveland, has been re-elected chairman, Diebold Safe & Lock Co., Canton, O. **A. J. Jones** has been renamed president and **H. C. Weible** has been re-elected secretary-treasurer.

♦

Myron Powers has been appointed manager of purchases, Chicago Pneumatic Tool Co., with headquarters at the general offices in New York. He formerly was in charge of purchases at Cleveland.

Activities of Steel Users, Makers

■ MAJESTIC Steel Co. Ltd. recently established an office at 415 Lexington avenue, New York, and is specializing in purchase of iron and steel for Great Britain and her colonies. Otto Kafka Jr., formerly president of the export firm of Otto Kafka Inc., New York, is director of the new office. Contracts have already been placed with American mills for sheets, bars, wire, screws, nails, ingots, billets, pig iron and rails.

♦

Winfield H. Smith Inc., Springville, N. Y., producer of speed reducers, gears and power transmission machinery, is celebrating its fortieth anniversary. Founded in 1901 as Smith & Essex Inc., Buffalo, the name was changed to Winfield H. Smith Inc. following the death of Mr. Essex. Steady expansion resulted in removal of the plant from Buffalo to Springville in 1925.

♦

Continental Can Co. Inc., New York, has awarded contract to The Austin Co. for erection of a packers' can plant at Mankato, Minn. Situated on a plot comprising 20 acres, the plant will have floor space of over 220,000 square feet of manufacturing and warehouse facilities.

♦

Two additions to factory buildings at the Elizabeth, N. J., plant of Phelps Dodge Copper Products Corp. have been announced by Wylie Brown, president. The first, a storage warehouse, is already in use, and plans have been drawn for construction of a laboratory, cafeteria and locker room building. Moving these departments to this new building will increase factory space for new equipment.

♦

Hartley Wire Die Co., Thomaston, Conn., will double its factory floor space for new equipment to produce special Carboloy dies. Production of the new dies will be under supervision of Anton Berg, formerly a supervisor in the Carboloy Co., and now released to Hartley by that company.

♦

International Spring Co., Chicago, has curtailed operations 20 to 25 per cent because of inability to obtain adequate supplies of brass, bronze and other nonferrous metals.

♦

Kewaunee Mfg. Co. has moved its general offices and Wood Furniture Division from Kewaunee, Wis., to Adrian, Mich.

♦

Federal Foundry Supply Co., 4625 East Seventy-first street, Cleveland, has acquired patterns, patent rights, etc., to a core wire straightener formerly made by the Worthington Pump & Machinery Corp., Harrison, N. J.

♦

Goodyear Tire & Rubber Co., Akron, O., has awarded contract for constructing a Chemigum, synthetic rubber, plant to Indiana Engineering & Construction Co., Ft. Wayne, Ind. Cost is estimated at $1,250,000, including equipment. The plant, with capacity for 10,000 tons of product per year, is being built under the program of the Defense Plant Corp., and part will be used by Goodyear and part by other firms.

DIED:

■ **Dudley Brewster Bullard,** 72, vice president, Bullard Co., Bridgeport, Conn., June 10, at his home in Southport, Conn. Mr. Bullard was the oldest of five brothers who carried on the business founded by his father. Born in Bristol, Conn., July 13, 1869, he was graduated from Williston Academy in 1891. He gained his early engineering experience as an apprentice in the plant of his father, who was the founder of the Bridgeport Machine Tool Works, later known as Bullard Machine Tool Co., and in January, 1929, Bullard Co. After serving as an apprentice in

Dudley B. Bullard

the machine shop he was advanced to the drafting room, subsequently becoming superintendent, chief engineer, and vice president in charge of engineering. He was an organizer of the Bridgeport chapter, American Society of Mechanical Engineers, and served as its chairman, 1931-1932.

♦

Clarence M. Henderson, 66, president and general manager, H. C. Macauley Iron Foundry Co., Berkeley, Calif., recently. He was a member, National Association of Manufacturers, and served as the first president, northern California chapter, American Founders Association.

♦

Edward G. Buckwell, 83, formerly secretary and manager of sales, Cleveland Twist Drill Co., Cleveland, May 28, in that city. He joined the company in 1899 and served as manager of sales until his retirement in November, 1922. He continued active as a director.

♦

Harvey C. Castle, assistant superintendent, cold roll strip mill, Jones & Laughlin Steel Corp., Pittsburgh, June 7. He went to Jones & Laughlin in 1938 from the Great Lakes Steel Corp., Detroit.

Baltimore Steel Club's Outing Attended by 170

■ Largest attendance in the history of the Steel Club of Baltimore recently turned out for the organization's sixth annual golf party and dinner, at the Baltimore Country Club. One hundred and seventy were present, including guests from Pittsburgh, Cleveland, other cities.

R. Walter Dietrich, Rustless Iron & Steel Co., recently elected president, presided at the dinner. Features of the evening program included awarding prizes to golfers and nongolfers, and presentation of a plaque to H. R. Dorney, Jones & Laughlin Steel Corp., former president, in recognition of his services to the club.

Principal prize winners were: E. M. Crocker, E. M. Crocker Co., low gross; J. B. Haddinott, Pittsburgh Steel Co., low net; and C. H. Piet, high gross. Prizes were presented by Charles W. Test, Youngstown Sheet & Tube Co., chairman of the golf committee.

Members of the golf committee in addition to Mr. Test: Joseph Coster, Bethlehem Steel Co.; C. H. Eisenhardt Jr., American Steel & Wire Co.; J. A. Doyle, Jones & Laughlin Steel Corp.; and C. H. Proffen, Charles T. Brandt Inc.

Among those at the head table were J. E. Aldridge, Bartlett-Hayward Division, Koppers Co.; and Joseph L. Hagger, Charles T. Brandt Inc., recently elected vice president and secretary-treasurer, respectively.

"Would Raise Capacity"

■ Use of all-basic-brick construction of open-hearth furnaces, from slag pocket to slag pocket, including roofs, will enable steel companies to increase open-hearth capacity at least 10 per cent, according to Lewis B. Lindemuth, consulting engineer, New York. Mr. Lindemuth recently returned from Australia.

Electroplaters in Convention Consider Growing Scarcity of Their Materials

BOSTON

■ DISCUSSIONS at the twenty-ninth annual convention of the American Electroplaters' Society, in Boston, last week were devoted mainly to technical subjects related to existing plating practice. However, the problem of coping with actual or prospective scarcity in supplies of important materials as a result of the defense program influenced both prepared papers and informal comment among delegates.

Total registration for the four days of more than 700 was the largest in the society's history.

Zinc and nickel are metals whose supply is of immediate concern to the industry. Shortage of zinc affects the supply of not only die castings and commercial brass products available for plating, but also anodes for zinc plating. Large-scale diversion of nickel to ordnance manufacturing is reflected in the curtailed amount of nickel anodes obtainable.

In the opinion of some electroplaters this latter situation likely will result in the use of a heavier copper plate under a lighter nickel plate, with steel parts substituted in many instances for zinc die castings and brass products. This trend already is being noticed.

Such circumstances will require changes in operating practice, but in general it is agreed that better economy and improved plant methods should result from this necessity of conservation and substitution.

Copper Supplies Not Assured

In view of the increased attention being given to copper plating, two papers presented at the educational sessions on latest developments in this subject were timely. One of the speakers, F. F. Oplinger, E. I. duPont de Nemours & Co., Wilmington, Del., pointed out, however, that under present conditions there is no assurance of a continued ample supply of copper for all plating requirements. He described modern methods of heavy copper plating which eliminate some buffing operations formerly employed in treating zinc and steel parts.

A new and improved alkaline copper plating method developed by United Chromium Inc., New York, was discussed by T. G. Coyle of that company. Important features of this process, which is said to give a smooth deposit of fine grain and good buffing qualities, are absence of strategic materials in any large amounts in the bath and 100 per cent efficiency of the anode and cathode. The bath is mildly alkaline, nontoxic and does not require the plated parts to be cleaned before other deposits are applied.

In addition to the various papers on electroplating subjects presented at the five technical sessions, several talks were given on other subjects of metal finishing. These included a discussion of radiant heat baking of organic finishes, presented by Dr. Gustave Klinkenstein, Maas & Waldstein Co., Newark, N. J., and a paper on electropolishing of stainless steel, prepared by C. L. Faust and H. Pray, Battelle Memorial Institute, Columbus, O.

Dr. S. S. Stratton, minerals and metals division of OPM, in addressing the convention urged the platers to co-operate with the government in the priority allocation phase of the defense program. Dr. William Blum, United States Bureau of Standards, recommended the substitution of other metals in nondefense work for those under priority control.

An exhibit of plated products was conducted during the convention. Individual displays were sponsored by the various branches of the society and illustrated the wide variety of articles now being electroplated and the different finishes being employed. Cup for the best exhibit was awarded to the Chicago branch.

Officers elected: President, Ellsworth Candee, Metal Hose Branch of American Brass Co., Waterbury, Conn. Vice presidents: Charles C. Conley, Stoole Corp., Sidney, O.; George Wagner, Newark, N. J.; Maurice R. Caldwell, W. B. Jarvis Co., Grand Rapids, Mich. W. J. R Kennedy, Springfield, Mass., continues as executive secretary.

Several awards were presented authors of best papers on electroplating or allied subjects in the past year. The Founder's gold medal was awarded to B. E. Lewis, Northwest Chemical Co., Detroit, for his paper on Relationship of Cleaning Technique and Adhesion of Electro Deposits.

W. L. Pinner, Houdaille-Hershey Corp., Detroit, was presented the A.E.S. gold medal. Proctor memorial award winner was Dr. M. M. Beckwith, J. B. Ford Sales, Wyandotte, Mich. R. M. Wagner, Guide Lamp Division, General Motors Corp., Anderson, Ind., received $50 for the best paper published in the society's monthly review.

Shortages Also Afflict Radio Industry

CHICAGO

■ CERTAIN shortage of raw materials struck a pessimistic note at the seventeenth annual convention of the Radio Manufacturers' Association in Chicago, last week.

Spokesmen pointed out that perhaps only 10 to 15 per cent of the industry's capacity is engaged in government work and that beyond this and future defense business, supplies of vital materials cannot be guaranteed. Radio manufacturing is classified as nonessential. Manufacturers were urged to book as much defense business as possible and to engage in subcontracting for war goods.

Paul V. Galvin, president, Galvin Mfg. Co., Chicago, and chairman of the association's government regulation and priorities committees, said the matter of priorities will be the No. 1 problem for civilian industry. Shortages in basic materials are curtailing production, but the situation now is not nearly as serious as it will be in months to come.

A three-point program was urged by Mr. Galvin to include: Caution and close control of inventories and commitments; acceleration in efforts to effect substitutions to conserve aluminum and nickel; and, contacting government bureaus to avert misunderstandings and to convince defense program officials that radio is an essential industry.

James S. Knowlson, president and chairman, Stewart-Warner Corp., Chicago, was re-elected president of the association. Vice presidents were named as follows: Mr. Galvin; Roy Burlew, president, Ken-Rad Tube & Lamp Corp., Owensboro, Ky.; H. E. Osmun, vice president, Centralab, Milwaukee; James P. Quam, Quam-Nichols Co., Chicago.

Bond Geddes, Washington, was re-elected vice president and secretary, and Leslie F. Muter, president, Muter Co., Chicago, was chosen treasurer.

■ Mackintosh-Hemphill Co., Pittsburgh, last week presented a mobile canteen to the community of West Bromwich, England, where it has an associate, C. Akrill & Co. Ltd. The canteen, which has a capacity of 50 meals, was purchased with a portion of a fund which Mackintosh-Hemphill has set aside for English communities in which it has associates.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Substitution of molybdenum tool steels ordered to conserve critical tungsten. Apparent available supply considered insufficient . . . St. Lawrence waterway project favored by OPM . . . Railroad car builders assured of steel for 73,000 units . . . United States', Canadian defense resources to be co-ordinated . . . Zinc placed under full priority control

WASHINGTON

■ WAR Department approved last week a $2,882,400 project for the fencing and lighting of "critical" areas at 95 posts and camps throughout the nation. Areas designated as "critical" contain either buildings housing vital supplies, including ammunition and other ordnance material, fuel, stores, etc., or dumps, where the materials are not under cover.

Fence to be used is seven feet high, of steel chain link type, surmounted by three barbed wire strands, making a 10-foot nonclimbable barrier. Total amount required is 1,500,000 feet, would extend from Philadelphia to Pittsburgh. To aid in safeguarding the storage areas, 5167 powerful floodlights will be erected at intervals of about 90 feet.

General Preference Order for Tungsten Tool Steels Issued

To conserve the nation's supply of tungsten and divert part of the demand for high-speed tungsten tool steel into molybdenum type steel, E. R. Stettinius Jr., director of priorities, last week issued a general preference order governing distribution of high content tungsten tool steel in industrial channels.

This is the first order issued in which substitution has been specifically required in order to conserve the supply of critical materials.

It is stipulated in the order that a customer of high-speed steel may not purchase the tungsten type steel if the molybdenum type would serve as well.

It is also provided that during any three months' period a customer for high-speed steel may purchase the tungsten steel only to the extent that he buys an equal amount of the molybdenum steel which contains less tungsten.

If a customer wants 50 pounds of high-speed steel the order will require him in effect to order 25 pounds of the molybdenum type steel in order to get 25 pounds of the steel with higher tungsten content.

The order becomes effective immediately. In it three-month periods are provided, but they are not regular calendar quarters — rather three-month periods beginning June 1, 1941. Producers and consumers are ordered to keep records of transactions for transmission to the Priorities Division. Priorities Administrator Stettinius said consumers will not be required to file reports at present but that producers must file an account covering the quarter ending Aug. 31, 1941, and not later than Sept. 5. Similar reports will be due five days from the last day of each succeeding quarter.

The order divides high-speed steel into class A or molybdenum type and class B, the tungsten type. Class A is defined as alloy steel containing not less than 0.60 per cent carbon and more than 3.0 per cent molybdenum, or alloy steel containing not less than 0.60 per cent carbon and 7.0 per cent or less tungsten and more than 3.0 per cent molybdenum. Class B is defined as alloy steel containing not less than 0.55 per cent carbon and more than 12.0 per cent tungsten.

Figures now available on tungsten indicate that the total supply available in this country during 1941, not including stock piles, will approximate 15,000 short tons of concentrates. During the latter half of the year, however, consumption of tungsten in direct military and civilian channels may increase to a rate of approximately 20,000 tons of concentrates.

These figures indicate that the tungsten situation will probably become increasingly tight. The supply figure will of course be affected considerably if imports from China are cut off.

Increase in Magnesium Capacity To 400,000,000 Pounds Proposed

OPM proposed last week that new magnesium facilities capable of producing 325,000,000 pounds of metal a year be constructed by the end of 1942. Requirements, it is estimated, will be approximately 400,000,000 pounds at that time. Present production is at the rate of 30,000,000 pounds, and plant additions under way will raise it to 75,000,000.

War Department, to which a recommendation for expansion has been made by OPM, is expected to negotiate for the new plants. Defense Plant Corp. will probably supply funds, officials said, and about seven companies are interested in producing magnesium.

Davies Appointed Deputy Co-ordinator for Petroleum

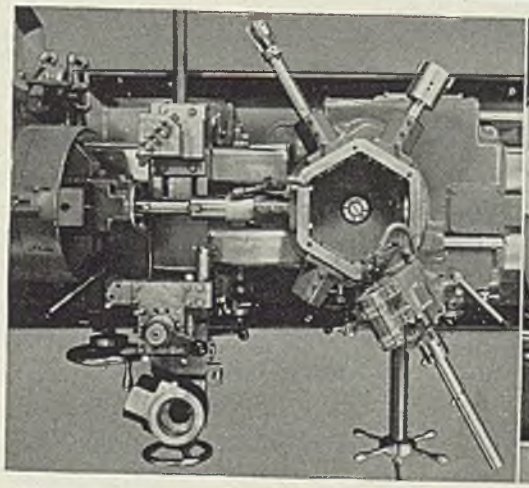
Ralph K. Davies has been appointed deputy co-ordinator of petroleum for national defense by Harold L. Ickes, co-ordinator. He is on leave as senior vice president, Standard Oil Co. of California.

David K. Niles was appointed special consultant to the OPM's associate director general, Sidney Hillman, to advise on "questions relating to the more effective integration of government agencies into the national defense program." Niles was an assistant to Harry Hopkins when latter was Secretary of Commerce.

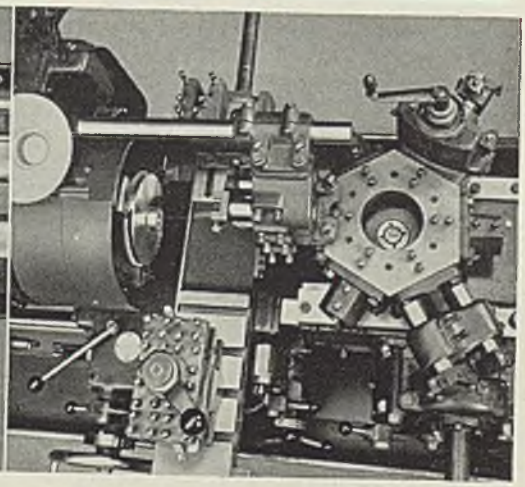
Arthur H. Bunker, executive vice president, Lehman Corp., New York, has been named acting deputy chief, Materiels Branch, OPM's

IT'S NOT TOO SOON

TO THINK OF THIS



Machining the breechblock of a gun on a Jones & Lamson 8A Saddle Type Universal Turret Lathe



Machining a bronze pump impeller on a No. 5 Jones & Lamson Ram Type Universal Turret Lathe

The tramp of armed men sounds louder day by day, and louder and louder must rise the roar of production from the shops to which America looks for planes and tanks and trucks and arms and ammunition. To meet this need and meet it quickly, wise management makes immediate use of versatile, high speed, standard Jones & Lamson equipment.

With all its skill and speed for armament, wise management also knows **it's not too soon to think of the future** — of the day when the salesman will follow the soldier — and post-war competition will be in full blast. Against that time wise management chooses cost-cutting Jones & Lamson equipment that not only speeds defense but protects future profits.

PROFIT PRODUCING MACHINE TOOLS

JONES & LAMSON MACHINE COMPANY

Springfield, Vermont, U. S. A.

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Tangent and Radial, Stationary and Revolving Dies and Chasers.

FAY AUTOMATIC LATHES

AUTOMATIC THREAD GRINDERS

OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

Production Division, to serve in the temporary absence of A. I. Henderson.

OPM's Approval of St. Lawrence Waterway Reported by Knudsen

William S. Knudsen, director general, Office of Production Management, last Thursday announced that OPM has formally approved the St. Lawrence waterway project "as part of the all-out defense effort." The approval covered both waterway and the electric power phases of the project.

Hearing on legislation to authorize construction will be held before the house rivers and harbor committee beginning June 17. (STEEL, June 9, p. 33.)

Plan Co-ordination of American, Canadian Defense Resources

Agreement that United States and Canada should not permit unlimited civilian consumption of metals in one country that can be utilized in war effort in the other was reached at meeting of the Material Co-ordinating Committee. It was learned aluminum, nickel, chromite and zinc figured in discussions here last week. A committee statement said:

"Definite progress was made toward co-ordinating raw material resources of the two countries."

Members of the committee are: William L. Batt, deputy director of the production division, Office of Production Management; H. J. Symington, Montreal, power controller for Canada; E. R. Stettinius Jr., director of priorities, OPM, and G. C. Batement, Toronto, Ont., metals controller for Canada.

Create Field Offices To Facilitate Department of Commerce Work

Reorganization of various Department of Commerce bureaus will provide business with more complete and timely information essential for profitable decisions, according to Wayne C. Taylor, undersecretary.

Due to national defense, business men are finding it important to possess market and economic data to a greater extent than ever before, he said.

Latest step in streamlining the department is the conversion of Bureau of Foreign and Domestic Commerce district offices into field offices for the department. Bureau of Census field representatives will work through these offices under a new plan for collecting current statistics essential in planning and production, Taylor stated.

Information Booklet on Defense Inventions Published

National Inventors Council, Department of Commerce, has announced the availability of a new information bulletin: *How Inventors Can Aid National Defense.*

Pamphlet, especially designed for inventors, scientists, engineers and other persons desirous of aiding the defense program, sets forth the purpose of the council and briefly sketches the character of useful inventions. Also included are biographical sketches of council members, the technical committees into which the council is divided, a list of literature thought to be of value to the potential inventor, and a suggested procedure to be followed in submitting inventions for examination.

Bulletin may be obtained without cost from the National Inventors Council, Department of Commerce building, Washington.

New Interpretations Issued on General Metals Order No. 1

E. R. Stettinius Jr., Director of Priorities, last week issued additional interpretations and instructions relating to General Metals Order No. 1 which provides inventory control over certain metals and classes of metals.

One change relates to iron and steel scrap and states that persons who handle such scrap shall be deemed to be suppliers only when they sell the material directly to the consumer. This means the sale of iron and steel scrap is exempt from the order until it reaches the stage where a person who has the material sells it to the consumer.

Another interpretation provides that metals, mineral salts, oxides and other compounds, prepared and sold for use as laboratory reagents or as catalysts in chemical processes, are finished products, and as such are not subject to the provisions of the general order.

More Than 300 Items Now on Priorities Critical List

Tungsten carbide, borax and boric acid, cork and cork products and various types of machinery and equipment last week were added to the priorities critical list which now covers more than 300 items.

Other products added to the list to assure them automatic preference in Army and Navy ratings are: Aircraft laboratory and test equipment; balloon barrage cable; bombing training and target assemblies; aerial dead-reckoning, time-conversion, and altitude-correction computers; heat-treating electric furnaces; addressing and duplicating machines, including plates, type and plate-making equipment; motion picture projection and sound equipment, aerial and ground photographic equipment; tractor-drawn scrapers, navigation sextants, sights and related equipment; tow targets; gun turrets; balloon winches; and medical and industrial X-ray equipment.

War Department Authorizes Additional Munitions Plants

War department last week reported selection of sites and authorization of funds for shell-loading and explosives manufacturing plants as follows:

Parsons, Kans., $35,000,000 for artillery ammunition and bomb-loading plant;

Texarkana, Tex., $45,500,000 for artillery ammunition and bomb-loading plant;

Chattanooga, Tenn., $39,000,000 for a T.N.T. plant; and

Minden, La., $29,000,000 for a shell-loading plant.

In each case the authorization includes funds for purchase of land, construction of buildings, building installations, machinery and equipment.

OPACS Assures Car Builders of Steel for 73,000 Units

Railroads, mine and freight car builders last week were assured they will be able to obtain the 1,400,000 tons of steel needed to complete the 73,000 cars on order May 1 by OPACS Administrator Henderson.

All synthetic rubber and certain types of polyvinyl chloride, a plasticized resin material used in the manufacture of sheathing for ship cables, were placed under mandatory priority control. Neoprene, one of the synthetic rubbers, has been under priority control since March 28. The Priorities Division will make specific allocations of these materials month by month to make sure all defense needs are filled before nondefense requirements.

Mr. Henderson issued a civilian allocation program covering all material and equipment used in car construction, which gives such deliveries preference over those for any other civilian use. Previous government and military contracts will keep the higher preference ratings than that given the car builders, however.

Mr. Henderson said some curtailment of steel going into other civilian uses will necessarily follow because "even though the industry is operating at capacity, there is not enough steel being produced to satisfy both military and all civilian needs."

Restrictions Governing Copper Toll Agreements Liberalized

Three changes in the priority control over copper were ordered

into effect last week by the Priorities Division of the OPM.

The amendments to the general preference order provide for the following revisions:

1—Each refiner in estimating the amount of copper he must set aside each month in a pool for specific allocation will set aside an amount equal to 20 per cent of his April production of duty-free copper.

2—The amendment provides that a refiner may make full shipment to any customer in any month in which that customer's total commitment does not exceed one minimum carload lot. It is also provided that no customer's order need be cut below a minimum carload lot for one month.

3—Restrictions governing toll agreements are liberalized. It is provided that persons who are parties to toll agreements for copper must file information concerning them but need not file full copies of such agreements and need not obtain specific permission for new agreements.

Stettinius Directs Aluminum Scrap to Defense Channels

Aluminum scrap was placed under priority control last week with a warning by E. R. Stettinius Jr., director of priorities, OPM, that all scrap will go to defense channels except when specific allotments are made to meet emergencies in civilian industries.

The order, effective June 10, declares that no person shall deliver scrap for melting or processing purposes unless the delivery has been assigned preference rating of A-10 or higher, or unless the director has specifically authorized delivery of a nondefense order which is directly or indirectly in the interests of national defense. The priority order does not apply to the sale or transfer of scrap between dealers but only to the sale of scrap to persons who will process it.

The order erects barriers against bootlegging by providing that a violator shall be prevented from obtaining further supplies of scrap.

Processors must also keep complete records on inventories, purchases, sales and deliveries. It is made a violation to accept delivery of secondary aluminum or castings which were obtained by melting and processing scrap delivered contrary to the order.

Reports and questionnaires on sales and inventories, based on the mandatory records, must not be sent to the priorities division until requested.

"Provisions of the order do not govern the sale or transfer of scrap between dealers but are intended to apply to the sale of scrap to persons who will melt or otherwise process the material," Mr. Stettinius said.

The order gives the priorities division complete control of aluminum in all forms except for transactions between dealers. The supplementary order, M-L-b, which governed distribution of low-grade aluminum, is revoked by the order.

OPM Places Zinc Industry Under Full Priority Control

Office of Production Management last week placed the zinc industry under full priority control.

The zinc order, effective July 1, provides that all defense needs shall be filled ahead of all other requirements, that an emergency pool will be created to meet urgent needs, and that the remaining zinc shall be allocated among competing civilian demands.

In allocating zinc for delivery under civilian orders, the OPM said, the director of priorities will be guided by a civilian allocation program when issued by the OPACS.

Heretofore, zinc has been subject only to partial control through a production pool which was established voluntarily by the producers.

275,000-Ton Shortage Looms

The new order was rushed through as Mr. Stettinius was informed that an overall shortage of from 215,000 to 275,000 tons looms for 1941. In announcing the order, he said the remaining amount of zinc in the hands of trade members after the pool allotment is made will be equitably prorated. The percentage for the July pool will be set soon, he added.

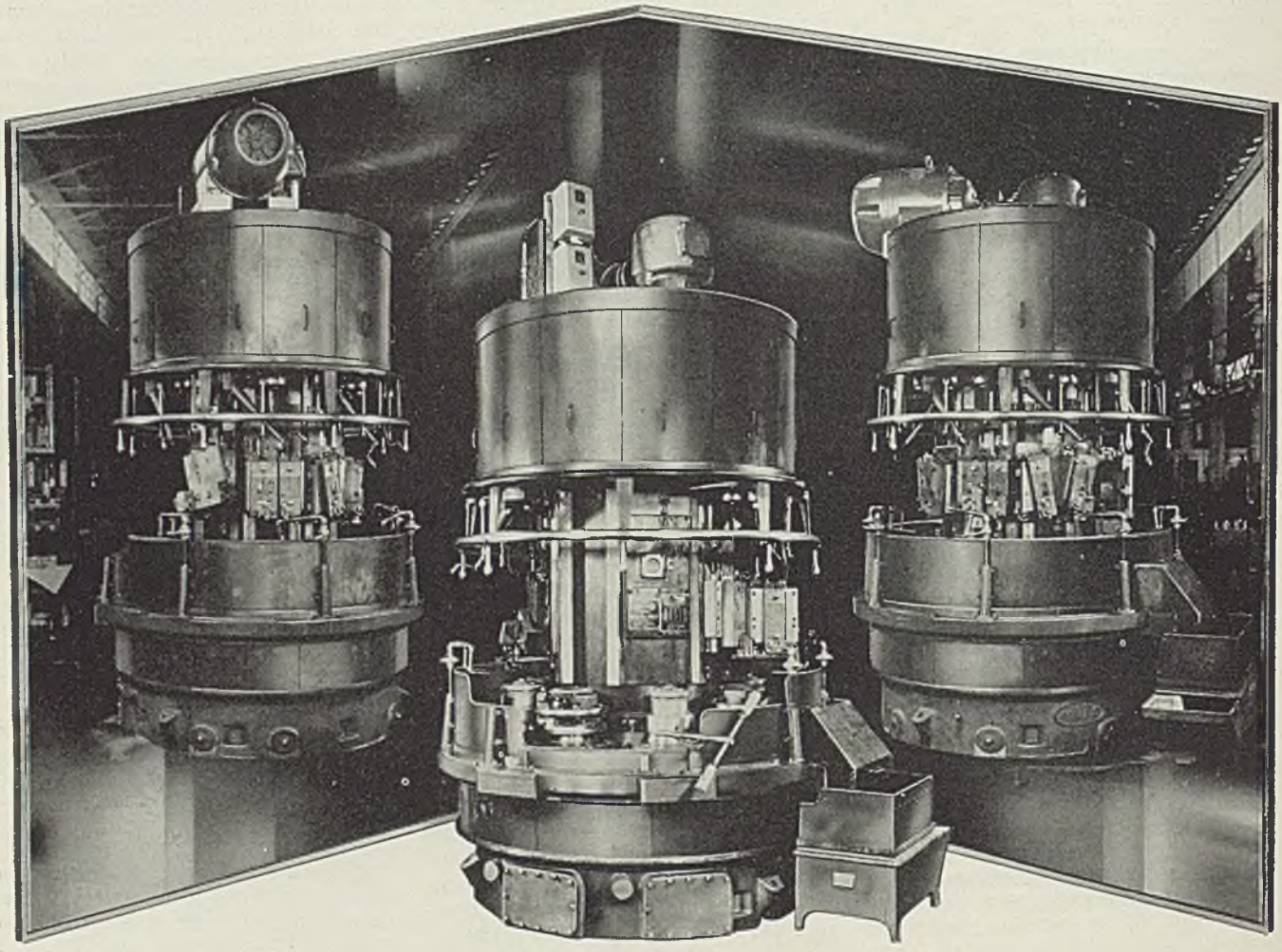
Producers of metallic zinc, zinc oxide and zinc dust must comply with this requirement each month beginning July 1. Mr. Stettinius included inventory limitations in the order to prevent accumulation of stock. The system will be voluntary as shippers are restrained from "knowingly" delivering zinc when they believe consumers' stocks are excessive.

Mr. Stettinius said his information indicated that the 1941 supply of zinc will range between 890,000 and 950,000 short tons. Military and civilian requirements for the year are estimated at 1,165,000 tons, forecasting a shortage that may reach 275,000 tons.

"A factor involved in the shortage is that total supply figures for 1941 include over 200,000 short tons which would be produced from foreign ore," he said. "Approximately 450,000 short tons of concentrate is required for this production and any inability to get ships to move this tonnage from South America could reduce seriously the estimated supply for this year."

Pontiac Electroplates Cast Iron Pistons

■ In a fortunate position by virtue of having always used cast iron pistons, Pontiac Motor Division, Pontiac, Mich., anticipates no difficulties from material scarcity on this score. Here are racks of machined iron pistons about to be lowered into electroplating bath which plates a layer of soft bearing metal on the skirts. Rubber caps over top and ring grooves keep the plating off those sections. Lower five pistons on the center rack have received plating



WHAT IS THE MULT-AU-MATIC METHOD?

It is the division of the total machine work on any given part into numerous separate operations in such a way that all the work can be done simultaneously and in the time of the longest single operation.

WHAT IS A MULT-AU-MATIC?

It is a machine with 6 or 8 working spindles, each completely independent as regards speeds, feeds, and tooling; so arranged that machining operations are carried on simultaneously on each spindle, with the exception of the one reserved for loading and unloading.

TOOLING CHANGE-OVER FROM PREVIOUS JOBS TO DEFENSE JOBS WHERE NECESSARY HAS BEEN DONE QUICKLY AND EASILY. IT WILL BE EQUALLY EASY LATER TO SHIFT THEM BACK TO PEACE TIME ACTIVITIES. A MULT-AU-MATIC IS ALWAYS A GOOD INVESTMENT.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Large tonnage of critical metals to be released for defense program by ingenuity of automotive engineers . . . Aluminum pistons now seem certain to give way to cast iron as foundry layouts await final approval . . . New steels for connecting rods and ring gears and pinions . . . Plan to extend Ford airplane engine plant, as well as new bomber plant . . . Motor companies covered on steel but have no assurance of shipments

DETROIT

■ WHAT do metal conservation programs devised by the motor industry mean in terms of actual tonnage saved? Obviously, at this date, such figures can be only rough estimates, since no accurate measure of 1942 model production is possible. Assuming, however, that 3,500,000 passenger cars can be built in the next model year, the industry has reported to the OPM that the following savings appear likely:

Metal	Savings, annual, in tons
Zinc	59,000
Copper	15,500
Lead	12,500
Aluminum	10,000
Nickel*	5,500
Tin	1,350
Chromium	835
Magnesium	245
Tungsten	55

*Includes that required for 93,000 tons of nickel steel which will be released.

This adds up to 154,985 tons in all of strategic and critical metals which will be released for defense production, if consideration is given to estimated saving of 50,000 tons in truck production. The latter figure may change because of the still unascertained extent of military truck production which, of course, would have priority to use critical metals.

Last week it became apparent that the switch from aluminum to cast iron pistons would have to go ahead as originally planned. For a time it looked as though supplies of secondary aluminum would be sufficient to relieve the necessity for a change, but the collapse of supplies going to smelters, as outlined here last week, has altered the outlook.

Companies using aluminum pistons have all developed complete layouts for a change to iron. Buick, for example, will produce gray iron pistons in the foundry at Flint, probably using dry sand cores made by blowing, with ten pistons in a mold. Foundry engineers are arguing the merits of dry sand versus green sand on this job. The former is more expensive since the cores have to be baked and special equipment installed to form them. A core cost of around 2 cents per piston is indicated. If green sand is used, changes in the piston design are required. Chevrolet and Pontiac pistons are cast in green sand, cores being integral with the drag section of the mold.

Chrysler is reported to have an elaborate new foundry layout developed for piston production at the Dodge foundry here, or in a new foundry building. If piston production should be centered in the present foundry, some other lines, such as flywheels or small parts, would have to be placed elsewhere. The piston layout would involve expenditure of an estimated $500,000, but in view of the fact no action has been taken on it as yet, there is considerable doubt that it will mature at all. Alternative is to contract for piston supplies from outside sources —Lakey Foundry & Machine Co. and the foundry of Electric Auto-Lite Co. at Fostoria, O., being two possibilities.

After all, if the necessity for a change is only a temporary expedient and if aluminum will be available again for 1943 models, the expenditure of a half million for a new iron foundry installation hardly could be justified. Over a period of five years or so, it might be worthwhile, but as a stop gap, no.

Packard, Hudson, Nash, Studebaker and Oldsmobile also must find some sources for iron pistons. Packard, Nash and Studebaker operate foundries, but their comparatively limited production works against re-equipping for piston casting; they might more profitably contract for requirements on the outside if sources can be located.

Higher Strength Required in Connecting Rod Steel

One thing the change to heavier iron pistons will require is a different type of connecting rod steel. Where S.A.E. 1045 forgings have been used—Buick, for example —new specifications are being issued for S.A.E. X1345, a high-manganese steel with somewhat higher strength. Bearing materials may not require much change, even though the heavier pistons are used, because present bearings have an ample factor of safety to take care of the additional loads. Buick was fortunate in making the change this year to sintered copper-nickel bearings with thin babbitt surface, which tests have shown to have several times the strength and life of previous bearing materials.

Another steel specification change which is typical of those being worked out by metallurgists these days is the adoption by Pontiac of S.A.E. 5120 in place of 4615 for ring gears and pinions. The latter is a nickel steel and hence cannot be obtained now. The substitute actually is less expensive as far as material cost is concerned, but ma-

chining and heat treating are more difficult.

Official specifications on the Ford 6 engine have been released and are substantially as outlined here several weeks ago. Water pump is of a new type, with six blades, delivering high pressure and being balanced to prevent gland wear. It is belted to the generator which has a double pulley, a second belt delivering power from the crankshaft pulley to which the engine fan is attached. Crankcase is cross ventilated, intake being through a screen in the breather pipe on the left side of the engine, and suction outlet on the opposite side. Seat inserts are used under both intake and exhaust valves. A service feature of the engine is the new attached flywheel housing, which permits removal of clutch and flywheel without disturbing the engine in the car. Oil pan is bolted to both flywheel housing and cylinder block.

Expand Ford Schedules for Engines and Bombers

Although not announced officially, it is understood the go-ahead has been given to the mile-and-a-quarter assembly building proposed for the Ford bomber plant at Ypsilanti, Mich. This is an extension of the building now going up for production of parts and subassemblies for Douglas and Consolidated assembly plants in the Southwest, and reportedly will require a mere 16,000 tons of structurals.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	509,233
March	389,499	440,232	533,912
April	354,266	452,433	489,841
4 mos.	1,418,247	1,764,382	2,057,112
May	313,248	412,492	.....
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
May 17	127,255	99,030
May 24	133,560	99,810
May 31	106,395	61,255
June 7	133,645	95,560
June 14	134,682	93,635

†Comparable week.

Meanwhile at the Rouge plant the airplane engine building is being extended 400 feet and equipment rearranged to facilitate jumping output of the 1850-horsepower Pratt & Whitney engine to two an hour instead of the originally planned one an hour. The OPM is now sighting on a goal for the Ford engine plant of 40 engines a day.

This suggests the possibility that the increased engine production is being designed to feed power plants to the bomber assembly building for installation in the 4-engine Consolidated bomber to be built there. However, this does not quite add up now because the present design of bomber mounts four 1400-horsepower P&W engines. Conceivably the design could be changed to four 1850-horsepower engines.

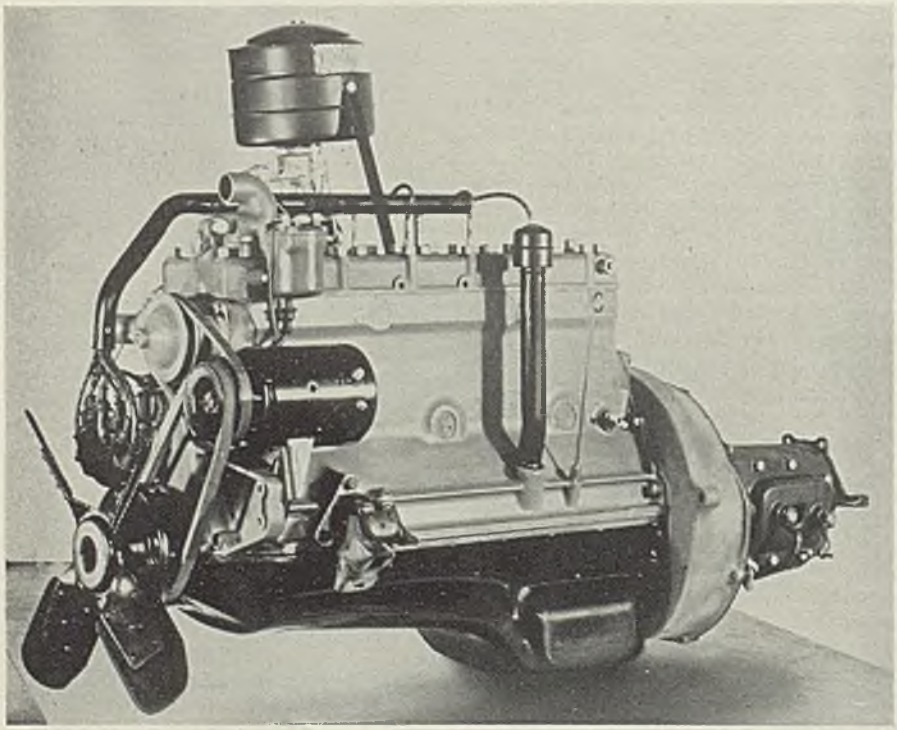
The bomber plane as Ford will build it comprises 70 standardized sections which are readily replaceable and interchangeable, thus greatly facilitating servicing. As far as is possible within the limits of present specifications and approved designs, welding will supplant riveting in subassemblies.

There is talk of setting up a department in the Ford Rouge plant to get started immediately on production of oleos or landing gear for the huge bomber. When equipment and personnel have been familiarized with the job and the new plant is ready, it could be moved in its entirety to the Willow Run plant at Ypsilanti. A complicating factor is the vast confusion resulting in bookkeeping (purchasing, scheduling, billing, etc.), from mixing bomber production with automobile production.

Fingers Crossed on Steel

No one will venture a guess as to the probable effect of civilian allocation of steel orders, recently instituted by the OPACS, on supplies of automotive steel. Motor companies generally are covered on steel requirements for the balance of the year, and some through the first quarter of next year. But steel companies are making no guarantees of deliveries and are receiving orders "when, as and if." Virtually all buyers have complied with the inventory control orders issued by the priorities division, realizing that they might get no more steel if the necessary forms were not filled out and filed prior to June 10.

There are many deficiencies in steel shipments already and the howls of customers are loud and long. Whether these howls are genuine or not is problematical; a trip through some plants in this area which fabricate steel shows steel stocks piled high. Heavy floats naturally are required to meet the high rate of car production now in force, but there is a suspicion that inventories in many cases are excessive. This may be true only of certain sizes and grades of steel. A sudden shortage of any one section can throw an entire plant out of gear, which is another reason why so many fabricators these days are grabbing at any available steel, whether or not it meets their exact needs on the score of analysis and size.



■ Delivering 90 horsepower at 3300 r.p.m., the new Ford 6 engine has a number of design innovations, including high-pressure water system, twin belt drive of generator and water pump, and cross ventilation of the crankcase. It marks the first venture of Ford into the six field since the early days of the company

CONTROLLED QUALITY

JUNIOR CHANNELS

Combine light weight with strength for stair stringers, roof purlins and other similar uses. Made in two sizes and three weights—10″-6.5 lbs.; 10″-8.4 lbs. and 12″-10.6 lbs.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS • PITTSBURGH, PENNSYLVANIA

Exports Lead All Consuming Groups In 1940 Steel Distribution

Automotive industry largest domestic outlet for ninth consecutive year . . . Warehouse distributors move record tonnage . . . Building and construction billings reflect defense plant expansion

■ STEEL exports, influenced by the war, offered a larger outlet for 1940 production than any domestic steel-using industry. Foreign shipments, mainly to United Kingdom and South American countries, took 17.7 per cent, or 8,098,874 of the 45,850,825 net tons total production.

Among domestic consumers, the automotive industry held first place for the ninth consecutive year. In 1940, automobile builders bought 7,185,016 tons, or 15.7 per cent of the total. In 1939, the automobile industry took 18.1 per cent of the total output. The 1940 figures include the tonnage used for mechanized military equipment.

These figures are revealed by a study of 1940 shipments to consuming industries just completed by the American Iron and Steel Institute. Survey covered reports by 130 companies which last year produced more than 98 per cent of all steel made in this country.

The study is the first of its kind and scope to be made by the institute, which this year for the sake of uniformity and elimination of duplicated effort took over the task of compiling steel distribution figures—a service inaugurated by STEEL in 1922.

Second largest user among domestic consumers was the building and construction industries which used 4,967,984 tons, or 10.8 per cent. Included in the total is the steel used for the construction of new aircraft and shipbuilding plants as well as the steel going into public construction projects, railroad and utility construction, highway building, and other branches of the construction industries.

Railroads in Third Place

Ranking third was the railroad industry to which was shipped 3,777,377 tons. Of this, 2,575,181 was forwarded directly to the railroads and 1,202,196 tons to car and locomotive builders and parts manufacturers. Together these tonnages represented 8.2 per cent of total shipments.

Container industry consumed 2,985,338 tons, approximately 6.5 per cent of the total.

Shipbuilders took 940,124 tons last year, or about 2 per cent of the total. Aircraft industry used 48,329 tons, or 0.1 per cent.

Agricultural implement and equipment manufacturers accounted for 919,502 tons, or 2 per cent of the aggregate.

Machine tool and machinery builders, other than farm implements, used 1,885,408 tons, 4.1 per cent.

Steel converting and processing industries, including manufacturers of wire products, forgings, bolts, nuts and rivets, consumed 2,928,842 tons, or 6.4 per cent of the total. Pressing, forming and stamping industries, including manufacturers of metal furniture and office equipment, hardware and household equipment, used 2,159,715 tons, 4.7 per cent of the total.

The oil, natural gas and mining industry consumed 1,132,201 tons, or 2.5 per cent.

Miscellaneous industries accounted for 2,135,581 tons, or 4.7 per cent.

Warehouses Set Tonnage Record

Warehouse distributors and dealers took 6,686,534 tons, 14.6 per cent of production, as compared with 15.64 per cent in 1939. In tonnage, the 1940 movement by warehouses established a new record. Statistics on steel distribution in past years have indicated the warehouses take a relatively high percentage of the total in years of low production and a lower percentage of the total in years of high production.

As to products produced, sheets held a dominant lead, followed by merchant bars, plates and shapes.

Following table presents a percentage comparison of steel shipments to consuming groups for 1940 and 1939; 1940 figures are those compiled by the institute, while those for 1939 were compiled by STEEL:

	1940	1939
Automotive	15.7	18.10
Building, construction	10.8	13.13
Railroads	8.2	9.29
Containers	6.5	9.38
Pressing, forming, stamping	4.7	3.61†
Machinery	4.1	3.79
Oil, gas, mining	2.5	5.48‡
Shipbuilding, aircraft	2.1	*
Agriculture	2.0	1.90
Exports	17.7	6.53
Warehouses	14.6	15.6
All other	11.1	13.15

†In 1939, this figure was for "furnishings for buildings" and is not strictly comparable. ‡Includes utilities. *Included in "all other."

Detailed classification of billings of products to consuming industries is shown in the accompanying tabulation. Extra copies may be obtained from Readers' Service Department, STEEL.

Distribution of Steel to Consuming Industries in 1940

Classification of billings of products, as reported to American Iron and Steel Institute by 130 producing companies, representing more than 98 per cent of year's output.

All Figures Net Tons

Description	Total Steel (Columns 1 to 21 inclusive)	Shipments to Members of Industry	Net Total	Ingots Blooms Billets Etc. (1)	Structural Shapes and Piling (2)	Plates (3)	Rails (4)	Skelp (5)	Track Acces. (6)	Bars: Carbon (7)	Bars: Concrete Reinforcing (8)	Bars: Alloy (9)	Pipe and Tubes (10)	Wire Rods (11)	Wire and Wire Prods. (12)	Black Plate (13)	Tin and Terne Plate (14)	Sheets and Strip: Hot Rolled (15)	Sheets and Strip: Cold Reduced (16)	Sheets and Strip: Galv. (17)	Sheets and Strip: All Other (18)	Tool Steel (19)	Wheels and Axles (20)	All Other (21)	Blast Furnace Products Only
1. Steel Converting and Processing Industries																									
(a) Wire drawers and wire product manufacturers	662,834	159,140	503,694	39,978	428	330	.....	.....	.....	12,207	.....	1,519	1,858	385,530	216,510	157	.....	1,730	1,631	702	.....	.....	.....	254	1,319
(b) Bolt, nut, and rivet manufacturers	833,258	125,300	707,958	63,846	104	551	.....	2,368	.....	378,549	168	16,079	1,390	259,099	102,149	.....	.....	5,814	2,834	63	43	114	.....	87	.....
(c) Forging manufacturers	759,462	184,984	574,478	421,245	2,896	5,784	.....	.....	.....	161,389	.....	142,937	1,755	1,859	2,500	.....	.....	4,240	76	249	108	2,707	.....	11,717	16,910
(d) All other steel plants and foundries	3,201,082	2,058,370	1,142,712	1,492,426	46,444	45,107	3,576	449,245	405	413,410	3,842	47,630	45,529	68,298	21,179	9,154	.....	469,883	23,663	3,773	729	1,352	.....	55,437	2,907,990
Total	5,456,636	2,527,794	2,928,842	2,017,495	49,872	51,772	3,576	451,613	405	965,555	4,010	208,165	50,532	714,786	342,338	9,311	.....	481,667	28,204	4,787	880	4,173	.....	67,495	2,926,219
2. Jobbers, Dealers and Distributors																									
(a) Oil and natural gas industry	653,936	.....	653,936	1,798	3,747	2,025	.....	.....	.....	4,042	3,975	127	612,658	.....	9,410	.....	.....	2,028	1,015	2,342	.....	.....	.....	10,739	.....
(b) All other	6,032,598	.....	6,032,598	21,738	327,776	311,638	22,054	.....	53,383	600,243	307,755	61,884	1,529,489	11,581	1,045,433	31,807	48,711	481,312	308,374	731,506	88,811	7,525	.....	41,578	138,272
Total	6,686,534	.....	6,686,534	23,536	331,523	313,663	22,054	.....	53,383	604,285	311,730	62,011	2,142,147	11,581	1,054,843	31,807	48,711	483,340	309,419	733,848	88,811	7,525	.....	52,317	138,272
3. Construction Industry	4,967,984	.....	4,967,984	21,431	1,682,208	805,004	33,556	.....	14,864	289,970	737,654	9,239	246,765	19,819	166,241	3,495	9,908	482,817	97,825	273,045	6,341	1,065	.....	66,737	160,470
4. Shipbuilding Industry	940,124	.....	940,124	8,177	143,324	568,574	968	.....	247	58,626	192	6,527	19,668	840	1,951	94	.....	18,468	7,535	8,777	2,084	603	.....	93,469	4,175
5. Pressing, Forming and Stamping Industry																									
(a) Metal furniture and office equipment	475,910	5,537	470,373	.....	2,055	4,358	.....	.....	.....	51,901	.....	846	23,017	533	22,106	847	3,897	219,086	123,650	20,481	2,398	172	.....	563	33,918
(b) Hardware and household equipment	978,942	29,087,	949,855	1,976	2,776	7,630	.....	.....	.....	52,248	.....	4,787	8,691	4,723	114,601	48,838	17,334	327,438	271,452	57,238	58,168	366	.....	676	22,173
(c) All other	799,467	59,980	739,487	2,114	10,666	37,840	.....	972	.....	63,525	10,223	6,882	20,275	15,163	72,076	43,828	34,985	289,487	110,335	47,359	31,572	122	.....	2,043	10,626
Total	2,254,319	94,604	2,159,715	4,090	15,497	49,828	.....	972	.....	167,674	10,223	12,515	51,983	20,419	208,783	93,513	56,216	836,011	505,437	125,078	92,138	660	.....	3,282	66,717
6. Container Industry	2,985,338	.....	2,985,338	.....	518	91,476	.....	.....	.....	8,218	.....	210	438	.....	43,308	128,554	2,071,403	538,699	36,339	40,060	6,392	35	.....	19,088	297
7. Agricultural, Incl. Impl. and Equip. Manufacturers	919,502	.....	919,502	60,526	54,384	39,278	.....	.....	.....	407,981	636	51,646	30,128	6,533	36,661	70	41	166,835	12,789	45,239	3,609	1,864	.....	1,272	236,560
8. Machinery and Tools																									
(a) Machinery and tools, not including elec. equip.	1,108,463	.....	1,108,463	60,352	127,707	265,632	2,183	.....	410	234,910	420	90,993	60,330	28,761	33,516	767	3,547	124,829	21,271	6,539	3,823	16,551	3,097	22,825	192,936
(b) Electrical machinery and equipment	776,945	.....	776,945	6,916	15,538	66,595	.....	.....	.....	70,410	813	10,009	74,036	16,411	22,464	1,242	245	230,968	95,794	5,069	149,690	1,804	1,458	7,483	31,011
Total	1,885,408	.....	1,885,408	67,268	143,245	332,227	2,183	.....	410	305,320	1,233	101,002	134,366	45,172	55,980	2,009	3,792	355,797	117,065	11,608	153,513	18,355	4,555	30,308	223,947
9. Automotive Industry	7,195,339	10,323	7,185,016	252,592	26,612	148,137	.....	.....	.....	1,007,191	174	627,462	72,451	35,540	225,241	2,032	29,495	2,931,177	1,704,973	9,261	56,849	4,478	16,024	45,650	393,134
10. Aircraft Industry	48,329	.....	48,329	189	.....	101	.....	.....	.....	2,670	.....	20,521	6,103	482	1,104	.....	.....	6,198	3,109	.....	240	1,762	.....	5,850	766
11. Railroad Industry																									
(a) All railroads	2,575,181	.....	2,575,181	21,631	99,028	330,335	1,187,001	.....	495,895	134,212	120	7,656	31,484	1,327	12,654	.....	.....	69,858	1,983	6,372	4,388	1,201	127,055	42,981	42,943
(b) Car and locomotive builders and parts mfrs.	1,202,196	.....	1,202,196	74,171	240,277	334,102	17,402	.....	3,815	137,296	.....	8,193	18,768	258	5,319	10,435	397	154,814	30,788	37,376	1,911	50	111,350	15,474	92,402
Total	3,777,377	.....	3,777,377	95,802	339,305	664,437	1,204,403	.....	499,710	271,508	120	15,849	50,252	1,585	17,973	10,435	397	224,672	32,771	43,748	6,299	1,251	238,405	58,455	135,345
12. Oil, Natural Gas and Mining Industry																									
(a) Oil and natural gas, including pipe lines	990,876	.....	990,876	30,628	28,308	68,596	.....	130,014	117	14,419	620	16,329	615,984	316	5,278	1,999	6,189	44,264	1,805	13,117	.....	1,398	.....	11,495	2,864
(b) Mining, quarrying and lumbering	141,325	.....	141,325	2,373	14,194	19,997	32,706	.....	12,570	18,712	1,535	4,501	2,873	94	8,261	401	90	10,416	176	2,500	.....	496	3,153	6,277	2,539
Total	1,132,201	.....	1,132,201	33,001	42,502	88,593	32,706	130,014	12,687	33,131	2,155	20,830	618,857	410	13,539	2,400	6,279	54,680	1,981	15,617	.....	1,894	3,153	17,772	5,403
13. Miscellaneous Industries	2,135,581	.....	2,135,581	139,980	55,191	205,331	2,446	99,912	4,113	280,184	20,747	74,363	133,376	44,999	144,391	10,624	33,355	454,510	164,628	103,139	16,244	2,711	6,513	138,824	936,105
14. Export, All Industries	8,098,874	.....	8,098,874	2,769,659	482,294	727,370	275,645	161,614	22,232	743,934	276,038	142,491	382,338	334,608	297,712	42,558	452,838	651,713	86,980	174,896	23,189	7,332	6,109	37,324	545,073
TOTAL	48,483,546	2,632,721	45,850,825	5,493,746	3,366,475	4,085,791	1,577,537	844,125	608,051	5,146,247	1,364,912	1,352,831	3,939,414	1,236,774	2,610,065	336,902	2,712,435	7,686,584	3,109,055	1,589,703	456,589	53,708	274,759	637,843	5,772,483
Less Shipments to Members of Industry	2,632,721	.....	.....	1,260,339	33,025	20,408	3,472	405,670	315	291,516	4,544	75,565	19,214	164,510	40,728	1,730	424	265,049	20,103	2,980	372	75	85	22,597	.....
NET TOTAL	45,850,825	.....	45,850,825	4,233,407	3,333,450	4,065,383	1,574,065	438,455	607,736	4,854,731	1,360,368	1,277,266	3,920,200	1,072,264	2,569,337	335,172	2,712,011	7,421,535	3,088,952	1,586,723	456,217	53,633	274,674	615,246	.....

April Finished Steel Output 5,269,748 Tons

Finished steel produced for sale in April totaled 5,269,748 net tons, 141,571 tons, or 2.62 per cent, less than 5,411,319 tons in March, according to the American Iron and Steel Institute.

Exports in April, 331,942 tons, represented a decrease of 159,577 tons, or 32.47 per cent, from 491,519 tons exported in March. Shipments to other members of the industry for further conversion totaled 327,683 tons, 38,054 tons, or 10.4 per cent, less than 365,737 tons in March.

April production was 2,264,530 tons larger than 3,005,218 tons made in April, 1940, an increase of 75.35 per cent. April exports, however, were 39,590 tons, or 10.66 per cent, less than 371,532 tons exported in April 1940.

Production in four months this year aggregated 20,698,172 tons, 7,119,969 tons, 52.44 per cent, larger than 13,578,203 tons in the comparable period last year.

Production for sale, less shipments to members of the industry for further conversion, related to estimated yield of 71.2 per cent of ingots, was at 104.4 per cent of capacity and for four months 102.7. Summary by months, in net tons, is as follows:

1940	Output	Exported	Pct. Exported
April....	3,005,218	371,532	12.37
May.....	3,576,860	476,761	13.33
June	3,802,485	601,668	15.8
July	4,173,839	835,385	20.0
Aug.....	4,649,065	1,053,110	22.6
Sept.....	4,446,555	951,555	21.4
Oct.....	4,937,388	783,652	15.87
Nov.....	4,760,948	562,587	11.82
Dec.....	4,909,448	713,802	14.5
Year	48,584,860	7,683,858	15.8
1941			
Jan.....	5,163,912	558,198	10.8
Feb.....	4,864,936	560,035	11.5
March...	5,411,319	491,519	9.07
April ...	5,269,748	331,942	6.29

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

April - 1941
PERIOD

	Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	Year to Date: Total	Year to Date: Per Cent of capacity	Year to Date: Shipments: Export	Year to Date: Shipments: To members of the industry for conversion into further finished products
STEEL PRODUCTS											
Ingots, blooms, billets, slabs, sheet bars, etc.	32	1	xxxxxxx	420,289	xxx	38,543	155,726	2,071,059	xxx	617,359	560,942
Heavy structural shapes	8	2	5,038,200	383,469	92.5	12,758	xxxxxxx	1,448,735	87.4	70,573	xxxxxxx
Steel piling	4	3	332,000	24,382	89.3	4,652	xxxxxxx	87,223	79.9	10,921	xxxxxxx
Plates—Sheared and Universal	19	4	6,168,590	446,653	88.0	27,235	1,907	1,746,013	86.1	155,555	8,592
Skelp	8	5	xxxxxxx	96,618	xxx	15,681	38,090	349,122	xxx	50,184	147,200
Rails—Standard (over 60 lbs.)	4	6	3,613,600	175,650	59.1	4,185	xxxxxxx	606,776	51.1	31,389	xxxxxxx
Light (60 lbs. and under)	6	7	302,800	16,410	65.9	6,574	xxxxxxx	66,996	67.3	26,838	xxxxxxx
All other (Incl. girder, guard, etc.)	2	8	102,000	2,021	24.1	345	xxxxxxx	7,712	23.0	1,385	xxxxxxx
Splice bar and tie plates	15	9	1,300,200	71,162	66.5	1,255	xxxxxxx	252,355	59.0	6,966	xxxxxxx
Bars—Merchant	35	10	xxxxxxx	521,970	xxx	33,358	52,280	2,140,948	xxx	225,884	237,373
Concrete reinforcing—New billet	16	11	xxxxxxx	118,972	xxx	18,282	xxxxxxx	455,367	xxx	77,236	xxxxxxx
Rerolling	17	12	xxxxxxx	16,788	xxx	873	xxxxxxx	45,814	xxx	3,486	xxxxxxx
Cold finished—Carbon	19	13	xxxxxxx	104,619	xxx	2,195	xxxxxxx	398,708	xxx	7,895	xxxxxxx
Alloy—Hot rolled	15	14	xxxxxxx	143,957	xxx	10,091	12,310	538,642	xxx	49,696	51,035
Cold finished	15	15	xxxxxxx	15,955	xxx	2,117	xxxxxxx	57,251	xxx	7,373	xxxxxxx
Hoops and baling bands	5	16	xxxxxxx	8,787	xxx	636	xxxxxxx	32,637	xxx	1,456	xxxxxxx
TOTAL BARS	52	17	12,194,785	931,048	92.8	67,552	64,590	3,669,367	91.5	372,966	288,408
Tool steel bars (rolled and forged)	15	18	127,870	10,319	98.1	607	xxxxxxx	35,751	85.0	2,781	xxxxxxx
Pipe and tube—B. W.	13	19	2,049,200	134,153	79.6	13,199	xxxxxxx	505,712	75.0	38,626	xxxxxxx
L. W.	8	20	885,260	41,101	56.4	4,615	xxxxxxx	155,993	53.6	10,994	xxxxxxx
Electric weld	4	21	452,520	36,963	97.1	1,926	xxxxxxx	129,450	85.1	3,389	xxxxxxx
Seamless	15	22	3,105,440	189,623	74.2	15,678	xxxxxxx	696,111	68.1	63,921	xxxxxxx
Conduit	6	23	152,145	11,541	92.2	267	xxxxxxx	44,162	88.2	671	xxxxxxx
Mechanical Tubing	12	24	467,725	39,706	103.2	3,267	xxxxxxx	152,124	98.9	16,066	xxxxxxx
Wire rods	18	25	xxxxxxx	128,377	xxx	10,473	24,021	510,251	xxx	57,798	87,667
Wire—Drawn	36	26	2,291,250	177,910	94.4	13,777	1,863	704,269	93.4	52,241	7,534
Nails and staples	19	27	1,120,610	69,702	75.6	6,646	xxxxxxx	278,417	75.5	22,382	xxxxxxx
Barbed and twisted	16	28	458,210	24,385	64.7	5,836	xxxxxxx	94,938	63.0	20,995	xxxxxxx
Woven wire fence	15	29	771,180	28,993	45.7	123	xxxxxxx	111,739	44.1	811	xxxxxxx
Bale ties	11	30	114,730	7,877	83.4	--	xxxxxxx	23,553	62.4	40	xxxxxxx
All other wire products	5	31	24,280	558	27.9	--	xxxxxxx	1,996	25.0	--	xxxxxxx
Fence posts	14	32	136,445	6,523	58.1	145	xxxxxxx	23,461	52.3	421	xxxxxxx
Black plate	11	33	341,235	34,917	124.4	2,146	--	124,208	110.7	5,163	8
Tin plate—Hot rolled	7	34	352,700	23,541	81.1	1,897	xxxxxxx	84,290	72.7	4,541	xxxxxxx
Cold reduced	10	35	3,520,640	241,697	83.4	21,659	xxxxxxx	847,369	73.2	72,222	xxxxxxx
Sheets—Hot rolled	24	36	xxxxxxx	660,525	xxx	25,578	18,866	2,573,870	xxx	112,725	76,130
Galvanized	14	37	xxxxxxx	154,651	xxx	10,995	xxxxxxx	613,606	xxx	44,718	xxxxxxx
Cold rolled	16	38	xxxxxxx	283,268	xxx	4,659	xxxxxxx	1,130,467	xxx	22,645	xxxxxxx
All other	14	39	xxxxxxx	58,429	xxx	1,832	xxxxxxx	272,254	xxx	7,756	xxxxxxx
TOTAL SHEETS	27	40	13,154,510	1,166,873	107.8	43,064	18,866	4,590,197	106.1	187,844	76,130
Strip—Hot rolled	23	41	3,200,380	166,930	63.4	5,234	22,620	679,638	64.6	27,818	90,254
Cold rolled	34	42	1,385,260	103,954	91.2	1,961	xxxxxxx	391,989	86.0	6,357	xxxxxxx
Wheels (car, rolled steel)	5	43	422,825	21,212	61.0	--	xxxxxxx	83,838	60.3	151	xxxxxxx
Axles	4	44	472,280	15,821	40.7	228	xxxxxxx	58,290	37.5	382	xxxxxxx
Track spikes	11	45	327,275	16,677	61.9	414	xxxxxxx	58,937	54.8	1,289	xxxxxxx
All other	5	46	10,600	2,693	308.8	--	xxxxxxx	6,131	175.8	79	xxxxxxx
TOTAL STEEL PRODUCTS	131	47	xxxxxxx	5,269,748	xxx	331,942	327,683	20,698,172	xxx	1,941,118	1,266,735
IRON PRODUCTS											
Pig iron, ferro manganese and spiegel	24	48	xxxxxxx	579,988	xxx	44,107	173,258	2,549,494	xxx	178,849	765,100
Ingot moulds	4	49	xxxxxxx	56,665	xxx	180	xxxxxxx	239,163	xxx	562	xxxxxxx
Bars	9	50	109,195	5,366	59.7	7	344	20,070	55.9	9	1,049
Pipe and tubes	3	51	109,300	5,301	58.9	237	xxxxxxx	20,498	57.0	359	xxxxxxx
All other	2	52	71,000	1,753	30.0	414	--	6,764	29.0	1,181	--
TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	224,995	12,420	67.1	658	344	47,332	64.0	1,549	1,049

Total Number of Companies Included - 148

The estimated average yield of products for sale from ingots produced by the companies included above is 71.2 *%, which applied to their total ingot capacity equals* 57,533,200 *net tons of finished rolled products.*

Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:

Current month 4,942,065 *N. T.;* 104.4 *%*

Year to date 19,431,437 *N. T.;* 102.7 *%*

Alloy Steel Production 4,966,000 Tons In 1940, Reflecting Increase for Defense

■ PRODUCTION of alloy steels in the United States in 1940, under the sharp impetus of the defense program and British demand, rose to a new peak of 4,966,000 net tons, according to the American Iron and Steel Institute.

This exceeded by nearly 60 per cent the 1939 production of 3,212,000 tons, and was 12 per cent above the prior peak of 4,432,000 tons in 1929.

In 1918, alloy steel output in this country was 2,002,000 tons, or only two-fifths of the tonnage in 1940.

For the most part, the alloy steels produced last year are the same steels developed originally for peacetime purposes. At present they are essential in constructing major items in the defense program, including airplanes, naval vessels, tanks, guns, defensive armor and certain projectiles. Some contain only 1 or 2 per cent of alloying elements, others as much as 25 per cent or more of chromium, nickel or other alloying elements.

The tonnage last year also amounted to a record-breaking proportion of total steel ingot production. Almost 7.3 per cent of the 66,650,000 tons was alloy steel ingots. By comparison, only 5.9 per cent of 1939 ingot tonnage was alloy steel.

Alloy steels constitute about 6.9 per cent of the 1929 steel ingot output, and exactly 4 per cent of the ingot production in 1918.

Steel Consumption Up 10 Per Cent; 2535 Pounds Per Family

Consumption of rolled iron and steel in United States rose sharply last year despite large exports.

Average of 2535 pounds of finished steel was consumed per American family in 1940, according to the American Iron and Steel Institute. Apparent consumption was 10 per cent above the 1939 total of 2295 pounds per family, and exceeded by more than 60 per cent the average in the 1930-39 decade.

A considerably larger proportion of finished steel last year went directly and indirectly for defense purposes than in 1939 and the immediately preceding years.

Apparent consumption of steel in the nation is estimated by adding total tonnage of finished steel produced here and the amount imported and deducting steel exports.

Total steel produced in 1940 was about 6 per cent above output in 1929—an increase almost equal to the gain in population. In 1929, however, only about one of every twenty tons of steel produced was exported, against one in six last year.

Largely for that reason, apparent consumption of finished steel per family in 1940 was below the 1929 peak of 2950 pounds.

Steel Ingot Statistics

	Estimated Production—All Companies								Calculated weekly production, all companies	Number of weeks in month
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	
Based on Reports by Companies which in 1940 made 92.91% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1941										
Jan. . .	6,271,862	99.0	451,637	76.0	205,256	93.4	6,928,755	96.9	1,564,053	4.43
Feb. . .	5,673,289	99.2	378,330	70.5	186,281	93.9	6,237,900	96.6	1,559,475	4.00
Mar. . .	6,461,936	102.0	460,169	77.4	209,536	95.4	7,131,641	99.7	1,609,851	4.43
1st quar	18,407,087	100.1	1,290,136	74.8	601,073	94.2	20,298,296	97.8	1,578,406	12.86
Apr. . .	6,130,638	99.9	395,009	68.6	232,081	109.1	6,757,728	97.6	1,575,228	4.29
May . .	6,406,838	101.1	444,361	74.8	250,560	114.0	7,101,759	99.3	1,603,106	4.43
Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
1940										
Jan. . .	5,356,444	85.7	285,447	56.1	122,832	77.0	5,764,723	83.4	1,301,292	4.43
Feb. . .	4,208,249	72.1	205,458	43.2	112,090	75.2	4,525,797	70.0	1,093,188	4.14
Mar. . .	4,078,843	65.3	191,568	37.6	118,772	74.5	4,389,183	63.5	990,786	4.43
1st quar	13,643,536	74.4	682,473	45.7	353,694	75.6	14,679,703	72.3	1,129,208	13.00
Apr. . .	3,808,031	62.9	176,419	35.8	116,024	75.1	4,100,474	61.2	955,821	4.29
May . .	4,583,771	73.4	258,741	50.8	125,270	78.5	4,967,782	71.8	1,121,395	4.43
June . .	5,222,120	86.3	305,115	61.9	130,208	84.3	5,657,443	84.5	1,318,751	4.29
2nd qtr.	13,613,922	74.2	740,275	49.5	371,502	79.3	14,725,699	72.5	1,131,875	13.01
1st half	27,257,458	74.3	1,422,748	47.6	725,196	77.4	29,405,402	72.4	1,130,542	26.01
July . .	5,269,701	84.5	322,567	63.5	132,357	83.2	5,724,625	83.0	1,295,164	4.42
Aug. . .	5,670,932	90.8	369,770	72.6	145,681	91.3	6,186,383	89.5	1,396,475	4.43
Sept. . .	5,535,198	91.7	365,289	74.2	155,759	101.1	6,056,246	90.6	1,415,011	4.28
3rd qtr.	16,475,831	89.0	1,057,626	70.1	433,797	91.7	17,967,254	87.7	1,368,412	13.13
9 mos.	43,733,289	79.2	2,480,374	55.1	1,158,993	82.2	47,372,656	77.5	1,210,339	39.14
Oct. . .	6,059,792	97.0	408,317	80.2	176,433	110.6	6,644,542	96.1	1,499,897	4.43
Nov. . .	5,872,162	97.1	420,448	85.3	176,497	114.2	6,469,107	96.6	1,507,950	4.29
Dec. . .	5,907,840	94.8	399,434	78.6	188,083	118.2	6,495,357	94.1	1,469,538	4.42
4th qtr.	17,839,794	96.3	1,228,199	81.3	541,013	114.3	19,609,006	95.6	1,492,314	13.14
Total . .	61,573,083	83.5	3,708,573	61.7	1,700,006	90.3	66,981,662	82.1	1,281,210	52.28

The percentages of capacity for 1940 are calculated on weekly capacities of 1,410,130 net tons open hearth, 114,956 net tons Bessemer and 36,011 net tons electric ingots and steel for castings, total 1,561,097 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth 73,721,592 net tons. Bessemer 6,009,920 net tons, electric 1,882,630 net tons.

The percentages of capacity for 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons Bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, Bessemer 6,996,520 net tons, electric 2,586,320 net tons.

May Ingot Production Close To March Peak

■ Production of steel ingots in May was less than one-half of 1 per cent below the record-breaking tonnage in March of this year. May output was 7,101,759 net tons, compared with 7,131,641 tons in March, 6,757,728 tons in April and 4,967,782 tons in May, 1940.

Average weekly production in May was 1,603,106 tons; 1,575,228 tons in April, and 1,609,851 tons in March. In May, 1940, the weekly average was 1,121,395 tons.

The industry operated at 99.3 per cent of capacity in May, compared with 97.6 per cent in April; 99.7 per cent in March and 71.8 per cent in May, 1940. For five months this year operations have averaged almost 98.1 per cent of capacity. Production for five months totaled 34,157,783 tons, against 23,747,959 tons in the same period last year, an increase of 43 per cent. Figures are from American Iron and Steel Institute.

Shipments Highest In Steel Corp. History

■ United States Steel Corp. shipments of finished steel in May were 1,745,295 net tons, an all-time high. The prior record was 1,720,366 tons in March, 1941, and before that, 1,701,874 tons in May, 1929.

For five months this year shipments were 8,384,240 tons, compared with 5,078,714 tons in the period last year.

(Inter-company shipments not included)

	Net Tons			
	1941	1940	1939	1938
Jan.	1,682,454	1,145,592	870,866	570,264
Feb.	1,548,451	1,009,256	747,427	522,395
March	1,720,366	931,905	845,108	627,047
April	1,687,674	907,904	771,752	550,551
May	1,745,295	1,084,087	795,689	509,811
June	....	1,209,684	807,362	534,994
July	.....	1,296,887	745,364	484,611
Aug.	.....	1,455,604	885,636	615,521
Sept.	.....	1,392,838	1,086,683	635,645
Oct.	.....	1,572,408	1,345,855	730,312
Nov.	.....	1,425,352	1,406,205	749,328
Dec.	.....	1,544,623	1,443,969	765,868
Total, by Mos.	.....	14,976,110	11,752,116	7,286,347
Adjustment	.....	.....	*44,865	†29,159
Total	.....	.....	11,707,251	7,315,506

†Increase. *Decrease.

$50,699,902 Beech Aircraft Award Leads Week's Defense Contracts

■ Defense awards reported last week by the War and Navy departments totaled $90,304,348, down substantially from totals of contracts announced in several prior weekly periods. War department alone placed $88,146,466. Contracts aggregating $50,699,902, placed with Beech Aircraft Corp., Wichita, Kans., for aircraft and spare parts, topped the list. Many awards were small, with army's ordnance department awarding most contracts.

Awards reported by the War department in the week:

Air Associates Inc., Bendix, N. J., agreement of lease with Defense Plant Corp. for establishment of plant facilities including machinery and equipment at or near Bendix for manufacture of aircraft and parts, $311,706.

Beech Aircraft Corp., Wichita, Kans., two contracts for airplanes and spare parts, totaling $50,699,902.

Muirhead, William, Construction Co. Inc., Durham, N. C., quartermaster depot at Charlotte, N. C., $2,757,828. Nine warehouses, railroad sidings and other items included.

Ordnance Department Awards

Abel, Robert, Inc., Boston, hoisting equipment, $1203.

Ahlberg Bearing Co., Chicago, ball bearings, $12,240.

Ajax Auto Parts Co., Racine, Wis., tire pumps, $2175.

Ajax Electrothermic Corp., Ajax Park, Trenton, N. J., generating furnaces and equipment, $489,700.

Albany Protective Service, Albany, N. Y., automatic fire detection system, $1660.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., steel, $3931.14.

Allis-Chalmers Mfg. Co., Milwaukee, spare parts for tractors, $115,985.78.

American Diamond Tool & Gauge Co., Detroit, gages, $1766.50.

American Rolling Mill Co., Middletown, O., steel plate, $1619.89.

Athey Truss Wheel Co., Chicago, trailers, $5346.

Auto Specialties Mfg. Co., St. Joseph, Mich., development of rough machined cast steel shell bodies, projectiles, $39,126.12.

Autovent Fan & Blower Co., Philadelphia, exhaust systems, $1541.

Baccalieri, P., Mfg. Co., Philadelphia, spinning machines and assemblies, $1168.84.

Baltinger Electric Co., New York, electrical supplies, $3837.23.

Barber-Colman Co., Rockford, Ill., modify precision hobbing machines, cutting tools, $16,570.

Bausch & Lomb Optical Co., Rochester, N. Y., gage equipment and optical supplies, $59,276.70.

Bay State Abrasive Products Co., Westboro, Mass., grinding wheels, $1025.50.

Bay State Elevator Co., Springfield, Mass., oildraulic levelator, $1680.

Bendix Aviation Corp., Brooklyn, N. Y., transmitters, $4950.

Bethlehem Steel Co., Bethlehem, Pa., steel rails, steel wool, $4610.63.

Binks Mfg. Co., Chicago, paint spray booths, $2268.

Bliss, E. W., Co., Brooklyn, N. Y., motor driven presses, $9488.

Broadway Office Supply & Equipment Co., Springfield, Mass., office equipment, $2110.09.

Brozyna, A., Mfg. Co., Newark, N. J., setback pins, $16,400.

Budd, Edward G., Mfg. Co., Philadelphia, bombs, $288,492.82.

Budd Wheel Co., Detroit, armor piercing cores, $55,000.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., ammunition parts, projectiles, $22,100.

Caterpillar Tractor Co., Peoria, Ill., tractor, $5262.70.

Carnegie-Illinois Steel Corp., Pittsburgh, hulls, $23,167.

Chase Brass & Copper Co. Inc., Waterbury, Conn., brass rod, $3900.34.

Chattanooga Stamping & Enameling Co., Chattanooga, Tenn., mines, $216,420.

Chefford Master Mfg. Co. Inc., Fairfield, Ill., fuzes, $181,120.

Cleveland Container Co., Philadelphia, containers, $123,900.

Cleveland Tractor Co., Cleveland, parts for tractors, $49,640.18.

Cleveland Twist Drill Co., Cleveland, hand reamers, $1839.36.

Colonial Broach Co., Detroit, horizontal broaching machines, $16,005.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., gun parts, $39,672.15.

Conkey, W. B., Co., Hammond, Ind., rifle targets, $12,175.

Consolidated Packaging Machinery Corp., Buffalo, taping machines, $7460.

Crucible Steel Casting Co., Milwaukee, steel castings, $4399.50.

■ **Navy department awards, for reasons of defense, will no longer be available for publication, it was reported in Washington last week. Contracts reported placed by the Navy department, and appearing in this issue, were the last to be released.—The Editors.**

Crucible Steel Co. of America, New York, steel, $12,440.83.

Davenport Besler Corp., Davenport, Iowa, flanges, $2793.

Denison Engineering Co., Columbus, O., hydraulic presses, $19,800.

DeSanno, A. P., & Son Inc., New York, grinding wheel points, $1430.

Electric Service Supplies Co., Philadelphia, vee blocks, $6138.

Electro Dynamic Works, Bayonne, N. J., motors, $15,234.04.

Equipment Co., Detroit, cutters, $2582.50.

Exact Weight Scale Co., Columbus, O., shadow indicator scales, $4984.98.

Federal Machinery Sales Co., Chicago, thread chasers, $1927.02.

Finkl, A., & Sons Co., Chicago, die blocks, $3637.50.

Firth-Sterling Steel Co., McKeesport, Pa., steel, $23,322.77.

Foster, L. B., Co., Pittsburgh, rails, bolts and nuts; splice bars and spikes, $2432.75.

Fox Munitions Corp., Philadelphia, gages, $20,303.50.

Gar Wood Industries Inc., Detroit, heavy parts for winch, $32,662.58.

Gas Weld Equipment Co., Boston, torches, $1221.52.

General Motors Corp., Delco-Remy Division, Anderson, Ind., generators and regulators, $17,326.40; New Departure Division, Bristol, Conn., ball bearings, $32,989.18.

General Time Instruments Corp., Seth Thomas Clock Division, Thomaston, Conn., bushings and collars, $7835.

Gibbs, Thomas B., Co. Inc., Delavan, Wis., dynamic regulator equipment, $64,796.

Gilbert & Barker Mfg. Co., Springfield, Mass., oil burning equipment, $20,998.

Hadley Special Tool Co. Inc., Boston, gages, $20,791.96.

Hannifin Mfg. Co., Moline, Ill., recoil mechanisms, $2086.

Hanssen's, Louis, Sons, Davenport, Iowa, oil cans, $2615.84.

Hebard, W. F., & Co., Chicago, tractors, $1775.

Heppenstall Co., Pittsburgh, tempered die, steel blocks, $3590.

Hesse Machine & Mfg. Co. Inc., Boston, gages, $2130.

Hummel & Downing Co., Milwaukee, spotter, target discs, $34,105.

International Harvester Co., Milwaukee, tractor engine, $1813.67.

Jacobs, F. L., Co., Detroit, fuze parts, $436,840.

JCH Automatic Machine Works, Philadelphia, dial collars and plates, die caps and holders, $1518.

Johnson, Justus, Hartford, Conn., dies, $12,455.

Jones & Lamson Machine Co., Springfield, Vt., accessories for lathes, $1020.45.

Kingston Products Corp., Kokomo, Ind., fuzes, $297,000.

Laminated Shim Co. Inc., Glenbrook, Conn., laminated shims, $4543.60.

Liberty Tool & Gage Works Inc., Providence, R. I., gages, $2806.

Lincoln Tool & Die Co. Inc., Detroit, fixtures, $3596.

Lisle Corp., Clarinda, Iowa, plugs, $3225.

Lunkenheimer Co., Cincinnati, primers, $2100.

Mattatuck Mfg. Co., Waterbury, Conn., set-back pins, $17,800.

McCulloch Mfg. Co., South Boston, Mass., gun parts, $15,344.28.

Merchant & Evans Co., Philadelphia, machine forgings, $1400.

Mid-West Forge Co., Cleveland, barrel blanks, $7625.

Miller Mfg. Co. Inc., Richmond, Va., boxes for fuzes, $356,000.

Modern-Bond Corp., Wilmington, Del., universal receivers, $4420.

Modern Tool & Die Co., Philadelphia, gages, $1440.

Mohawk Machine & Tool Co., New York, gages, $1774.

Molded Insulation Co., Philadelphia, parts for tanks, $1840.06.

Morse Twist Drill & Machine Co., New Bedford, Mass., taps, $4185.36.

Mueller Brass Co., Port Huron, Mich., brass forgings, boosters, $58,911.46.

Multi-Products Tool Co., Newark, N. J., fixtures for staking rotor cover in booster body, $2800.

Murdock Tool Co. Inc., Detroit, counterbores, $1015.20.

Mutual Wheel Co., Moline, Ill., brake shoe linings, $2480.

National Forge & Ordnance Co., Irvine, Pa., forgings, $2043.60.

National Wire Co., Pittsburgh, electric cable, $4733.60.

New Jersey Machine Corp., Hoboken, N. J., machines, $3910.

Nice Ball Bearing Co., Philadelphia, ball bearings, parts for tanks, $1154.40.

Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., steel tubing, gages, $2337.80.

North American Mfg. Co., Cleveland, air compressors, $1188.90.

Package Machinery Co., Springfield, Mass., cartridge loading machines, $13,600.

Pallet Sales Corp., Tupper Lake, N. Y., pallets, $2382.50.

Parsons Co., Detroit, practice mines, $154,000.

Peco Mfg. Corp., Philadelphia, lifting eyebolt plugs, screws, $153,500.

Peterson Bros. Tool Co., Milford, Mass., gages, $1976.

Phoenix Mfg. Co., Catasauqua, Pa., forgings, $9223.40.

Pipe Machinery Co., Cleveland, gages, $8069.

Powell Pressed Steel Co., Hubbard, O., tote boxes, $1212.

Precision Mfg. Co., New York, gages, $42,545.50.

Proctor & Swartz Inc., Philadelphia, automatic dryers, $1520.

Quality Tool & Die Co., Indianapolis, gages, $73,474.95.

Rahaim Machine & Tool Co., Boston, gages, $4223.35.

Reasoner Tool & Supply Co., Boston, power hack saw blades, $7844.38.

Reed-Prentice Corp., Worcester, Mass.,

lathes, $2,607,300.
Reliance Machine & Tool Co., Pottstown, Pa., chamber boring lathes, $44,400.
Remington Rand Inc., Davenport, Iowa, office machines and equipment, $5883.30.
R. & M. Mfg. Co., Royal Oak, Mich., gages, $20,237.92.
Robbins & Myers Inc., Philadelphia, electric hoists, $4428.
Ryerson, Joseph T., & Son Inc., Cambridge, Mass., structural steel, $1028.81.
Saginaw Stamping & Tool Co., Saginaw, Mich., trailers, $614,553.60.
Schoitz Engineering Works, Waterloo, Iowa, gages, $1837.50.
Scovill Mfg. Co., Waterbury, Conn., setback pins, $24,165.
Sheffield Corp., Dayton, O., gages, $53,948.41.
Shipley, W. E., Machinery Co., Philadelphia, grinders, $1913.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $4133.70.
Standard Wire & Iron Works Co., Philadelphia, tool room partition, $1092.
Starrett, L. S., Co., Athol, Mass., calipers, $1735.46.
Stedfast & Roulston Inc., Boston, Indexing station machines, $11,631.
Steinhardt, J. M., Inc., Albany, N. Y., air conditioning units, $5193.
Strong Steel Foundry Co., Buffalo, steel castings, $1789.
Suburban-Essex Machinists Inc., Orange, N. J., gages, $2017.80.
Super Tool Co., Detroit, tools, $1487.16
Swind Machinery Co., Dayton, O., motor driven machines, $2012.50.
Thompson Products Inc., Detroit, adapters, $146,000.
Thurston Mfg. Co., Providence, R. I., cutting tools, $3745.
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., parts and kits to convert tank transmissions, tank parts, $72,123.70.
Tools & Gages Inc., Cleveland, gages, $3744.
Tredegar Co., Richmond, Va., artillery ammunition, $200,837.22.
Tungsten Electric Corp., Union City, N. J., dies and tools, $2092.88.
Union Twist Drill Co., Athol, Mass., cutting tools, saws, $4366.82.
United Precision Products Co. Inc., Chicago, gages, $1855.
United States Gauge Co., Sellersville, Pa., oil pressure gages, $1950.
University of Michigan, Department of Engineering Research, Ann Arbor, Mich., testing device, $10,000.
Veit & Young, Philadelphia, tools, $26,635.
Vinco Corp., Detroit, gages, $3843.75.
Vulcan Crucible Steel Co., Aliquippa, Pa., tool steel, $8246.62.
Vulcan Mold & Iron Co., Latrobe, Pa., cast iron molds, $4992.
Wallace Supplies Mfg. Co., Chicago, exhaust manifolds, $50,877.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., motor driven hopper, $1050.
Watson-Stillman Co., Roselle, N. J., hydraulic presses, $71,753.75.
Webb, Jervis B., Co., Detroit, conveyors, $5692.
Wellman, S. K., Co., Cleveland, clutch rivets and facings, $5387.55.
Weldon Tool Co., Cleveland, cutters, $3897.31.
Western Cartridge Co., Winchester Repeating Arms Division, New Haven, Conn., cylinders, $6900.
Westinghouse Electric & Mfg. Co., Westinghouse X-Ray Division, Long Island City, N. Y., photographic X-ray equipment, $55,000.
White Motor Co., Cleveland, spare parts for vehicles, $3,582,197.92.
Wilmington Experimental Station, Wilmington, Del., primer mixing machines, $22,500.
Wollaston Brass & Aluminum Foundry, North Quincy, Mass., castings, $11,266.51.
Wood, John, Mfg. Co. Inc., Muskegon, Mich., radio parts, $29,497.86.
Worcester Pressed Steel Co., Worcester, Mass., plates for tapering machine, $1248.
Worthington Pump & Machinery Corp., Harrison, N. J., accumulators, $12,807.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $2760.01.

Chemical Warfare Service Awards

Alexander, H. B., Harrisburg, Pa., clothing renovation plant, New Cumberland general depot, Pennsylvania, $235,450.
Baldwin Laboratories Inc., Franklin, Pa., outlet valve guards, $7239.
Bowers Building & Construction Co., Salt Lake City, Utah, office building and dispensary, shell loading plant, Ogden arsenal, Ogden, Utah, $27,131.
Brotherton, Fred J., Inc., Hackensack, N. J., antenna covers, Ft. Monmouth, New Jersey, $26,955.
Chase Brass & Copper Co. Inc., Waterbury, Conn., sheet and round brass, $12,772.35.
Continental Can Co., New York, manufacturing equipment for canisters, $48,295.
Diamond T Motors, Chicago, 4-ton cargo and wrecker trucks, $3,717,966.25.
Eastern Construction Corp., New Haven, Conn., construction of temporary buildings and utilities, Ft. H. G. Wright, Long Island, N. Y., $108,500.
Falbo, Gilbert, Co., San Antonio, Tex., additions to buildings and heating systems in existing buildings, San Antonio arsenal, Texas, $216,207.
Honeycutt Co., A. J., Inc., North Birmingham, Ala., recreation buildings, including necessary utilities and appurtenances, Ft. McClellan, Alabama, $195,518.
Macri Bros. and S. S. Mullen Inc., Seattle, rigging loft in south pier, Seattle quartermaster depot, Washington, $34,911.
Martell, F. H., Co., Washington, barracks building, post exchange building, and motor repair shop at Arlington cantonment, Virginia, $28,900.
Mundt, Charles, & Sons, Jersey City, N. J., tinplate, $17,560.40.
North & Judd Mfg. Co., New Britain, Conn., clasps, loops and slides, $35,563.
Parent Metal Products Co., Philadelphia, steel cabinets and shelving in ordnance training center, Aberdeen proving ground, Maryland, $1797.77.
Pittsburgh-Des Moines Steel Co., Pittsburgh, 200,000-gallon steel water tank, pumps and water line, Ft. Custer, Michigan, $33,740.
Post, John, & Son Corp., New York, mess hall and store house, Ft. Jay, New York, $16,430.89.
Simon, Edward A., St. Louis, sewage disposal plant, lift station and force main, Jefferson quartermaster depot, Indiana, $64,983.40.
Spitzer Electric Co., New York, installation of electric underground cable, Ft. Dix, New Jersey, $17,000.
Truck Engineering Corp., Cleveland, semitrailers, $3756.
Yellow Truck & Coach Mfg. Co., Pontiac, Mich., 1½ to 3-ton chassis trucks, $19,769.28.

Air Corps Awards

Air Cruisers Inc., Clifton, N. J., assemblies, $64,000.
Bunell Machine & Tool Co., Cleveland, crankshaft spline and thrust bearing nuts, $100,718.38.
Chicago Pneumatic Tool Co., Detroit, hammers, $124,475.
Crescent Insulated Wire & Cable Co. Inc., Trenton, N. J., cable, $147,283.
Curtiss Wright Corp., St. Louis plant, Robertson, Mo., airplanes, $351,477.
Edgewater Steel Co., Pittsburgh, adapter assemblies, $39,167.85.
General Motors Corp., Delco Products Division, Dayton, O., motor assemblies, $84,000; Delco Remy Division, Anderson, Ind., assemblies, $393,800.
Hamilton Metal Products Co., Hamilton, O., tool kits, $24,570.
Kennedy Mfg. Co., Van Wert, O., tool kits, $76,558.
Leece-Neville Co., Cleveland, assemblies, $220,000.
Mall Tool Co., Chicago, electric drills, $62,832.83.
Nichols Electric Co., Dayton, O., cable, $322,365.
Sperry Gyroscope Co. Inc., Brooklyn, N. Y., control assemblies and hydraulic controls, $78,898.
Weston Electric Instrument Corp., Newark, N. J., indicator and generator tachometers, $98,148.

Medical Corps Awards

American Optical Co., Southbridge, Mass., surgical equipment, $54,637.
Mueller, V., & Co., Chicago, surgical equipment, $2515.
Torrington Co., Torrington, Conn., needles, $10,312.50.

Quartermaster Corps Awards

American Bantam Car Co., Butler, Pa., ¼-ton trucks, $864,141.30.
Damascus Steel Products Corp., Rockford, Ill., butchers' cleavers, $1026.44.
Ford Motor Co., Dearborn, Mich., ¼-ton trucks, $865,700.
General Motors Corp., Chevrolet Division, Detroit, 1½-ton trucks, $27,107.96.
Ontario Knife Co., Franklinville, N. Y., butcher knives, $842.60.
Yellow Truck & Coach Mfg. Co., Lebanon, Ind., 1½-ton trucks, $6682.05.

Corps of Engineers Awards

Aetna Steel Construction Co., Jacksonville, Fla., steel frame and sliding doors for hangar and steel frame for boiler house, flying school No. 6, Albany, Ga., $58,430.
American District Telegraph Co., Seattle, burglar alarm system and ventilator vault, $2105.
American Laundry Machine Co., New York, laundry equipment, $4417.
American Sash & Door Co., Kansas City, Mo., millwork, aircraft assembly plant, Tulsa, Okla., $2219.65.
Bethlehem Steel Co., Seattle, steel, $2140.
Brown & Root Inc., Houston, Tex., runways, Corpus Christi municipal airport, Texas, $207,467.
Bruce-Fluornoy Motor Co., Norfolk, Va., stake body trucks, Langley field, Virginia, $3640.
Buffalo Gasoline Motor Co., Buffalo, engine-generator unit, military airfield, Windsor Locks, Conn., $7620.
Campbell Foundry Co., Harrison, N. J., cast iron curb guard sections, frames and gratings, $2076.
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, aircraft assembly plant, Kansas City, Kans., $21,960.
Cincinnati Shaper Co., Cincinnati, shapers, $7698.
Cleaver-Brooks Co., Milwaukee, steam generating plant, $5807.
Cleveland Trencher Co., Cleveland, trench diggers, $21,600.
Crane Co., Seattle, pipe and fittings, $4549.69; Portland, Oreg., pipe and fittings for sewage disposal system, Boise air corps cantonment, Idaho, $2369.78.
Doermann-Roehrer Co., Cincinnati, parkway cable, Patterson field, Ohio, $7817.55.
Dohrmann Hotel Supply Co., Seattle, kitchen equipment, Sunset field and McChord field, Washington, $8686.25.
Erie Foundry Co., Erie, Pa., forging hammers, $2550.90.
Fairchild Aviation Corp., Jamaica, N. Y., mirror stereoscopes, $167,555.
Florida Pipe & Supply Co. Inc., Jacksonville, Fla., black steel pipe, Drew field, Tampa, Fla., $5987.
General Electric Co., Schenectady, N. Y., primary switchboard, military airfield, Windsor Locks, Conn., $5162.16.
Grimes Pipe & Supply Co., Denver, pipe and fittings, Lowry field, $2038.54.
Grinnell Co. of the Pacific, Seattle, pipe and fittings, $11,831.93.
Griscom-Russell Co., New York, distilling plant, $18,644.
Heller Pipe & Machinery Co., Los Angeles, mild steel, black bars, Hill field, Ogden, Utah, $2229.76.
Hime, J. R., Electric Co., Palm Beach, Fla., lighting system, Palm Beach

county park airport, Lantana, Fla., $10,775.95.
Hughes Range Co., Tacoma, Wash., oil-fired kitchen ranges, Snohomish county airport, Everett, Wash., $9609.
Hunkin Conkey Construction Co., Cleveland, and Shofner, Gordon & Hinman, Los Angeles, embankment and spillway, Youghiogheny river reservoir, Confluence, Pa., $3,675,265.
Leibfried, C. H., Mfg. Corp., Brooklyn, N. Y., galvanized iron straps, $2975.
Los Angeles Fencing Co., Los Angeles, fence, gates and appurtenances, Las Vegas airport, Las Vegas, Nev., $7948.41.
Manning, Maxwell & Moore Inc., Shaw-Box Crane & Hoist Division, Muskegon, Mich., cranes, $4544.
Pacific Door & Mfg. Co., Seattle, millwork, $6855.05.
Palmer Supply Co., Seattle, pipe fittings, $5933.88.
Paris Mfg. Co., Paris, Ill., earth drills, $5383.
Paxton Co. Inc., Norfolk, Va., locks, hinges, Langley field, Virginia, $2081.12.
Perine Machinery & Supply Co. Inc., Seattle, radial drill and lathe, $4127.
Price Bros. Co., Dayton, O., power shovel, trac-trucks, bulldozers, reinforced concrete pipe, $13,098.50.
Prosperity Co. Inc., Syracuse, N. Y., laundry equipment, $8555.50.
"Quick-Way" Truck Shovel Co., Denver, truck-cranes, attachments, and trailers, $705,604.61.
Republic Steel Corp., New York, steel sheets, $4027.03.
Ritter Bros., Harrisburg, Pa., ordnance magazines, Middletown air depot, Middletown, Pa., $23,340.
Roebling's, John A., Sons Co., Seattle, wire rope, $3052.
Snead & Co., Jersey City, N. J., steel half-boats, $5585.
Somerville, Thomas, Co., Washington, plumbing supplies, $2970.48.
Star Machinery Co., Seattle, milling machines, $4772.60.
Stusser Electric Co., Seattle, electric wire, $3132.97.
Tacoma Millwork Supply Co., Tacoma, millwork, $5399.72.
Tietjen & Lang Dry Dock Co., New York, repairing patrol boat, $6107.50.
Vancott Co., Los Angeles, substation and distribution system, Las Vegas airport, Nevada, $44,160.
Van Norman Machine Tool Co., Springfield, Mass., milling machines, aircraft assembly plant, Kansas City, Kans., $16,369.44.
Virginia Bridge Co., Roanoke, Va., noses, $3184.
Westinghouse Electric Supply Co., Omaha, Nebr., bolts, screws, Lowry field, Denver, Colo., $2093.92.
Worthington Pump & Machinery Corp., Harrison, N. J., horizontal centrifugal pumps, military airfield, Windsor Locks, Conn., $4745.
Ziebarth, Fritz, Long Beach, Calif., airport lighting system, Fly field, Yuma, Ariz., $28,000.

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Navy department reported the following contracts:

Bureau of Supplies and Accounts Awards

American Art Metals Co. Inc., Atlanta, Ga., trucks, racks, conveyors and stands, $30,424.04.
American Brass Co., Waterbury, Conn., aluminum bronze rod, $5175.
Baldt Anchor Chain & Forge Co., Chester, Pa., anchors, $14,640.
Carnegie-Illinois Steel Corp., Pittsburgh, sheet steel, $33,293.78.
Citrin, Charles, & Sons, Brooklyn, N. Y., metal bound paint brushes, $5080.
Cummins Engine Co., Washington, generator sets, $211,155.
Dell, Samuel M., & Co. Inc., Baltimore, metal bound paint brushes, $14,800.
Easton Car & Construction Co., Easton, Pa., electrically driven trucks, $11,895.
Elliott Service Co. Inc., New York, steel bulletin boards, $7200.
Ford Instrument Co. Inc., Long Island City, N. Y., parts for torpedo directors, $60,818.44.
Franklin Bronze & Aluminum Co., Franklin, Pa., bronze journal shells, $6800.
General Cable Corp., New York, cable, $57,305.65.
General Electric Co., Schenectady, N. Y., electric transformers, triple conductor cable, $21,286.50.
General Motors Corp., Cleveland Diesel Engine Division, Cleveland, exhaust valves, $9282.56.
Gray, G. A., Co., Cincinnati, housing planers, $103,924.
Greeff, R. W., & Co. Inc., New York, magnesium flat shavings, $22,875.
Hamilton Watch Co., Lancaster, Pa., chronometer watches, $68,516.80.
Hanlon & Goodman Co., Belleville, N. J., metal bound paint brushes, $7400.
Kearney & Trecker Corp., Milwaukee, milling machine, $7835.75.
Kilby Steel Co., Anniston, Ala., star cutters, $229,476.50.
Linzer, David, & Sons Inc., New York, metal bound paint brushes, $17,832.88.
Lionel Corp., New York, compensating binnacles, $167,900.
Morck Brush Mfg. Co., San Francisco, metal bound paint brushes, $10,122.24.
National Traffic Guard Co., Atlanta, Ga., star cutters, $43,000.
National Tube Co., Pittsburgh, steel flasks, $14,120.
Phosphor Bronze Smelting Co., Philadelphia, phosphor bronze bar, $39,519.70.
Pittsburgh Plate Glass Co., Baltimore, metal bound paint brushes, $69,429.40.
Riverside Metal Co., Riverside, N. J., phosphor bronze bars, $14,716.13.
Rubberset Co., Newark, N. J., metal paint brushes, $21,125.
Seymour Mfg. Co., Seymour, Conn., phosphor bronze bar, $6768.38.
Star Electric Motor Co., Bloomfield, N. J., motor generator sets, $408,046.45.
U. S. Motors Corp., Oshkosh, Wis., generators, $25,146.48.

Canada To Enlarge Its Electric Steel Capacity

TORONTO, ONT.

■ Special efforts are being made by the Canadian government and primary producers to increase substantially production of iron and steel, and at the same time to divert larger tonnages into war channels at the expense of civilian requirements.

Electric furnace capacity is being enlarged rapidly in Ontario and Quebec. Atlas Steels Ltd., Welland, Ont., has ordered two new electric furnaces for immediate installation. It is said, however, that this is a part of the company's $5,000,000 expansion program to be financed by the federal government. Report is that the new furnaces will aid in production of $900,000 of stainless steel contracted by the United States Navy department.

Canada is likewise planning volume production of complete antiaircraft guns of two types, including barrels, breech mechanism, mountings and platforms, and expects to begin manufacture by October. It is also declared the government is prepared to sell 4200 additional antiaircraft gun barrels, and will guarantee delivery by July, 1942. Plant for manufacture of the guns will be erected at Windsor, Ont., and will cost $8,000,000.

Department of Munitions and Supply, in the week ending May 30, placed 2671 contracts with total value of $17,546,254. Awards included orders to United States companies aggregating $2,921,332. New awards:

Shipbuilding: St. John Dry Dock & Shipbuilding Co. Ltd., St. John, N. B., $68,000; Whitehead Metal Products Co. of Canada Ltd., Toronto, $77,976; Russell Bros. Ltd., Owen Sound, Ont., $12,675.

Instruments: Dominion Electric Protection Co. Ltd., Montreal, Que., $93,240; Kelvin, Bottomley & Baird (Canada) Ltd., Montreal, $5552; Northern Electric Co. Ltd., Ottawa, Ont., $48,108; Research Enterprises Ltd., Toronto, $381,810.

Land transport: George W. Reed & Co. Ltd., Montreal, $13,680; International Harvester Co. of Canada Ltd., Ottawa, $46,458; Metallic Roofing Co. of Canada Ltd., Toronto, $26,612; General Motors Products of Canada Ltd., Oshawa, Ont., $277,350; Goodyear Tire & Rubber Co. of Canada Ltd., New Toronto, Ont., $34,001; Ross Cycle & Sports Ltd., Toronto, $13,924; Firestone Tire & Rubber Co. of Canada Ltd., Hamilton, Ont., $11,137; Canadian Top & Body Corp. Ltd., Tilbury, Ont., $10,260; Canadian Brown Steel Tank Co. Ltd., Brandon, Man., $23,112; Richardson Road Machinery Co. Ltd., Saskatoon, Sask., $121,660.

Aircraft: Air Ministry, England, $40,000; Canadian SKF Co. Ltd., Montreal, $76,113; D. K. McLaren Ltd., Montreal, $5100; Noorduyn Aviation Ltd., Montreal, $32,597; Switlik Canadian Parachute Ltd., Montreal, $16,159; J. H. Connor & Son Ltd., Ottawa, $38,226; Irvin Air Chute Ltd., Ottawa, $20,554; George W. Reed & Co. Ltd., Ottawa, $18,360; S. & S. Aircraft Ltd., Ottawa, $31,421; Steel Co. of Canada Ltd., Hamilton, Ont., $142,229; Belleville Foundries Ltd., Belleville, Ont., $6966; R. Laidlaw Lumber Co. Ltd., Toronto, $73,008; Fleet Aircraft Ltd., Ft. Erie, Ont., $11,835; Standard Machine Works, Winnipeg, Man., $5670; Prairie Airways Ltd., Moose Jaw, Sask., $14,155; MacKenzie Air Service Ltd., Edmonton, Alta., $35,184; Precision Machine & Foundry Ltd., Calgary, Alta., $9790; Boeing Aircraft of Canada Ltd., Vancouver, B. C., $6071.

Electrical equipment: British Admiralty, England, $20,000; Bepco (Canada) Ltd., Montreal, $6078; Canadian Marconi Co., Montreal, $5391; Superior Fixtures Co., Montreal, $16,934; Canadian General Electric Co. Ltd., Ottawa, $6722; Vancouver Radio Laboratories Ltd., Vancouver, B. C., $5935.

Machinery and tools: Canadian Fairbanks Morse Co. Ltd., Ottawa, $7281; Dominon Chain Co. Ltd., Niagara Falls, Ont., $7910; Precision Tool Works Ltd., Toronto, $5378.

Ordnance: Hall Machinery Co., Sherbrooke, Que., $11,370; John Inglis Co. Ltd., Toronto, $3,820,000.

Munitions: Dominion Arsenals, Ottawa, $3,780,200; W. H. Banfield Son Ltd., Toronto, $20,093.

Miscellaneous: LaFrance Fire Engine & Foamite Co. Ltd., Toronto, $53,727; Turnbull Elevator Co. Ltd., Toronto, $6855; Berkel Products Co. Ltd., Toronto, $16,785; Beatty Bros. Ltd., Fergus, Ont., $12,183; Horton Steel Works Ltd., Toronto, $25,263; Canada Foundries & Forgings Ltd., Welland, Ont., $6183; Hammant Steel Car & Engineering Works, Hamilton, $7672; J. S. Hewson, Montreal, $30,000; Kelly & Cracknell, Toronto, $19,000; F. W. Flett, Cardston, Alta., $12,000; Clare Bros. Western Ltd., Winnipeg, Man., $28,000.

War construction projects: Canadian Ingersoll-Rand Co., Montreal, equipment for Canadian Propellers Ltd., $50,000; Magloire Couchon Ltd., Quebec, Que., addition to Dominion Arsenal, Valcartier, Que., $450,000.

American Machine Tool Capacity Now Five Times Germany's, Chapin States

■ SPEAKING to a group of newspaper men in their tour of defense plants as guests of the National Association of Manufacturers, Frederick H. Chapin, president, National Acme Co., Cleveland, expressed the opinion last week that the American machine tool industry is now capable of turning out at least five times as many machine tools as Germany can produce.

Within recent years he visited most of the leading machine tool plants in Europe and until the outbreak of the war he was active as a director in the Pittler Works in Germany, with which organization National Acme made manufacturing arrangements on automatic screw machines in 1930.

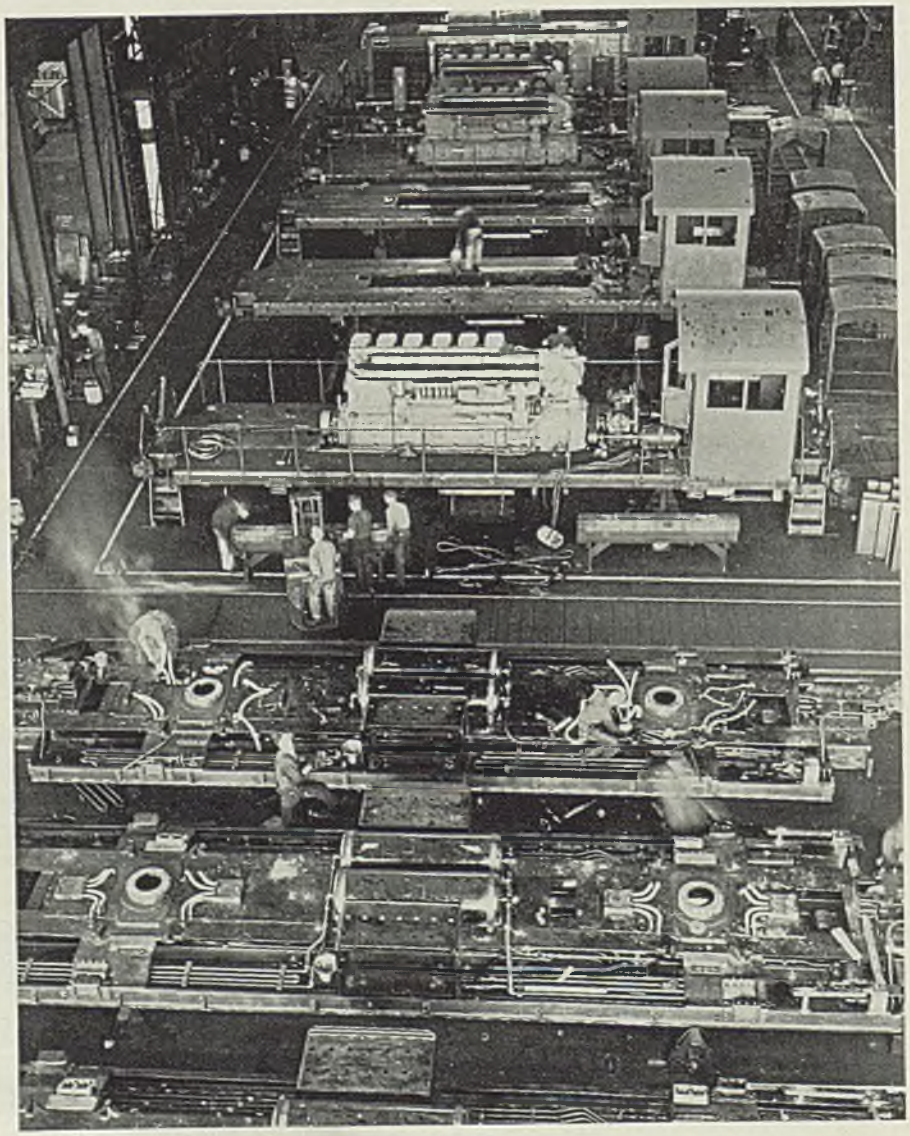
As an indication of the ability of the American machine tool industry to rise to an emergency, Mr. Chapin pointed out that 2280 of the 3100 workers now employed by his company have been trained in the plant through a learner system of specialization. Production of National Acme automatics, which are essential to defense work, is rapidly approaching 150 per month.

Other plants visited by the delegation in Cleveland included the Cleveland Diesel Engine Division of General Motors Corp.; Warner & Swasey Co.; Thompson Products Co. George W. Codrington, general manager of the Diesel Engine Division, stated that his organization was well ahead of schedule on its $150,000,000 worth of orders for naval propulsion machinery, and that 15,000 to 18,000 workers in 25 states were helping to supply materials and parts.

Charles J. Stilwell, Warner & Swasey president, predicted that 101,000 machine tools, including 3500 turret lathes, would be required to carry out the government's new airplane program. His company, which turned out $6,000,000 worth of turret lathes in 1929, will build $35,000,000 worth in 1941.

Thompson Products, according to Frederick C. Crawford, president, now employs over 5000 workers at its Cleveland plant on manufacture of aircraft parts, including sodium-cooled exhaust valves, is adding to this force at the rate of 300 per month, and is building an $11,000,000 government-financed plant in suburban Euclid.

Mr. Crawford said that in his opinion the most serious difficulties now facing American industry in the defense program are those growing out of interference on the part of the National Labor Relations Board and labor organizations, 60 per cent of this interference coming from the government and 40 per cent from unions.



Keel Laid for First of 640-Foot Ore Carriers

■ Work has been started on the first of five new 640-foot bulk freighters to be built for Pittsburgh Steamship Co., United States Steel Corp. subsidiary. Great Lakes Engineering Works, River Rouge, Mich., which will build three of the vessels, has laid one keel, will start the second late in June and the third by mid-July. The other two carriers will be constructed by American Shipbuilding Co., Lorain, O.

General dimensions of all will be as follows: 640 feet, over-all length; 614 feet, keel length; 67 feet, beam; 35 feet, depth; maximum loaded draft, 23 feet 10 inches; loaded speed in deep water, about 13 miles per hour at maximum draft; maximum single cargo capacity, about 17,500 gross tons.

They will be single screw, double reduction gear, turbine driven bulk freighters.

The HARRY COULBY, flagship of the Interlake Steamship Co., last week established a new record for the largest cargo of iron ore loaded on a Great Lakes carrier by taking on 15,982 gross tons at Superior, Wis. The vessel also had held the previous record, 15,974 tons, loaded at Ashland, Wis., last year. A photo of the COULBY loading at Superior appeared in STEEL, June 9, page 50.

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■ Diesel-electric switching locomotives in assembly at General Electric Co.'s Schenectady, N. Y., plant. These include 660-horsepower and 1000-horsepower units, scheduled for delivery to various railroads. The locomotives are a joint product of American Locomotive Co., New York, and General Electric

Husky Army Half-Tracs Demonstrated; Three Companies Co-operating on 9747

■ MARKING the beginning of mass production of 5308 half-trac reconnaisance and troop-carrying vehicles for the United States Army, White Motor Co., Cleveland, staged a plant inspection and demonstration June 6. The event was attended by a large number of army officers, automotive experts and editors, who were luncheon guests of Robert F. Black, president of the company.

White and the Ordnance Department have been collaborating eight years in developing scout cars and half-tracs. The present order for half-trac vehicles follows a prior one for 2915 four-wheeled scout cars, completed early in May about five months ahead of schedule.

The half-tracs now are going through the regular heavy truck assembly line at the rate of 15 per day, but within two months, it is said, this output will be doubled. A new building of 45,000 square feet has just been added for testing and final inspection.

Parts Interchangeable

The White order is part of a total of 9747 half-trac scouting and personnel cars, in which two other companies are participating. Interchangeability of parts is maintained between the products of all three suppliers, and their engineering and purchasing departments are co-operating. White superpower engines are used in all the vehicles. Materials are furnished by 186 primary suppliers, who in turn buy from 7812 secondary suppliers. It is estimated this business spreads to 219 communities in 26 states.

Half-tracs are built high off the ground but have comparatively low overall "target height." They have four-wheel drive, but in place of ordinary rear wheels, wide tread endless rubber-block belts are used, these being driven by the forward axle of the rear bogie. Rear axle weight of the vehicle is supported on these belts at each side by floating four-wheel trucks whose small rubber tired wheels run on the inside of the belts, thus giving a large area of contact with the ground.

Front wheels are equipped with cleated pneumatic tires of self-healing variety through which bullets can pass without releasing the air. A large roller at the front helps them to climb out of holes and ditches.

The cars are armored with ¼-inch plate, which will withstand direct hits by 30-caliber rifle or machine gun bullets or glancing hits by those of heavier caliber.

The remarkable ability of these half-trac vehicles to negotiate difficult terrain at high speed was demonstrated by driving five of them just off the White production line, up the rocky muddy bed of a large creek (see illustration) each fully manned. Not only did they plunge through stretches of water nearly 3 feet deep, but they ascended and descended steep shale banks without difficulty. Capable of traveling up to 50 miles per hour over reasonably level ground, these machines with their eight speeds can negotiate trackless swamps, climb grades up to 60 per cent, and even climb out of a 6-foot trench. Riding qualities over rough terrain are remarkably good. With 60-gallons gasoline capacity, they have cruising range of at least 350 miles.

While not intended primarily for combat purposes, the vehicles mount three machine guns, two of 30-caliber and one of 50-caliber on a gun track encircling the top rim of the armored body.

■ Fully manned, and with machine guns mounted, five armored half-trac reconnaisance vehicles, first of 5308 now under production at White Motor Co., Cleveland, demonstrate their ability to negotiate difficult terrain by dashing through mud and water nearly 3 feet deep

J & L Stock Conversion Would Eliminate Arrears

■ Shareholders of Jones & Laughlin Steel Corp., Pittsburgh, were informed last week of the directors' intention, upon consummation of a merger with two of its important subsidiaries and a conversion of its present stocks into new stocks, to inaugurate regular dividends on a new preferred stock beginning with the first quarterly payment date and at the same time to begin paying dividends on a new common stock.

Shareholders will meet July 22 in Pittsburgh to vote on a merger into Jones & Laughlin of Vesta Coal Co. and Shannopin Coal Co. This would involve conversion of the outstanding $58,713,600 par value of present 7 per cent preferred stock, including accrued dividends amounting to $45.75 per share or a total of $26,861,472 as of April 1, 1941, and outstanding 576.320 shares of present common stock into new securities.

The holder of present 7 per cent preferred stock would receive for each such share: (1) One-half share of new 5 per cent cumulative preferred stock, series A, $100 par; (2) one-half share of new 5 per cent cumulative preferred stock, series B, convertible, $100 par, each full share of which may be converted at any time into three shares of new common stock; and (3) one and one-quarter shares of new common stock, no par value.

Holders of common stock would receive one share of new common for one share of old.

Through the proposed plan, annual preferred dividend requirements would be reduced from $4,109,952 on the present 7 per cent preferred stock to $2,935,680 on the new 5 per cent preferred, prior to any conversion of series B preferred into common, and to $1,467,840, after giving effect to complete conversion of series B preferred.

Defense Expansion More Than Doubling 50 Years' Growth in Aluminum Capacity

■ WHEN Dr. Paul J. Raver, Bonneville administrator, threw an electric switch at the Vancouver, Wash., Works of Aluminum Co. of America recently he delivered the electric current necessary to place in operation of the fifth unit of the company's new Northwest plant.

He also called attention to completion of a large construction project in an extremely short time. Less than 15 months ago the site now occupied by the works was a cow pasture. When the switch was thrown, capacity of the plant was increased to more than 150,000,000 pounds annually. (See illustrations on opposite page.)

Total production of aluminum in the United States did not exceed 130,000,000 pounds per year in the last World war, and the entire industry did not produce 150,000,000 pounds a year until 1924. The Vancouver Works, however, will account for only a fifth of the metal to be produced by this company by midsummer of 1942.

"Completion of this plant is significant in that it brings to the Pacific Northwest the beginning of a great new industrial development in the field of light metals," commented Dr. Raver. "This development will do much toward stabilizing the income and economy of this region long after the national emergency is past."

Construction of the plant began in March, 1940. At that time it was designed to deliver 30,000,000 pounds of aluminum a year. With increased national need, the company decided to add other units as construction proceeded. Each was to have an annual capacity of 30,000,000 pounds.

Completed on Schedule

First unit went into operation last September, less than six months after the first concrete was poured. A second unit was completed in December. The third went into service in March, 1941, the fourth in April.

Work proceeded on schedule or ahead of schedule at all times, despite temporary delays. Worst scare was experienced last fall, when the Steel Tank & Pipe Co., Portland, Oreg., suffered a severe fire.

Building in which this concern was assembling steel reduction furnaces, known as "pots", for the Vancouver works, burned. Without these pots it would have been impossible to operate. But delivery was made before schedule. Work on the pots was finished in the open, with the help of motor-driven truck cranes.

Once, to keep up with the schedule which had been delayed eight weeks because of a steel strike, a conveyor bridge was installed with five different crafts working on it at the same time—steel workers, painters, carpenters, millwrights and sheet metal workers.

On another occasion, a carbon baking furnace was under construction below a temporary roof before steel for the permanent building arrived.

To produce 150,000,000 pounds of aluminum a year, a carbon electrode plant has been installed to make the special carbon electrodes required.

When work was begun on the plant in March, 1940, there were 39 on the construction payroll. Today more than 800 are permanently employed in manufacturing aluminum.

Total aluminum production in the United States in 1939 was 327,000,000 pounds. Output at present is at the rate of nearly 600,000,000 pounds annually, and by July 1942 will reach 825,000,000 pounds a year.

Until recently, the Aluminum Co. of America was the sole producer of primary aluminum in this country. By July, 1942 it will have completed its expansion program which will more than double the capacity built up over a half century of operation. In 1942, the company's production of new metal will amount to more than 720,000,000 pounds; and to reach this, as well as to expand fabricating facilities, it will have expended $200,000,000.

Three Planemakers Pool Facilities To Produce Single Type Heavy Bomber

■ THREE major Pacific coast aircraft manufacturers last week arranged to pool their facilities for the production of a single type of plane, the Boeing B-17E Flying Fortress, a 4-engine, long-range bomber.

The four are Boeing Aircraft Co., Seattle; Douglas Aircraft Co., Santa Monica, Calif.; and Vega Airplane Co., subsidiary of Lockheed Aircraft Corp., Burbank, Calif. Several other aircraft manufacturers, not yet definitely decided, will contribute to the program through subcontracts.

The planes will be identical, even to interchangeability of parts.

Program, which was organized at the request of the War Department to meet present demands for vast numbers of heavy bombers, is being handled by a joint administrative committee composed of representatives of the three companies and the Army Air Corps. The committee, comprising 60 technicians representing the engineering, production, purchasing and other departments of the co-operating companies, now is working under forced draft.

The joint plan has been cited as an outstanding example of how quickly production and engineering facilities can be marshaled for defense production. Despite the fact each of the California companies has equally prominent designs of their own, when the War Department requested them to turn to production of the Flying Fortress, the response was immediate acceptance. The B-17 type has reached an advanced stage of development, has been proven and is in production. Large-scale output with a minimum of delay will thus be made possible.

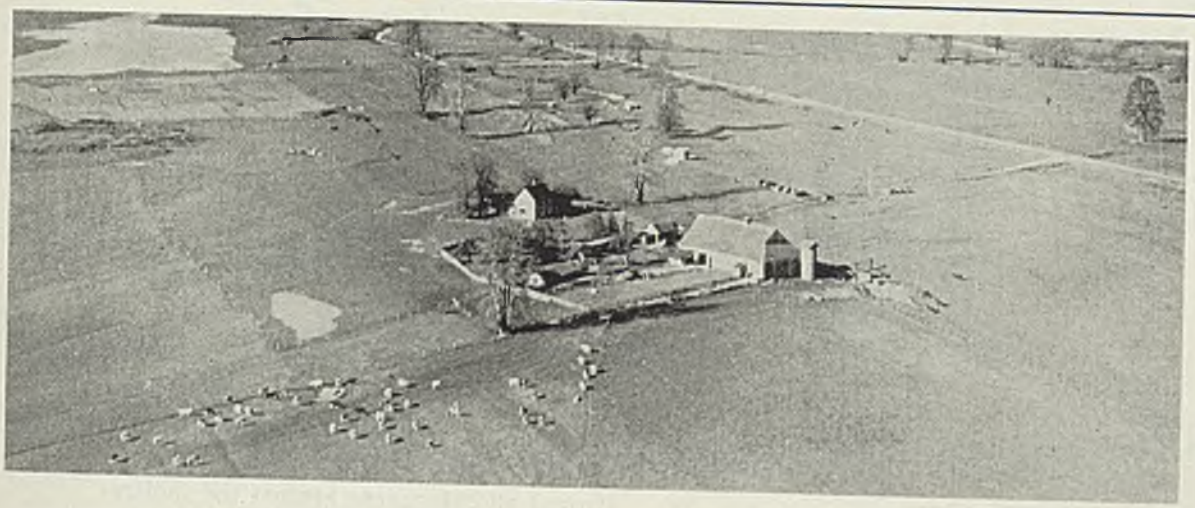
Douglas will manufacture the Flying Fortresses in its new blackout plant at Long Beach, Calif.; the main plant at Santa Monica will continue to manufacture Douglas planes. Vega will use its newly-constructed plant in Burbank to make the Boeing bombers.

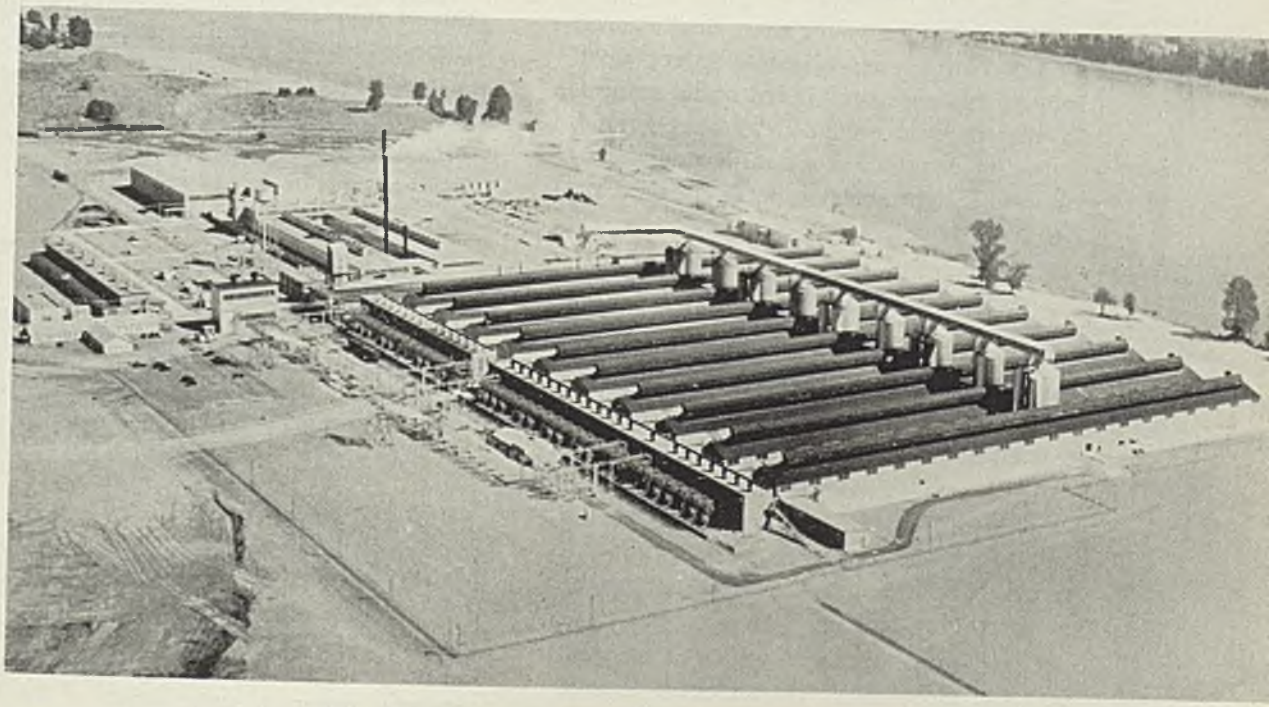
Will Subcontract Parts

Boeing will start immediately on an addition to its new plant at the Stearman Division in Wichita, Kans. To the 384,000 square feet of floor space completed this spring and now in use will be added 1,320,600 square feet, making a total of 1,704,600 square feet, approximately equal in area to the company's No. 2 plant in Seattle. Both the Wichita and Seattle No. 2 plants will be used to produce the Flying Fortresses.

A wide program of subcontracting is being arranged by all three companies. This includes the development of dual sources of supply of fabricated parts, or arrangements to have "standby tools" available to produce the parts in alternate localities, or similar methods to insure that production will not be interrupted in event of failure of one supply source.

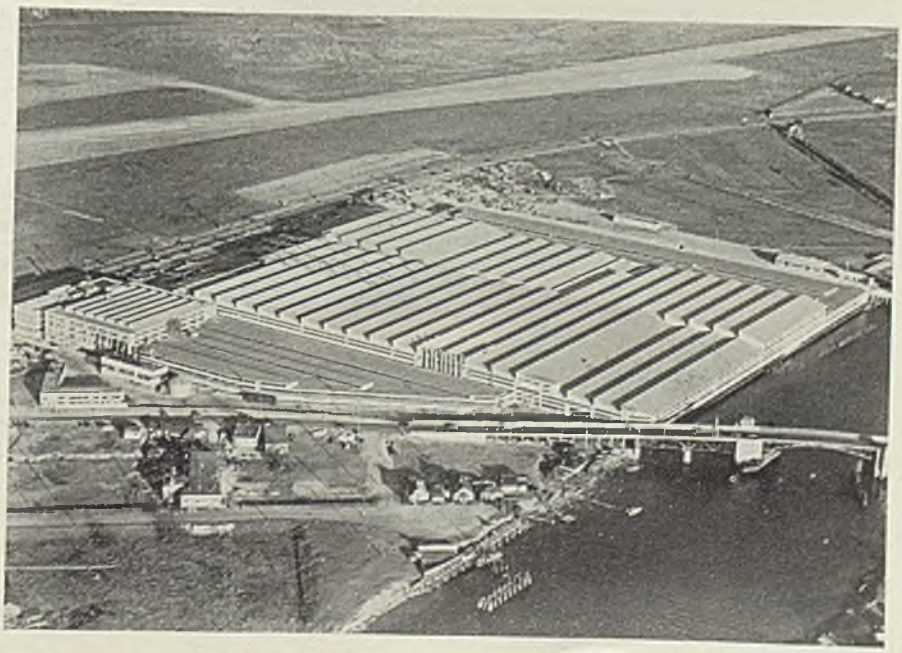
Speed Features Aluminum and Aircraft Plant Construction





■ Cows were grazing on the Columbia river farm near Vancouver, Wash., when the photograph at the top of the page was taken March 9, 1940. Fifteen months later the pasture had been transformed into an immense industrial center (immediately above), with five plants capable of producing 150,000,000 pounds of aluminum annually. For article see opposite page.

Equally impressive is the speed—140 days—in which Boeing Aircraft Co.'s latest 1,000,000-square foot addition to its 42-acre bomber plant at Seattle was completed. This entailed long hours for construction workers during the severe winter months. So pleased was The Austin Co., Cleveland, engineers and builders, that the 2156 workers who participated in the project were presented merit awards, signed by G. A. Bryant, Austin president



Our National Drama; Tragedy of A Beautiful Friendship

■ DURING the middle twenties some of the more serious playhouses in the United States were presenting a terrifying drama which left an indelible impression upon everyone who witnessed it.

The hero was a young man, disillusioned by the World war, who was intent upon bending his energies toward social reform. In this he was seconded by the heroine, attractive daughter of a wealthy industrialist, who sought social experiment as a relief from boredom.

• • •

They set out to "uplift" the underprivileged. Implemented with the enthusiasm of youth and the zeal of fanatics, they attracted a sizable following to their cause.

Among their associates was a young man who, courteous and co-operative at the start, began to assume more and more authority and eventually turned out to be a red revolutionist.

Craftily he introduced people of his kind into the movement. He fomented trouble at every opportunity but always managed to be in a safe place when danger ensued.

Too late, the hero and heroine realized they had been duped by this villain. He staged a revolution, against their violent opposition. The revolution was put down, but not before many of the sincere novices in social reform had forfeited their lives.

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It was a realistic dramatization of the perfect execution of the "boring from within" technic of the reds.

Americans who saw that play in the twenties have had abundant opportunity to think of it again in more recent years.

They must have thought of it when they witnessed the spectacle of Senator Wagner and others rushing through a bill which destroyed all safeguards against the infiltration of subversive influences into the union labor movement.

Surely their minds must have leaped back to the ghastly red play when they saw President Roosevelt and others smear the Dies committee in its effort to know the truth about the red menace.

They felt the impact of the play when they learned that the first lady of the land was a member of the red-infested newspapermen's guild and again when she told the members of a convict-headed union that everybody should join a union.

• • •

The play's horrible lesson came to mind when Madame Perkins tried to protect Harry Bridges; when sitdowns fomented by reds went unnoticed, if not actually encouraged; and when reds, sabotaging the defense program under cover of the Wagner "magna charta," went unpunished and still to this day have gone unpunished.

The leadership of our government has been duped as thoroughly and with almost as disastrous results as were the innocent zealots of social reform in that revolting play of 15 years ago.

Why cannot we be realistic? Why continue to confuse revolution with legitimate labor issues?

E. L. Shaner

EDITOR-IN-CHIEF

The *BUSINESS TREND*

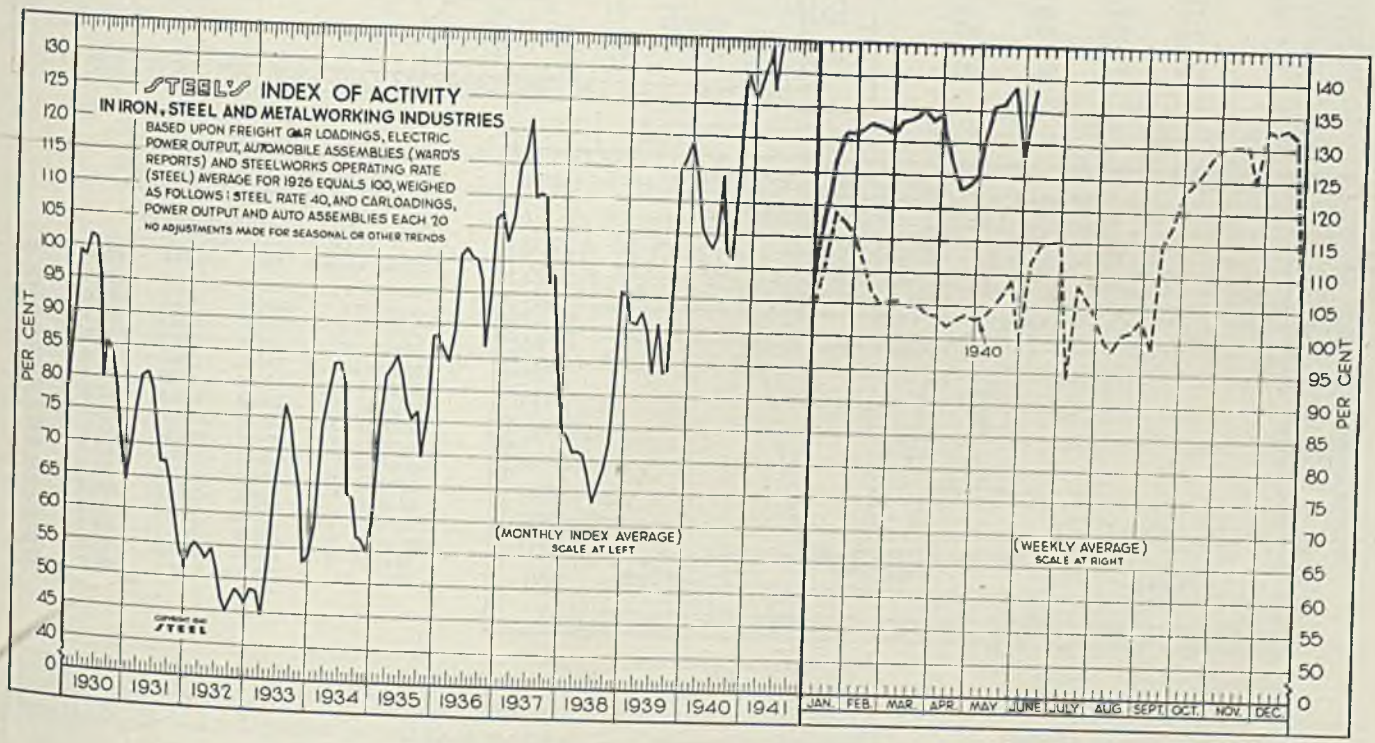
Activity Index Rebounds Sharply From Holiday Dip

■ ENCOURAGING rebound of industrial activity from the temporary interruption during Memorial Day week reflects the tremendous underlying strength of current demand for defense and civilian items.

While below the record volume recorded in recent months, new orders are still substantial. In some industrial lines, mainly those involved in the defense program, the problem is not to get orders but to meet increasing pressure for immediate deliveries on huge order backlogs already accumulated.

Tightening in metals and raw materials supplies has been growing more acute in recent weeks and is expected to be further accentuated in the months ahead. Reflecting this situation additional priorities and other types of controls are being brought into play.

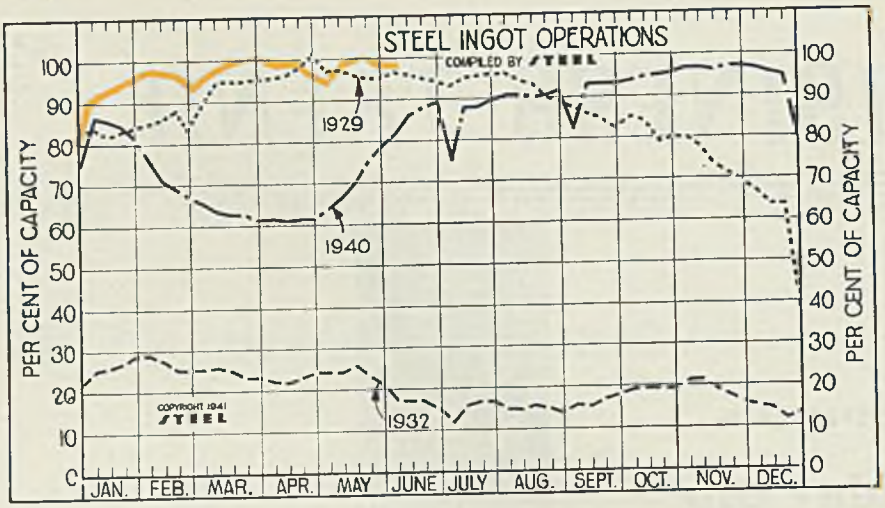
During the week ended June 7 STEEL'S index of activity recovered from the temporary dip recorded in the preceding holiday week. The index now stands at 138.4, a gain of 10 points over the previous period and compares with the 111.9 level recorded at this time last year.



STEEL'S index of activity gained 10 points to 138.4 in the week ended June 7:

Week Ended	1941	1940
March 22	133.5	103.7
March 29	133.9	103.2
April 5	128.9	101.8
April 12	123.8	102.7
April 19	124.2	103.4
April 26	126.5	102.8
May 3	132.6	103.3
May 10	135.9	104.8
May 17	136.1	106.8
May 24	138.6	106.1
May 31	128.4	99.2
June 7	138.4	111.9

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3



Steel Ingot Operations

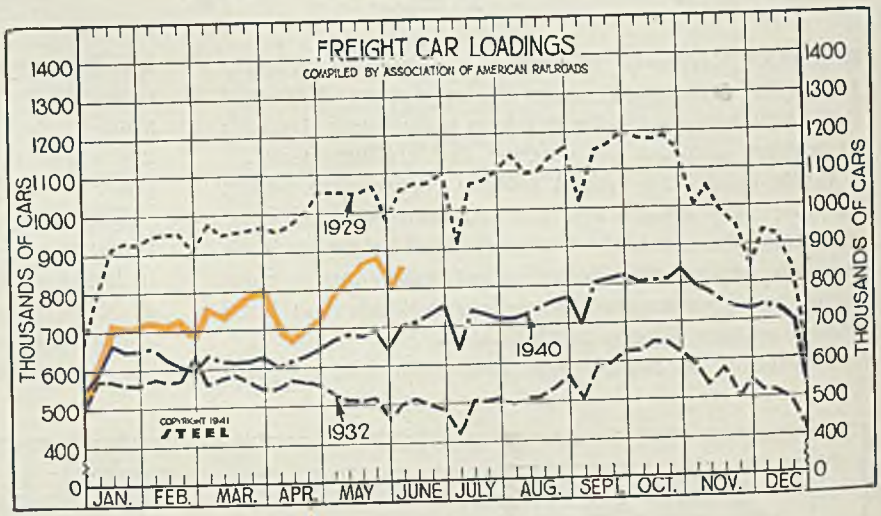
(Per Cent)

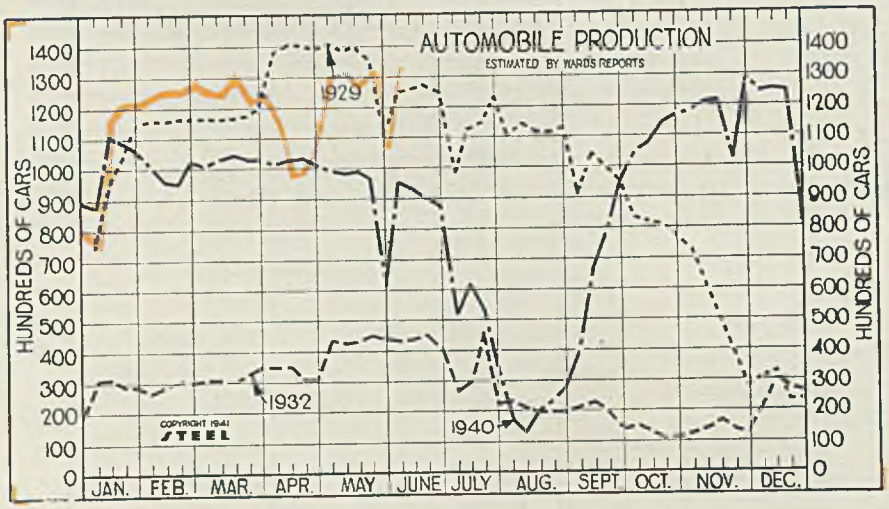
Week ended	1941	1940	1939	1938
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5
May 24....	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19...	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0
April 5...	98.0	61.5	53.5	32.0
March 29..	99.5	61.0	54.5	36.0
March 22..	99.5	62.5	55.5	35.0
March 15..	98.5	62.5	56.5	32.0
March 8...	97.5	63.5	56.5	30.0
March 1...	96.5	65.5	56.0	29.5
Feb. 22....	94.5	67.0	55.0	30.5

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
June 7.....	853	703	635	554
May 31.....	802	639	568	503
May 24.....	886	687	628	562
May 17.....	864	679	616	546
May 10.....	837	681	555	542
May 3.....	794	666	573	536
April 26.....	722	645	586	543
April 19.....	698	628	559	524
April 12.....	680	619	548	538
April 5.....	682	603	535	522
March 29....	792	628	604	523
March 22....	769	619	605	573
March 15....	759	619	595	540
March 8.....	742	620	592	557
March 1.....	757	634	599	553
Feb. 22.....	678	595	561	512





Auto Production

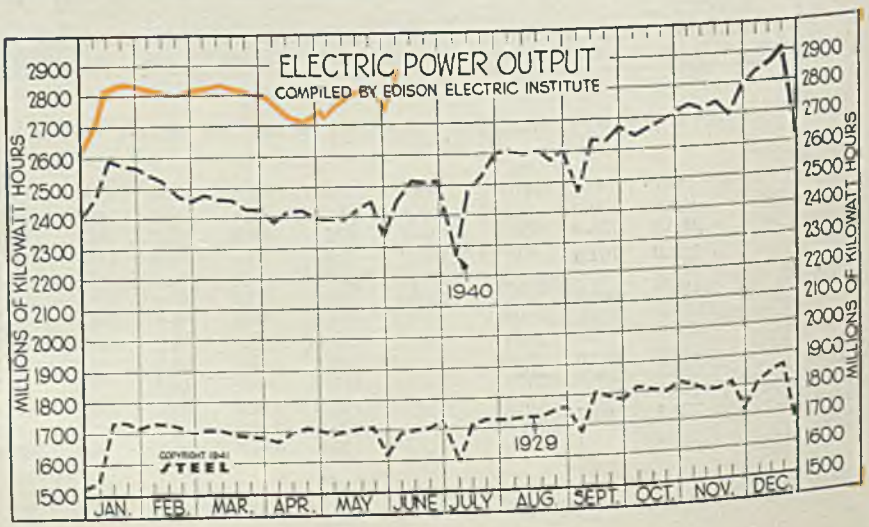
(1000 Units)

Week ended	1941	1940	1939	1938
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3....	130.6	99.3	71.4	53.4
April 26...	108.2	101.4	86.6	50.8
April 19...	99.9	103.7	90.3	60.6
April 12...	99.3	101.9	88.1	62.0
April 5....	116.3	101.7	87.0	61.0
March 29..	124.2	103.4	86.0	57.5
March 22..	123.8	103.4	89.4	56.8
March 15..	131.6	105.7	86.7	57.6
March 8...	125.9	103.6	84.1	57.4
March 1...	126.6	100.9	78.7	54.4
Feb. 22....	129.2	102.7	75.7	57.0

Electric Power Output

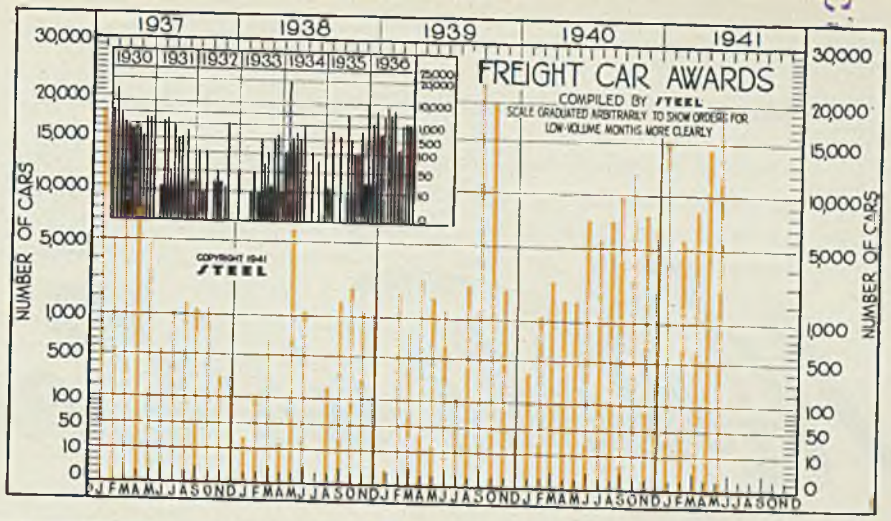
(Million KWH)

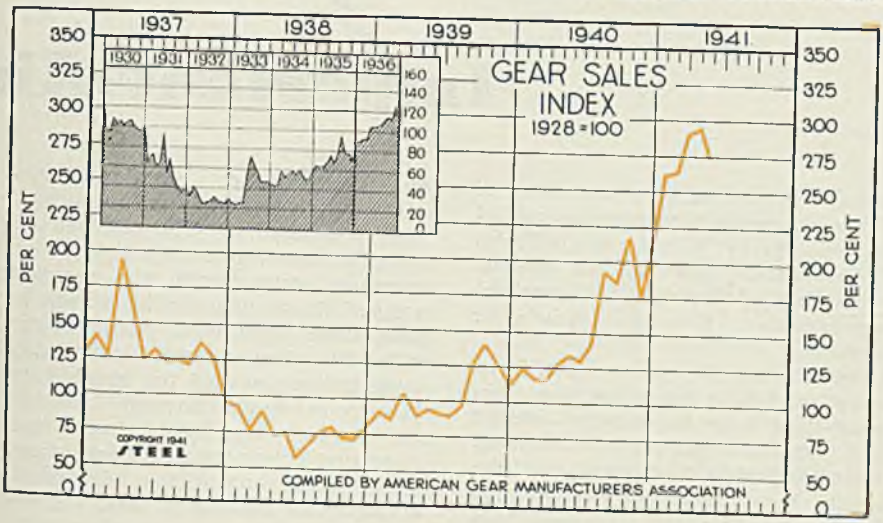
Week ended	1941	1940	1939	1938
June 7...	2,877	2,453	2,257	1,992
May 31...	2,730	2,332	2,114	1,879
May 24...	2,838	2,449	2,205	1,973
May 17...	2,800	2,422	2,170	1,968
May 10...	2,792	2,388	2,171	1,968
May 3 ..	2,734	2,386	2,164	1,939
April 26..	2,750	2,398	2,183	1,939
April 19..	2,702	2,422	2,199	1,951
April 12..	2,721	2,418	2,171	1,958
April 5 ..	2,779	2,381	2,174	1,990
March 29.	2,802	2,422	2,210	1,979
March 22.	2,809	2,424	2,199	1,975
March 15 .	2,818	2,460	2,225	2,018
March 8 .	2,835	2,464	2,238	2,015
March 1..	2,826	2,479	2,244	2,036
Feb. 22...	2,820	2,455	2,226	2,031



Freight Car Awards

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5,508	1,147	2,259	109
March	8,074	3,104	800	680
April	14,645	2,077	3,095	15
May	18,630	2,010	2,051	6,014
5 mos.	62,026	8,698	8,208	6,943
June		7,475	1,324	1,178
July		5,846	110	0
Aug.		7,525	2,814	182
Sept.		9,735	23,000	1,750
Oct.		12,195	19,634	2,537
Nov		8,234	2,650	1,232
Dec.		7,181	35	2,581
Total		66,889	57,775	16,303





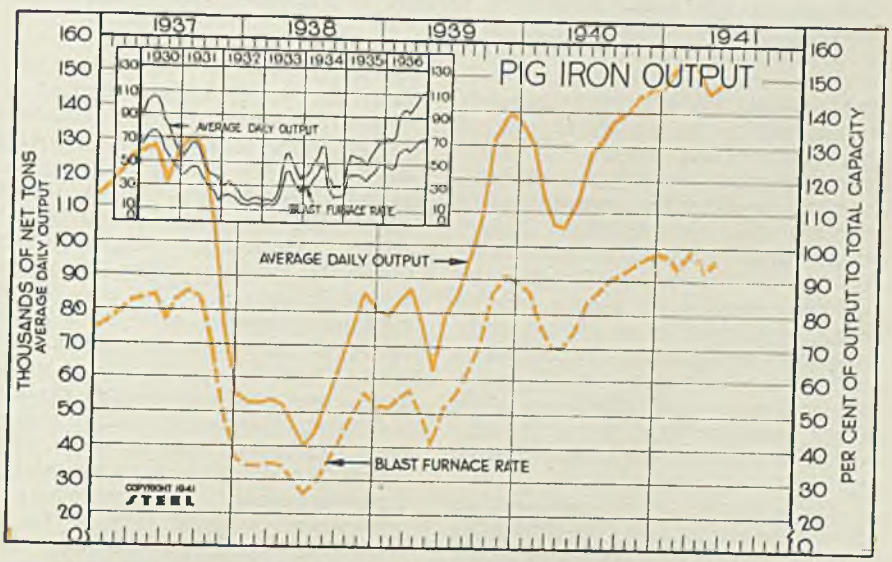
Gear Sales Index

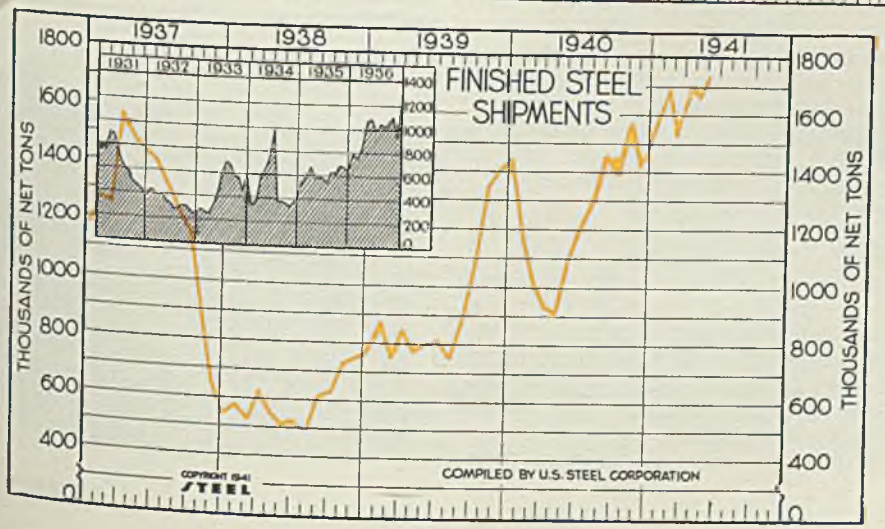
(1928 = 100)

	1941	1940	1939	1938	1937
Jan.	259	123	91.0	93.0	144.0
Feb.	262	116	86.0	77.0	130.5
Mar.	288	114	104.0	91.0	195.0
April	292	128	88.0	74.0	164.0
May	273	133	93.0	70.0	125.5
June	...	129	90.0	58.0	134.0
July	...	141	89.0	67.0	124.0
Aug.	...	191	96.0	76.5	125.0
Sept.	...	183	126.0	80.5	123.0
Oct.	...	216	141.0	72.5	139.5
Nov.	...	173	126.0	72.0	127.5
Dec.	...	208	111.0	81.0	97.0
Ave.	...	155.0	103.0	76.0	135.5

Pig Iron Production

	Daily average —Net Tons—			Blast furnace —Rate (%)—		
	1941	1940	1939	1941	1940	1939
Jan.	150,524	129,825	78,596	95.5	85.4	51.0
Feb.	150,244	113,943	82,407	95.3	75.0	53.5
Mar.	151,707	105,502	86,465	96.3	69.5	56.1
Apr.	144,685	104,635	76,732	91.8	68.9	49.8
May	148,262	112,811	62,052	94.1	74.2	40.2
June		127,103	79,125	....	83.6	51.4
July		130,984	85,121	....	86.1	55.0
Aug.		136,599	96,122	....	89.9	62.4
Sept.		139,085	107,298	....	91.5	69.7
Oct.		143,152	131,053	....	94.2	85.2
Nov.		146,589	138,883	....	96.4	90.3
Dec.		146,544	136,119	....	96.4	88.5
Ave.		128,128	86,375	....	84.3	62.6





Finished Steel Shipments

U. S. Steel Corp.

(Unit 1000 Net Tons)

	1941	1940	1939	1938	1937
Jan.	1682.5	1145.6	870.9	570.3	1268.4
Feb.	1548.5	1009.3	747.4	522.4	1252.8
Mar.	1720.4	931.9	845.1	627.0	1563.1
Apr.	1687.7	907.9	771.8	550.5	1485.2
May	1745.3	1084.1	795.7	509.8	1443.5
June	.....	1209.7	807.6	525.0	1405.1
July	.....	1296.9	745.4	484.6	1315.3
Aug.	.....	1455.6	885.6	615.5	1225.9
Sept.	.....	1392.8	1086.7	635.6	1161.1
Oct.	.....	1572.4	1345.9	730.3	876.0
Nov.	.....	1425.4	1406.2	749.3	648.7
Dec.	.....	1544.6	1444.0	765.9	539.5
Tot.†	.....	14976.1	11707.3	7315.5	14097.7

†After year-end adjustments.

Metals as Catalysts

Important Aids

■ Catalytic reactions, not so long ago of theoretical interest only, are today of fundamental industrial importance. They offer the most promising means of controlling the speed of chemical reactions and thereby permit more efficient production of many important raw materials. Too, modern blitzkrieg war depends upon many products of catalyzed reactions including synthetic rubber, gasoline, nitric acid—the raw material for making any explosive. Even the glycerin for explosives is now being made by a catalytic process.

Catalysts used in these processes are all metals or simple compounds of them. Do you know why a catalyst becomes poisoned and unfit for further use—how a catalyst is dispersed for maximum efficiency—how long an average catalyst will work—how a catalyst is prepared—how it acts—how you make a catalyst?

Next week, the second section of this series will show how nitric acid, the basis of all explosives, is made from ammonia by a catalyzed reaction, the ammonia in turn being made from nitrogen from the air and hydrogen from water by another catalyzed reaction.

■ MAN'S ADVANCE has been much influenced by his ability to control his environment within the comparatively narrow ranges of temperature, pressure and humidity necessary to his existence. Today, this control has been extended to a point where materials found more or less plentiful in nature can be changed chemically or physically to give new materials either found to a limited extent or not at all in our mineral or animal kingdoms. The basic importance of chemistry and chemical engineering in our modern civilization is unchallenged.

The widening use of catalyzed reactions to produce an ever-increasing number of products necessary to our existence has enabled us to increase our productive capacity and to reduce costs to an extent that would have been impossible without the use of this important phenomenon. The large scale industrial use of catalyzed reactions began at the turn of the century. Much progress has been made in the last 40 years. In the last few years their use has been extended to many improved processes of great military importance, as will be pointed out.

Some discussion of catalysis is perhaps in order. Briefly, a catalyzed reaction is one in which the mere presence of a small amount of apparently inert material will alter the speed of a chemical reaction to a marked extent. A change in the speed of a chemical reaction may be either an increase or decrease. Hence, two classes of catalysts are recognized, positive catalysts, commonly referred to as catalysts, and negative catalysts, called inhibitors. The use of inhibitors (negative catalysts) to retard the oxidation of rubber may be mentioned as only one of many such cases to illustrate this class.

Phase: Catalyzed reactions may be classified in another way also. Reactions may be homogeneously, heterogeneously or micro-heterogeneously catalyzed. In a homogeneously catalyzed reaction, catalyst and reactants (called the substrate) are in the same physical state—all liquids, solids or gases.

In a heterogeneously catalyzed reaction, catalyst and substrate are in different physical states. In this class, the reaction is considered to place at the interface between the two phases. In this class are many reactions of industrial importance using solids as catalysts. In micro-heterogeneously catalyzed reactions, the catalyst itself is thought to be matter in the colloidal state. Many reactions in this class are of biochemical importance.

Poisoning: In the case of heterogeneously and micro-heterogeneously catalyzed reactions, another phenomenon is encountered—that of poisoning. The catalyst frequently loses its activity as reaction goes on until finally the reaction stops. It can usually be shown in such cases that an impurity in the substrate has reacted chemically with the surface of the catalyst or in some other way covered it so that the normal interface between catalyst and substrate no longer exists. Thus small amounts of hydrogen sulphide in hydrogen used for hydrogenation of oils will react with the nickel catalyst used and will cover the surface with a layer of nickel sulphide, thus poisoning the catalyst.

In this case there is not much to do except be sure that a source of hydrogen is used which is free from hydrogen sulphide. Similarly in the process for the oxidation of ammonia to form nitric acid, small dust particles in the gas stream eventually cover the surface of the platinum gauze catalyst thus changing the interface and slowing the reaction. In this case the poisoning is produced by a physical covering of the surface rather than a chemical reaction with it.

Frequently water vapor causes this second type of poisoning or retardation. In this case it is usually sufficient to raise the temperature

to Defense

In 1914, the United States had merely a struggling chemical industry. The present emergency sees a well established industry with vast plant facilities. As a result of intense research programs, many new and improved processes are now available, chief among these are those involving catalytic reactions. Quantities of metals and metal oxides so used are becoming increasingly important

By E. A. ARNOLD
Associate Professor of Chemistry
Case School of Applied Science
Cleveland

of the catalyst for a short time thus driving off the water and restoring the normal activity.

Promotors: Another phenomenon of great importance is "promotor action." Frequently a mixture of two or more substances has a greater activity than can be accounted for solely on the basis of additive effects. This is called an activated or promoted catalyst and the substances responsible for the effect are called activators or promotors. An example of this phenomenon is afforded by one of the common ammonia catalysts. While finely divided iron was first used, it was soon found that the activity could be greatly increased by adding amounts of the order of one per cent of certain of the difficultly fusible or difficultly reducible oxides such as alumina, magnesia and the rare earths. Thus the catalyst commonly used for this reaction at present is metallic iron containing small amounts of aluminum and potassium oxides. Promotors may, in themselves, catalyze the reaction itself apparently little or none at all.

Promotor action must be differentiated from purely mixed catalyst action. As has been noted, promotor action is characterized by an effect which is greater than the sum total of the individual effects. However, in mixed catalysts, the effect is purely additive.

As has been inferred, heterogeneous catalysts, in part, owe their activity to the extent of the surface exposed. Thus a catalyst may be distributed on a special support designed for dispersion of the catalyst so maximum surface may be maintained. The support should also keep the mass porous so as not to build up a resistance to the flow of the substrate. Frequently, a support can be selected that will show a mild promotor effect.

The accompanying curves will illustrate these effects. They were first drawn from experimental data by Mittasch who did so much of the developmental work on the Haber-Bosch synthesis of ammonia.

Curve I illustrates the case where substance A is poisoned by relatively small amounts of substance B. Curve II illustrates the strictly mixed catalyst effect where the individual effects of substances A and B on the reaction are strictly additive. In this case substance A is actually a catalyst but substance B is not and mixtures of the two show the expected average effect. Curve III illustrates promotor action and it can be seen that while substance B is not of itself a catalyst for the reaction considered, its effect in mixtures with A is no longer additive, but is much greater. Curve IV illustrates the mild apparent promotor effect due to the catalyst support.

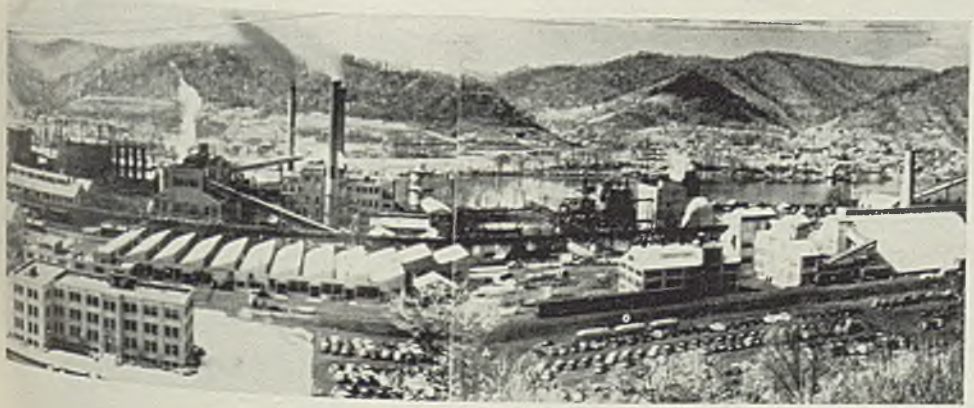
Common Catalysts: The catalysts most commonly used industrially are the elements themselves, the oxides, the halogen salts, and more recently a few of the sulphides. In many homogeneous reactions, salts, acids and bases also serve as catalysts. Among the elements used as catalysts, those found in group eight of the periodic table are most common. These are iron, cobalt, nickel and the platinum metals.

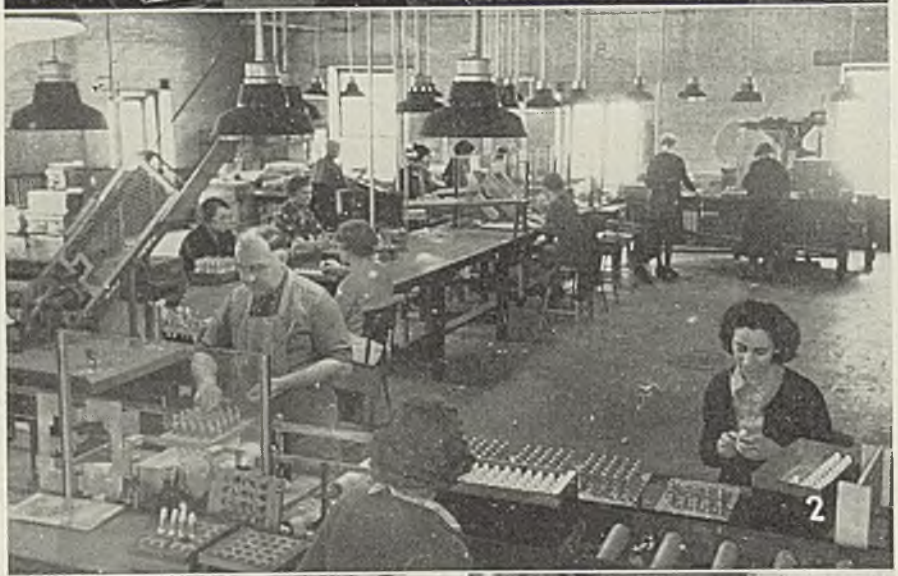
The oxides most commonly used are the oxides of the alkali and alkaline earth metals, zinc, cadmium, aluminum, the rare earths, thorium, titanium, zirconium, vanadium, chromium, manganese, bismuth, molybdenum, tungsten and uranium.

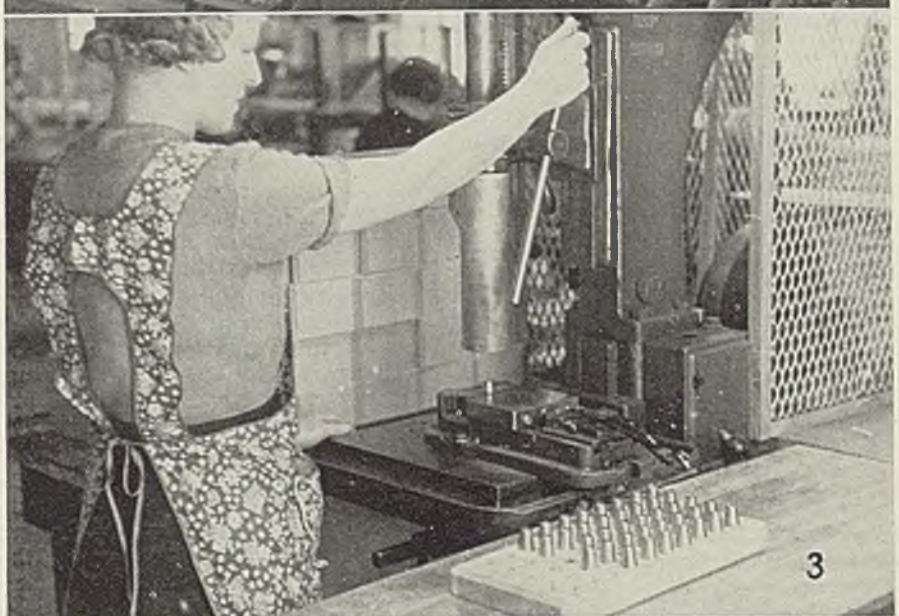
The halogen salts are used in the form of many of their easily volatile compounds in homogeneously catalyzed reactions because of this volatility. Thus we find in this class the use of many of the chlorides of the heavy metals as halogenating catalysts for the hydrocarbons. Certain of the halogen derivatives of the lower hydrocarbons find commercial use as refrigerants, and antimony chloride has proved to be a useful catalyst in preparing these compounds from the mineral hydrocarbon gases. In addition, the use of certain of these halides has been very fruitful in polymerization reactions. Thus, boron trifluoride is an important catalyst in the production of certain of the synthetic rub-

(*Please turn to Page* 79)

View of Belle Works of E. I. du Pont de Nemours & Co., Belle, W. Va., where synthetic ammonia, alcohols, etc. are now being made by catalytic processes







Production

SHELL

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.

THE SERIES of illustrations, shown here by kind permission of the Ordnance Department, United States Army, exhibits machining, gaging, testing, inspection and loading operations on artillery fuzes. Machining of fuze parts is largely a job for the automatic screw machine, tolerances as close as 0.001-inch being maintained and parts as small as 1/16-inch in diameter and

Fig. 1—These multiple spindle drilling machines are typical of much equipment involved in making parts for fuzes. All illustrations here are from official photographs, Ordnance Department, United States Army

Fig. 2—General view of fuze assembly line. Fuze bodies and noses start at left and right rear, respectively; are assembled with various elements as they progress along stations at benches in line at left; the line makes a bend just to left foreground of picture and proceeds to right in immediate foreground. No charges are placed here. That is done in barricaded crank and hydraulic presses shown in Figs. 11, 12 and 13. Illumination is provided for 24-hour operation of line

Fig. 3—Closeup of portion of fuze head assembly line, shown at extreme rear right, Fig. 2. Here the operator is assembling parts into the head by means of press fits

Fig. 4—Closeup of operator placing fuze body in marking machine which stamps identification and lot number on fuze body by rolling it against a die. This is part of fuze body line at extreme rear left, Fig. 2

(This Is Number 19 in a Series on Ordnance and Its Production. Prepared for STEEL by Professor Macconochie)

Methods for Making and BOMB FUZES

Automatic screw machines make many fuze parts. Assembly of fuzes is handled on simple form of assembly and test line. Mixing and loading the charges into the fuze is done with special barricades to safeguard operators as much as possible

less than 1/16-inch long being turned out.

Brown & Sharpe, Acme-Gridley automatics and Bardons & Oliver electric turrets are on the job, while Hanson-Whitney thread millers take care of thread cutting operations on the adapters. Some parts, such as fuze booster cups, are no thicker at the lip than 0.03-inch and have to be reduced from solid aluminum bar stock. It has been suggested that plastics may enter into fuze construction to cheapen and perhaps lighten the parts.

Production on fuze parts runs high. These booster cups, for instance, have to be rough drilled, flat drilled, threaded outside, reamed, and so on, but we get about 100 to the hour. Multiple operations on fuze bodies, cut from cold-drawn free-machining steel bars, include drilling, opening out, machining the exterior, reaming, finishing the outer surface, tapping internally, cutting off—all done in no more than 20 seconds. Fuze setting sleeves are worked from ⅜-inch aluminum bar stock and involve turning, drilling inside, reaming and cutting off—yet can be made at the rate of 3000 pieces per 8-hour shift.

Fig. 4 shows a Noble & Westbrook machine which stamps the identification number and also the lot number on the fuze body. The parts are placed vertically in different stations of a revolving plate which carries them past the marking dies at the rear of the machine. Each piece is rolled across the marking dies, making a clear impress of the desired legend on the body of the fuze. The pieces are automatically ejected to the chute barely seen under the operator's hand at the rear of the machine.

Fuze production consists of two separate and distinct chains of operations. The first is the production and assembly of the metal parts, Figs. 1 to 8. Most of these are familiar to shop men. The loading operations, Figs. 8 to 14, however, are another story. These must be performed by workmen who are

Fig. 5—The fuze must not permit the shell to be detonated until AFTER it has left the gun barrel; thus the importance of the "arming" element which acts to arm the fuze—and the necessity of checking the action of this element. Operator watches action of the arming pin as reflected in the mirror over the fuze as fuze is spun by an electric motor drive to simulate the spin produced by firing shell through rifling of gun

Fig. 6—This station in the assembly line is to left foreground of area shown in Fig. 2. Here an operator gages concentricity of the fuze, using the revolving fixture in front of his left hand. His right hand is placing a fuze in fixed gage for checking fuze length. Note the simple drive for the rotating gage—two pulleys revolved by a common belt and driving by friction the wheel between them

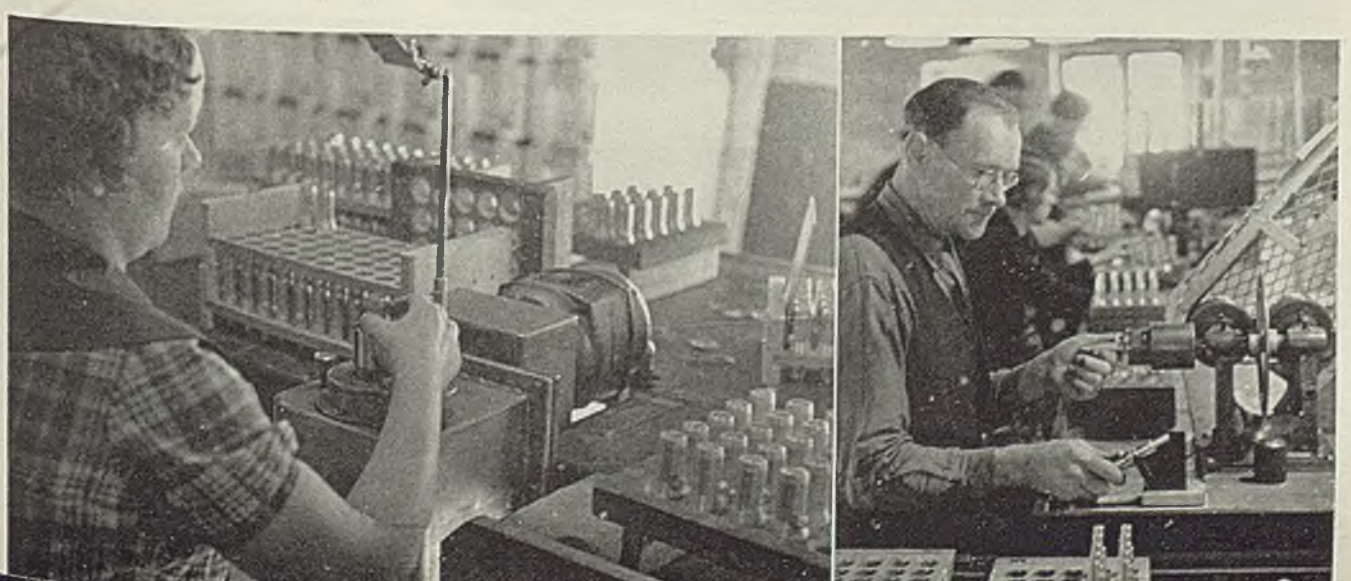


Fig. 7—Here fuzes have passed through many preliminary steps in assembly and are having their heads painted by dipping inverted into the paint. Note that fuzes are handled through assembly operations in racks of 25 units. In this portion of line, these racks are moved down the line between rails spaced the correct distance apart. Dipping is done by lowering a movable section of track over the paint tank. This station is also shown in immediate foreground of Fig. 2. After being inspected and set in racks in boxes, the fuzes are passed through the small opening in the wall into the loading section, down the roller conveyor seen in line with the wall opening. This is just one of the many elaborate precautions taken in all loading plants

Fig. 9—Here a detonator charge is being weighed. Note operator works in booth which forms a steel barricade to protect other operators and that a barricade protects her own face and body, exposing only her hands and arms. Detailed safety instructions are mounted directly in front of the work station, an everpresent reminder of safe practice

Fig. 8—Here an operator in the loading section is screening and drying a primer mixture. The primer is the part which the firing pin in the fuze strikes to start detonation. Fuze action proceeds in this order: Acceleration in gun arms fuze; after set interval (if time fuze), firing pin is released against primer which sets off detonator charge which, in turn, sets off booster charge, which then sets off bursting charge—all of course in a mere fraction of a second. Note here the shield for operator

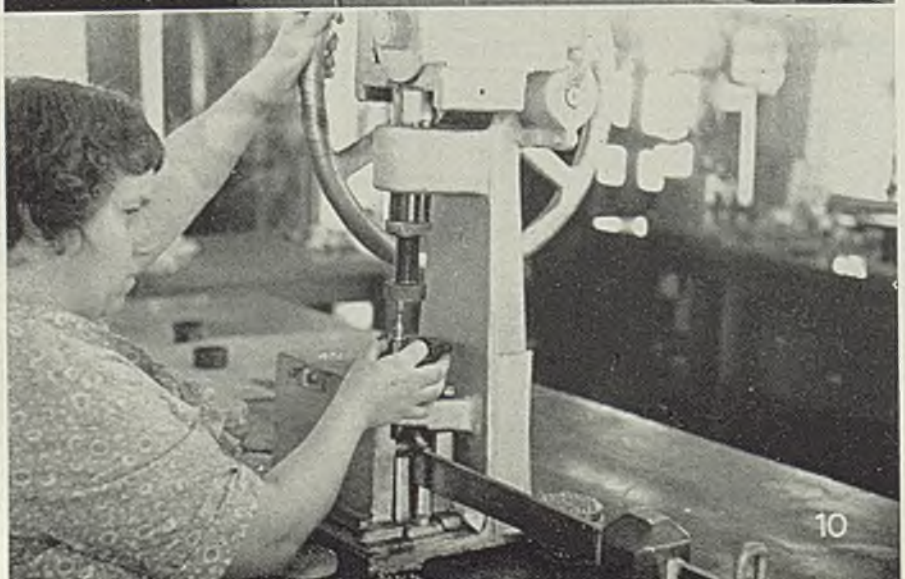
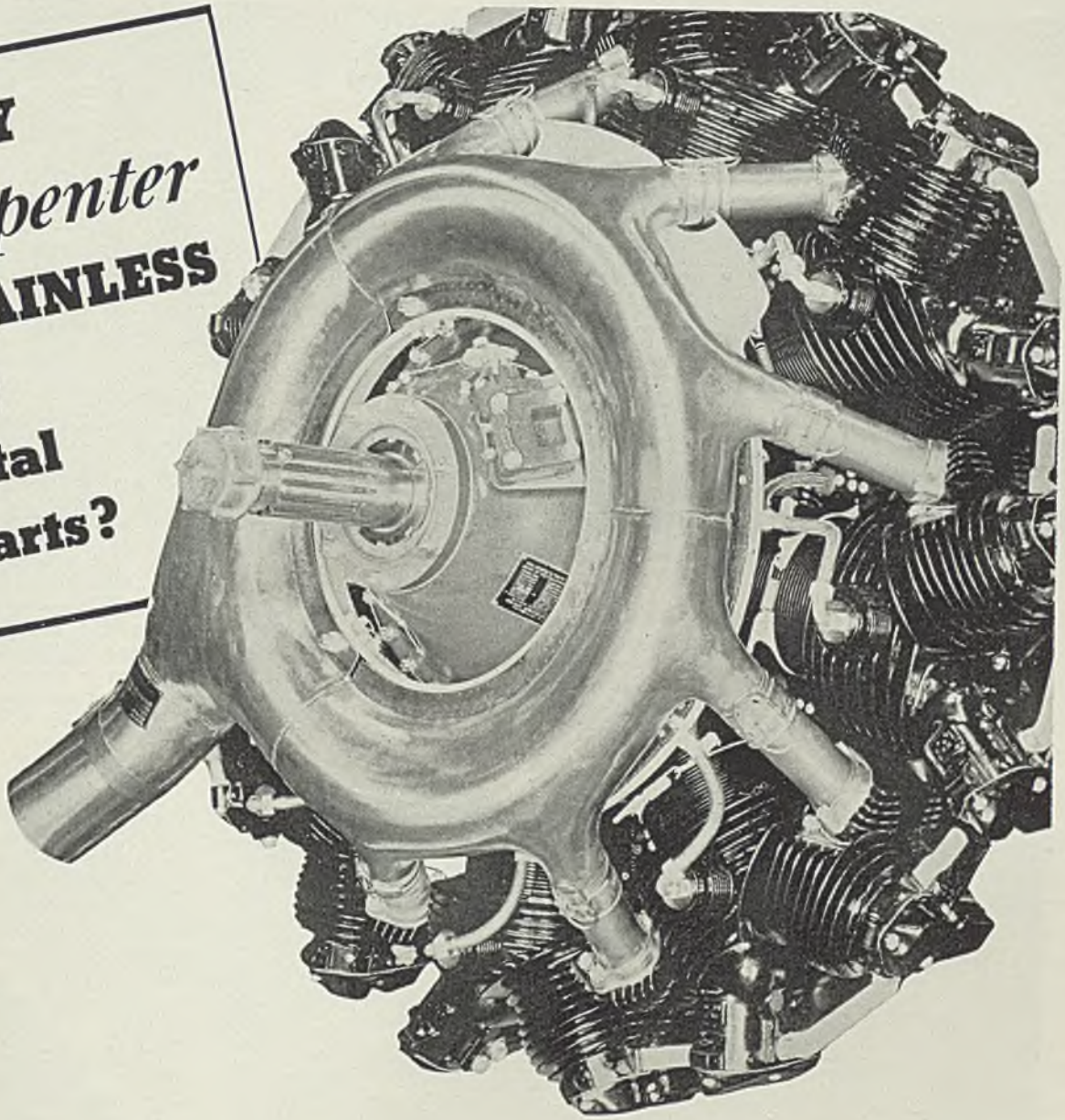


Fig. 10—A charge is being pressed into the detonator cup here, using a hand press working against a weighted balance which shows the operator when the correct amount of pressure has been applied. This assures uniformity of detonator action since it makes certain sufficient pressure will be applied yet prevents the operator from applying excessive or dangerous pressures

specially trained for this task.

The explosives used in loading fuzes are ordinarily first pressed into pellets by the use of commercial pill-making machinery. These pellets are then loaded into primers, detonators, interrupters, delay elements and other parts of the fuze. Tetryl—or, to give it its full name, trinitrophenylmethylnitramine—has very high explosive strength and "brisance" and would appear to be well adapted for use as the bursting charge of the shell itself. How-

WHY *Carpenter* STAINLESS for vital parts?



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In this engine, Carpenter Stainless Steels are used in valve seats, carburetor air intake screens, butterfly valves, cotterpins and inserts. In some models, valves and exhaust manifold nipples are also made from stainless steels. So it's dependability, combined with easier working qualities, which account for the use of Carpenter Stainless Steels in vital parts.

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Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Fig. 11—This eccentric press used to crimp the fuzes is heavily barricaded to protect the operator. The small opening through which she inserts work has a sliding door which falls as the press starts the crimping operation, thus completely protecting the operator. Instead of a positive drive, a spring drive on the door prevents any injury to the operator's fingers if they are not clear when the door closes

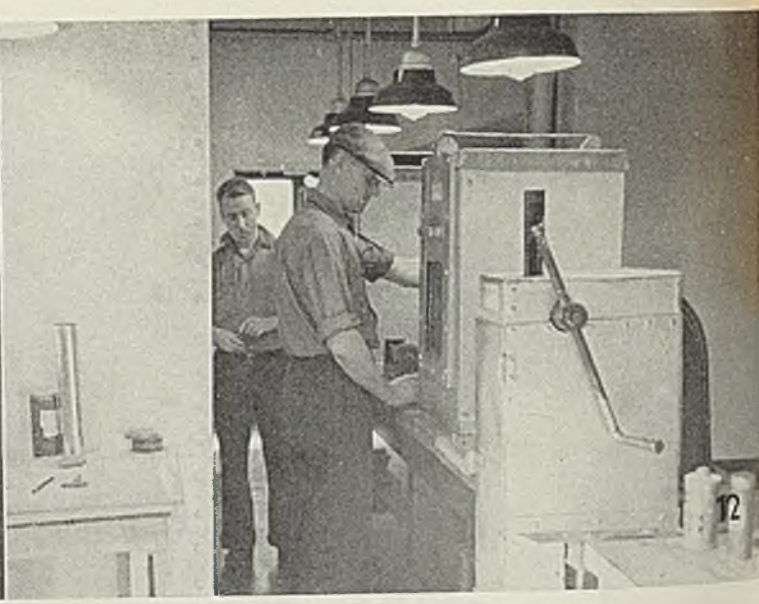
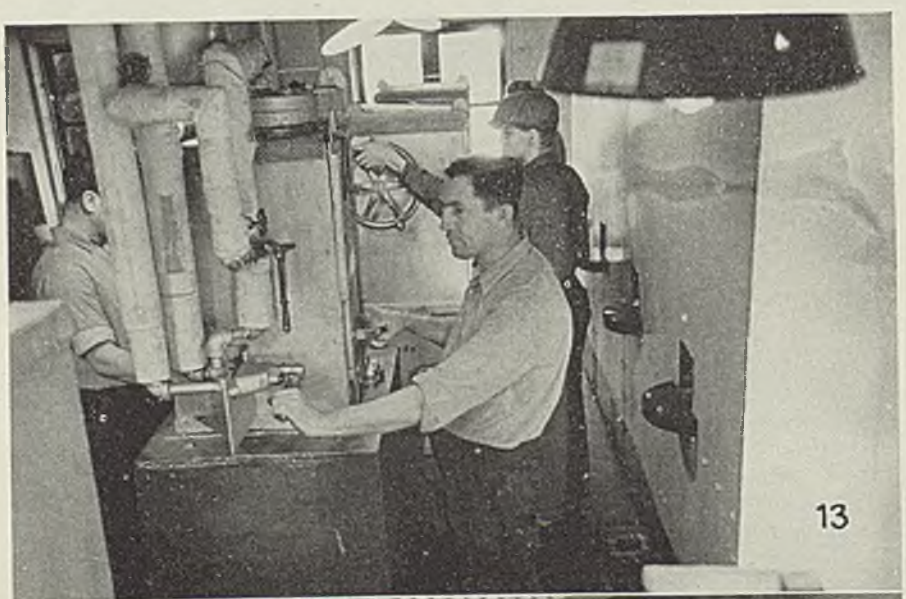


Fig. 12—Barricaded mechanical presses used in loading charges into primer caps. All lighting fixtures are special explosion-proof units. Note all benches and working surfaces in these illustrations are kept clear or only a few parts or small supplies are at hand. A careful program is followed to prevent accumulation or necessity of large quantities of charges at any point, yet provision is made for high production by assuring a continuous flow of work through all points



ever, it is too sensitive to mechanical shock to stand discharge from the gun, but is sufficiently insensitive when compressed into a booster to be perfectly safe. In this condition it is readily detonated by the detonator in the fuze of the shell, the violence of the detonation ensuring a high order of detonation of the main or bursting charge.

Tetryl, as well as other explosives, must be kept dry, and hence every fuze must be carefully sealed from the atmosphere if long life in storage, dependability and accuracy are to be maintained. All operations in both the manufacture of the metal parts and the loading of the fuze must be carefully controlled by inspection and tests, some of these inspections being illustrated in the accompanying photographic series.

Fig. 13—These hydraulic presses are used to load charges into detonators. Notice the careful provision for barricading the presses, padding on hydraulic lines, steel covered walls separating entire shop into many small fireproof sections. Work is passed from one section to another through small openings in these walls, such as those shown along the right wall here

Fig. 14—This is a station for final visual inspection of the loaded fuze. Each rack to right on bench holds 25 units. Racks in metal boxes at left each hold 50 fuzes

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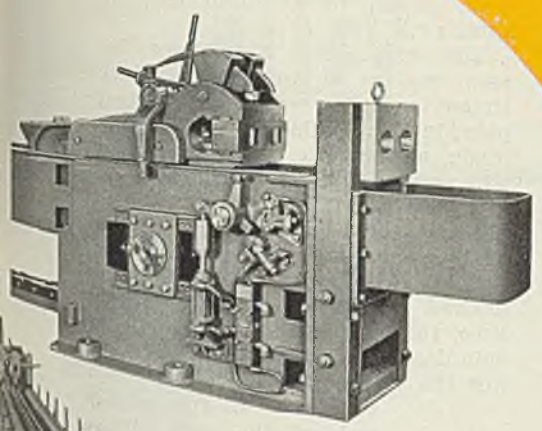

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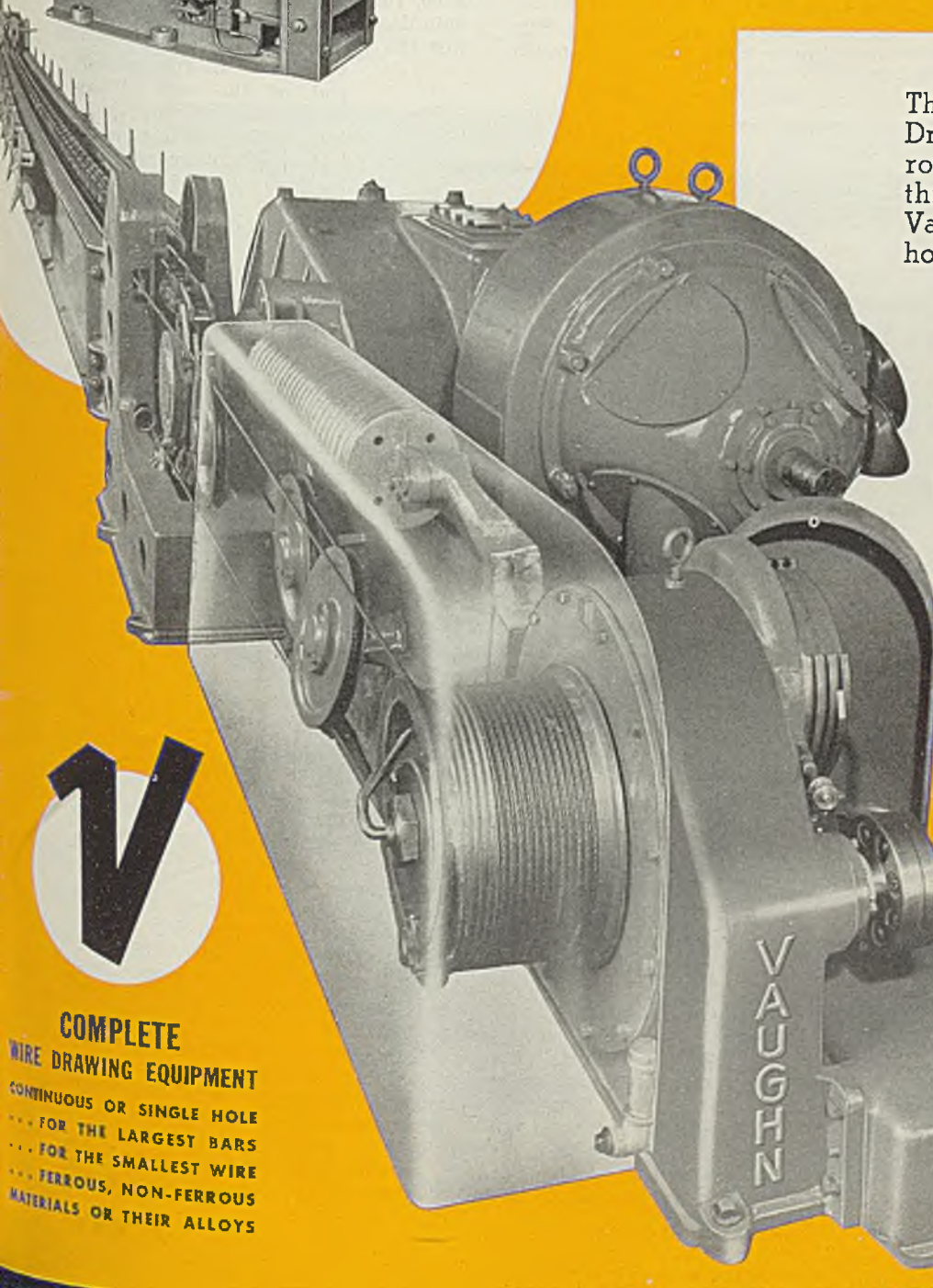

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JOINING TUBE ENDS

in making structures of tubing

■ CURRENT report that one automobile manufacturer has designed a new model which will consist largely of plastics and tubing is a reminder of the widespread use of tubular members for making sturdy light-weight structures—especially in the automotive industry. It has been estimated that two-thirds the output of welded tubing finds its way into automobiles, trucks, busses, tractors and the like. While much of this simply affords passage for liquids, there also are many mechanical parts made from tubing because of the high efficiency and weight-saving advantages of the tubular section.

In any tubular structure or any assembly using tubes for structural members, the problem of joining the ends arises. What type of joint should be used, how should the tube be prepared, how does the joint affect the strength —these are only a few of the factors involved.

Advantages of tubing in various structures include primarily the ease of fabrication. Many shaping operations can easily be performed on a straight steel tube to adapt it to function in combination with other members of a complete structure. While some of these operations may appear complicated and difficult to a designer accustomed to working entirely with rectilinear sections, the automotive engineer, on the other hand, is so familiar with tube fabricating possibilities that he looks upon tubing as the easiest of all sections to work into a design. This is because a taper is readily and cheaply obtained, a flair or other type of expansion made easily. Likewise a stop to keep a tubular member from sliding beyond a certain point can be made by a simple beading operation.

Possibly most important of all is that round tubing can be bent with equal ease in all directions and, with certain limitations, a single piece of tubing can be bent in more than one direction. All these operations are readily accomplished upon welded tubing made from flat-rolled strip since wall thickness is exceptionally uniform, being of the same order as the thickness tolerances of the rolled strip itself.

Another favorable factor is that the majority of tubing manufacturers have adequate facilities for fabricating tubular parts to order so such parts can be delivered ready for assembly if desired.

A study of the methods employed for cutting to length and forming the ends for various joining or attaching schemes reveals that this work can be done often at a much higher rate than might seem possible at first glance.

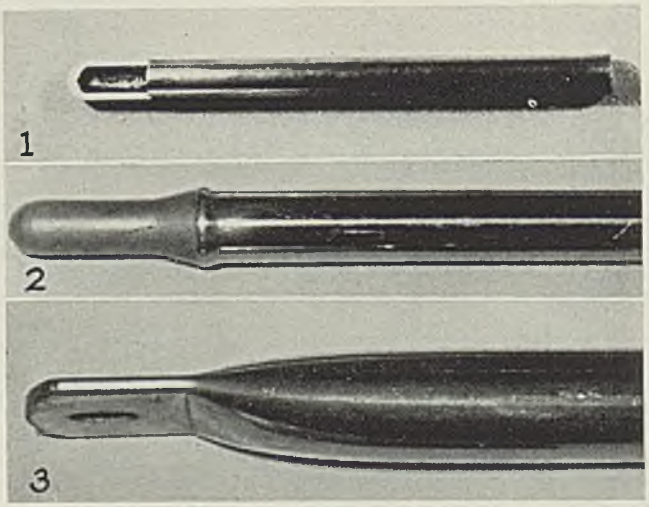

Fig. 1—Welded steel tube, closed to a round end by spinning

Fig. 2—Bicycle seat post made of a welded steel tube. The end is not quite completely closed. It was formed at one stroke of a heavy press

Fig. 3—Tube ends often are flattened like this to make an end connection. To reinforce the structure, a short piece of close fitting tube is placed inside the end before forming, thus doubling effective wall thickness at the critical points

For instance, one method of closing ends which can be adapted to a large variety of designs is spinning. A properly shaped die held in a chuck and rotated at high speed will close the end of a tube pushed against the die as the friction softens the metal so it is easily pressed together into a complete closing. This can be done with the work started cold, or can be expedited by preheating.

Fig. 1 shows a welded steel tube 7/16-inch diameter with 0.072-inch wall, closed to a round end by spinning.

The end here also may be spun square or to various other shapes such as the bullet-shaped point in Fig. 2. Such an end can be made as smooth as desired and will serve well either as a stop or as a bearing. The square end closing also can be drilled and threaded to provide an end connection if desired. Similarly, if a flange is desired at the end of the closed tube, this can easily be formed by spinning the end closed and shaping the die so as to increase the thickness of the material at the end. The flange then is produced by forging, still retaining the tubular section in the main body of the tube.

The end in Fig. 2 is a bicycle seat post made of welded steel tube 13/16-inch in diameter with a wall 0.083-inch thick.

This end, however, is not completely closed as it has an opening 7/32-inch diameter. The entire forming operation was done with one stroke of a heavy press, producing an expansion to the maximum diameter of ⅞-inch and a reduction to ⅝-inch. Subsequently the tube was plated and polished only as far as the middle of the bulge.

An attachment of exceptionally wide application in structural work is shown in Fig. 3. This not only permits two or more tubes to be joined together but affords ready means of joining a tube to a flat member. The particular example shown in Fig. 3 is a welded steel tube 1¼ inches in diameter with 0.078-inch wall. It serves as a column support for a heavy fan. Closing here is done as a simple press operation. It is followed by slotting to receive the attachment bolt. This tube has been calculated to be of sufficiently large section to carry its load safely as a column.

However, on account of the high D/t ratio, it was not considered

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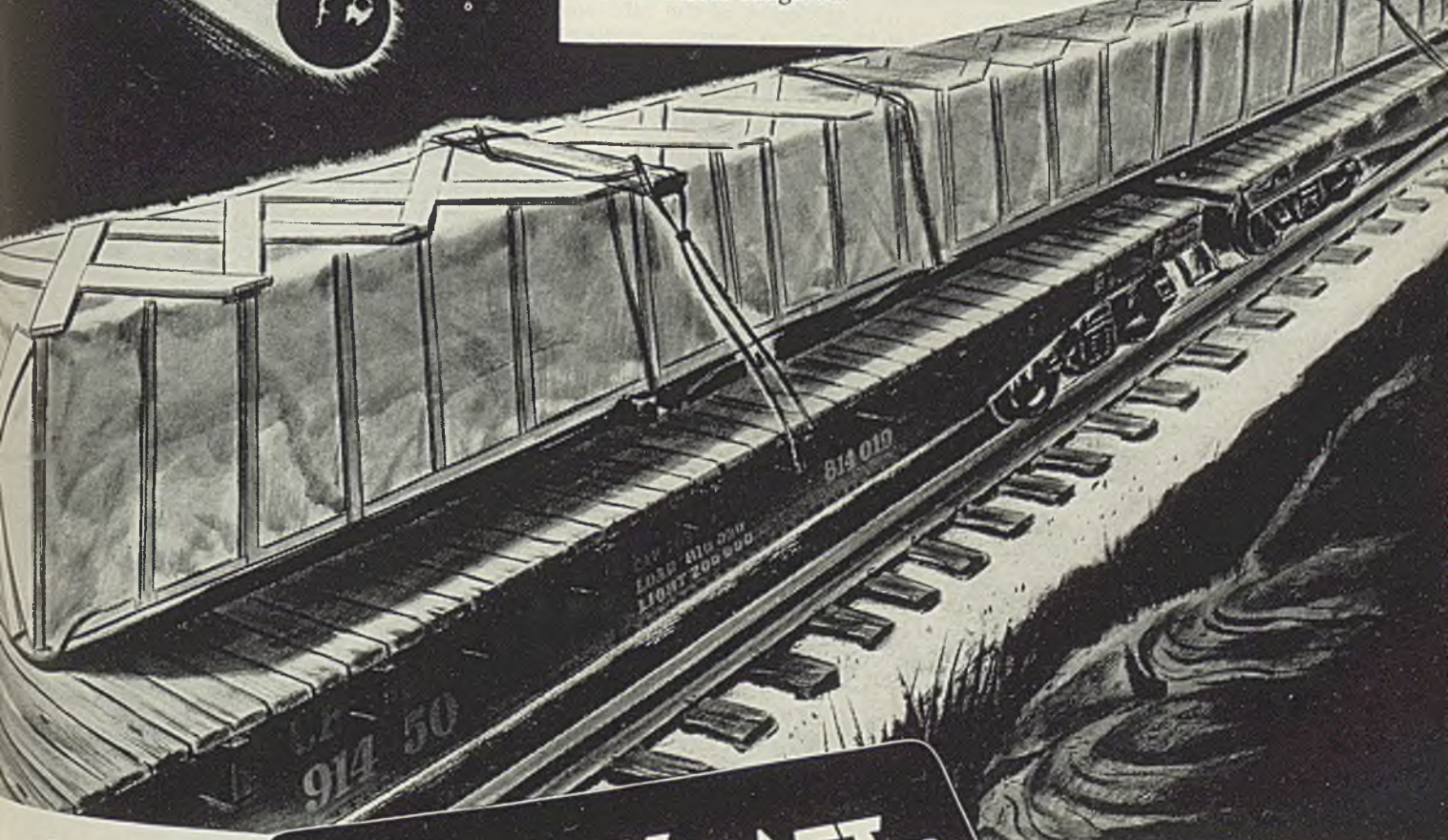

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SERVING INDUSTRY . . . CONSTRUCTION AND AGRICULTURE THROUGHOUT THE WORLD

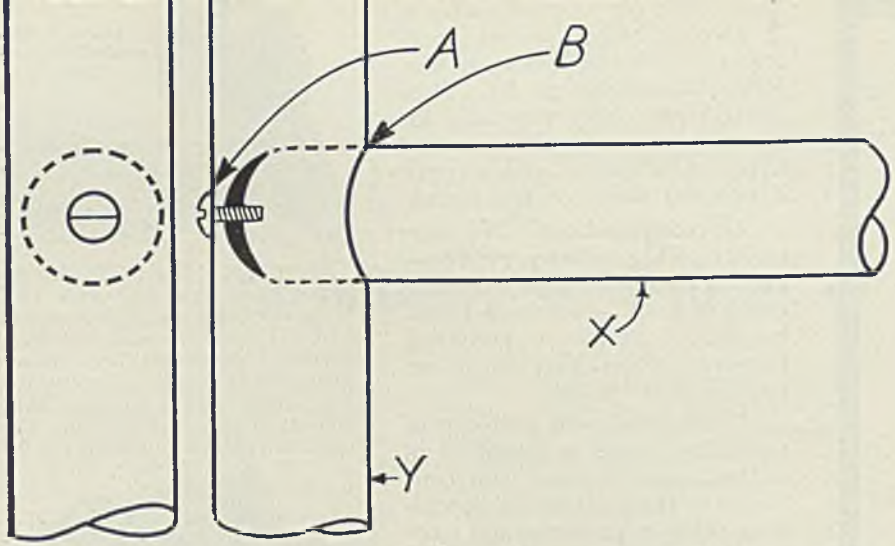


Fig. 4—This method of joining tubes helps distribute stresses; can be used in both permanent and temporary assemblies

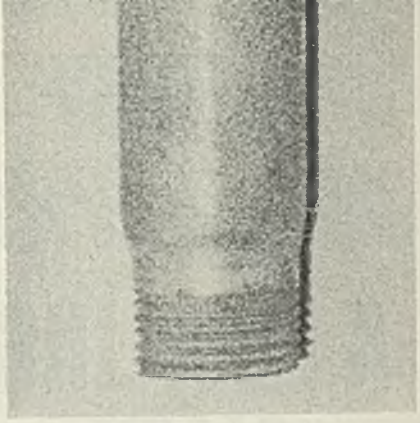


Fig. 5—A standard size tube was adopted to fit a nonstandard coupling by slightly reducing the diameter of the tube at the end as shown here. The operation was done in a press

that there was sufficient material at the flattened end to give a good safety factor. Additional material was furnished by inserting a tube of smaller diameter into the end of the main tube before closing, thus giving the end twice the normal wall thickness in the critical area.

Sometimes it is desirable to provide a perfectly square closure at the end of a tube and also to provide sufficient thickness at the closure for drilling and tapping to receive a bolt. Fig. 6 illustrates three methods of accomplishing this. At A, a thick plug is flash welded to the end of the tube, forming a butt weld up against the end and providing an extremely substantial attachment.

At B, Fig. 6, a tapered plug has been formed into the end of the tube, which then is spun over the plug. C is a similar design except that an annular notch replaces the bevel or taper on the plug and tube end. Closing here is done by rolling the metal over in a press instead of by spinning, if desired, or the end can be closed by a simple stamping operation on the end.

Such an attachment can be made liquid or gas-tight by welding, brazing or soldering. When the center hole is tapped, it permits attaching the tube to a sheet or plate by means of a threaded bolt as the plug then acts as a nut.

Of course the tube ends can be threaded and screwed into a fitting or a weld fitting employed for making many types of joints. Fig. 5 shows how a standard size tube was adapted to fit a coupling which was not of standard size. This avoided making a special coupling. A slight reduction in the end of the tube was easily made in a press. Wall thickness of the tube was not sufficient to permit cutting full depth thread with safety; therefore the thread was cut only to partial depth and left with a flat top. Under the circumstances, this tube was satisfactory, and considerable time and expense were saved by using the standard material at hand.

In general it might be said that it is far easier and cheaper to fabricate the shape desired on the end of the tube without trying to accomplish joining by means of a complicated fitting. Of course, fittings have their proper place in making many, many types of joints.

Another method exceptionally useful at times is shown in Fig. 4. The end of tube X is closed by spinning. A T-joint is produced between two tubes, Fig. 4, for both temporary and permanent assemblies.

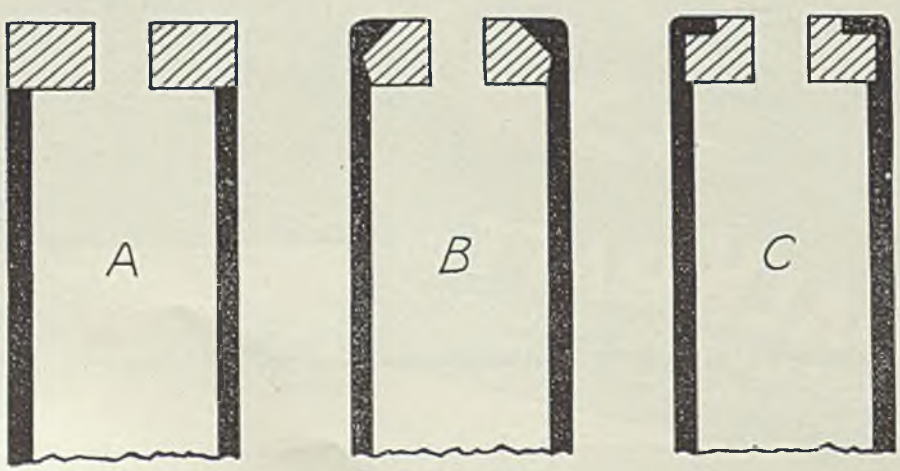
For instance, the joint as shown could be used in a temporary assembly such as in furniture or other structures which might be shipped knocked down or taken apart for transportation, storage or other reasons. In this case, the end of the tube X is spun closed and the dies designed so that spinning will cause a slight thickening of the tube wall at the clossure. The tube Y is punched or drilled at B to receive tube X. Then both tubes are drilled at A, tube X being tapped to receive a screw bolt, securing the assembly.

Obviously it is necessary that the diameter of tube X be less than the diameter of tube Y by at least twice the wall thickness of tube Y.

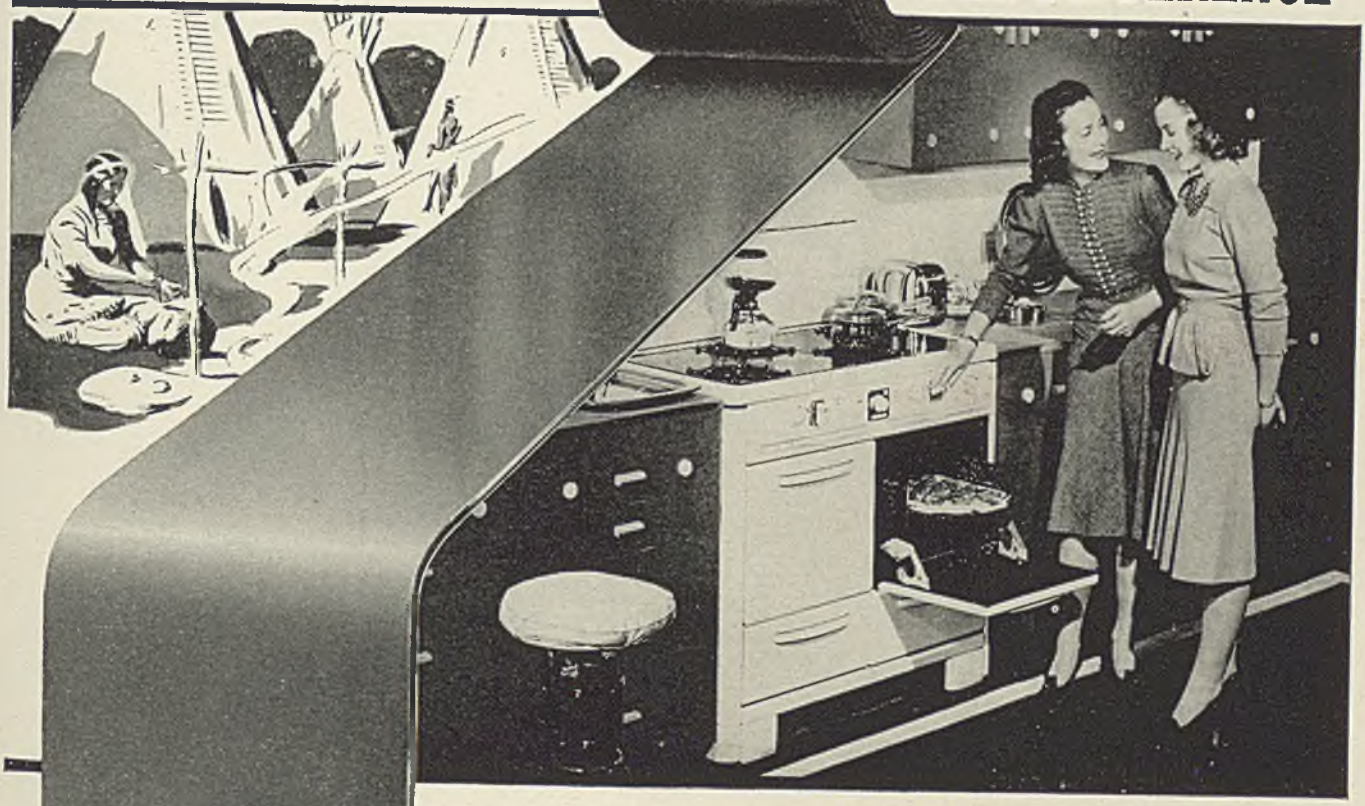
A common method of making a permanent T-joint between two pieces of tube is to punch and mill the end of tube X so it makes a fairly tight fit on tube Y all the way around the juncture at B. With such a joint, any movement of tube X naturally causes a flexing of the wall of tube Y in the neighborhood of the welded joint, and the weld itself may be severely loaded. However, if we close the end of tube X by spinning and insert it, as shown in Fig. 4, through Y so it abuts against the opposite wall of tube Y, it is possible to spot weld the opposite side of tube Y to the closed end. Or if desired, a hole can be punched in the wall of tube Y at this point and a permanent connection made by a plug weld through the wall of Y to the end of X. It is not difficult to make such a weld so it can be ground off smooth, if that is desired.

In either instance, we now have a small weld in shear at A, which takes up any load that is imposed by bending the tube X. This greatly reduces the load on the weld at B and on the wall of tube Y in that area.

Fig. 6—Various means of providing a square end closure which can be drilled and tapped to receive a bolt. A, flash welded; B, tapered plug forced in and tube spun over it; C, here an annular notch replaces the taper in B



MODERN STEEL MAKES THE DIFFERENCE



Without steel our wives would have few advantages for food preparation over their great-grandmothers, or even the Indian squaw at her rude campfire.

For as Mrs. America of 1941 surveys her modern kitchen she finds her every want anticipated. Refrigerator, range, sink, cabinets, pots and pans, even the walls of colorful tile--all designed for beauty, labor-saving convenience and economy--are fabricated of enameling sheets surfaced with lustrous glass-smooth, easy-to-clean porcelain. Thus has modern steel brought increased efficiency, comfort and leisure into the American home.

For more than forty years a leading producer of sheets for fabricators, Youngstown has aided this revolution in home standards. Today, in a national emergency, Youngstown is contributing its best to home defense--furnishing materials for national rearmament, as well as supplying steel for fabrication to protect the American standard of living.

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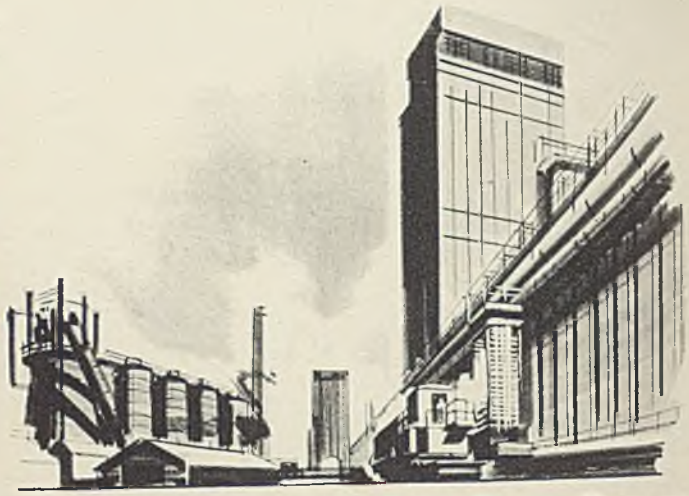
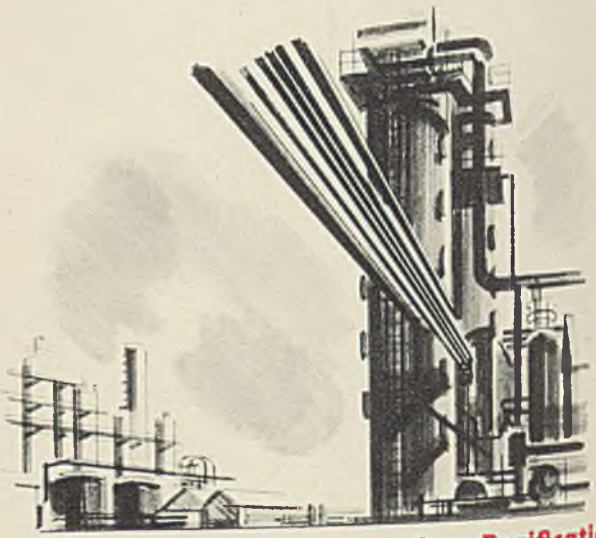
not only great volume
but great diversity



11 Current Contracts for Coke Ovens. These contracts involve a total of 618 ovens, with an annual new coke producing capacity of 3,000,000 tons.



2 Contracts for Oil Refinery Gas Purification Plants. The sulfur removed from the gas in these plants may be converted to sulfuric acid in the total amount of approximately 50,000 tons per year.

Coke oven plants

Gas plants

By-product plants

Light oil recovery and refining plants

Purification plants

Sulfur recovery plants

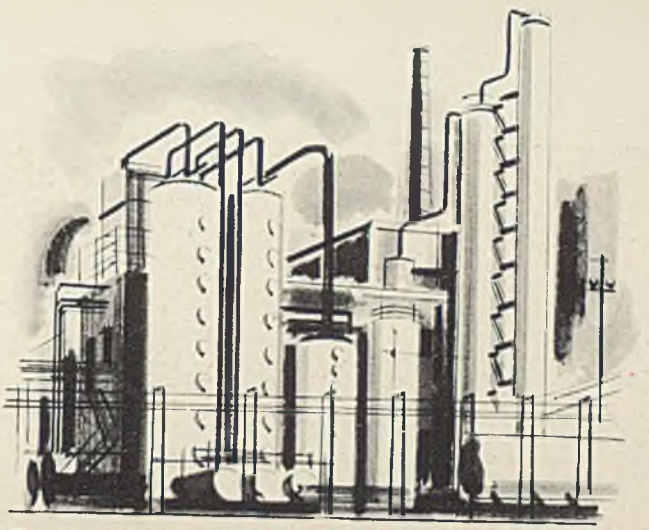
Boiler plants

Material-handling plants

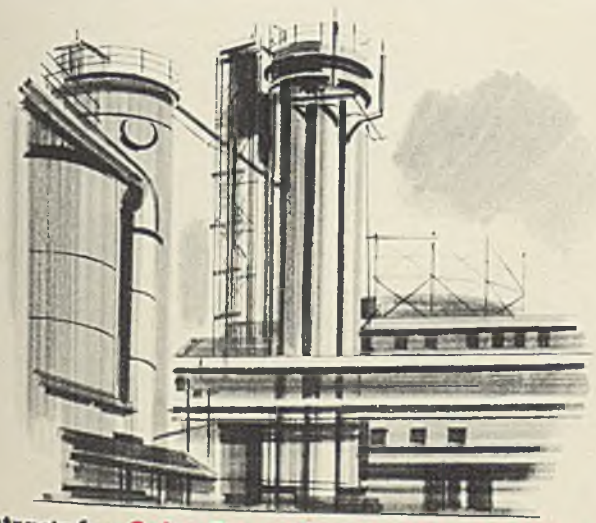
Chemical production plants

Tar distillation plants

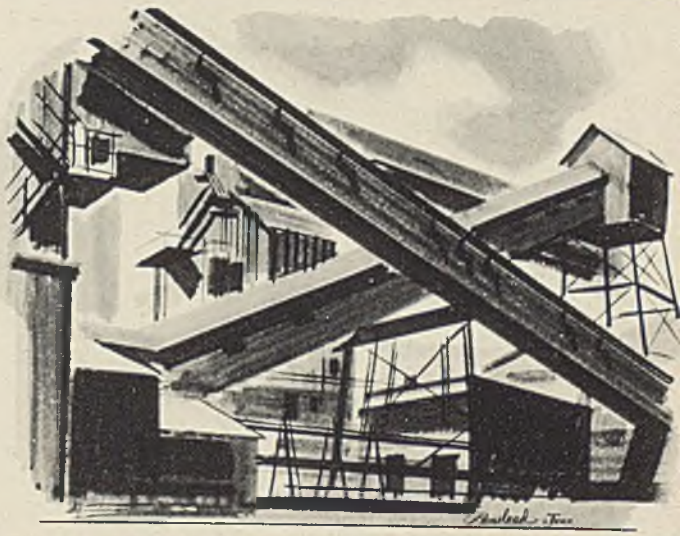
3 Contracts for Completely-new By-product Plants. They have a total annual tar producing capacity of 48,000,000 gallons, and an annual ammonium sulfate producing capacity of 60,000 tons.



7 Contracts for Light Oil Recovery and Refini Plants. These plants have the capacity to recover a refine 28,000,000 gallons of light oil. Refined pro ucts include approximately 4,000,000 gallons of tolu



2 Contracts for Coke Oven Gas Purification Plants. In these plants, sulfur is converted to sulfuric acid in the amount of 7,500 tons per year and elemental sulfur is produced for agricultural use in the amount of 1,800 tons per year.



Many Current Contracts for Miscellaneous Con struction. These include gas producer plants, coal an coke handling systems, boiler plants, tar distillatio plants and various chemical production units.

Koppers appreciates the opportunity to carry out these vital construction projects . . . and stands ready to further serve the steel and other industries. **Koppers Company, Pittsburgh, Pa.**

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Over fifty years ago we proudly tested the first power crane to be built in our shops. In its day this crane was a marvel of engineering. Yet the very next crane we built incorporated many improvements which experience had taught us and so it has gone. Each year — almost each day of the past 50 years has taught us something to improve the operating and production efficiency and lengthen the life of Industrial Brownhoist cranes. Today the I.B. cranes such as the one shown working in a mid-western manufacturing plant (below) whether equipped with magnets, hooks, or buckets are lifting loads with an ease never before thought possible. They are cutting handling costs to figures far below those of any other method of handling.

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INDUSTRIAL BROWNHOIST
BUILDS BETTER CRANES

By HENRY D. HIBBARD
Plainfield, N. J.

Control of HYDROGEN in STEEL

Various defects in steel are traced to hydrogen which remains in solution in molten bath. Means for expelling this gas from molten metal is so-called boil. To avoid troubles from hydrogen a method is proposed in which the boil is varied in volume and vigor according to the amount of humidity. Such practice promises thick skinned rimming steel ingots more uniform than heretofore have been obtained

HYDROGEN is perhaps the only important variable involved in steelmaking that is not controlled or compensated for, at least in some degree. Certain troubles or defects occurring in steel have been definitely traced to hydrogen in the metal as their cause, wholly or in part. Its control, therefore, is of importance.

Hydrogen may exist in cold iron or steel in various ways:

1. In iron deposited by electric current.
2. In iron or steel pickled, as for coating.
3. In steel so as to cause flakes.
4. In interior gasholes in a killed or partly killed steel ingot.
5. In skin holes in a rimmed steel ingot.

Hydrogen which causes flakes is evidently that remaining in solution in the molten metal after the quantity, which forms or tends to form gasholes, has left it. High-duty steel such as that for ordnance is usually killed and thus has few or no gasholes in the ingot. Consequently, more hydrogen remains in solution and flakes are likely to result. Lack of proper boil of the bath accounts for it, as is pointed out later.

Gasholes are present in all partly-killed steel ingots and hydrogen is one of the important gases they contain. They are usually located in the central parts and are more numerous in the upper than in the lower portions. Some ingots of this type have also skinholes around the upper part which resemble hydrogen holes, and may be caused by that gas.

Hydrogen is particularly the bane of rimming steel, it being the chief of the gases found in the skinholes. Skinholes are usually more numerous in the lower than in the upper half of a rimmed steel ingot. Rimming steel being relatively free from hydrogen is, for that reason, free from flakes.

In Belgium, in 1914, Baraduc-Muller extracted gases from a number of soft basic bessemer liquid steels. He got much more hydrogen from steels made in rainy weather than from those made in fair weather, which excess he ascribed to water vapor in the atmosphere, which was doubtless true.

The sources of hydrogen in the bath metal include crude iron of the charge, scrap and water vapor in the gases in the melting chamber.

Molten crude iron evolves gases. So if used direct in steelmaking, it may introduce more gases to the bath than it would if allowed to freeze and to be charged cold. This, however, is probably unimportant.

Gases in scrap are probably negligible.

Hydrogen gets into the metal presumably, by absorption during melting. When water vapor touches iron at or near the melting point, it is decomposed. Its oxygen forms an oxide of iron, while its nascent hydrogen is absorbed in part, if not wholly, by the iron. In the molten iron, under bath conditions, oxygen seems to have no power to oxidize hydrogen. If it did, however, there would be no need of further control of hydrogen, because the metal would contain enough oxygen in the form of oxide of iron to combine with the hydrogen present. Solubility of the gas in this instance, at the temperature, seems to be stronger than chemical affinity. The higher the degree of heat the more the one is strengthened while the other is correspondingly weakened.

The water vapor in the melting chamber is derived from steam blown into the producers, inducted air, and that formed by combustion of hydrocarbons in the producers and in the furnace. Our present concern is with hydrogen in the bath metal—however it gets there.

To avoid trouble from hydrogen in steel, the metal, as cast, should not contain more than a permissible amount of the gas. Achieving that depends first on how much gets into the metal, and then on how completely it is expelled therefrom. Whatever precautions may be taken to limit the amount of hydrogen which reaches and is absorbed by the metal, adequate measures must also be taken to drive out the unmanageable excess.

The more hydrogen the more boil needed. The only agent or means apparent for expelling hydrogen

Fig. 1—Ingot free from skinholes on the sides, but with a few scattered over the bottom

from the metal is the so-called boil of the bath. This boil is the escape from the bath of bubbles of carbon monoxide gas.

Every steel melter wants his charge to have what he calls a "good boil" though he may not be able to give reasons for it. Usually the boil is considered as merely incidental, to be watched indeed, but with part of its lesson missed. The common procedure is that the metal is brought to the desired carbon content and temperature and the charge is then finished.

Volume of boil is the total amount of gases which escape from the bath, chiefly CO. So the more carbon in the initial bath metal and the longer the boil is continued, the more gas is formed and the greater the volume of boil.

It is extremely probable, if indeed, not proven, that the escaping gas of the boil has power to carry off with it some of the other gases which may be in the metal, and which are unable to escape unaided, perhaps because they are present in too small quantities. This may apply to hydrogen, so to expel it satisfactorily may call for proper control of the boil.

Per cent carbon in rimming steel tapped at various atmosphere conditions

Temp. air, deg. Fahr.	Saturation of air in per cent: Below 30	30-60	60-80	80-100
Below 32	0.08	0.08	0.07	0.06
32- 50	0.08	0.07	0.06	0.06
50- 70	0.07	0.06	0.05	0.05
70-100	0.06	0.05	0.04	0.04

The power of carbon monoxide to carry off other gases may also depend on the vigor of the boil. A strong boil may be more effective to that end than a weak one. Vigor shows the rate at which carbon is being oxidized and that depends on the concentration of carbon in the metal and the rate at which it is being contacted or supplied with oxygen in some form.

The bath temperature must be right between narrow limits through the working period, and particularly at tapping. It should be high enough at the end to permit the steel to be cast properly, but no higher. During the working period, if too high, it lessens the vigor of the boil and increases the solubility of the metal for gases. Both of these happenings tend to charge the metal at the end with too much hydrogen with results as noted.

Carbon and, particularly, manganese, may also have some solvent or holding power for hydrogen. Prolonging the boil proportionately eliminates these two elements also and, by that, favors expulsion of hydrogen. Ingot iron, which is almost free of them is also free from skinholes which hydrogen, if plentifully present, might cause. So, the more hydrogen the longer the boil should be extended.

Genesis of Skinholes

The liquid rimmed metal entering the mold is cooled which lessens its solvent power for the gases it contains. The CO therefore escapes copiously, causing the well-known effervescence. The escaping gas presumably carries off with it some of the other gases in the metal, and notably hydrogen, as in the boil in the furnace.

Eventually the saturation point of the remaining hydrogen is reached when it begins to be liberated and so to form bubbles which tend to attach themselves to the inner wall of the frozen shell of the ingot and to grow in size continually by accretions of gas. The frozen shell constitutes the primary skin of the ingot, outside the skinholes.

The escaping gas bubbles give a lively churning motion to the liquid metal which is progressively more active from the bottom upward because the bubbles become more numerous and larger. The metal at the bottom is relatively quiet. The moving metal dislodges and sweeps away the hydrogen bubbles as they form above the level where it has sufficient force. Below that level and over the bottom they, or some of them, persist until the ingot is nearly or quite solid.

With the foregoing as preamble, the method proposed herein is to vary the boil in volume and also perhaps in vigor according to the amount of humidity in the air, when the metal, either crude in the blast furnace, or steel in the open hearth, is being melted.

The content of water in the atmosphere varies greatly from day to day, and even from hour to hour. At one time it may be 50 times as much per unit as at another. Its maximum occurs in hot wet weather, and its minimum when the weather is cold and clear.

The higher the humidity the greater the need for regulation of

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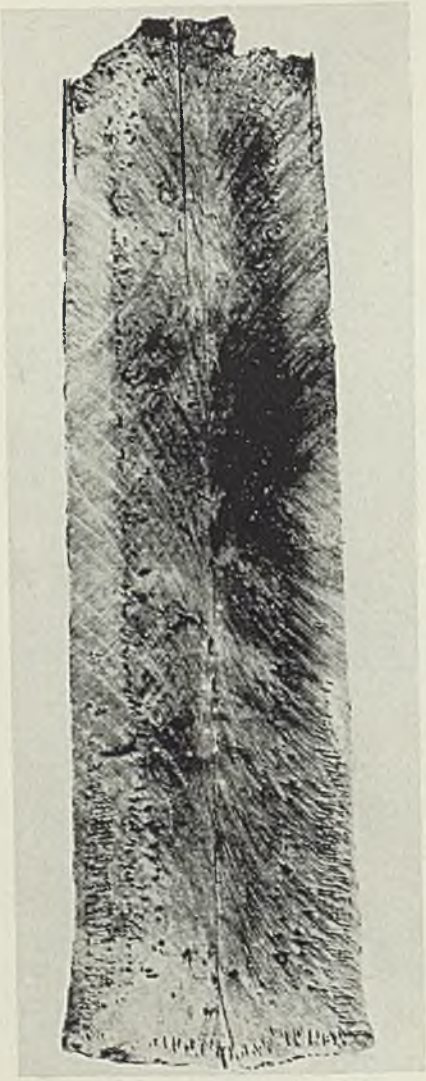


Fig. 2—Rimmed steel ingot of ordinary quality showing skinholes over bottom and around sides in lower part of ingot

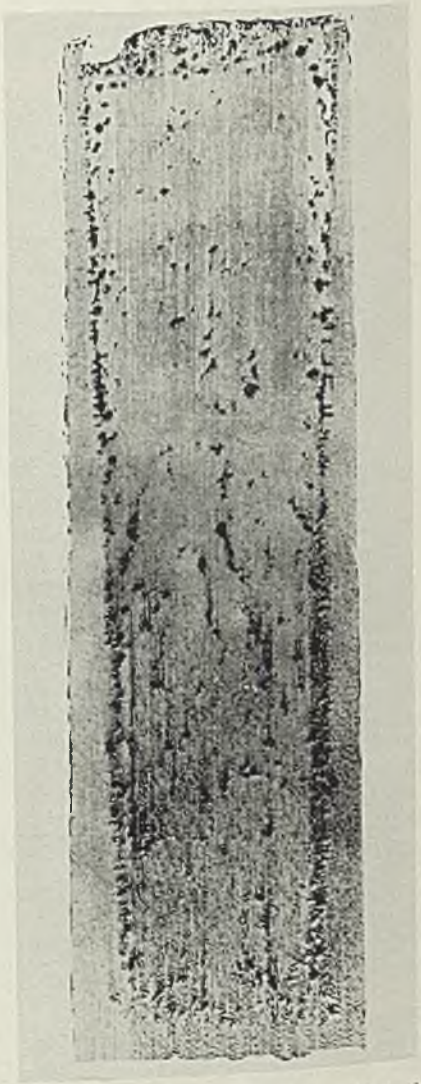
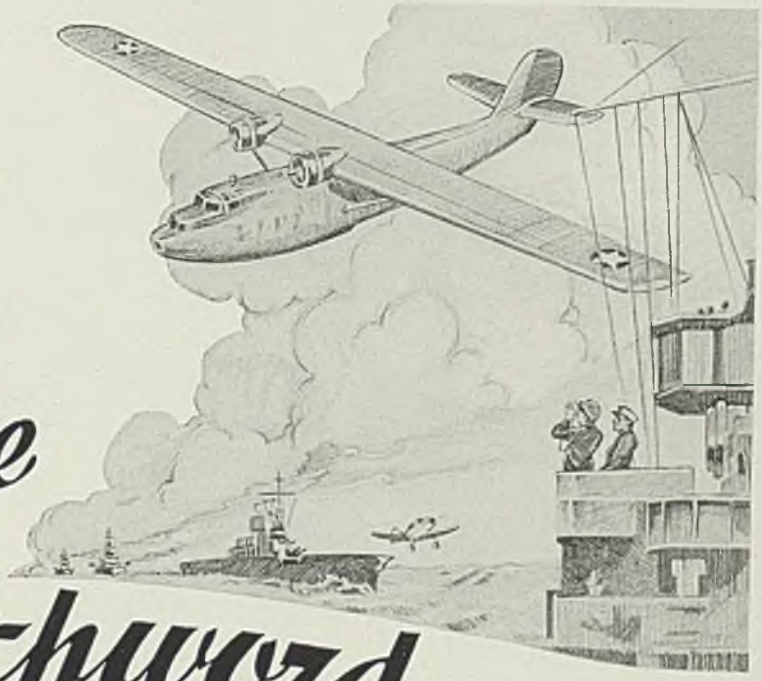


Fig. 3—Excellent quality of rimmed steel ingot free from skinholes

AT OHIO SEAMLESS

Vigilance is the watchword



From the selection of the steel that enters our furnaces until your tubes are shipped - vigilance is the watchword.

Constant inspection by eye and instrument while your tubes are undergoing every process, plus the most rigid final inspection, assure you the uniform top quality for which OHIO SEAMLESS Steel Tubing is famous.

During the past year this series of pictured trips into the home of OHIO SEAMLESS at Shelby, Ohio, the birthplace of seamless tubing in America, has described to you briefly the experience, skill and vigilance of our craftsmen; also, the technical and production facilities of our modern plant.

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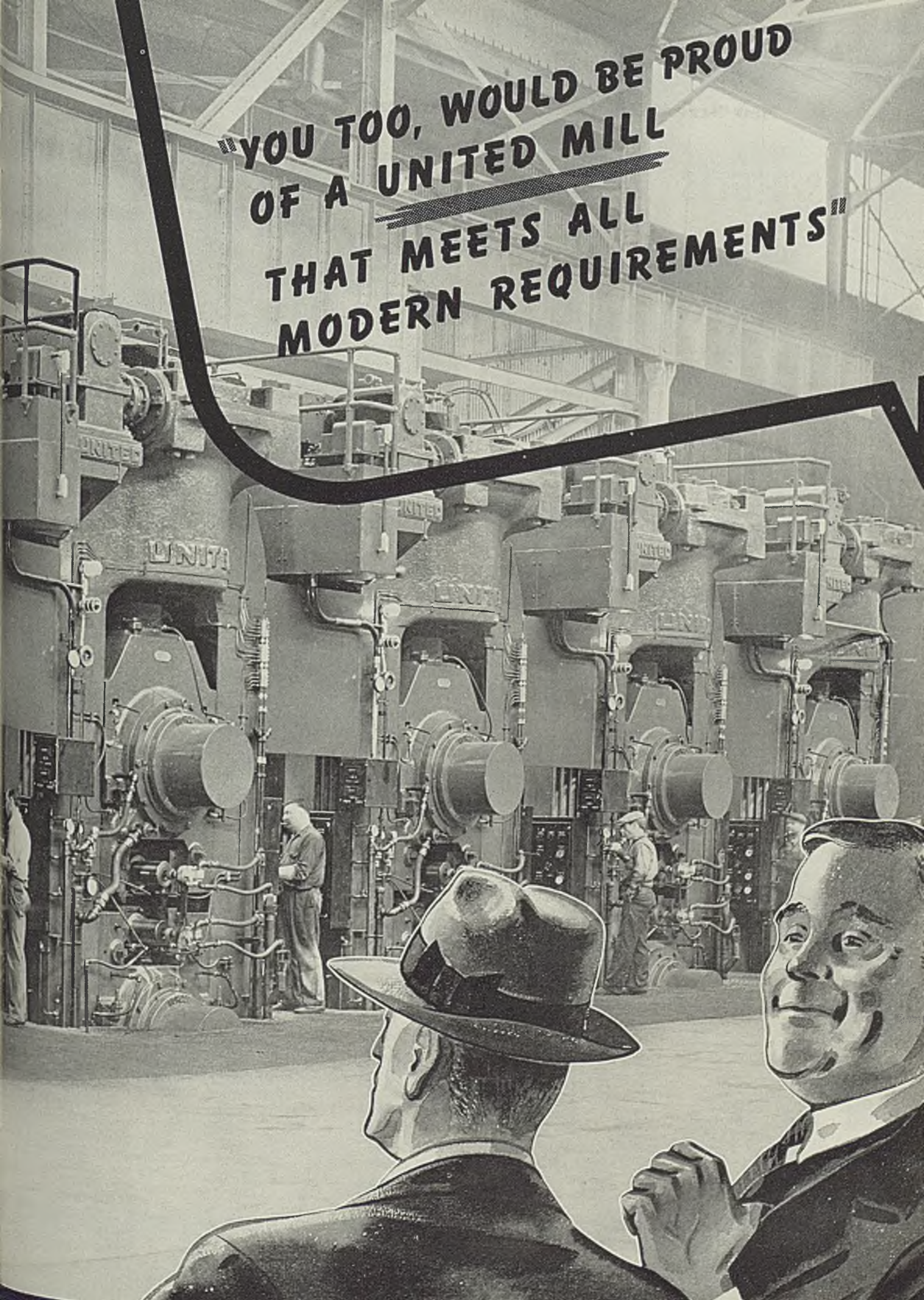
"YOU TOO, WOULD BE PROUD
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THAT MEETS ALL
MODERN REQUIREMENTS"

New Screw Head Recess and Driver System

SPEEDS MATERIALS HANDLING

In Assembly Work

By MAXWELL A. WEST
Research Engineer
102 Southwest Sixth Avenue
Portland, Ore.

A RECENTLY perfected and patented type of recess for driving sheet metal, wood and machine screws; stove bolts and set screws offers a number of important advantages.

Plan and cross section, Fig. 1, show the cruciform recess formed by a pair of identical slots, 12 and 13, which intersect on the vertical axis of the screw at V. While the length of these slots depends on the diameter of the screw head, the width of the slots is made uniform throughout a range of ordinary screw sizes so the same size driver can be employed for various sizes of screws throughout a reasonable range.

As will be seen from the illustrations, the driving recess somewhat resembles that of a well known screw head but differs in a number of important points:

First, the vertical walls of the cruciform opening are practically parallel vertically. The end walls of the slots of the Challenger screw recess as shown at 14 and 15, below, descend from the top face of the screw head in inwardly and downwardly curving planes. These merge at "a" with the bottom walls, 16 and 17 respectively. The bottom surfaces of the recessed slots, having this convex contour, are a shape which facilitates the forming of the screw head recess in manufacture by a single punching operation with minimum distortion of the screw head.

Possibly the most important feature of the Challenger screw recess is the fact that the sidewalls 18, 18', 19 and 19' in each of the slots are vertical and parallel throughout most of their extent. Only the uppermost portions of these sidewalls have a slight taper as indicated at "t," in lower view. This taper is to allow easy entrance of the driving tool into the recess. It is considered preferable that this taper not extend more than one-third the total slot depth at the center of the screw.

The parallel edges at top and bottom of the opposite sidewalls of the slots give this screw recess its most important characteristic—the fact that torque applied to the screw in driving does not tend to force the driver out of the screw head.

The main cause of slippage and consequent reaming of the recess in other similar designs is the tendency of the driving tool to be forced out of the recess due to the walls of those recesses being tapered. This new design eliminates that tendency, even when the driver does not actually contact the bottoms of the slots. The greater area of the sidewalls of the slots upon the walls of the driving tool here produces sufficient bearing surface to provide a grip on the screw that will twist it in two before the recess or head will become damaged.

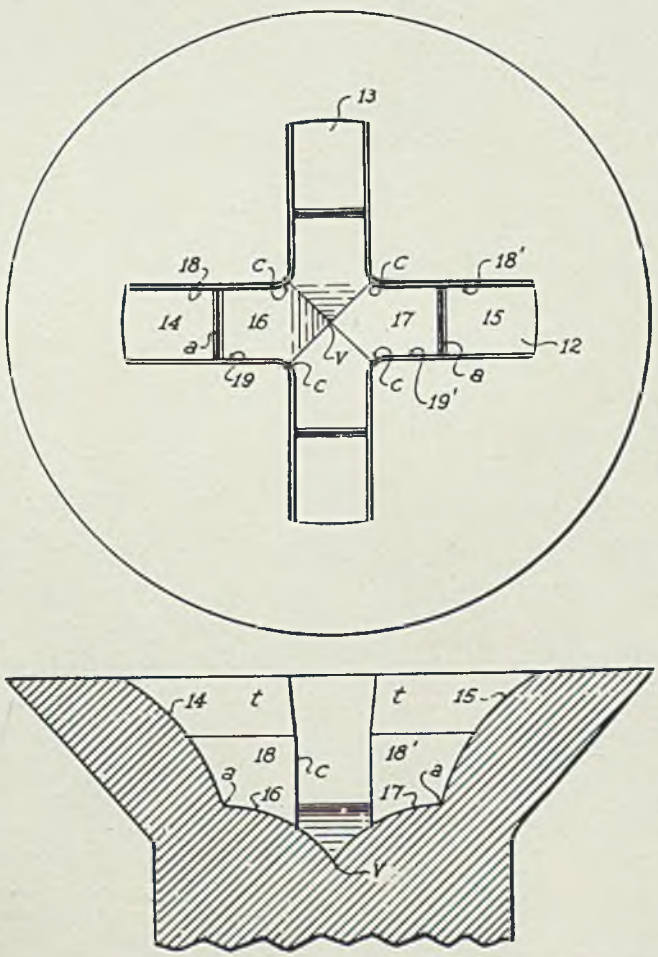


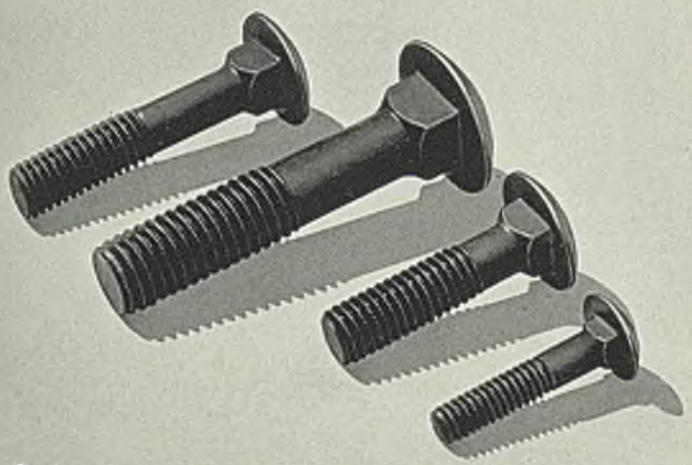
Fig. 1—Upper, plan view of cruciform recess of Challenger screw head. Lower, note sidewalls of recess taper for only about one-third the depth of recess at center. The vertical walls at bottom portion engage driver so screw is driven from near bottom, not top, of screw head. Absence of taper at driving point eliminates any tendency toward backthrust on driver, so avoids any tendency for driver to slip

While ordinarily the screw recess is made in a cruciform shape as shown in Fig. 1 with four intersecting equally spaced radial slots, it is possible to modify the form to use three radial slots, see Fig. 2, disposed symmetrically about the screw head and intersecting on the vertical axis of the screw, the slots otherwise being identical to the four radial slots in Fig. 1. As such screws cannot be driven with an ordinary screwdriver, they are suitable for use in places where it is desired that screws not be removable by ordinary means.

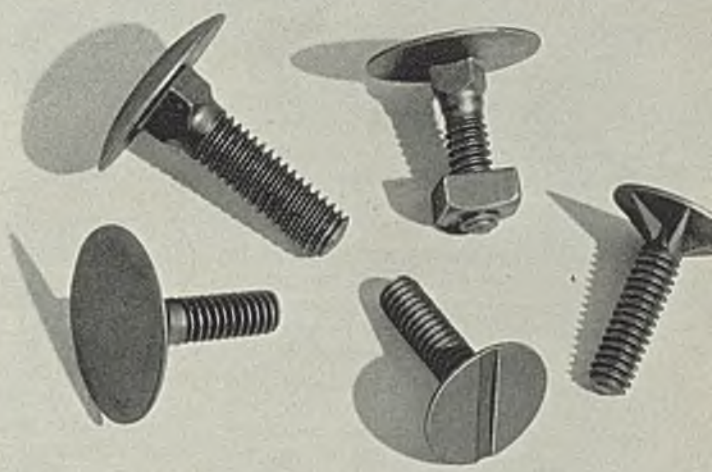
On the other hand, the standard cruciform shape as shown in Fig. 1 can be serviced with an ordinary screwdriver, which can be inserted into any two radially opposite slots.

Preferably, however, a specially constructed driver is used as shown in Figs. 3 and 4. This has a driving tool or bit formed to engage all of the slots of the screw recess simultaneously and thus obtain great

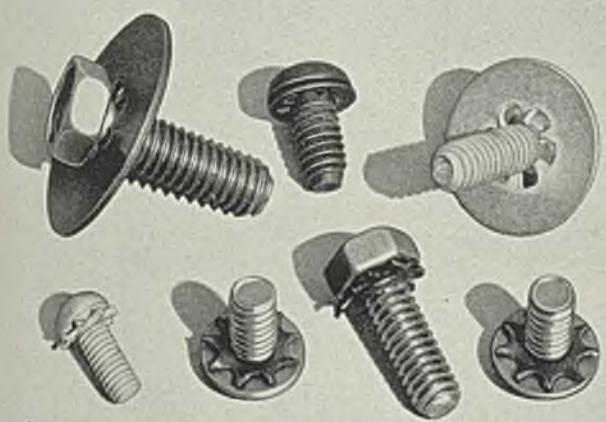
LAMSON *Standard* FASTENINGS SAVE TIME



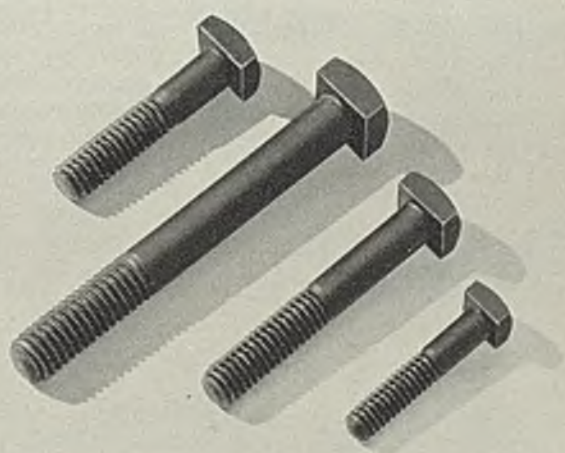
Carriage bolts of heat treated steel are accurately made, have smooth, round heads and true, square shanks. Available in either rolled or cut threads. Stocked in a full list of sizes up to ¾-inch diameter, 14-inch length. Larger sizes made to specifications.



Elevator Bolts are made in four standard types. No. 1, flat head countersunk; No. 2, oval head; No. 3, flat head, with slot, four fins beneath head; No. 4, flat head, four fins beneath head. Stocked up to ⅜-inch diameters; made with large heads to Bolt Institute standards.



Lamson Pre-assembled Lock Washer screws are available in 8/32" to 5/16" diameters, and in lengths up to 1 1/2". Standard head styles are round head, binding head, oven head and hexagon head. Lamson & Sessions Company is a licensed manufacturer of this patented screw.



Machine bolts with either square or hexagon heads are made of heat treated steel, and have true, straight shanks and very accurate threads. Made up to 2-inch diameter, any length, but stocked only up to 1¼-inch diameter, 12-inch lengths.

• While Lamson & Sessions Company is one of the world's largest producers of special fastenings, and ordinarily seeks to make this service of greater value to more manufacturers, the present national emergency demands the use of standard fastenings wherever possible—*to save time*. Quite frequently our engineers are asked to provide a "made to order" headed and threaded product for an assembly which would have been as well served in all respects by a standard bolt or screw from out of stock! Therefore we urge that you consult our catalog for a standard fastening before you decide upon a special design that will require *extra time and extra cost* to produce.

•

THE LAMSON & SESSIONS COMPANY, Cleveland, Ohio

Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

Your Jobber stocks the Lamson line

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BOLTS • • NUTS • • COTTERS • • CAP SCREWS • • SPECIALS

gripping power on the screw. It will be seen that such a system permits the screw actually to be guided by the driver. In fact, the screw can be placed on the point of the driver, started and subsequently driven completely home without again touching the screw.

Another advantage of this system is that elimination of backthrust allows the driving to be controlled entirely by how the power driver is set. Thus screws can be driven much more uniformly, since pressure operator may need to exert in driving no longer is an important element, only sufficient pressure to hold the bit in the screw recess ever being necessary.

A study of the illustrations will show that with such a driver and screw recess, there is no tendency of the driver to rise out of the recess, no matter how much torque is developed in driving the screw. Also it is evident that the screw is driven from the bottom of the recess, not from the top of the recess. Thus there is ample metal back of the driving contacts to prevent any distortion or reaming action to be developed. This is the reason why on tests it will be found that practically any size standard screw or bolt can be twisted in two

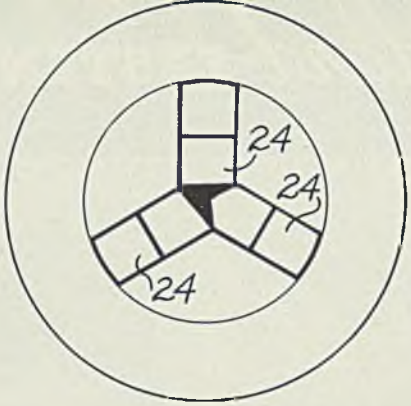


Fig. 2—This is a 3-slot variation of the Challenger screw, made for use where a recess is wanted that will not engage an ordinary screwdriver

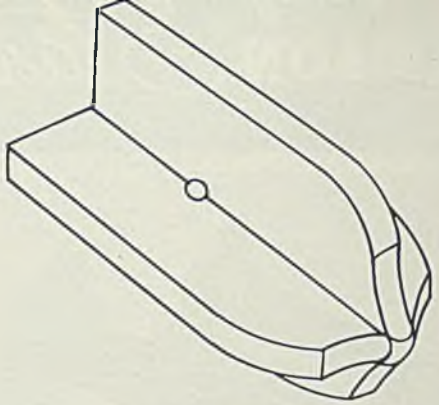


Fig. 3—Special bit used with the Challenger screw recess to engage all four slots simultaneously. Note rounded tip. This avoids damaging the screw recess when entering the slots

in the shank before the head will become damaged.

Another important development in connection with this system is that the engaging portion of the preferred driving tool, Fig. 4, is swiveled. This, in effect, produces a universal joint near the end of the driving tool, thus assuring that the tool bit will be in accurate alignment with the screw.

It is well known that when driving any screw it is not possible to keep the axis of the screwdriver in perfect alignment with the axis of the screw. This means the tip of ordinary driver may partially or completely escape from the slot or recess, reaming the screw head recess or marring the work.

Furthermore, often it is desired to drive the screw in such a location that the axis of the screwdriver must necessarily be out of proper alignment with the proper axis of the screw. With an ordinary screw and screw driver, this presents a problem of some difficulty.

With the Challenger screw recess and the Challenger driver, the bit as in Fig. 4 is swiveled so the operator can maintain accurate alignment with the screw recess without the driver shank actually being in alignment with the screw. This is done by arranging the axis of the driver shank and driver bit to permit slight movement out of alignment with each other but still maintaining full engagement for turning the screw—without sacrificing any strength in the driver, the driving bit or the engagement with the screw recess. Swiveling the bit of the driver in this fashion assures alignment of the bit with the screw, in spite of a slight variation of axis of the driver.

It is evident from Fig. 3 that the detachable bit has a tip and driving wings formed similarly to the recess in the screw head. This permits the bit to engage the screw with no tendency whatever to fracture the screw head or to abrade the screw recess or bit of the driving tool.

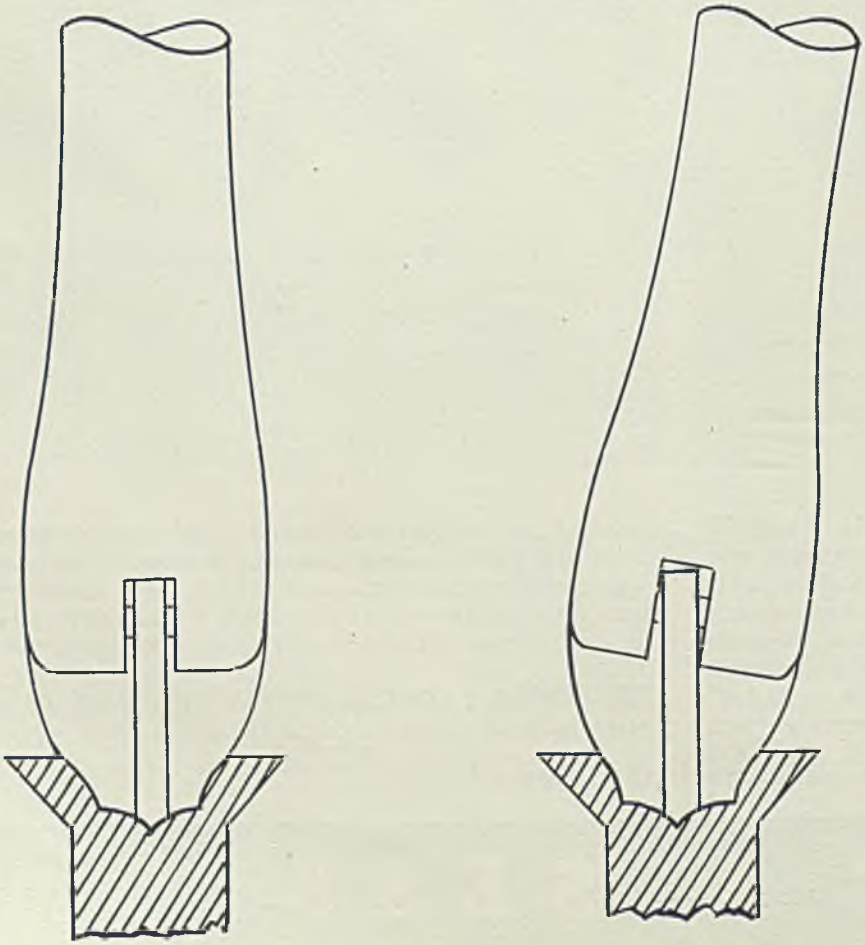
Since the bit is fastened to the shank of the driver by a pin, it can be detached and replaced at any time by simply driving out the connecting pin.

It is evident such a screw recess and driver have a number of important advantages.

First, since the screw is driven from near the bottom of the recess and there is no longitudinal taper involved, there is no end thrust on the driver regardless of the amount of torque exerted. Thus there is no tendency for the driver to be forced out of the screw head recess,

(Please turn to Page 99)

Fig. 4—This shows how bit is connected to shank of driver to afford a universal joint or swivel action that automatically corrects for some misalignment between driver and screw. Note, please, that slots in shank here are purposely made large to show action. Actually, a 2-degree range of pivoting will usually afford all the swiveling needed although this amount of swivel can easily be made any degree wanted. Pin can be driven out, allowing replacement of bit



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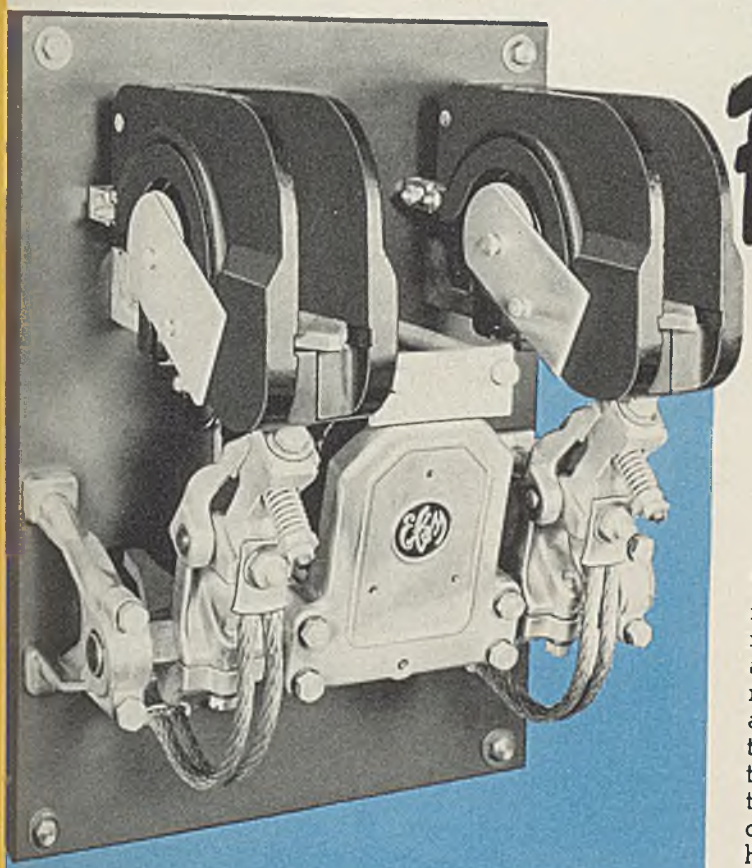


IN WELDING SERVI

ON HEAT-TREATING JOB

ON LIGHTING LOADS

ON MOTOR CONTRO

The results expected of magnetic contactors are most exacting. Certain applications require quick response—ability to open and close a circuit many times in rapid succession to meet high speed production methods. In others, the contactor remains closed—heavy currents must be handled for long periods of time without overheating. In all cases, the circuit must be ruptured with minimum wear from the hot destructive arc.

EC&M meets these conditions with LINE-ARC Magnetic Contactors. They're designed for *speed* with moving parts of high-strength, aluminum alloys which reduce weight and permit *lightning fast* response. Current-carrying parts are liberally designed to handle not only normal loads continuously with minimum rise in temperature but have reserve capacity to take care of the abnormal loads which, experience shows, can not always be avoided.

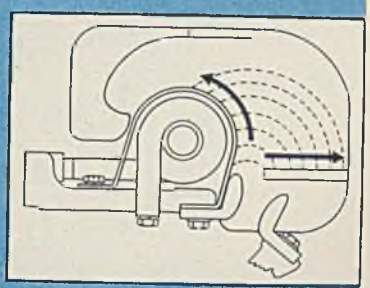
In arc-rupturing ability, these LINE-ARC Contactors have no equal. Contacts have high wear-resistance; they're cold formed by a special process giving high Brinell hardness throughout their entire thickness. Combined with the LINE-ARC principle, which scientifically controls the arc as the circuit is broken, the life of contacts has been increased beyond any previous standard of comparison.

Give these LINE-ARC Contactors an opportunity to prove their worth in your plant. Install them on controllers, welders, furnaces, etc. You'll find their performance outstanding.

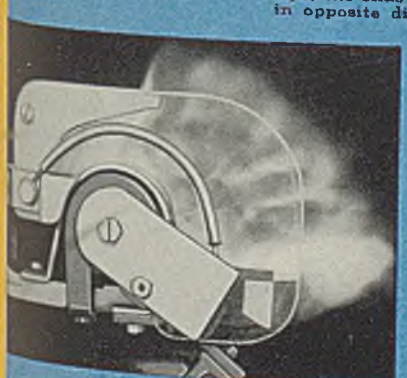
THE LINE-ARC PRINCIPLE GIVES LONG CONTACT LIFE

•

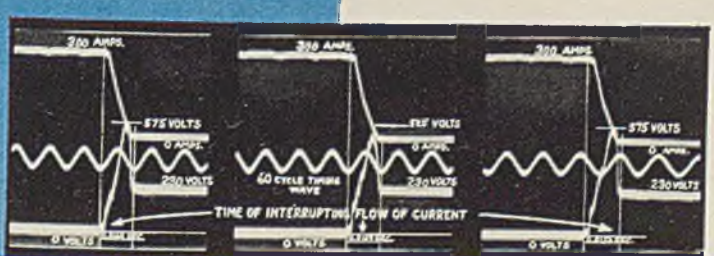
NO DESTRUCTIVE BURNING OF ARC SHIELDS



As the contacts start to separate, the arc is immediately removed from the contact tips, the ends of the arc traveling rapidly in opposite directions along the circular blow-out guard and horizontal arcing-plate, being stretched out in a line, centered between but not touching the arc shields.



Left is shown a LINE-ARC Contactor specially fitted with glass arc shields to demonstrate the LINE-ARC principle. The glass was neither smudged nor harmed in this test. This unit is still in active use at the EC&M Factory. All visitors witness this convincing demonstration of the LINE-ARC principle.

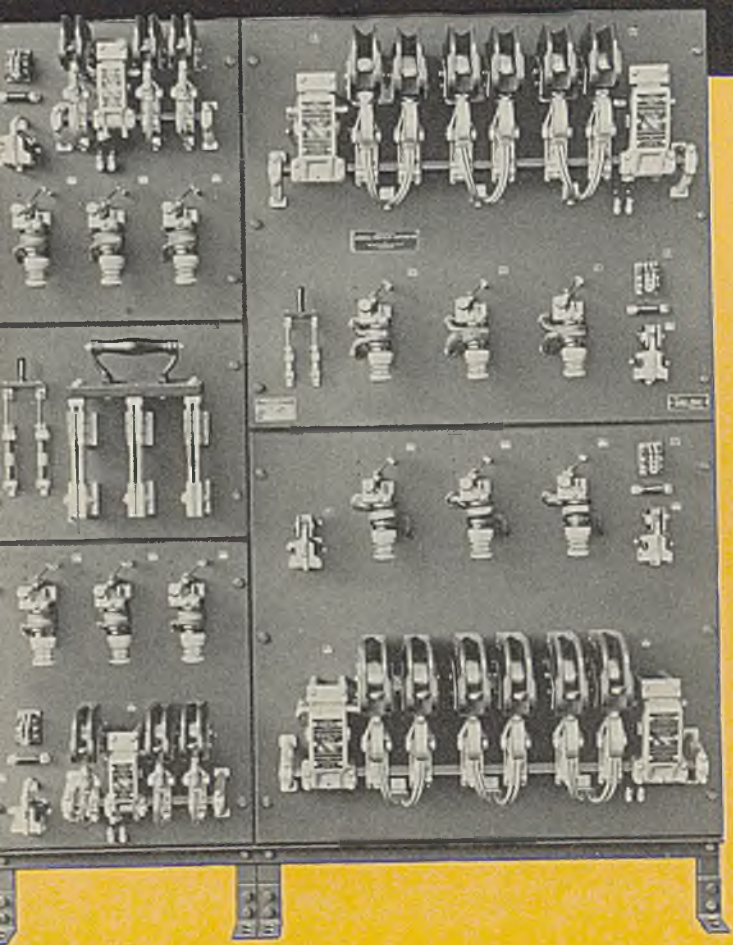


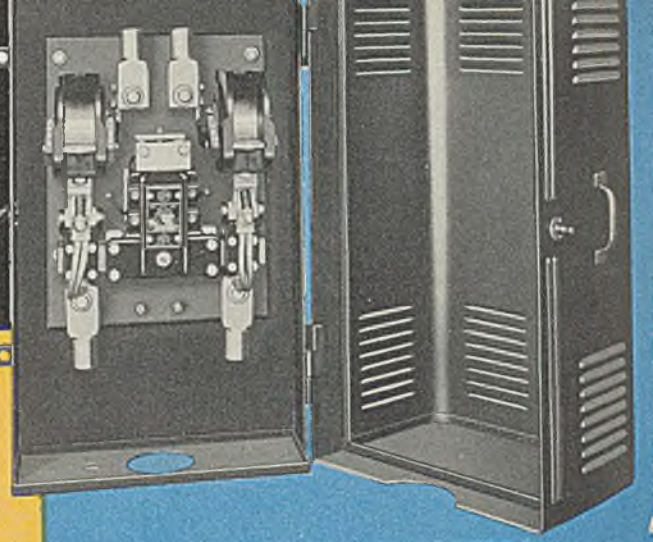
Oscillograph curve of LINE-ARC Contactor rupturing 300% load. The current curve is a smooth, straight line from maximum to zero value. There is no restriking of the arc and but one smooth, rounded voltage peak across the contacts as the circuit is opened. The time of rupturing is consistent and of short duration.

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

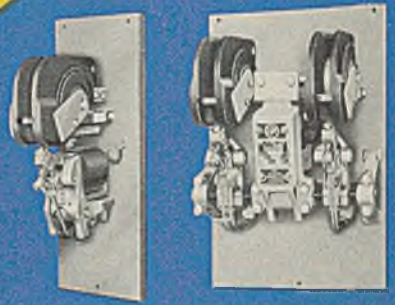
EC&M LINE-ARC MAGNETIC CONTACTORS FOR AC

lnit Contactors
r Control Panels

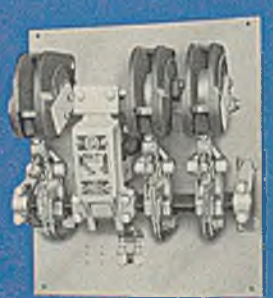




WELDER CONTACTORS



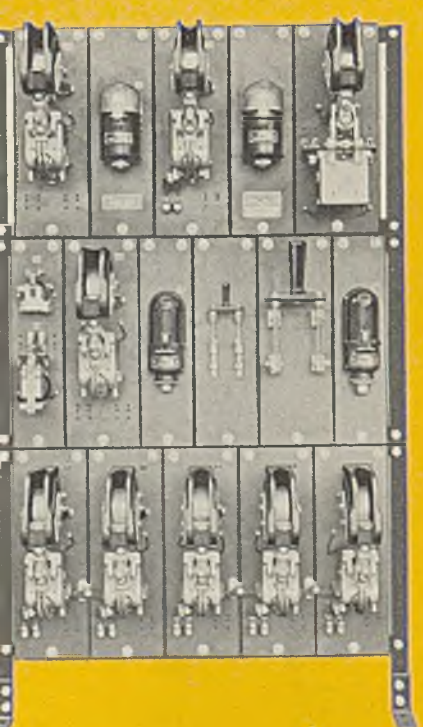
SINGLE POLE DOUBLE POLE



TRIPLE POLE

D-c Contactors are built in Single and Double Pole designs with normally open contacts. Also in the single pole, spring-closed style with normally closed contacts for "off-point" braking and similar service. Standard mounting is on slate base with composition panel, optionally supplied when requested.

A-c Contactors are built in Double and Triple Pole designs for all applications except welding; welder contactors being of D.P. design. Continuous capacity operating coils are used for all standard voltages, 110 to 550 volts, 25 and 60 cycles.



HEATER or
FURNACE PANELS

MOTOR CONTROL
for A-C or D-C
MILL or CRANE

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

Specify

Bulletin 1140 CONTACTORS for A-c Service Bulletin 1145 CONTACTORS for D-c Service
Bulletin 1211 CONTACTORS for Welder Service

Metals as Catalysts

(*Continued from Page* 55)

bers. In a similar way the chlorides of antimony are efficient in the manufacture of the vinyl polymers.

How the Catalyst Is Made: The metals and the metallic oxides are used principally in heterogeneously catalyzed reactions. As previously said, this type of reaction takes place at the interface between the substrate and the surface. Therefore, the activity of the catalyst will be, in large measure, determined by the extent of the surface exposed. For this reason then, the preparation and supporting of the catalyst, whether a simple, a mixed, or a promoted catalyst, is of fundamental importance. From the numerous physical measurements that have been made and from the wide technical experience gained, it has been established that a fine subdivision is not only favorable but necessary in an active catalyst. So that whereas spongy platinum, pyrophoric nickel or very porous oxides make catalysts of practical activity, metal in the form of wire or foil or dense nonporous oxides may be completely inactive.

Therefore, in preparing a heterogeneous catalyst, that process which gives a material with a maximum surface gives a catalyst of greatest activity. Thus the active catalysts are in general highly unstable systems of loose surface structure and great surface development prepared by chemical methods such as reduction, precipitation, etc., at as low a temperature as possible. If such systems are subjected to high temperature, rearrangement occurs to form more stable surface structure with consequent loss in activity. For this reason industrial reactions, especially those which involve a liberation of heat, are carried out in apparatus which contains necessary heat exchangers so that over-heating during the process and the resulting loss in activity of the catalyst may be avoided.

Can Be Too Active: Of course, it is not always desirable to have a catalyst of greatest activity. As an example, the Raney nickel catalyst is made by treating nickel-aluminum alloys with caustic soda. This dissolves out the aluminum and leaves behind skeletal nickel crystals of high porosity. This catalyst is excellent for the hydrogenation of organic compounds in the vapor phase at low temperatures, in the neighborhood of room temperature. But at high temperatures its great activity is a drawback because of destructive hydrogenation. These facts can be summarized by saying that a catalyst of great activity *in the temperature range to be used* is the correct catalyst to use.

In discussing the use of metallic oxides as catalysts, one must bear in mind that oxides may serve as sources of raw material for making other catalysts such as the metals as well as serving as catalysts themselves. Similarly oxides may be used also as components of mixed catalysts or as promotors or as supports.

Metallic cobalt, iron and nickel, widely used as hydrogenation catalysts, are frequently made by impregnating a supporting material such as activated carbon, alumina, silica, pumice, etc. with an oxide, nitrate, carbonate or an easily reduced organic salt and then reducing at low temperature with hydrogen. Catalysts of this type possess great activity at low temperature and are much used in the hydrogenation of motor fuels to produce aviation gasoline. They have the disadvantage of being quite sensitive to poisoning, especially by sulphur compounds.

Metallic iron made in the same way from magnetic oxide but promoted before the low temperature reduction by adding a small amount of potassium alum is widely used as a catalyst for the synthesis of ammonia from its elements. Modifications of this catalyst are also used in the Fischer-Tropch process for the hydrogenation of water gas to produce synthetic hydrocarbon-alcohol mixtures. This process has been exploited particularly in Germany.

Important Catalysts: The oxides of these same metals are used to advantage in high pressure hydrogenation reactions at moderate temperatures. Although the oxides are supposedly the catalysts, there is the possibility that reduction by the hydrogen takes place with the result that the real catalyst is again the element.

Metallic sulphides such as those of nickel and cobalt are finding use in the high pressure hydrogenation of petroleum fractions as these catalysts are not subject to poisoning by sulphur compounds commonly found in petroleum.

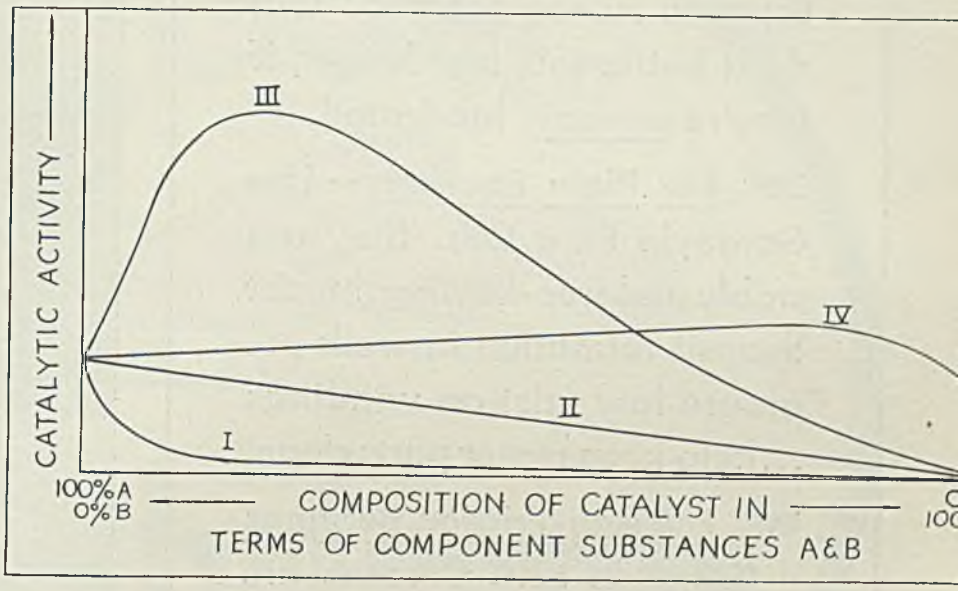
Finely divided metallic copper produced by the low temperature reduction of copper oxide produces a somewhat less active catalyst than nickel. Its principal use is as a catalyst in the synthesis of methyl alcohol from carbon monoxide and hydrogen. In this reaction the copper is promoted with nickel or chromium oxide.

Magnesium oxide finds some use as a promotor and also as a catalyst in the hydrogenation of coal and oil.

Zinc oxide is perhaps the most common catalyst for the hydrogenation of carbon monoxide to produce methanol or methyl alcohol. For this use it is generally promoted with chromium oxide or some other metallic oxide.

Aluminum oxide is used to some extent as a support for nickel and other hydrogenating catalysts. It also finds a limited use in the high pressure hydrogenation of coal and oil. Thorium oxide is a fairly common promotor used to increase the activity of the catalyst in the synthesis of ammonia from its elements.

The principal use for the chromium oxide is as a promotor in the methanol synthesis where it is of considerable value. The oxides of tungsten and molybdenum are used to some extent in the destructive hydrogenation of oils and also in methanol synthesis. Manganese and uranium oxides are used as pro-



This chart shows how degree of catalytic activity varies with nature of component substances

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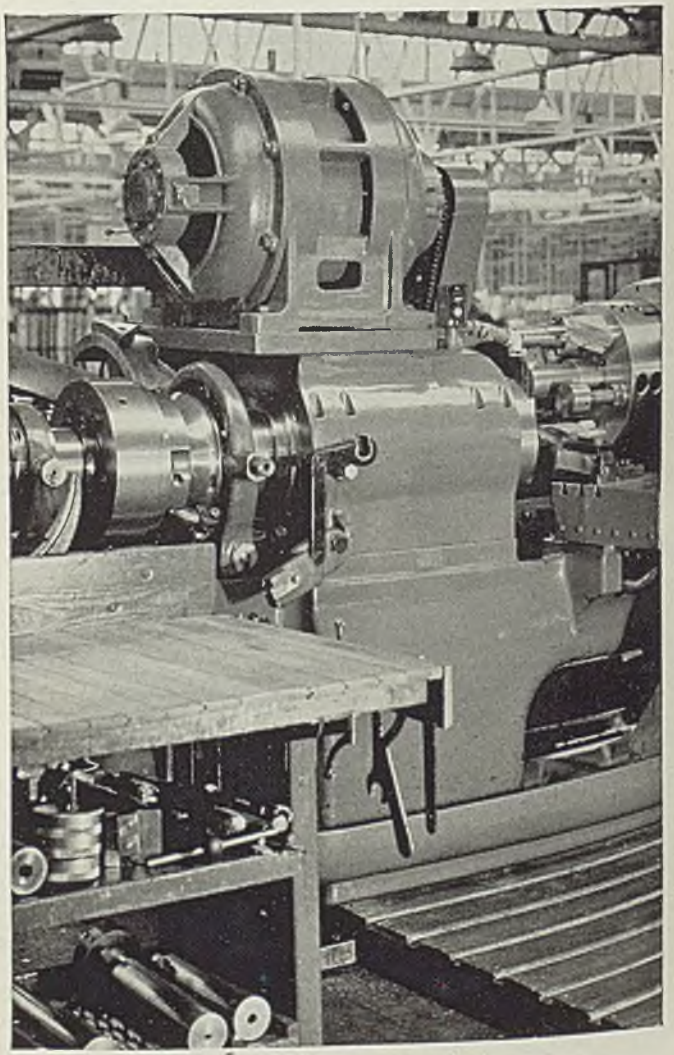
ELECTRIC MOTOR BEARINGS will do a better job, last longer, if they're correctly lubricated.

☛ For Plain Bearings — Use Gargoyle Etna Oils. They are stable and free-flowing...resist deposit formation in wells . . . assure low mist on windings ...help keep motor parts clean.

☛ For Anti-Friction Bearings — Gargoyle BRB Greases are famous for stability, low leakage, resistance to heat. They help guard races and rolling parts from wear, rust, corrosion.



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STEEL

motors of methanol catalysts.

Improves Gasoline: In the polymerization of unsaturated hydrocarbons to make motor fuels, much progress has been made. It has been found that metallic copper made by the low temperature reduction of the oxide is quite effective in polymerizing the acetylene hydrocarbons, while the alkali and alkaline earth metals are more effective for the diolefines. Both alumina and silica have activity in polymerizing olefines at high temperature. By using a mixed catalyst of these two components, it is claimed a satisfactory motor fuel can be made from cracked petroleum gases by polymerization.

One of the oldest catalytic processes used in industry is the contact process for oxidation of sulphur dioxide to the trioxide for the manufacture of sulphuric acid. In this country, the catalyst used is generally platinum. But this catalyst is very easily poisoned by arsenic compounds. Due to this fact and also to the high cost of the catalyst, much work has been done abroad on an iron oxide catalyst promoted with other metallic oxides such as bismuth oxide. Generally speaking, the conversion to sulphur trioxide is not as complete as it is on the platinum catalyst.

Many Important Catalytic Processes: In the dehydration of alcohols to form olefine hydrocarbons, alumina and thoria have been found particularly serviceable. During the World war of 1914-19, it was necessary to make large quantities of ethylene for the manufacture of mustard gas and this was accomplished through the dehydration of ethyl alcohol over these catalysts.

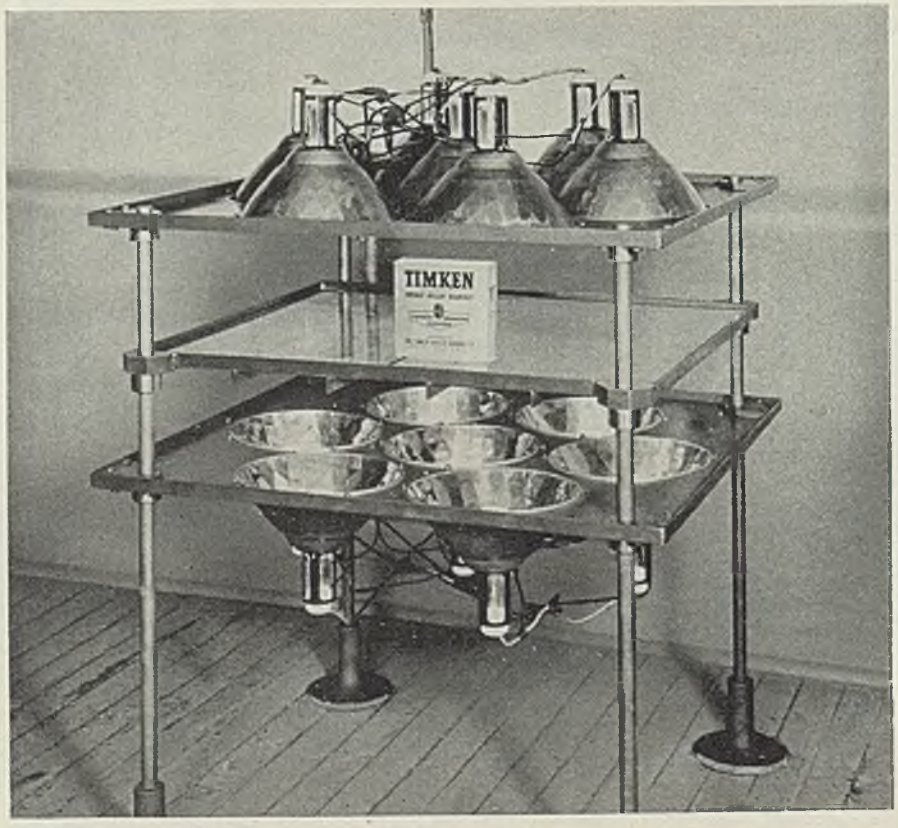
Vanadium pentoxide finds considerable use as a catalyst for the controlled oxidation of many organic compounds in the vapor state. This class of reaction can be illustrated by the production of phthalic anhydride by the controlled oxidation of naphthalene, a by-product from coal tar. The vaporized napthalene with the proper amount of air is passed over a catalyst of vanadium pentoxide at somewhat elevated temperatures and a yield in the neighborhood of 90 per cent of phthalic anhydride is obtained. This compound is important as a dye intermediate. Also by its reaction with glycerine, it furnishes an important class of resins used in the manufacture of paints and varnishes.

How Much Catalyst? It would be extremely difficult if not impossible to give any figures on the amount and values of the substances used as catalysts. This fact is evident because small amounts of catalyst will convert very large amounts of substrate to useful products. Therefore the amount of catalyst used will be relatively small compared with the tonnage made in any catalytic process. Therefore, while it is possible to readily obtain figures on the tonnage of zinc oxide sold, it is practically impossible to estimate what fraction of this total tonnage finds its way into use as a catalyst. It would also be very difficult if not impossible to approach the problem from the other angle, that of deciding the amount of zinc oxide used from the tonnage of synthetic methyl alcohol produced as there is no stoichiometric relation between the amount of product produced and the amount of catalyst required.

Before concluding, a few words should be said about the purity and the physical characteristics of materials destined by use as catalysts. Due to the phenomenon of poisoning, a minute amount of an impurity may render a substance entirely unfit for use as a catalyst. Of course, if a knowledge of the possible poisons for a certain catalyst is available, the presence or absence of these poisons can be established by a chemical analysis. Further, catalysts used in heterogeneous reactions must be in a physical state where large surface development is attained. This is necessary since the seat of the reaction is in the interface at the surface. Therefore any process that aims at the preparation of catalysts should carry out only those processes which tend toward large surface development.

Catalytic processes appear destined to be of ever-increasing importance to our economic life as time goes on and technology is showing its awareness of this fact by the ever-increasing number of researches and patents appearing in this field.

Electricity Gives Bearings Tight Press Fit



■ At Timken Roller Bearing Co., Canton, O., this odd-looking device above is employed for heating bearing cones preparatory to assembling them on shafts where a tight press fit is required. It consists of three trays—the middle tray is of pyrex glass while the top and bottom trays each carry seven 250-watt special infra-red ray bulbs backed by gold-plated reflectors. The bearing cones are stacked in their containers on the middle tray and heated to a maximum temperature of 155 degrees Fahr. for 20 minutes. The infra-red rays penetrate the boxes, heat the steel, but leave the cardboard relatively cold

Engineers' Council Issues Annual Report

■ The Engineers' Council for Professional Development, 29 West Thirty-ninth street, New York announces its eighth annual report covering the year ending October, 1940. It embodies committee reports on engineering schools, profession recognition, professional training and student selection and guidance.

I was worried

when I realized our production was not geared to meet delivery dates. New business had come our way, spurred by national defense. Were *we* going to lag behind?

But determined

I studied every operation . . . consulted time-and-motion experts . . . went through the plant for the hundredth time, and *there* on the assembly line . . . was a major cause of delay.

Slow work?

"Yes," said one foreman, "our screw-driving *is* slow. Can't use power drivers, for fear of driver slippage. Hand driving is hard work . . . screws go in crooked . . . screw heads split."

THE CAUSE . . .

"Old-Fashioned Fastening"

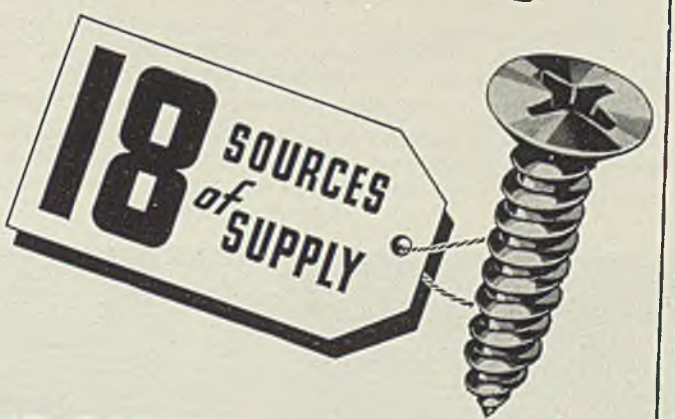
I began to notice. Screws fumbled. Driver wobbling. Help needed to steady the parts. Everywhere — waste resulted because I had insisted, *incorrectly*, that slow-driving screws *cost less!* I decided —

Don't Be Old-Fashioned

Phillips Screws Will End Slow, Wasteful Fastening

It's just good sense, I found out. The driver can't slip from the Phillips recess — so pneumatic or electric drivers can be used. No more screw driver accidents — no more delays — no more unnecessary worker fatigue. No wonder so many industries are standardizing on Phillips Screws.

Don't forget—it isn't the *price* of the screws that counts. It's the cost of *using* them. Thousands agree — *Phillips Screws cost less to use!*



PHILLIPS RECESSED HEAD SCREWS...

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS
SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

Speed Product Deliveries by Cutting Assembly Time

U. S. Patents on Product and Methods Nos. 2,046,345; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Lock Washer Co., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

Finish Is Important

On Defense

Machine Tools!

By JAMES H. CONNIFF
and
JOHN LAWRENCE
Jones & Lamson Machine Co.
Springfield, Vt.

■ IN THE face of the present emergency, it may seem hardly short of frivolous to devote time and thought to better paint room methods in a machine tool plant. In other words, why bother about the appearance of machine tools when the insistent cry is: "Delivery!".

Yet, in times of emergency the army and navy both continue to recognize the value of smart appearance. Hence trim uniforms, frequent inspections, and constant insistence on order, courtesy and snap.

On the basis of similar psychological reasons, workmen produce better work and more of it in neat surroundings. Not only is a well painted machine tool a pleasure to look upon, but also it inspires in its owner and its operator a highly desirable sense of power, a sense of responsibility, and confidence—all of which are priceless at a time like this when thousands of new machine operators are being brought into industry.

What is more, every machine tool which leaves its shop of origin carrying a durable, good-looking paint job, is more than a mere testimonial to the professional pride and skill of its creators. It expresses a keen desire on the part of those who built it, that those who operate it shall in turn be inspired at all times to treat it in such a way that it will give and keep on giving to industry the full benefit of the productive power built into the unit.

To meet the demand for better machine tool paint work, and at the same time to keep pace with constantly increasing production of these machines, Jones and Lamson Machine Co., Springfield, Vt., has enlarged and modernized its paint room facilities—taking advantage of the latest equipment and methods. By replacing paint brushes with spray guns, increased efficiency and quality have been attained in every step of the way from application of the initial primer coat, to the spreading on of the light grease or slush which serves to protect the bright metal parts while machines are in transit.

To start right in at the beginning, consider the vacuum cleaner method now used for cleaning gearbox type castings. The adoption of this method was based on the reasoning, "How better to remove dirt, chips and core sand from the inside of a rough casing and prepare it for painting than by means of a powerful vacuum cleaner unit designed especially for that purpose?"

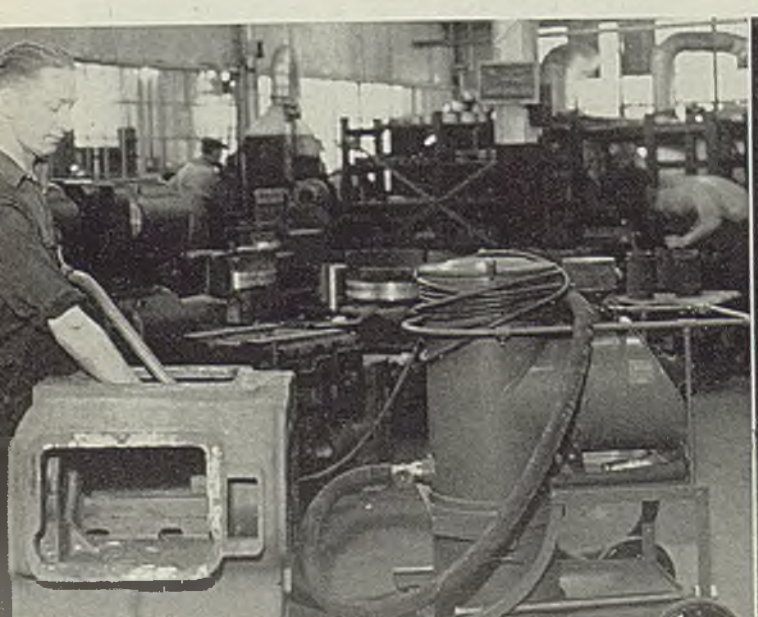
The powerful motor-driven unit adopted and shown in Fig. 1 is readily portable. Its easily manipulated extension hose sucks out sand, dirt, chips and other foreign matter from the most inaccessible nooks and crannies of complicated cored castings such as headstocks and gear boxes. Not only does it get the dirt out, but it keeps this dirt from drifting around the shop as was the case when it was brushed or blown out. With this vacuum system, all the dirt is trapped and held in the separator unit integral with the suction apparatus.

After suction cleaning, the castings are sprayed on the outside with a coating of light gray alkaline-type synthetic primer of high adhesive properties. This keeps the casting from rusting and also serves as an excellent bonding coat for the subsequent heavy bodied filler.

Machine tools embody many castings which require internal finishing with oil resisting sealer. Typical of these are gear boxes wherein the gears run in a bath of oil. To handle such internal spraying with maximum efficiency, Jones & Lamson uses an 18-inch extension nozzle having a 45-degree offset, as shown in Fig. 2. Not only does this enable the operator to reach into

Fig. 1—Vacuum cleaning of interiors of castings such as headstocks and gear boxes, not only does a thorough job of removing sand, dirt and chips prior to application of first primer coat, but also keeps removed dirt from drifting around the shop as it does when castings are brushed or blown out

Fig. 2—Dark ivory oil-resisting sealer, easy on eyes of assembly men, is applied to interior surfaces of gear cases by means of an 18-inch 45-degree offset spray nozzle. This allows operator to reach into difficult corners without getting close to spray himself



Those who would attempt to hasten deliveries by slighting the finish of machine tools for defense production, show ignorance of basic machine shop psychology. A good looking and durable "paint job" is the exterior manifestation of the ingenious engineering and fine craftsmanship embodied in American machine tools. Through it, to a large degree, these machines inspire deserved and lasting respect on the part of their operators and maintenance men. That respect insures maximum output with minimum downtime—over a long life of usefulness

Modern finishing materials applied by modern methods make it both practical and economical to maintain high standards of machine tool finishing without in any way interfering with quick deliveries. This article explains in detail how this is being accomplished by Jones & Lamson Machine Co., an organization whose machine tool building history is long but whose patience with outworn "traditional methods" is short

otherwise difficult corners and pockets, but also it permits him to stand well away from the blast of spray.

The oil resisting sealer used for this purpose is dark ivory pyroxylin which dries within 30 minutes after application. It is interesting to note that prior to the choice of dark ivory color, pure white was tried but was found by assembly men to be altogether too glaring. As a first attempt to remedy that condition, aluminum paints were tried but were found so nearly the same color as the cleaned cast iron surfaces that completeness of coverage was difficult to judge. Adoption of the dark ivory pyroxylin solved both problems.

Application of heavy bodied filler by the spraying process, depicted by Fig. 3, is relatively new in the machine tool field. This is now accomplished successfully by using a spray gun equipped with a direct connected pressure feed cup instead of the suction type apparatus employed with lighter bodied finishing materials. Three coats are applied —a minimum of 10 minutes drying time being allowed between each coat and the subsequent one. The operator soon "gets the hang" of building up low spots and can turn out a remarkably smooth job.

It is important that overnight air-drying follow this triple application of filler. It has been found that drying by intense artificial heat does not work satisfactorily at this particular phase of machine tool finishing. It causes the filler to "case-harden", thus sealing in some of the volatile solvents, resulting in pin holes and eventual chipping.

In this technique of heavy filler spraying, special precautions are taken to safeguard the health of the spray gun operators. Only lead-free fillers are used, and even though this work is carried on in booths ventilated by a powerful suc-

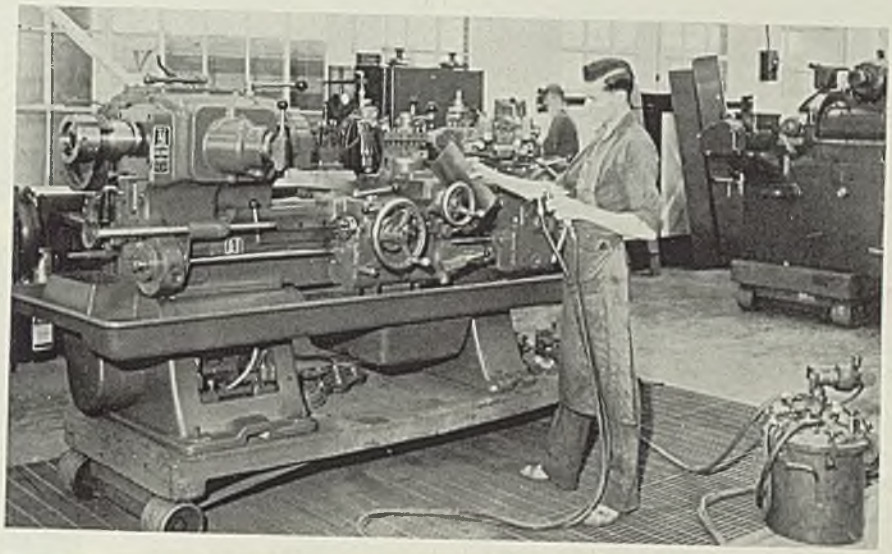
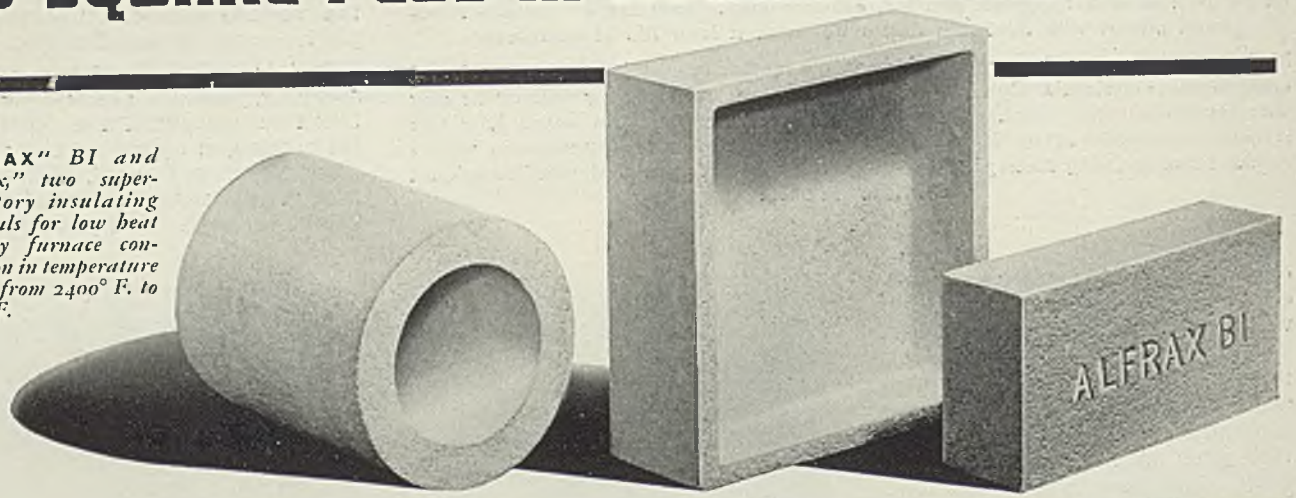


Fig. 7—Close-up of machine over the down-draft spray pit, which permits spray painting and slushing of complete machines "right out in the open". All fumes and drifting spray are sucked down into the pit and the work is done without the slightest inconvenience to others working in the near vicinity. Spray gun application of rust-preventing "slushing compound" to bright parts—as depicted here—is a new and very effective method

Fig. 3—Heavy-bodied filler—formerly "knifed on"—is now applied rapidly and smoothly by means of spray gun fitted with pressure feed cup. Note grease-mounted paper sheets on panels of booth. When dirty, these are easily stripped off and replaced by clean sheets

Fig. 4—Sanding down filler coat on frame casting, using rotary disk sanders made from converted air drills. Hand sanding is resorted to only in inaccessible pockets and corners. This work is done in a suction ventilated booth and lead-free fillers are used, respirators being worn at all times as an extra measure of health protection

NO SQUARE PEGS IN ROUDD HOLES HERE!



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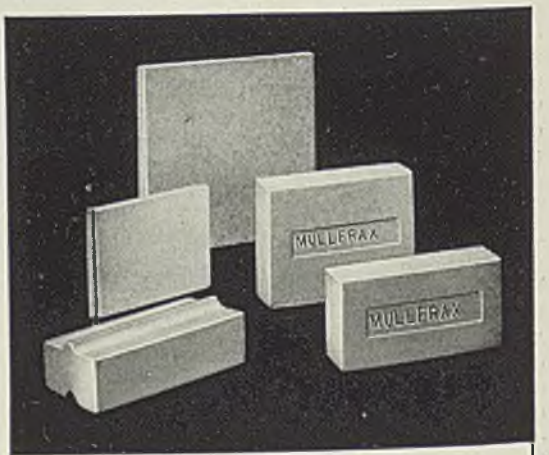

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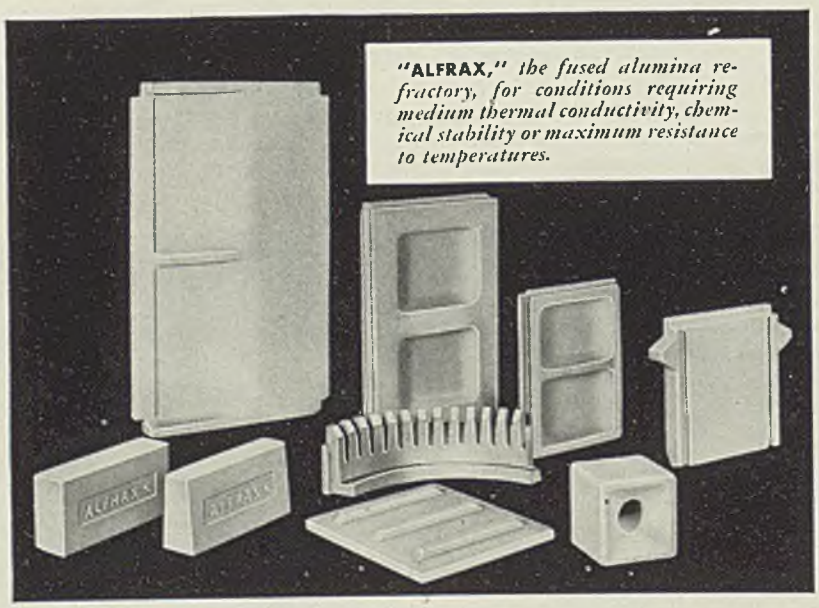

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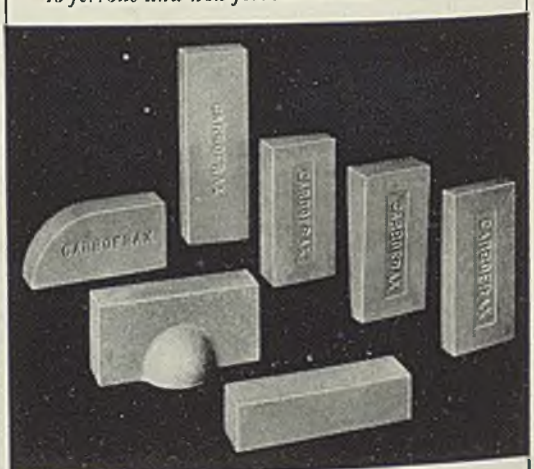

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STEEL

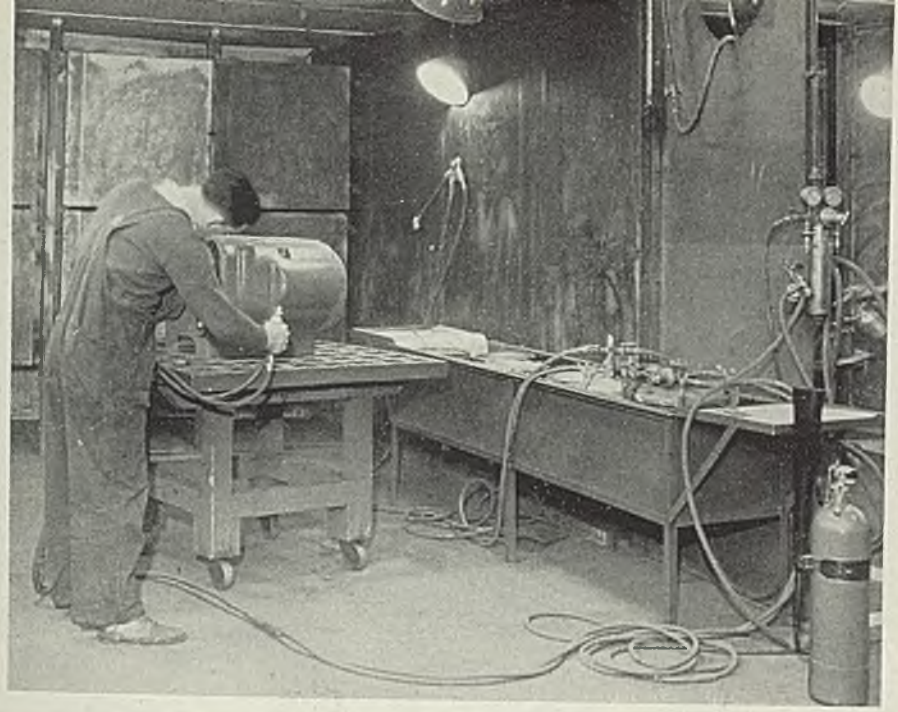

Fig. 5—Prior to machining, castings are sprayed with one coat of nitrocellulose oil-resisting lacquer to protect the filler while they go through the shop. While strong suction exhaust and greased paper covered booth walls cut the fire hazard to a minimum, the high effective carbon dioxide fire extinguisher at right is ready for instant action "just in case"

tion, the operator is required to wear a respirator.

Despite the fact that the filler can be applied to a much greater degree of smoothness by spraying than is possible by the conventional "knifing-on" process, power sanding is used to give an extra degree of surface quality. This work is done in a suction booth which is large enough so two men can work simultaneously on large castings, as indicated by Fig. 4. Highly effective rotary sanders have been made by converting air drills to this purpose.

These tools are equipped with flexible abrasive disks supported on thick felt pads which in turn are mounted on steel disks. Experience has proved that 5-inch disks made of No. 80 open grain sanding cloth, rotated so as to have maximum surface speed of 3000 feet per minute, are most effective in dressing down the filler. While these felt-mounted disks will handle a large proportion of the surfaces, a little hand sanding may be necessary to clean up places inaccessible to the power-driven tools.

After sanding down the filler—and prior to the beginning of machining operations—the castings are given one spray coat of oil-resisting nitrocellulose lacquer. This treatment, illustrated by Fig. 5, serves effectively to seal the filler and provides a relatively hard surface which will protect the filler against hard knocks. In addition, machining is made a much cleaner process than it used to be when the work was done on rough scaly castings, it gives improved visibility to the work during laying out and machining.

This nitrocellulose spraying—as is true of the other spraying and sanding operations already described—is done in large open front booths with powerful suction exhaust to carry away the fumes. An innovation in all these booths at the Jones & Lamson shop is the means used to keep their interior surfaces clean. Heavy brown craft paper is "papered" onto their interior panels by means of a coating of thick grease. As soon as this paper becomes dirty it readily is stripped away from its grease adhesive and fresh paper is mounted. Not only does this system keep the walls of the booths clean and light-reflecting, but also the grease-mounted paper soaks up the stray lacquer which falls upon it and cuts down greatly on the fire hazard. For added fire protection, a carbon dioxide fire extinguisher always is kept within easy reach at the front of the booth—as in Fig. 5—so that fire can be

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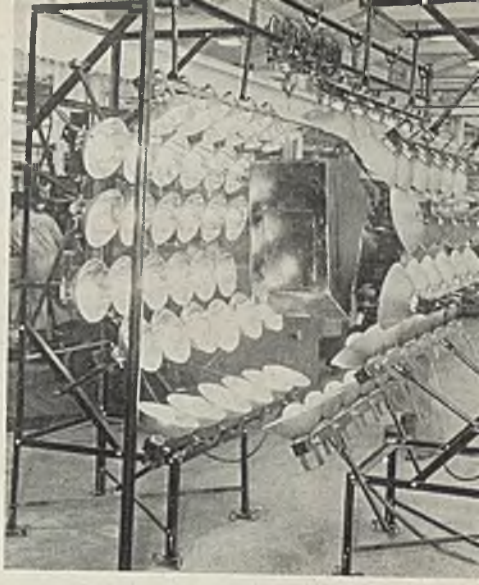
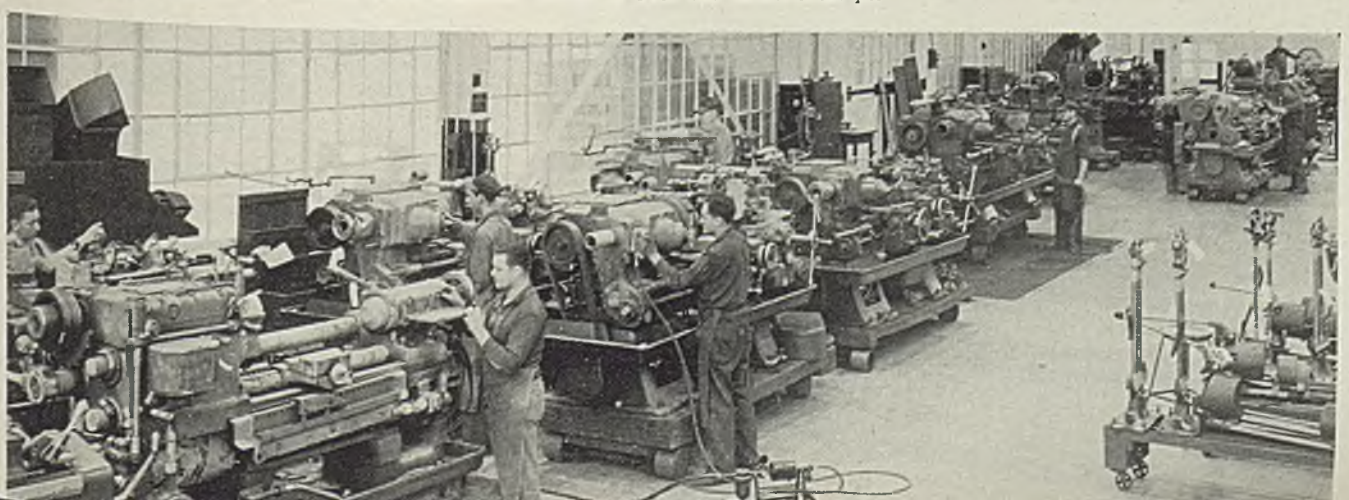


Fig. 8—The "last word" in drying finishes—including those of "wrinkle" type—on guards and other sheet metal parts is by infra-red rays. These portable batteries of infra-red lamps have a monorail unit between them on which the work is oscillated automatically. Energy rays penetrate the finish and strike the metal surfaces where they are converted into heat. This dries the lacquer from the inside out, expelling solvent instead of trapping it

Fig. 6—General view of the final paint line. Workman in foreground is spotting and glazing chipped spots in the filler coating, the man next beyond him is going over the surface lightly with an oscillating sander, while the man standing on the floor grid is spraying lacquer on a machine which is over the down-draft pit



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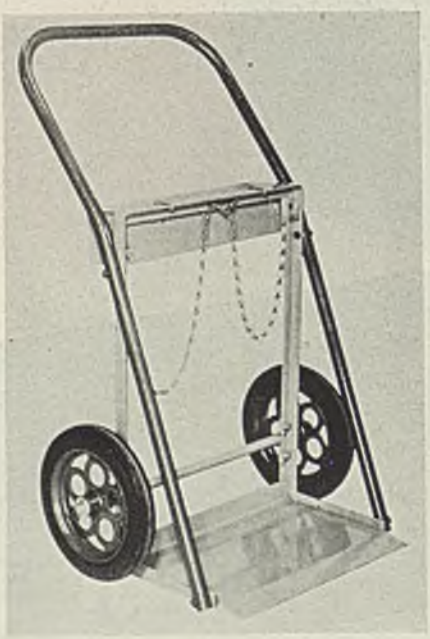
"The Modern Strip Mill," to be published by the Association of Iron and Steel Engineers, is an attractive permanently bound volume, 9 in. x 12 in., and about 400 pages. In it are contained descriptions of the twenty-eight wide strip mills, with plant layouts, as well as detailed discussions of the design and operation of plant equipment, with many tables and a wealth of curves and illustrative material.

Industrial Equipment

Cylinder Truck

■ The Linde Air Products Co., unit of Union Carbide & Carbon Corp., 30 East Forty-second street, New York, reports a new hand truck for carrying an oxygen cylinder, an acetylene cylinder and a complete welding and cutting outfit. Known as the Oxweld T-7, 2-wheel welding truck, it is light in weight, well balanced, and has 14-inch



wheels equipped with semipneumatic rubber tires. The truck is easy to maneuver, especially over rough places. The 4½-inch reduction in its overall width also permits pasage through narrower openings. In addition, the size of the removable metal tool box, for extra blowpipes, tips, goggles and wrenches has been increased.

Twin Filter Respirators

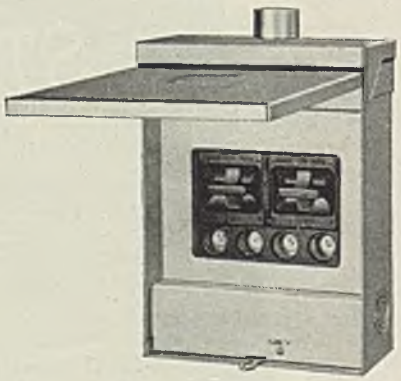
■ H. S. Cover, South Bend, Ind., announces a new line of Dupor twin filter respirators featuring plastic parts. Due to this construction each unit is slightly lighter in weight and now may be completely dismantled for thorough cleaning. The No. 24 respirator has been effected most by the new material. Its twin filter retainer plates are now ivory-toned plastic. They are held in place by dust-tight anchor plates that provide 24 square inches of clear breathing area. The respirator carries a United States Bureau of Mines approval for use in connection with coniosis and silicosis producing dusts. All valves, grom-

mets, screw connections etc., formerly of aluminum also are furnished in molded plastics; this applies to the entire line of respirators.

The method of attaching or adjusting the elastic headband also has been redesigned. New clip-on devices and handy slide fasteners are provided for adjusting band to any head size.

Raintight Equipment

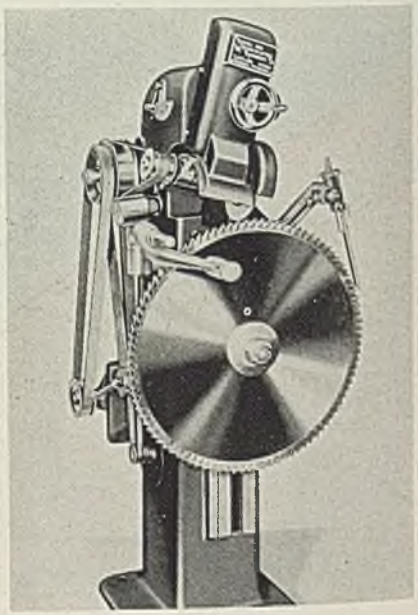
■ Square D Co., 6060 Rivard street, Detroit, announces that its line of raintight service equipment has been extended to meet an increasing demand for such enclosures in line with recent rulings brought about by the National Electric Code. The enclosures feature substantial watertight tops with lap joints which effectively exclude moisture. Wide overlapping flanges on the covers guard against driving rain or jets of water. A "hold up" feature also is included in the units for holding covers in open position. All knockouts are located below lowest live parts. Enclosures are made of code gage galvanized steel with aluminum finish and can be furnished



with or without conduit hubs or nipples. The steel dead-front shields prevent accidental contact with live parts and are sealable. Standard fuse-breaks act as switches and fuse carriers. They are noninterchangeable and may be reversed for the "on" and "off" positions. Test holes also are provided so that fuses may be tested without interrupting the service. All neutrals are grounded and are provided with four 60-ampere and four 30-ampere connectors.

Saw Grinder and Segmental Saw Blades

■ Motch & Merryweather Machinery Co., 715 Penton building, Cleveland, announces two developments —a new automatic saw grinder for sharpening segmental saw blades used in connection with its No. 3 and No. 4 hydraulic cold sawing machines, and a new segmental saw blade. The grinder is rigidly constructed and with its automatic in-



dexing assures rapid accurate sharpening. Its drive is obtained by means of an electric motor through belts. The drive is completely enclosed and protected against the entrance of dust. An oil pump provides lubricant to all internal moving parts. Both the wheel spindle and wheel slide are located in the same plane. Accurate pitch is effected without complicated devices by an indexing disk. Fast speed for fine pitches and small-diameter saws, and slow speed for larger saws are accomplished through sliding gears. Alternate high and low teeth can be ground in one setting by merely positioning a lever on the lefthand side of the machine. All operating controls can be actuated while the grinder is running. The saw blade has a tooth pitch that can be suited to any material. It consists of segments of tool steel fitted to a heat-treated center. They project slightly to protect the body of the blade from rubbing. The teeth are ground to a special form to afford favorable cutting conditions. The segments form a closed

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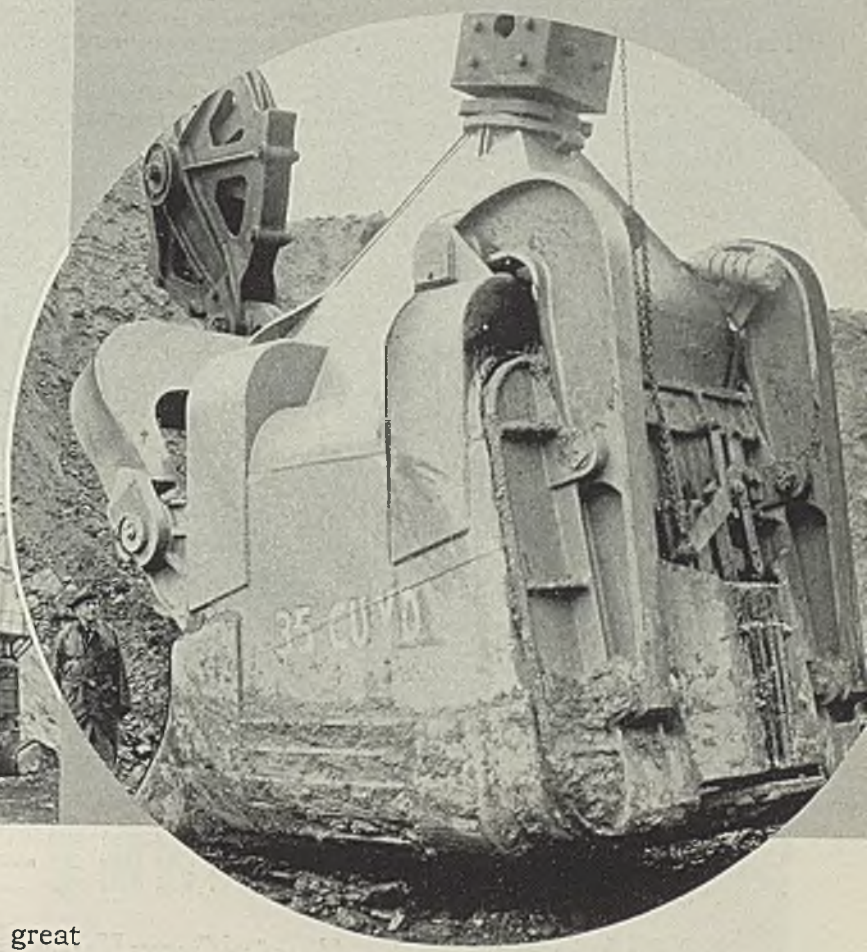
STRENGTH



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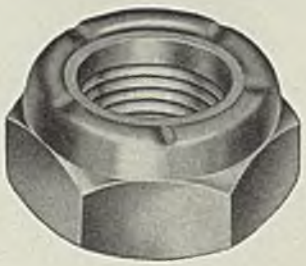
STEEL CASTINGS

ring which stiffens the blade and lends additional strength. After the segmental teeth are completely worn, the main blade can be reset with new segments without any reduction in diameter. The segments are machined to gage and can be readily exchanged.

Thin Hex Nuts

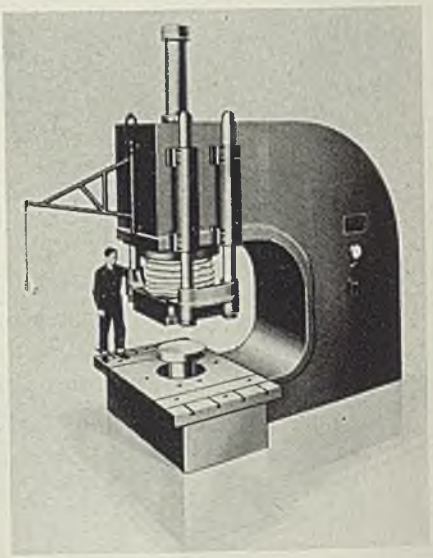
■ Elastic Stop Nut Corp., 2332 Vauxhall road, Union, N. J., has placed on the market an improved line of thin hex nuts for use on shear bolts where a high degree of the stress is lateral, and for general application to light and medium



stress fastenings. All nuts in the line have approximately 40 per cent of the strength of standard-height hex nuts. They have been approved for use on aircraft by all of the military and civil authorities. As in the standard nuts, the self-locking action is accomplished by means of a vulcanized fiber collar which is built into the head of the nut. This material resists the entry of the bolt, thus forcing the nut outward and taking up all thread play. The fiber, being nonmetallic and of a resilient character, does not deteriorate under vibration, and so continues to hold the threads of nut and bolt in a constant pressure-contact. The nuts are available in steel, brass and aluminum, in a complete range of standard sizes, both coarse and fine thread.

Hydraulic Press

■ Denison Engineering Co., 119 West Chestnut street, Columbus, O., has developed a new 400-ton C-frame hydraulic press that combines the main ram, rapid traverse cylinder and a stripper cylinder operating through the bolster. Its design is such that it allows ready modification in a wide variety of pressing applications. The oil reservoir, the hydraulic pump and motor, the motor starter, electrical controls and the control valves are all assembled within the open frame. The frame itself is entirely of welded steel plate, and the press, when installed, extends below the floor level to obtain proper working height for the bolster. The main cylinder has a stroke of 30 inches. It is of single-action, and has a 36 x 36-inch platen provided with T slots for affixing tools. The rapid traverse cylinder is



double-acting, and is flange mounted on the main press cylinder. It has a down-speed of 6 feet per minute and an up-speed of 10 feet per minute. The hydraulic stripper cylinder is double-acting and is flange mounted to the subbolster in the lower part of the press frame. The bolster is machined to accommodate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the stripper cylinder. It is provided with T slots for affixing tools and its horizontal surface measures 60 x 96 inches. A pendant-type control station on a swinging bracket extending from the front of the press embodies a push-button control for the main ram. The stripper cylinder is operated from either of two push button stations, placed on opposite sides of the press frame. Safety arrangements are incorporated throughout.

Conveyor Belt

■ B. F. Goodrich Co., Akron, O., has introduced an entirely new type conveyor belt for specialized coke wharf service. Its design is based on the fundamental fact that in most coke wharf service severe abrasion occurs on only one-half the belt width, which in the conventional type belt is worn out long before the other half. The belt's construction provides a double thickness of cover over the areas of greatest wear on both the top and bottom of the belt, so that when abrasion wears this down the belt can be turned over and used on the other side.

Four full-width and four half-width plies of 32-ounce duck provide a total tensile strength equal to six full-width plies. The cover is of a compound which provides exceptional resistance to aging as well as abrasion. Cover thickness of the area of greatest wear on top and bottom of the belt is ¼-inch and ⅛-inch over the remaining width. In addition to coke wharf duty the belt also is adaptable to any service where off-center loading causes premature belt failure.

Solenoid Starter

■ Allen-Bradley Co., 1311 South First street, Milwaukee, has developed a new size 4, Bulletin 709 solenoid starter. It has a maximum horsepower rating of 50 maximum horsepower, 220 volts and 100 horsepower, 440-550-600 volts. The double break, cadmium silver contacts of the unit are totally encased in an arc hood, each pole of the switch having its individual arc chamber. By employing the solenoid design, the size of the starter has been reduced. At the same time, a generous amount of wiring space is provided. Moreover, the arc-interrupting capacity is high. Currents of at least ten times the maximum horsepower rating are easily interrupted. The switch has only one moving part. Wiring is made easy by plainly marked, accessible terminals and by the wiring space between the starter and cabinet. The white enameled interior eliminates dark shadows and makes terminals and other details stand out distinctly. The starter is mounted on a self-insulated metal base plate, which may be mounted on any metal surface without extra insulation. It can be provided with or without an enclosure. The starter is available for general purpose applications, as well as for corrosive gases, etc.

Boring Bit

■ McKenna Metals Co., 200 Lloyd avenue, Latrobe, Pa., announces a standard type carbide-tipped boring bit for service on steel boring operations. It has a 12-degree posi-

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. . . give higher quality finish
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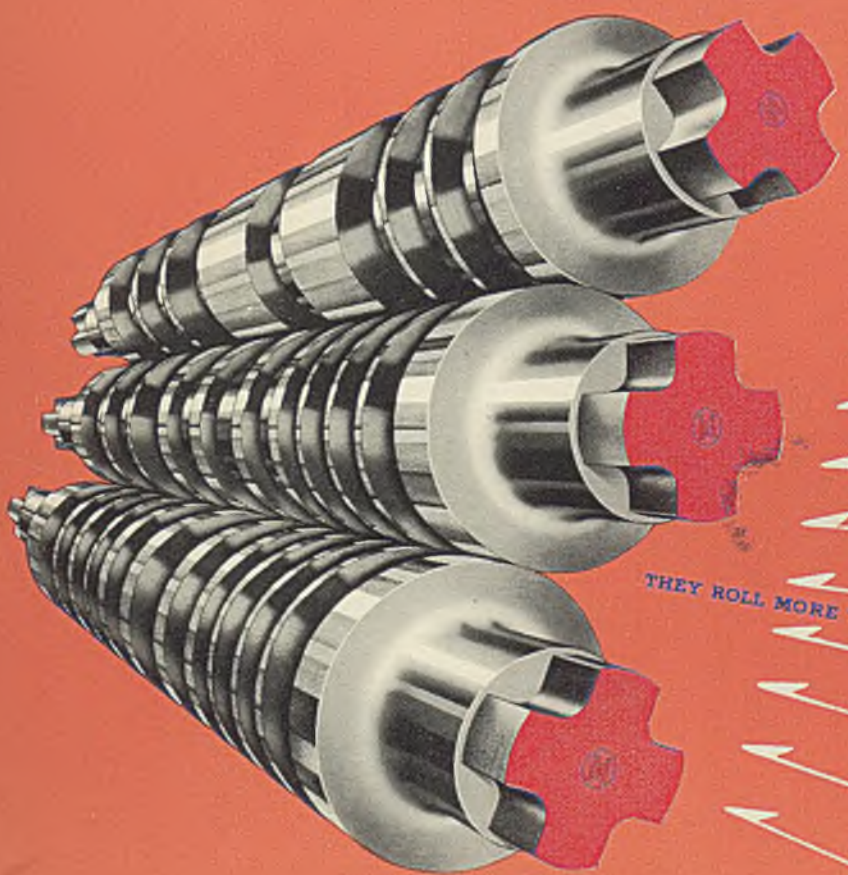

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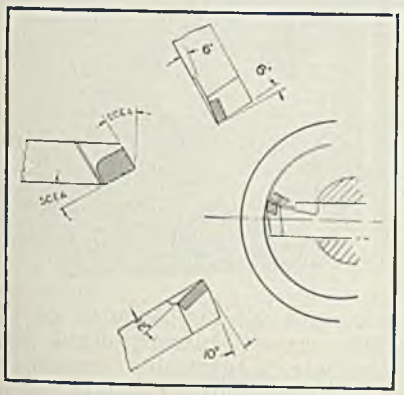
3 "Safety Lock" prevents tripping of shaft and yet permits adjustment of dies, thus protecting operator while flywheel is in motion.

TRADE **FERRACUTE** MARK

tive back rake which combined with a compound front clearance angle, provides firm support to the cutting edge. The front clearance angle degree on the tip of the tool is 0, providing an effective cutting clearance of 4 to 10 degrees for the average bore. The secondary clearance of 10 degrees on the shank permits the tool to fit in holes without rubbing on the heel. On very small holes, the heel of the tool may be chamfered off. While the back rake and clearances are standard for the boring



bit, side cutting edge angles and end cutting edge angles vary for six standard styles in which the tool is supplied. The various combinations of edge cutting angles will be found effective for most boring jobs where bits are held in the boring bars from a 90 to a 45-degree angle—both for boring straight through and for cutting up to a 90-degree shoulder. The right and left-hand tools for the six standard styles of boring bits are listed as styles 23 to 34 inclusive.

Pneumatic Carriers

■ Stephens-Adamson Mfg. Co., Aurora, Ill., has placed on the market a No. 711 pneumatic impact carrier featuring pneumatic rollers for use on belt conveyors, wherever the shocks of impact are excessive. These are designed for use under

loading spouts and in belt feeders where the impact of heavy bulk loads subject both conveyor belt and carrier to abnormal strains and wear. To cushion the impact of materials, the rollers in the carriers are made up of a series of pneumatic rubber units, 6 inches in diameter. In the carriers they are mounted on the steel hub in which bearings and shaft are housed. Roller units have thick, wear-resisting treads and are inflated and permanently sealed to prevent loss of air. The whole assembly is built for easy servicing and quick replacement of damaged units.

Sliding Grille

■ Cornell Iron Works Inc., Thirty-sixth avenue and Thirteenth street, Long Island City, N. Y., has placed on the market an improved sliding grille designed to be applied on the back of delivery trucks for protecting merchandise.

Because of its construction, it will nest at the side of an opening or will travel around a sharp curve. It includes a stretching latch which can take a padlock either on the inside or outside.

Water Cooler

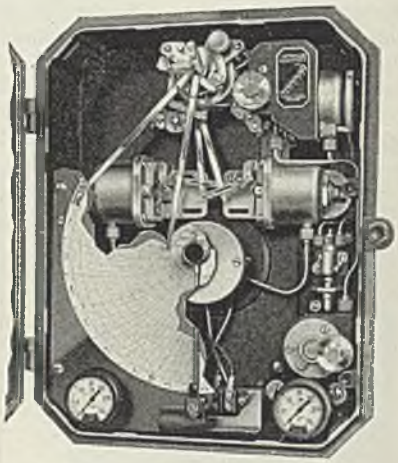
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reports a new explosion-proof water cooler for Class 1, Group D hazardous locations, such as oil refineries and paint factories. Available in three models, it has a stainless top, heavy steel body and hermetically-sealed condensing unit. Capacities of the three models are 8.2, 9.8 and 18.9 gallons per hour of water respec-

tively, cooled from 80 to 50 degrees Fahr.

The unit's cycling control mechanism and overload protective devices are completely enclosed. The motor and compressor are water-cooled by a counter-flow double tube condenser wrapped around the motor shell. Automatic flow control regulates the flow of the condensing water when condensing unit is running and stops the flow when unit is idle.

Ratio Controller

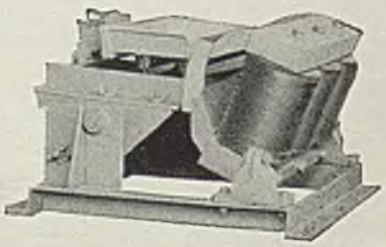
■ Taylor Instrument Cos., Rochester, N. Y., have placed on the market a simple, direct-set ratio controller for applications where a temperature, pressure, rate of flow or liquid level must be controlled in a desired ratio or differential to another related variable. It features two measuring systems—one the adjusting system which indicates or records only—the other, the controlling system, which may either indicate or record. The adjusting system resets the control point of the controlling system through a linkage arrangement according to a predetermined ratio. The action of the controlling system is the same as the 120R series Fulscopes and may be used as a single duty bi-recording controller when the ratio setting is zero. The ratio is changed by a simple screwdriver adjustment directly on a calibrated dial throughout the range of 0:1 to 3:1, direct or inverse. It is unnecessary to disturb the processing or remove the chart plate while making the adjustments. Both indicating and recording models of the controller are avail-



able with all the features of the 120R series Fulscope—fixed high sensitivity, adjustable sensitivity, adjustable sensitivity with automatic reset, adjustable sensitivity with pre-act, and adjustable sensitivity with automatic reset and pre-act.

Magnetic Separator

■ Stearns Magnetic Mfg. Co., Milwaukee, announces a small magnetic separator with a very deep, powerful, magnetic field for extracting reluctant minute iron particles from powdered vitreous enamel and similar materials. Known as the type KB it is equipped with an electric vibrating type feeder for distributing the material in a uniformly even layer to the magnetic field at capacities of from 100 to 250 pounds per hour. The separator is



equipped with an automatic trap gate for discharging the fine iron collected outside the flow, should the electric current be interrupted for any reason. Unified control, push button operated, is provided for the vibrating feed and magnetic field with rheostats for regulating the flow of material and intensity of the magnetic field. In the absence of direct current, the unit can be furnished with motor generator sets or rectifier, whichever is preferred. Its current consumption is approximately 250 watts.

Speeds Handling

(*Continued from Page 76*)

thus no tendency for the recess to become reamed by slippage of the driver.

Second, the universal joint near the bit in the driver produces a self-aligning action which assures alignment of the bit with the screw.

Third, the bits of the driver are renewable at low cost. These bits are milled from solid bar stock to the cruciform cross section and heat treated so their normal life is considerably longer than usually experienced. Also, since there is no back thrust on the screwdriver, there is no slippage, and thus the bit is not exposed to the punishment ordinarily experienced. This feature will be especially appreciated by assemblers using power tools.

Protects Threads

It is especially desirable that sheet metal screws be driven without wobbling the screw since any wobble imparted to the screw in driving partially destroys the thread being cut in the sheet by the screw as it is driven. By using the Challenger system with the swiveled driver bit, the screw can be driven completely home without changing the position of the screw axis. This assures stronger threads and a much stronger final assembly.

Materials handling engineers working on assemblies will appreciate the significance of this development—particularly in connection with power-driven screws. With flat or oval heads, the wings of the recess are usually not extended to the periphery of the screw head. However, with round head screws, the two slots at right angles may be cut clear across the screw head. Yet no matter which design is used, it is possible to place the screw on the end of the bit, insert it into the work and drive it completely without its falling off.

Or the screw may be inserted into the opening with the fingers and the power driver applied with no danger of any reaming action developing to damage the screw head recess because of incomplete connection with the driver and screw. The reason for this is that the absence of any longitudinal taper allows complete entry of the driving bit as soon as the wings come opposite the first set of openings.

To prevent reaming of the recess on entering or leaving, the Challenger bit employs a special contour as shown in Fig. 3. This, it will be noted, has a rounded tip or point, which prevents reaming the recess as the bit enters.

Also it will be noted the contour then changes abruptly to the exact shape of the contour of the recess. Thus once the bit enters, it can drive the screw effectively —an important factor when using power drivers.

In addition to preventing reaming, the rounded point at Fig. 3, acts as a centering element to position the driving bit in the recess. Thus in entering the recess with a power driver, it is entirely permissible for the operator to "feel" along one of the slots until he strikes the center of the recess, allowing the bit to enter. This can be done with the bit rotating without reaming or injuring the recess. The result is a recessed head screw and driver system that is practical for use in power screwdriving operations.

This completely eliminates the possibility of slowing up assembly operations to remove screws with damaged heads or screws that can be only partially driven. Also because of the lack of any longitudinal taper, the screws can be driven much tighter than would ordinarily be practicable without reaming the screw head recess.

Contrary to many other types of specially recessed screws, Challenger screws do not require a special driver to work them (except the

3-slot type previously mentioned). An ordinary screwdriver can be used to remove and replace any Challenger screw in the field when it may be necessary to service equipment in which it is used, as these screws can be driven easily and turned home tightly with an ordinary screwdriver. The tip of the screwdriver is simply ground or filed to somewhat wedge shape to permit complete entry into recess.

An ordinary screwdriver of correct size will always allow partial entry and thus can also be used to service the screw. The flat walls of the recess will engage with the flat sides of the driver bit to form an effective contact that will not tend to slip and ream out the recess. Since Challenger screws need no special driver, they can be used on machines and equipment which might be serviced in the field without the assurance of the special driver bit being at hand. Of course, however, full advantages of the recess are not obtained unless the preferred bit, Fig. 3, is used.

The Challenger screw is covered by patent No. 2,216,382, while the Challenger screwdriver is covered by patent No. 2,218,631.

An unusual feature of this system is that it permits the driving of screws with the axis of the screw as much as 60 degrees from the axis of the driver. Since the bit cannot slip from the screw recess, the shank of a special driver (not shown) is made up of a number of segments locked together in such a manner as to provide a universal joint action throughout their length. This allows the bit to be inclined 60 degrees to the handle of the driver, and yet the shank will transmit the torque to the bit with an extremely small amount of play.

Thus, for the first time, it becomes practicable to drive screws at any angle up to 60 degrees in places inaccessible to ordinary drivers. This allows the use of machine screws on assemblies in places heretofore impracticable because of no means being provided to work the driver to run down the screw.

Develops New Blue Glass For Aluminum Welders

■ A special blue welding glass, called Alubro-Weld, for use by aluminum and bronze welders to filter out injurious rays of light is announced by Willson Optical Research Laboratories, Reading, Pa. Also recommended for glass work, instrument making, and other operations where a sodium yellow glare is encountered, it is said to transmit less than 1 per cent of the infra-red rays.

Although the glass has a much higher visible light transmission than the average of ordinary blue glass colors, it blocks out the harmful ultra-violet rays entirely. Because of its higher visible light transmission, welders can see their work better through it and the flow of metal onto the weld can be controlled more accurately.

New Paint Deadens Sound Vibrations

■ A sound deadener paint for sheet metals is now being offered by Thompson & Co., P. O. Box 6757, Pittsburgh. Known as Tanco, it is for use on air-ducts and all sheet work and equipment. It also can be applied on steel plate construction.

To deaden sound, the paint is applied to one side of the noise-producing metal. It comes in the form of a semipaste, but is of such consistency that it can be brushed on without thinning.

According to the company, the paint will not deaden the first sound when the metal is struck by a hard object, but it will dampen the vibration and eliminate practically all resonance. It is available in a gray color; however, other colors may be had on special order.

Finish Is Important

(*Continued from Page 87*)

smothered before it gets a foothold.

The nitrocellulose spray coat just mentioned is the last painting operation performed before the machine passes through the assembly and testing lines. Following its assembly and testing, it enters the final paint line. Here the initial operation is removal of all the dirt, oil and grease picked up during machining, assembly and testing. This cleaning is done by thorough wiping with cloths moistened with a solvent containing neither gasoline nor benzol. It has been found that both of those volatile liquids leave a slight oily film which is extremely difficult to remove and which if not removed will cause the final coats of finish to flake off.

All Bright Parts Protected

The next step is to mask all bright parts of the machine with Scotch tape to protect them during final spraying. While this Scotch masking tape is more expensive to use than was the soft grease coating previously employed, its extra cost is more than counterbalanced by the time saved in cleaning the machine after its final spray painting.

Principal final surface finishing operations subsequent to the cleaning and masking just described are as follows: (1) The machine is spotted and glazed; (2) its surfaces again are sanded down; (3) it is given another thorough cleaning; (4) it is given its final coats of sprayed-on finish (5) it is cleaned again; and (6) its bright surfaces are "slushed" to prevent rusting during shipment.

As indicated in Fig. 6, all these operations are done "right out in the open" in the shop while machines are mounted on the heavy-duty 4-wheeled dollies.

To repair any spots in the finish which have been caused by accidental chipping in the course of manufacturing and handling operations, nonshrinking free-sanding quick-drying pyroxylin putty is used. This is applied by hand by means of rubber squeegees which have the faculty of conforming readily to irregular surfaces. For the final sanding, which results in a smooth, uniform base surface for the finishing coat, an air-operated oscillating sander with a 5 x 3-inch felt base for its sandpaper working surface, is employed. It was found that hand sanding of flat surfaces not only is unduly slow, but also is inclined to produce a wavy effect which detracts from the finished appearance of the machine.

As has just been stated, all these final finishing operations are carried on "in the open", and that includes the spraying on of the final finishing coats—which formerly called for booth enclosures of the machine. Necessity for booth enclosure at that point used to interrupt the straightline flow of the work, it resulted in poor illumination of the work at a point where clear visibility is important, it took up a lot of valuable shop space, and interfered seriously with overhead handling facilities.

All these inconveniences have been neatly eliminated by the introduction of the successful open type down-draft spray pit, Figs. 6 and 7. Unquestionably this is one of the most important contributions toward speeding up machine tool production made in the last decade. The pit over which final spray finishing is done at the Jones & Lamson plant is of cement construction and is 8 feet wide, 15 feet long and 9 feet deep. Within the pit, which is covered by a heavy steel grid set flush with the floor, is a series of spray nozzles which create a curtain of water through which the draft of air drawn down through the floor grid must pass. Operating with down draft velocity of 220 feet per minute, about 22,000 cubic feet of

air per minute are drawn down through the grid.

The machines are simply rolled onto the center of grid on their dollies, and are sprayed just as though they were in a booth. Although spray operators wear masks as an extra measure of protection, there are no signs of lacquer on the floor around the pit nor is there any odor of it in the vicinity. While the solvent fumes are expelled out-of-doors through exhaust stacks, the "body" material of the stray lacquer is trapped by the water curtain, and collects on the surface of a pool in the bottom of the pit. This accumulation periodically is rolled up like a rug and is returned to the paint manufacturer to be remade into lacquer.

While "on the grid", the machines are first given one spray coat of heavy pigmented sealer. This is touched up by hand to cover any spots missed by the overall spraying and then is subjected to a light sanding operation. Two spray coats of lacquer of association standard gray color follow. Within half an hour after application of the second coat, the machine can be cleaned and masking tape removed.

Finally comes the task of slushing of the bright surfaces with the temporary rust preventative which will protect them during shipment. Until recently the slushing compound was brushed on. In comparison with the spray used on the other operations it was very inefficient—representing a real "bottleneck" in the finishing line. Moreover, it often failed properly to penetrate places such as tapped holes in cam drums, where rust prevention is highly important.

Spraying Eliminates "Bottleneck"

To eliminate this bottleneck, Jones & Lamson now makes use of a special type of slushing compound which can be applied by means of a spray gun as shown by Fig. 7. This work is done while the machine is over the downdraft spray pit. To protect other parts of the machine from stray drifts of slush spray, the operator merely holds a small protective shield behind the part or area on which the slush is being sprayed. Careful tests have proved that this sprayed on slush actually gives a more uniform coating.

Earlier in this article mention was made of the fact that intense artificial heat does not work well as far as drying of heavy bodied fillers on machine tool castings is concerned. That statement, however, does not hold true in connection with the drying of finish on sheet metal guards, etc. At least, it does not hold true with infra-red ray heating which here speeds production and improves quality on this particular class of work.

Two portable, adjustable batteries of infra-red reflecting units are employed in conjunction with a portable monorail unit on which the parts are hung and by which they automatically are oscillated in the "radiant tunnel" which is formed when the two concavely arranged batteries of infra-red lamps are set facing each other with the monorail unit between them. See Fig. 8.

The infra-red rays themselves are penetrating energy rays rather than heat rays. So they pass through the finish and strike the surface of the metal where they are converted into heat. This system is particularly effective in producing wrinkle finish.

Of the various other pieces of apparatus which contribute to the success and economy of Jones & Lamson's modernized machine tool finishing department, the vibrating paint mixer deserves brief mention. This power-driven unit—much faster, cleaner and more effective than old fashioned paddle stirring methods—makes it possible to buy finishing materials in large lots at minimum prices and to mix generous batches perfectly and very

quickly, as needed by the men.

Thus sequence of finishing as practiced with a typical part—a gear case—is as follows:

1. Clean thoroughly by means of vacuum apparatus. (Working in the open)
2. Spray one coat of bonding primer on outside. (Working in suction booth)
3. Spray one coat of dark ivory gear case lacquer on inside. (Working in suction booth)
4. Spray three coats of filler on outside. (Working in suction booth)
5. Dress down filler with revolving sander. (Working in suction booth)
6. Spray on one coat of lacquer for protection during machining. (Working in suction booth)
7. After machining give case second thorough vacuum cleaning. (Working in the open)
8. Spray second coat of dark ivory gear case lacquer on inside of case —prior to its assembly. (Working in suction booth)
9. Clean and wipe assembled machine, using special solvent to remove all traces of oil and grease. (Working in the open)
10. Mask with Scotch tape to keep lacquer off all surfaces which are to remain unpainted. (Working in the open)
11. Go over entire machine thoroughly, spotting and glazing all chipped spots. (Working in the open)
12. Go over entire machine with oscillating sander. (Working in the open)
13. Clean and wipe entire machine once more. (Working in the open)
14. Spray on one coat of quick drying, heavy pigmented sealer (Working over down-draft pit)
15. Sand very lightly, and clean. (This can be done in the open)
16. Spray on two coats of "Machine Tool Gray" lacquer. (Working over down-draft pit)
17. Give machine final cleaning and remove masking tape. (Working in the open)
18. Spray special slushing compound on all bright surfaces as corrosion protection during shipment. (Working over down-draft pit)

Several months of multiple shift operation under this new technique of machine tool finishing have proved conclusively that it has resulted in more and better paint work, at less cost. Improvements in working conditions brought about through its adoption are obvious. It is not surprising that the reduction in fatigue is a subject of much favorable comment among the workmen.

In the firm conviction that modernization of machine tool finishing is an important contribution to the cause of national defense in any machine tool building plant, the Jones & Lamson Machine Co. volunteers its hearty co-operation toward helping others establish similar systems. A number of companies already have sent representatives to Springfield, Vt. to study the system and equipment in action. So remember, the latch string is always out up there in the interests of National Defense!

Hydrogen in Steel

(*Continued from Page* 70)

hydrogen. In clear weather no particular care to that end may be necessary; in clear cold weather even less so. The procedure advocated may be advisable only in warm wet weather. In the winter the air may not often contain enough moisture to be troublesome.

The accompanying table shows a tentative program to be followed in making rimming steel having 0.10 per cent carbon and 0.35 per cent manganese. It gives proper content of carbon in bath metal when tapped in varying atmospheric conditions.

An hygrometer may be desirable at the start but a melter will probably soon become weatherwise enough to know his course without

one. The rule is, the more hydrogen the more boil.

The table assumes that 0.02 per cent carbon will be gained from the ferromanganese added. When the metal at the end has less than 0.08 per cent carbon, additional carbon must of course be added to give 0.10 per cent to the finished steel.

If this proposed procedure proves sufficient to prevent trouble from hydrogen, it may not be necessary to limit the amount of water vapor which enters the melting chamber. But if it is, the principal steps to that end will be (1), blowing the producers with air instead of steam and (2), drying the air entering the furnace for combustion. Both of these involve difficulties.

A split ingot of ingot iron is shown in Fig. 1. It contained about 0.02 per cent each of carbon and manganese. It illustrates the efficiency of long continued boil to dispel hydrogen as well as carbon and manganese.

Fig. 2 shows a split ingot of rimming steel of ordinary quality containing 0.09 per cent carbon and 0.36 per cent manganese.

A split ingot of excellent quality rimmed steel containing 0.12 per cent carbon and 0.37 per cent manganese is illustrated in Fig. 3 of this article.

Flakes and woody structure in high-duty steels become serious defects only after a great increase in the content of manganese in the crude iron in the open-hearth charge became customary, early in this century. That procedure was apparently based on the reasoning that, as a certain amount of manganese in the iron was beneficial, more would be so in proportion. Control of oxygen in the bath metal was the aim.

The greater addition of manganese and its presence in the bath metal, weakened the boil unduly, and increased the power of the metal to dissolve and to hold gases. Acid steel is more likely to be so affected than basic, and acid steel was the first to be troubled by flakes. So, to avoid or lessen flake trouble it will be well to increase volume to boil.

A certain vigor of boil may be assumed to be right for expelling hydrogen from the bath metal. It may be from "brisk" to "strong" when the metal contains more than 0.20 per cent carbon, no unoxidized silicon, and only a moderate concentration of manganese, say not more than 0.10 per cent. With a weaker boil too much hydrogen may be retained.

Sometimes in bottom-casting rimming steel, enough gas is liberated in the central runner to blow back. To prevent this, aluminum rod is sometimes fed into the stream. This seldom happened before the adoption of the practice of putting high manganese in the crude iron. Inasmuch as the blow-back may be traced to high manganese it follows that the manganese should not be too high, and the boil in consequence insufficient.

This matter of hydrogen in steel bears on, or is a part of that other question, "Is it better for the quality of the product (1) to decarbonize the metal fully and then to add recarbonizers to give the desired content, or (2) to catch the carbon coming down, so that, at the end, only the manganese alloy is needed"?

Bessemer steel is of course all made by the first method. It may be rid of gases other than CO more thoroughly than open-hearth steels. Merchantable open-hearth steel has been made both ways.

Claim is made that steel produced by the first mentioned method resists shock better than that made by the second. It has boiled more and is, therefore, presumably freer of harmful gases, including hydrogen. Many heats must be made each way, and, their mechanical and physical properties compared. Until that is done one may not advocate either method to the exclusion of the other, but from present indications that involving the more boil is to be preferred.

<< HELPFUL LITERATURE >>

1. Furnace Refractories

Basic Refractories, Inc.—8-page illustrated bulletin describes line of refractory materials for use in open hearth furnaces. These include dead-burned dolomite, quick-setting magnesia refractory, domestic dead-burned magnesia, air-setting refractory for rammed hearths and cold furnace repairs, and sized basic refractory for use with cement gun.

2. Copper Alloys

Revere Copper & Brass, Inc.—24-page illustrated bulletin lists chemical and physical properties of copper and copper alloys for use in process industries. Photographs show various types of tanks, kettles, agitators, cookers and other equipment made of copper bearing alloys. Data is presented on forming and fabrication.

3. Needle Bearings

Torrington Co. — 28-page illustrated catalog No. 24 presents information on general design, manufacture and advantages of needle bearings which operate efficiently under either rotating or oscillating shaft movements. Tables list specifications and tolerances for all types and sizes.

4. Hydraulic Tables

Lyon Iron Works—Two-fold broadside is devoted to hydraulic elevating tables for stacking or tiering of material, for elevating or lowering materials to proper working levels, and for handling dies, sheets and rolls. Number of standard and specially designed tables are illustrated and briefly described.

5. Mill Guides

Youngstown Alloy Castings Corp.—Illustrated bulletin No. 1491 explains how savings are effected through use of "Trantinyl" alloy guides on blooming, skelp and other rolling mills. Correct processing and heat treatment of guides contributes to their long life, and resistance to wear and abuse encountered in steel mill service.

6. Induction Motors

General Electric Co.—12-page illustrated bulletin GEA-3580 presents data on design, construction, and application of "Tri-Clad" induction motors. Unassembled views give details of construction, and application photographs show some of typical industrial uses.

7. Hobbing Steel

Jessop Steel Co.—6-page folder No. 341 outlines properties, composition and characteristics of "Press E-Z" hobbing steel. Metal is dead soft low carbon steel used for making molds for plastics and die castings by hob sinking method.

8. Formed Steel Shapes

Commercial Shearing & Stamping Co.—10-page bulletin No. 2 comprises drawings and dimensional data on steel shapes now available as standard line. These include tank heads and accessories, steel tunnel lining, furnace heads and stampings, and miscellaneous stampings of all shapes and weights.

9. Power Squaring Shears

Niagara Machine & Tool Works—24-page illustrated bulletin No. 72-B describes features, construction and operation of power squaring shears for accurate flat shearing of plate and sheet metal products. They are available in range of capacities and sizes for shearing up to ¾-inch mild steel 18 feet in length.

10. Lamp Ballasts

Acme Electric & Manufacturing Co.—Bulletin covers line of 62 types and sizes of fluorescent lamp ballasts. Wiring diagrams, dimensional drawings and tables of capacities are included.

11. Sludge Inhibitor

Magnus Chemical Co.—4-page bulletin describes "Clerex" which when added to heavy fuel oils, in proportions of one pint to 1000 gallons, retards formation of sludge. This eliminates clogged burners, screens, valves and piping; smoke, carbon and soot; and gives more regular and complete combustion.

12. Centrifugal Pumps

Allis-Chalmers Manufacturing Co.—40-page illustrated bulletin B-6146 describes features of single-stage double suction centrifugal pumps. In addition to pump dimensions, normal and special application data, bulletin presents friction tables, head-capacity tables, and other pump engineering information.

13. Roller Bearings

Shafer Bearing Corp.—Two-fold broadside is descriptive of heavy duty self-aligning roller bearing designed for aircraft use. Tables give tolerances and specifications for all sizes, and line drawings show typical aircraft applications for flap and for aileron control.

14. Well Water Systems

Layne & Bowler, Inc.—32-page bulletin No. WS is devoted to discussion of reclamation of ground water. Operations of locating underground water, drilling wells, building and installing pumping and clarification equipment is described in detail. Many photographs picture typical installations for cities, factories, railroads, and for irrigation purposes.

15. Gear Finishers

Michigan Tool Co.—Illustrated folder deals with Series 900 rack type crossed-axis gear finishers. Gears are generated from basic rack insuring correct reproduction of ideal tooth form and correct sizing. Complete specifications are given in tabular form.

16. Grinding & Lapping

Clover Manufacturing Co.—28-page illustrated catalog and price list describes types of coated abrasives, and grinding and lapping compounds. Information is given on coated abrasive backings, applications, flexibility, characteristics of commonly used abrasives, and how to make proper selection of grinding and lapping compounds.

17. Flexible Couplings

Falk Corp.—18-page bulletin No. 8100 illustrates and describes outstanding features of five types of "Airflex" couplings. Design and application data, as well as typical stiffness factors and torque deflection curves are given. Guidance is given for selection of proper unit for any specific application.

18. Cold Sawing Machines

Motch & Merryweather Machinery Co.—8-page illustrated bulletin describes No. 3 and 4 hydraulic feed high speed saws. Cut-away and unassembled views point out features of design and construction. Automatic saw grinder and segmental saw blades are also described.

19. Chipping Chisels

Steel Conversion & Supply Co.—4-page bulletin tells of care used in manufacture of company's chipping chisels. They are forged from alloy steel, hardened and heat treated, and ground to U. S. Navy standards. Series of sketches show standard sizes and shapes available.

20. Grinding Wheels

Norton Co.—Twofold broadside lists six outstanding features of "Resinoid" grinding wheels. Tables list recommended types for grinding ferrous and non-ferrous castings, steel bars and billets, welds and dies. Prices and dimensions are given for most of commonly used sizes and shapes.

21. Explosionproof Motors

Century Electric Co.—Three data sheets explain purpose behind use of Underwriters' label on company's motors and tell how to select proper motor for specific class and group of explosion hazards. Requirements of Underwriters' approval for explosion-proof motors are outlined.

STEEL

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HELPFUL LITERATURE

(Continued)

22. Flame Hardener

Fellows Gear Shaper Co.—12-page illustrated bulletin describes flame hardener for heat-treating of gear blanks and other circular parts. Work is mounted on spindle and rotated while oxyacetylene torches bring temperature up to desired degree. Operation of machine is entirely automatic.

23. Knife and Face Grinder

Samuel C. Rogers & Co. — Two-fold broadside describes cabinet base knife and face grinder for precision wet or dry grinding of paper, chipper, veneer, shearblade or any straight knife on edge or face. Unassembled views present construction details.

24. Bench Center

Barber-Colman Co.—4-page illustrated bulletin enumerates features of improved bench center which provides accurate fast method for inspecting cylindrical and circular pieces. Specifications, dimensions and suggested uses are given.

25. Convection Furnaces

Hevi Duty Electric Co.—8-page illustrated bulletin deals with types of electric convection furnaces for operation between 400 and 1850 degrees Fahr. Units are available in 13 sizes with complete automatic controls and atmosphere protection if desired.

26. Spray Finishing

DeVilbiss Co.—28-page illustrated bulletin No. IE is descriptive of line of standard spray finishing equipment for industrial use. This equipment includes exhaust fans, air compressors and accessories, gauges, spray guns, spray booths, paint tanks, respirators, water wash compounds and blowers. Prices are given for all products.

27. Hydraulic Presses

A. B. Farquhar Co.—16-page illustrated bulletin No. 41-H-02 describes and pictures variety of hydraulic presses for use in powder manufacturing; for assembly, bushing and forcing operations; and for metal forming processes.

28. Precision Tool Grinder

Hannifin Manufacturing Co.—8-page illustrated bulletin No. 54 gives features and construction of No. 5 precision tool grinder which is specially designed for handling modern cutting tools. Close-up photographs show accessories that can be obtained to increase machine's flexibility.

29. Welding Positioners

Ransome Concrete Machinery Co.—4-page illustrated bulletin No. 176 describes improvements in 3 and 8-ton capacity welding positioners. It is devoted in part to comparison between ordinary welds and positioned welds, illustrating both and giving time required for each type.

30. Power Cylinders

Hanna Engineering Works—28-page illustrated catalog No. 230 is devoted to line of air and hydraulic cylinders for all types of power applications. Engineering data, specifications, construction details and other information are given for cylinders, control valves and air-operated hoists.

31. Unit Heaters

J. O. Ross Engineering Corp.—8-page illustrated bulletin No. 21 presents data for heating and ventilating engineers on unit heaters. Dimensions, heat ratings, recommended piping connections, steam British thermal unit constants, and types of suspension are covered.

32. Chain Link Fence

Page Steel & Wire division, American Chain & Cable Co.—48-page illustrated catalog No. 641 covers fence styles for industries, airports, public utilities, municipal properties, and panel partitions for interior industrial use. Catalog is sectionalized and each section is devoted to particular type of fence. Pictures, description, line drawings and specifications round out the information.

33. Insulating Material

Johns-Manville—10-page bulletin No. 585 presents technical information on "Marinite" structural and insulating material which is available in board or panel form for oven and drier construction. Line drawings and tables give properties, application data, and guidance for construction work.

34. Fence Fabrics

Pittsburgh Steel Co.—Three-fold bulletin enumerates features of welded wire fence fabric, and lists number of uses. Complete specifications are given for all meshes together with sketches of each size.

35. Combustion Controls

Hays Corp.—44-page illustrated bulletin No. 39-304 is descriptive of centralized combustion control system. This includes master control for regulating desired steam pressure under ideal combustion conditions, air flow control, fuel feed control, and furnace draft control.

36. Insulating Firebrick

North American Refractories Co.—12-page illustrated bulletin No. 103 tells how "Narco" insulating firebrick reduces heat losses. This information is amplified with charts and tables. Properties of various types of brick are enumerated, and typical applications are given.

37. Electrical Products

Ideal Commutator Dresser Co.—24-page general catalog pictures and describes variety of electrical products. These include flashlight storage batteries, electric etchers, soldering irons, undercutters, carbon brush concavers, wire brazers, wire strippers, cable and wire connectors, live lathe centers, switchbox supports and arc welders.

38. Propeller Fans

Ilg Electric Ventilating Co. — two-fold bulletin No. 141 gives specifications for complete line of ventilating products, including diagrams and installation views of propeller fans, automatic shutters, fan guards, power roof ventilators, dark room ventilators, and volume blowers.

39. Gas Cutting

Air Reduction—26-page illustrated bulletin No. ADC-625 discusses use of gas cutting machines in marine construction work. Action photographs display machines and their functions in detail.

40. Hydraulic Presses

Baldwin Southwark division, Baldwin Locomotive Works—28-page bulletin presents in pictures variety of sizes and types of self-contained hydraulic presses. Each press is briefly described and its use is specified.

41. Materials Handling

Barrett-Cravens Co.—100-page pocket-size catalog No. 414 is devoted to line of materials handling equipment. Complete specifications are given for lift trucks, scale trucks, skids, portable and permanent elevators, storage racks, platform trucks, hand trucks and special handling equipment.

42. Industrial Chronology

Worthington Pump & Machinery Corp. —78-page illustrated booklet traces development of company from its inception in 1840 to 1940. Highlights in company's history are chronologically present in 11 chapters, each chapter dealing with progress made during one of country's great eras. Equipment photographs show many of historical "firsts" developed by company.

43. Welding Process

Metal & Thermit Corp.—30-page illustrated booklet No. 18d covers history of "Thermit" welding, welding procedure, physical properties of welds, application of welding for repair of heavy parts in steel mills and marine work, rail welding, and foundry applications of product.

STEEL

Readers' Service Dept.
1213 West Third St.,
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Please have literature circled below sent to me.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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STEEL
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CLEVELAND, OHIO

Civilian Steel Needs Are More Troublesome

Not supplied by old sources, they try to establish new ones. Full priority on zinc caused by 275,000-ton deficit.

MARKET IN TABLOID ★

Demand

Sales first half June 20 per cent ahead of month before.

Prices

Another price-freezing exception on steel plates. Southern ferromanganese up.

Production

Unchanged at 99.

■ CONSUMERS of steel for civilian purposes, alarmed by the increase in defense needs, additional priorities and rumored rationing for civilians, are exerting more pressure on steelmakers to book additional orders. Disappointed by usual source of supply, many consumers have turned to other producers, promising, with much emphasis, that they will remain customers when steel is plentiful again. New companies, many of them with elaborate plants, now find it virtually impossible to buy steel because of their newness and lack of standing as a regular customer.

Apparently this is the beginning of a new phase of the situation in which the distress of civilian metal-using manufacturers will become more vocal. More such companies are trying to take on defense work, as witnessed by the several army and navy ordnance offices and Federal Reserve banks which act to put prime contractors in touch with various subcontractors. Some civilian manufacturers may have to curtail operations sharply or even shut down for a while, though employes should be able to find work in defense plants.

Sharper distinctions will have to be drawn between defense and non-defense projects. Thus the government itself is inquiring for large quantities of galvanized sheets, one of the scarcest items, for fabricating into storage bins for grain. Though food is part of defense, does this particular project bear directly on defense?

Zinc has been placed under full priority, as of July 1, previously having been in partial control, with certain percentages of production placed in a pool for defense work, the latest assigned figure having been 22 per cent. As things were going a shortage of as much as 275,000 tons of zinc had loomed for 1941. Production of galvanized sheets has fallen another point to 57 per cent of capacity, lowest since July, 1940.

Some steelmakers report a new surge of buying, largely for defense, a leading independent finding orders the first half of June 20 per cent ahead of the corresponding period of May. The building of a new mill for the manufacture of plates, as announced by the Republic Steel Corp., has long been regarded as inevitable. To the main outlet for ship hulls have been added freight cars, pipe lines and gun mountings, much of this new demand being due to the turning over to the British of several of our merchant ships.

Shortage of steel scrap becomes keener, the frozen prices preventing exodus from hidden places which would take place if prices were more attractive. Experts state that there are large untapped sources in the Middle and Far West, largely agricultural scrap, which cannot be shipped profitably at present because of high freight charges.

One large steelmaker is producing scrap for electric furnaces by unorthodox methods. It collects what No. 1 and No. 2 heavy melting steel it can, adds crop-ends—then, with the necessary pig iron, melts down and refines in open-hearth furnaces.

More progress is yet to be made in reducing the number of official standard steels to make for simplicity and efficiency. It is noted that the British did not make genuine progress in their simplification until the evacuation from France. German standard steels were simplified some years ago.

The action of the Canadian government in ordering cancellation of all contracts in pig iron for civilian uses makes American pig iron producers more cautious in making large sales to civilians. Producers probably will not sell for the full third quarter, but rather monthly.

Thirteen companies making sheets and strip have been asked to curtail production for non-defense consumers. The makers have been asked by OPM to file compliance reports by June 18.

Scheduled production of automobiles for the week ended June 14 has reached a new 1941 high of 134,682, a gain of 1037 for the week, comparing with 93,635 for the corresponding week of last year.

The national steel ingot production rate last week was unchanged at 99 per cent of capacity. At Chicago the pace rose ½ point to 102 per cent, at Youngstown 1 point to 98 and in New England 4 points to 94. Declines were: Cleveland 1 point to 92, Cincinnati and Buffalo, each 2½ points to 89 and 90½. The following were unchanged: Pittsburgh at 100½, eastern Pennsylvania at 97, Wheeling at 88, Birmingham at 95, St. Louis at 98 and Detroit at 92.

STEEL'S three composite price groups for last week were unchanged: iron and steel at $38.15, finished steel at $56.60 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	June 14	June 7	May 31	One Month Ago May, 1941	Three Months Ago March, 1941	One Year Ago June, 1940	Five Years Ago June, 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.27	$37.69	$32.79
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	52.20
Steelworks Scrap..	19.16	19.16	19.16	19.16	20.04	19.03	12.55

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

	June 14, 1941	May 1941	March 1941	June 1940
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	2.25
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	2.225	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

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 ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	June 14, 1941	May 1941	March 1941	June 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.09	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.18	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	115.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.75	$19.90
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	18.65	18.10
Heavy melting steel, Chicago	18.75	18.75	19.43	18.00
Rails for rolling, Chicago	22.25	22.25	20.75	22.22
No. 1 Cast, Chicago	20.00	20.00	21.35	16.60

Coke

Connellsville, furnace, ovens	$6.25	$5.70	$5.50	$4.75
Connellsville, foundry, ovens	7.25	6.30	6.00	5.75
Chicago, by-product fdry., del.	12.25	12.25	11.75	11.25

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. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

20% Ni.-Cr. Clad

Plates	18.00*
Sheets	19.00

**Annealed and pickled*

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c
Boston, delivered	2.42c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c-2.35c
Sparrows Point, Md.	2.10c-2.35c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

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	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

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., Youngs., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

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)	59
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	1.70	3300	3.80
2500	2.55	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.20
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N.. Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40
Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

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	65½ off
Do., ⅝ and ⅞ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	56 off
Plow bolts	65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller 64 off

Square Head Set Screws

Upset, 1-in., smaller 71 off
Headless set screws 60 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.75c
⅞-inch and under	60-5-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l.	$4.50

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

In.	Blk.	Galv.
Steel		
½	63½	51
¾	66½	55
1—3	68½	57½
Iron		
¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel		
2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½
Iron		
2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

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
Iron		
	Blk.	Galv.
¾ butt weld	25	4
1 and 1¼ butt weld	29	10
1½ butt weld	33	12½
2 butt weld	32½	13
1½ lap weld	23½	4
2 lap weld	25½	6
2½ to 3½ lap weld	26½	8½
4 lap weld	28½	12
4½ to 8 lap weld	27½	11
9 to 12 lap weld	23½	6

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

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—Per 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 11/32-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

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$6.00- 6.25
Connellsville, fdry.	7.00- 7.50
Connell. prem. fdry.	7.25- 7.60
New River fdry.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	12.60-13.05
Chicago, outside del.	11.50
Chicago, delivered	12.25
Terre Haute, del.	11.75
Milwaukee, ovens.	12.25
New England, del.	13.75
St. Louis, del.	12.25
Birmingham, ovens.	8.50
Indianapolis, del.	12.00
Cincinnati, del.	11.75
Cleveland, del.	12.30
Buffalo, del.	12.50
Detroit, del.	12.25
Philadelphia, del.	12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
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.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

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.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	24.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	24.50
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; 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	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%,
Carlots, duty paid, sbd. $120.00
Carlots, del. Pitts. 125.33
Carlots, f.o.b. Southern furn. 145.00
For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot. 36.00

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
1½% carbon 128.00
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
less than 200 lb. lots. 12.25c

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

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., lb. 0.80

Ferrotitanium, 40-45%, lb., con. tl., 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%, tl., 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% tl., 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. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. 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., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c
88% chrome, cont. tons. 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00

35-40%, 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	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.90	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	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	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	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	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	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	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	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.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	6.90	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.25	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.15	4.15	6.40	4.30	6.50	5.50	....	6.60	10.55	9.80
San Francisco	3.90	4.40	6.00	3.90	3.90	5.60	3.90	6.40	5.65	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	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	9.55	8.55	8.40	9.05
San Francisco	5.25	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 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 10 bundles and over in Philadelphia; 750-4999 in San Francisco.

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.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£ s d
Merchant bars, 3-inch and over	£66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 21 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1 11 4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.15	1 15 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	$43.00-46.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	.....
So. African, 48%	70.00-72.00
Brazilian, 46%	69.00-71.00
Chilean, 47%	65.00-70.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced by Office of Price Administration and Civilian Supply (Gross Tons)

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.25	$19.50	$19.25	$18.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.25	19.50	19.25	18.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	13.50	14.75	14.50	13.75
Machine shop turnings	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Shovel turnings	16.50	16.50	15.25	14.75	15.25	14.75	16.00	15.75	15.00
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.00	15.25	15.00	14.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50
Stove plate	19.00	.....	16.00	18.00	18.50	18.00	15.75	19.00	13.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.25	23.25	24.50	24.25	23.50
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
Low phos. punch., plate scrap	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
No. 2 cupola	20.00	20.00	19.00	21.50	22.00	21.50	21.00	19.00	20.00
Machinery cast cupola size	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Punchings and plate scrap‡‡	22.00	22.00	20.75	20.25	20.75	20.25	21.50	21.25	20.50
Punchings and plate scrap§§	21.00	21.00	19.75	19.25	19.75	19.25	20.50	20.25	19.50
Heavy axle and forge turnings	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
Medium heavy elec. furnace turnings	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50

	St. Louis	Kansas City	Detroit	Duluth	Birmingham¶	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$16.00	$17.85	$18.00	$17.00	$.....	$.....	$15.50	$14.50
No. 1 hyd. comp. black sheets	17.50	16.00	17.85	18.00	17.00	.....	.....	15.50	14.50
No. 2 heavy melting	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 1 bundles	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 2 bundles	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50
Mixed borings and turnings	12.75	11.25	13.10	13.25	12.25	.....	.....	10.75	9.75
Machine shop turnings	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Shoveling turnings	14.00	12.50	14.35	14.50	13.50	.....	.....	12.00	11.00
No. 1 busheling	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
No. 2 busheling	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Cast iron borings	13.25	11.75	13.50	13.75	12.75	.....	.....	11.25	10.25
Uncut structurals and plate	16.50	15.00	16.25	17.00	16.00	.....	.....	14.50	13.50
No. 1 cupola	20.00	15.00	19.00	21.00	17.75	20.00	21.00	22.00	18.00
Heavy breakable cast	18.50	13.50	17.50	19.50	16.25	.....	.....	20.50	17.00
Stove plate	14.50	12.50	12.75	.....	12.00	.....	.....	14.00	14.00
Low phos. billet and bloom crops	22.50	21.00	22.85	23.00	22.00	.....	.....	20.50	.....
Low phos. bar crops and smaller	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	.....
Low phos. punch. and plate scrap**	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	.....
No. 2 cupola	19.00	14.00	18.00	20.00	16.75	19.00	20.00	21.00	17.00
Machinery cast cupola size††	21.00	16.00	20.00	22.00	18.75	21.00	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	16.50	20.50	22.50	19.25	21.50	22.50	23.50	19.50
Clean auto cast	21.50	16.50	20.50	22.50	19.75	21.50	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	.....
Punchings and plate scrap§§	18.50	17.00	18.85	19.00	18.00	.....	.....	16.50	.....
Heavy axle and forge turnings	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
Medium heavy elec. furnace turnings	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50

*Claymont, Del., Coatesville, Phoenixville, Harrisburg, Pa. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., Seattle; ¶Prices are for scrap delivered to the Birmingham, Ala., consuming point, excepting scrap for Birmingham consumption originating west of the western boundary of Alabama. In the latter case the Birmingham, Ala., consumer may pay $1 more than the prices indicated under "Birmingham"; **⅝-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ⅝-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$.....	$19.75	$19.75	$20.50	$20.25	$19.50
Scrap rails	22.00	22.00	20.75	.....	20.75	20.75	21.50	21.25	20.50
Rerolling quality rails	23.50	23.50	22.25	.....	22.25	22.25	23.00	22.75	22.00
Scrap rails 3 feet and under	24.00	24.00	22.75	.....	22.75	22.75	23.50	23.25	22.50
Scrap rails 2 feet and under	24.25	24.25	23.00	.....	23.00	23.00	23.75	23.50	22.75
Scrap rails 18 inches and under	24.50	24.75	23.50	.....	23.50	23.50	24.25	24.00	23.25

	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$18.50	$17.00	$18.85	$19.00	$18.00	$.....	$.....	$16.50	$15.50
Scrap rails	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	16.50
Rerolling quality rails	21.00	19.50	21.35	21.50	20.50	.....	.....	19.00	18.00
Scrap rails 3 feet and under	21.50	20.00	21.85	22.00	21.00	.....	.....	19.50	18.50
Scrap rails 2 feet and under	21.75	20.25	22.10	22.25	21.25	.....	.....	19.75	18.75
Scrap rails 18 inches and under	22.25	20.50	22.60	22.75	21.75	.....	.....	20.25	19.25

*Philadelphia, Wilmington, Del. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., Seattle.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such consuming points shall be the maximum price at consumer's plant at any point on the railroad's line, except: Where a railroad from which scrap originates operates in two or more consuming points having the different switching charges, the price of such railroad scrap: (1) To a consumer located within a consuming point having the highest switching charge, shall not exceed the maximum on-the-line price established above; (2) To a consumer located within a consuming point not having the highest switching charge, shall not exceed the maximum on-the-line price established above less the difference between the switching charges at that consuming point and at the consuming point having the highest switching charges; (3) To a consumer located on the line of the railroad at a point having no switching charges, shall not exceed the maximum on-the-line price established above less the highest switching charge at any consuming point on the line; and (4) To a consumer located off the line of the railroad, shall not exceed the maximum off-the-line price established below less the highest switching charge at any consuming point on the line.

Sheets, Strip

Sheet & Strip Prices, Page 108, 109

An increasing number of sheet-makers are booking tonnages for shipment in 1942, at mill convenience. Promises of definite shipment dates are made only on the most urgent defense projects. Little tonnage is available for current buying for 1941 delivery, except for defense. Considerable tonnage for non-defense use, promised for delivery this year, will be forced over into next year because of expanding needs of rearmament projects, taking priority. Recent preference given railroad equipment builders will cause considerable readjustment of shipment schedules, delaying deliveries to commercial users.

Galvanized sheet makers expect some relief in the shortage of zinc, under the new priority system. Much of the galvanized sheet bookings are for defense and lack of zinc has been a delaying factor.

The government has issued an inquiry for corrugated galvanized sheets for grain storage bins, to be fabricated as needed when crops are harvested. Most of these sheets are to be delivered at Kansas City, Mo.

Rationing of sheets for third quarter by an Ohio producer, preparatory to forming a production schedule, brought immediate reaction from non-defense users. Automobile builders contended that allocations for their third quarter use were inadequate and appealed for a larger measure. It is estimated that commercial users will receive 30 per cent less sheets than during first half.

Producers of automobile parts and accessories are resisting efforts to curtail specifications against tonnage on order, insisting all volume due will be absorbed by units required by the government when reduced assemblies for civilian sales become effective. Some of this tonnage is not covered by high priority ratings. Due to restrictions in accepting forward orders for nondefense needs and a policy of allocations for regular customers, the spread between incoming volume and shipments is narrowing with some rerollers. Premium prices are offered on cold strip for export, but only a fraction of such tonnage offered is being taken. Consumption by the aircraft industry is mounting, stainless, on which strict priorities apply, being in heaviest demand.

Plates

Plate Prices, Page 108

Plate mill backlogs continue to increase and with railroad equipment builders given a certain degree of priority, requirements of nondefense character are due for further delay. The problem of plate distribution is under consideration by Washington and plate producers, with the possibility of further restrictions soon. Producers have little tonnage to offer for

delivery this year, except for defense.

Fabricators of small tanks and pontoons have substantial orders, pontoons also taking considerable floor plates. Large tank inquiry has slackened following active demand for oil and fuel storage.

In New England strip mill equipment will not be able to change over to production of plates as most mills are suited only for narrow widths. However, such conversion in other districts is expected to throw a heavier burden on narrow strip mills in that area. Most plate inquiry outside defense is being held in abeyance by producers.

Deliveries for most defense requirements are being maintained well, for ship construction especially. Some relief in light plates is expected as soon as sheet mills begin rolling this material. This will ease the situation in several lines.

Bethlehem Steel Co. and OPM representatives have been discussing conversion of the former's sheet and strip mill at Buffalo to production of light plates, as this mill is particularly suited to this use. It is planned to roll ½-inch plates for tanks and ships and lighter plates for railroad equipment.

Plate producers in the Birmingham, Ala., district have heavy backlogs for shipbuilding in Gulf yards and have put production for this purpose at capacity. Backlogs now extend into second quarter, 1942.

PLATE CONTRACTS PLACED

400 tons, two 55,000-barrel oil storage tanks, navy yard, Charleston, S. C., to Industrial Heating & Plumbing Co., St. Joseph, Mo.; bids June 6, public works officer, yard.

100 tons or more buoys, navy, ordnance department, east and west yards, to Columbian Steel Tank Co., Kansas City, Mo., $192,617.10; Richmond Engineering Co. Inc., Richmond, Va., awarded contract at $18,538 under same schedule 6388, bids May 6.

Unstated tonnage, one 113-foot coast guard cutter, Washington, to Avondale Marine Ways Inc., Avondale, La., $167,450, bids May 15.

PLATE CONTRACTS PENDING

600 tons, three 400,000-gallon elevated water tanks and appurtenant facilities, Aviation Mechanics Training school, Biloxi, Miss.; bids to United States engineer, Mobile, Ala., inv. 459, June 17.

500 tons, 3,000,000-gallon steel water reservoir, Scott Field, Ill., bids to United States engineer, St. Louis, inv. 181.

425 tons, estimated, lighted buoy bodies, coast guard, delivered Brooklyn, R. D. Cole Mfg. Co., Newnan, Ga., low on substantial part of inquiry.

Unstated tonnage, 100,000-gallon elevated steel water tank, 128th Observation Squadron airfield, Camp Forrest, Tullahoma, Tenn.; bids in.

Bars

Bar Prices, Page 108

Except for defense materials bar consumers are able to place little new tonnage, mills being pressed to meet specifications against orders now on books. Deliveries of cold-drawn bars are further extended, due to lag in shipment of hot-rolled bars. Deliveries for defense purposes are being maintained well but more tonnage is appearing for indirect defense use and ordinary commercial needs are being pushed further back.

Indications are that the bar market will be on practically complete priority basis before the end of the year. Demand now extends as far as mills are willing to book, usually not beyond the end of the year. Expectation that defense priorities will be heavier in 1942 causes producers to hold back on promises for that delivery.

Marine requirements are heavy and 705 tons of nickel steel is being allocated at Boston for forged chain. In New England consumption of forging steel is at capacity, largely for the aircraft industry, and specifications to mills on this material are heavy.

Pipe

Pipe Prices, Page 109

Deliveries are tightening on black and galvanized steel pipe, construction, largely for defense building and shipyards, taking a substantial part of current deliveries. Miscellaneous industrial requirements are steady, in small lots. Distributor stocks, relied on for quick delivery in most cases, are in better balance than recently, some warehouses having some-

what larger than normal inventory.

On the other hand stocks at pipe mills have been drawn on heavily and are much smaller than normal in many instances, with demand continuing in excess of production. Mills able to book merchant pipe for this year's delivery can offer little better than September or October, in contrast to two to three weeks delivery three months ago.

Manufacturers of metal furniture are experiencing difficulty in obtaining steel tubing, resulting in some curtailment and production delays in the East. Users making their own tubing are in better position than those buying it elsewhere, though the former are drawing on reserves.

Cast iron pipe activity centers about releases against blanket orders by municipalities and airfield requirements. Southern pipemakers are booking a steady volume of small orders and are operating six days a week. A foundry in the Boston district is receiving ample pig iron supplies, in contrast to two other pipemakers in the East.

Line pipe construction placed or under consideration involves a heavy tonnage. Williams Bros. Corp., Tulsa, Okla., has been awarded a 12-inch line 250 miles long from North Troy, Vt., to Montreal, Que., to carry gasoline. It will require about 30,000 tons of pipe, which has not yet been allocated. P. R. Jones Pipeline Co., Dallas, Tex., is associated in this project. Action is pending on a 24-inch line from Shreveport, La., to the New York metropolitan district, which would require about 430,000 tons. Standard Oil Co. of New Jersey and several other companies are interested in this project. The Texas Co. also has a line under consideration from Texas to New York. An inquiry is current for line pipe for a gas line 87 miles long, for the Anchor Hocking Glass Corp., Lancaster, O.

CAST PIPE PLACED

1400 tons, various sizes, Newfoundland, divided; Warren Foundry & Pipe Co., Phillipsburg, N. J., and United States Pipe & Foundry Co., Burlington, N. J., through contractors.

CAST PIPE PENDING

642 tons, United States engineer office, South Pacific division, San Francisco; bids opened.

200 tons, 6 and 12-inch, Class 150; bids to Everett, Wash., June 10.

Wire

Wire Prices, Page 109

Wire mills supplying the automobile industry and partsmakers are meeting resistance in attempts to limit or reduce releases and specifications. Consumers insist they require all tonnage on order until reduction in assemblies becomes effective. Meanwhile demand for spring wire and numerous specialties is unabated, with bottlenecks appearing in processing operations. Finishing schedules could also produce more were rods available. This situation prevails even with mills producing their own rods and is becoming more acute with nonintegrated units. Only in rare spots is capacity open for shipment during the remainder of the year and mills, although discouraging buying into next year, have been under pressure to accept some tonnage for first quarter.

Nails, plain wire and wire rope can be placed for 1941 delivery, in marked contrast to most steel products. Large demand for plain wire has appeared from the ordnance department for fabrication of bomb clips.

Six cable mills share in a $3,168,766 order for insulated heat and flame resistant electric cable for naval vessels under construction at eastern yards. Award is shared by Collyer Insulated Wire Co., Pawtucket, R. I., General Electric Co., General Cable Corp., Phelps-Dodge Copper Products Corp., Okonite Co. and Anaconda Wire & Cable Co. The contract is one of many requiring hundreds of tons of cable of various types for marine needs. Deliveries extend well into next year and tonnage is being placed on a basis of delivery, widely distributed among the limited number of works producing electric cable specialties.

Rails, Cars

Track Material Prices, Page 109

Preference rating on steel for car building, announced by OPACS last week, will aid materially in meeting demands of carriers for more rolling stock. However, builders are asking mills to furnish them material at once to forestall further shutdowns of car shops for lack of steel. Six shops now are idle and it is claimed four others will close if tonnage is not supplied soon. It is estimated that 5000 cars were lost as of June 1, by delay in steel supply and another 5000 will be lost if prompt action is not taken.

Builders estimate more than 1,000,000 tons of rolled steel will be required for 75,000 cars to be built by private builders this year, in addition to requirements for some 10,000 cars to be built in railroad shops. Wheels, axles, forgings and other specialties will require about 500,000 tons of steel. Much of the latter will be for car repairs and for new cars built in railroad shops.

CAR ORDERS PLACED

Chicago, Rock Island & Pacific, 800 fifty-ton box cars, to Pressed Steel Car Co., Pittsburgh.

Delaware & Hudson, 35 seventy-ton gondolas, to American Car & Foundry Co., New York.

Erie, five 90-ton heavy-duty flat cars, to Greenville Steel Car Co., Greenville, Pa.

Gulf, Mobile & Ohio, 850 forty-ton box cars and 150 fifty-ton twin hopper cars, to American Car & Foundry Co., New York.

Lehigh Valley, 500 gondolas to Bethlehem Steel Co., Bethlehem, Pa.; these are in addition to 500 recently noted as placed with other builders.

Northern Pacific, 2200 freight cars, including 1500 box cars and 200 ballast cars, to American Car & Foundry Co., New York, and 500 box cars to Pullman-Standard Car Mfg. Co., Chicago.

South African Railways, 1000 gondolas; reported placed with Canadian Car & Foundry Co.

CAR ORDERS PENDING

Navy, bureau of supplies and accounts, 26 flat cars, 30-ton capacity, 36 feet, 6 inches long exclusive of guards, delivery Yorktown, Va.; bids June 24, Washington, sch. 7378.

Seaboard Air Line, 700 fifty-ton single end door box cars, 300 fifty-ton double end door box cars, 100 seventy-ton hoppers, 100 fifty-ton flats and 50 seventy-ton covered cement hoppers; bids June 20.

War department, chief of engineers, 68 forty-ton ammunition cars, 29 forty-ton fire control cars; bids June 21; also four 10,000-gallon gasoline tank cars; bids June 18.

LOCOMOTIVES PLACED

New York Central, fifteen 4-8-2 type steam locomotives, to American Locomotive Co., New York.

New York Central, seven 660-horsepower diesel-electrics to Electro Motive Corp., La Grange, Ill., and one to Baldwin Locomotive Co., Philadelphia.

LOCOMOTIVES PENDING

Bureau of Supplies and Accounts, Navy, Washington, two diesel-electric locomotives and spares, sch. 7375; bids June 24, delivery Yorktown, Va.

Clinchfield, ten 4-6-6-4 type locomotives, bids asked.

Ordnance department, Jefferson Proving Ground, Madison, Ind., two diesel-electric locomotives, 65-70 ton; bids June 18, cir. 142, commanding officer.

BUSES BOOKED

A.c.f. Motors Co., New York: Thirteen 36-passenger for San Diego Electric Railway Co., San Diego, Calif.; seven 37-passenger for Carolina Coach Co., Raleigh, N. C.; six 33-passenger for Southeastern Greyhound Lines, Lexington, Ky.; three 28 passenger for Valley Transportation Co., Lemoyne, Pa.; three 27-passenger for Cumberland & Westernport Transit Co., Frostburg, Md.; three 31-passenger for Safety Motor Transport Co., Roanoke, Va.; three 33-passenger for Union Bus Co., Jacksonville, Fla.; four 37-passenger for Santa Fe Trail Transportation Co., Chicago; two 28-passenger for Fitchburg & Leominster Street Railway Co., Fitchburg, Mass.; two 34-passenger for Burlington Rapid Transit Co., Burlington, Vt.

J. G. Brill Co., Philadelphia: Seventeen trolley coaches for Des Moines Railway Co., Des Moines, Iowa; seven for Denver Tramway Corp., Denver.

Bissett Builds Addition

Bissett Steel Co., 945 East Sixty-seventh street, Cleveland, warehouse distributor of steel, is building a one-story addition 80 x 90 feet, with monitor and steel sash. Sam W. Emerson Co., Cleveland, has the general contract. The company stocks steel products, including cold-rolled, alloy steel and ground machine shafts.

Structural Shapes

Structural Shape Prices, Page 108

Greater realization of the shortage of steel works against construction undertakings requiring steel. Inquiry and sales generally are much lighter than a few months ago but the buying movement is by no means over. A naval ordnance plant at Indianapolis will require over 4000 tons of shapes.

Deliveries are still being arranged at about five months after receipt of order. Considerable tonnage will be needed for steel plant expansion under the program to increase steelmaking capacity 10,000,000 tons annually. Otis Steel Co., Cleveland, is finding out cost for 1500 tons of structurals for an extension to its open-hearth department.

Prices of fabricated shapes, erected, with one coat of paint, have risen an average of 66 2/3 per cent from a year ago, states a Cleveland architect, who does much work with that form of building material. Prices today range from $130 to $160 per ton as against $80 to $100 per ton a year ago.

SHAPE CONTRACTS PLACED

2000 tons, state bridge, Union railroad, Hall, Pa., to American Bridge Co., Pittsburgh.

1225 tons, court house, Dauphin county, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; W. A. Berbusse Jr. Inc., Portchester, N. Y., contractor.

1225 tons, warehouse and boiler house, veterans' hospital, Hines, Ill., U. S. Veterans' Administration, to Gage Structural Steel Co., Chicago; William R. Goss Co., Chicago, contractor; bids May 6.

1220 tons, power house and loading line, shell loading plant, Burlington, Iowa, for government, 800 tons to Illinois Steel Bridge Co., Jacksonville, Ill., and 400 tons to Vierling Steel Works, Chicago; A. Guthrie & Co., St. Paul, and Al Johnson Construction Co., Minneapolis, joint contractors.

900 tons, airplane repair dock No. 2, Middletown, Pa. air depot, to Bethlehem Steel Co., Bethlehem Pa.

500 tons, camouflage plant, Boeing Aircraft Co., Seattle, to Wisconsin Bridge & Iron Works, Milwaukee; the Austin Co., contractor.

450 tons, buildings, American Brass Co., Kenosha, Wis., to Worden-Allen Co., Milwaukee; Austin Co., Chicago, contractor.

425 tons, state highway bridge, Hardin county, Montana, to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.

400 tons, substations, Bonneville project, Portland, to Bethlehem Steel Co., San Francisco.

329 tons, state highway bridge, Richardson county, Nebraska, to Omaha Steel Works, Omaha.

325 tons, hangar, sliding doors and boiler house, U. S. engineer, Jacksonville, Fla., to Aetna Steel Construction Co., Jacksonville, Fla.; inv. 292.

300 tons, bridge and gate house, navy yard, Portsmouth, N. H., to American Bridge Co., Pittsburgh; Vulcan Construction Co., Boston, contractor.

220 tons, landward lock and dam 2, Hastings, Minn., for government, to E. J. Soshnik, Minneapolis, broker; Winston Bros., Minneapolis, contractor; bids May 13.

205 tons, state bridge, Troy, N. H., to American Bridge Co., Pittsburgh.

185 tons, equipment repair building, airport, Middletown, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

185 tons, turbine generator supports, Connecticut Light & Power Co., Devon, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

173 tons, state bridge, Northbridge, Mass., to Bethlehem Steel Co., Bethlehem, Pa., through Carlo Bianchi & Co., Framingham, Mass., contractor; also 62 tons reinforcing bars, to Northern Steel Co., Boston.

171 tons, state bridge FAGH-842-B, Pacific Junction, Mills county, Iowa, to Illinois Steel Bridge Co., Jacksonville, Ill.; Jenson Construction Co., contractor; bids May 27.

170 tons, state highway bridges, El Paso and Pueblo counties, Colorado, to Minneapolis-Moline Power Implement Co., Minneapolis.

165 tons, airplane ramp, army base, Bermuda, to Ingalls Iron Works Co., Pittsburgh.

133 tons, bridge No. 3, Indianapolis Union Railway Co., Indianapolis, to American Bridge Co., Pittsburgh.

130 tons, addition, Pepsi Cola Bottling Works, Chester avenue, Cleveland, to

SHAPE AWARDS COMPARED

	Tons
Week ended June 14	11,296
Week ended June 7	21,577
Week ended May 31	11,725
This week, 1940	22,430
Weekly average, 1941	31,799
Weekly average, 1940	28,414
Weekly average, May, 1941	29,872
Total to date, 1940	438,460
Total to date, 1941	763,187

Includes awards of 100 tons or more.

Fort Pitt Bridge Works, Pittsburgh.

130 tons, state bridge B5466 over Chicago, St. Paul, Minneapolis & Omaha railway, Worthington, Nobles county, Minnesota, to American Bridge Co., Pittsburgh; E. J. Dunigan Co., contractor.

115 tons, bridge No. 1.60, Cranston, R. I., New York, New Haven & Hartford railroad, to American Bridge Co., Pittsburgh.

100 tons, ordnance shop, warehouse and boiler house, Fort Ethan Allen, Vt., to Haarmann Structural Steel Co., Holyoke, Mass.; Coleman Construction Co., Providence, contractor; bars to Vermont Structural Steel Co., Burlington.

100 tons, shapes and bars, shop building, Deere & Co., Colonie, N. Y., to Gage Structural Steel Co., Chicago, and Buffalo Steel Co., Buffalo; Lange Finn Construction Co. Inc., Albany, N. Y., contractor.

Unstated tonnage, prefabricated buildings, navy, spec. 900-5127, to U. S. Steel Export Co., $119,000; bids May 23.

SHAPE CONTRACTS PENDING

6000 tons, Sperry Gyroscope Co., Long Island City, N. Y.

4000 tons, naval ordnance plant, Indianapolis; Austin Co. builder; bids in.

3000 tons, various highway projects, State of Oklahoma; bids June 17.

1700 tons, hangars, test laboratory and bridge, Wright field, Dayton, O., for war department.

1662 tons, piling, including 1080 tons sheet piling and 582 tons bearing piling, flood wall, Cairo, Ill., U. S. engineers; Lake States Engineering Co., Chicago, low; bids June 5.

1200 tons, section 1, protection project, Massillon, O., for army engineers.

1000 tons, highway bridges, Kansas, including 107 tons to be awarded June 7 and 900 tons on June 11.

985 tons, state highway bridge, New York; bids June 18, Albany, department of public works.

910 tons, highway overpass, St. Johnsbury, Vt.; Charles I. Hosmer Inc., Greenfield, Mass.; bids June 13, Montpelier.

900 tons, east transit shed, Bayonne, N. J., for navy.

900 tons, plaza, contract MHT-55, Lincoln tunnel, New York; P. J. Carlin Construction Co., New York, low.

876 tons, bridge, Los Angeles River and Southern Pacific Co. tracks, Los Angeles county, Calif., for state; bids June 26.

750 tons, factory addition, Electro-Motive division, General Motors Corp., La Grange, Ill.

698 tons, two highway bridges for Arkansas; S. N. Dixon, Warren, Ark., low bidder on 470 tons and F. P. McNulty, Pine Bluff, Ark., low on 228 tons.

650 tons, state bridge, Mt. Vernon, Iowa.

625 tons, I-beam overpass, Lancaster county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 20.

550 tons, state bridges, Arapahoe, Nebr.

500 tons, two bridges, Nickel Plate railroad, Ramsey and Charleston, Ill.

500 tons, 850 transmission towers, Coulee-Covington line, Washington state; bids Bonneville project, Portland, June 6.

428 tons, two Illinois highway bridges, June 13.

425 tons, bridge PSC-4716, Dansville, N. Y.

425 tons, state highway projects, including bridges, Becket, Pittsfield and Northbridge, Mass.; bids July 1, R. W. Coburn, chief engineer, department of public works, Boston.

415 tons, foundry building, American Brake Shoe & Foundry Co., Baltimore.

400 tons, highway bridge, Livingston County, N. Y., bids June 18.

378 tons, trash racks, specification 1510-D, Bureau of Reclamation, delivery to Friant, Calif.; bids opened.

275 tons, viaduct FAGM-183-3-3, Elkhorn, Nebr., for state.

272 tons, Pennsylvania state bridge, Venango county.

270 tons, through truss bridge, Venango county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 20.

265 tons, gymnasium, Windham high school, Willimantic, Conn.

255 tons, viaduct, Draper, S. Dak., for state.

245 tons, state bridge, Webster, W. Va.

220 tons, overpass, Branchville, Md., for state.

215 tons, reconstruction roadway, Liberty bridge, Pittsburgh, for Allegheny county, Pennsylvania.

210 tons, roadway and pedestrian bridge, New York, for city.

205 tons, ore dock spouts, dock No. 4, Allouez, Wis., for Great Northern railway.

190 tons, state bridge 538, Dancy, Wis.

185 tons, warehouses, Camp Powers, Jeffersonville, Ind., for war department.

175 tons, Eureka slough bridge, Eureka, Calif., for state.

170 tons, pontoon assembly parts, Quonset Point, R. I., for navy.

165 tons, power house, Merck & Co., Rahway, N. J.

160 tons, state bridge PSC-8141, Hempstead, N. Y.

155 tons, building, Mine Safety Appliances Co., Pittsburgh.

150 tons, bridges, Montour county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 20.

140 tons, viaduct, Draper, S. Dak., for state.

133 tons, bridge, route 6, section 21A, Danville relocation, New Jersey; Union Building & Construction Corp., Passaic, N. J., low.

130 tons, state bridge, Blanchard river, Kieferville, O.

120 tons, state bridge FSN-502, Hudson, Iowa.

110 tons, repairs to bridge 154.85, Streator, Ill., for New York Central railroad.

110 tons, trestle units and rolling gates, Panama, schedule 4138; Harris Structural Steel Co., New York, low; bids June 2.

100 tons, plant addition, Otis Elevator, Buffalo, N. Y.

100 tons, plant addition, du Pont de Nemours & Co., Tonawanda, N. Y.

100 tons, building addition, Durez Plastics & Chemicals Co., North Tonawanda, N. Y.

100 tons, steel superstructures, two bridges, I.C.R.R. relocation, Kentucky project; bids June 30, Tennessee Valley Authority, Knoxville.

Metallurgical Coke

Coke Prices, Page 109

Coke supply has ceased to be an important factor in steelmaking. Supply of furnace and foundry grades is in better supply than other materials. With threats of a coal strike averted the situation appears clear. Southern users expect to be adversely affected by the new coal wage agreement, which will be reflected in coal and coke prices, perhaps sufficient to affect southern pig iron competition in northern markets.

Reinforcing Bars

Reinforcing Bar Prices, Page 109

Producers and suppliers are drawing a line more closely between defense and civilian projects. Thus at Cleveland are two typical cases. One inquiry for 1000 tons for the TNT plant near Sandusky, O., plainly is in the defense group. But another tentative inquiry for 3500 tons, for a bulkhead at Edgewarter Park yacht basin, Cleveland, may be difficult of placement. An inquiry for an addition to an Ohio department store has also been questioned. In a few instances suppliers have been unable to fill contracts for defense projects and contractors have been obliged to make emergency purchases elsewhere.

CONCRETE BARS COMPARED

	Tons
Week ended June 14	7,679
Week ended June 7	13,653
Week ended May 31	11,343
This week, 1940	4,014
Weekly average, 1941	11,667
Weekly average, 1940	9,661
Weekly average, May, 1941	10,521
Total to date, 1940	195,824
Total to date, 1941	280,004

Includes awards of 100 tons or more.

REINFORCING STEEL AWARDS

1500 tons, naval operating base supply pier No. 5, Norfolk, Va., to Bethlehem Steel Co., Bethlehem, Pa.; McLean Construction Co., contractor.

1400 tons, East Boston housing, Boston, to Northern Steel Co.; John Bowen Co., contractor.

850 tons, Panama, schedule 5129, to Jones & Laughlin Steel Corp., Pittsburgh, $46,667.50.

800 tons, plane engine test building, Studebaker Corp., South Bend, Ind., 500 tons to Inland Steel Co., Chicago, and 300 tons to Carnegie-Illinois Steel Corp., Chicago, purchase made direct by Studebaker Corp.; 400 to 700 tons additional to be purchased through contractor, bids June 10.

488 tons, lock in Mississippi River, Hastings, Minn., to Bethlehem Steel Co., Bethlehem, Pa.; Winston Bros., Minneapolis, contractor; bids May 13.

385 tons, powder bagging units, Goodyear Engineering Corp., Charlestown, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

356 tons, warehouse and boiler house, Veterans' hospital, Hines, Ill., for U. S. Veterans' administration, to Joseph T. Ryerson & Son Inc., Chicago; contractor, bids May 6.

350 tons, additional tonnage, aviation facilities naval air base, Quonset Point, R. I., to Jones & Laughlin Steel Corp., Pittsburgh; George A. Fuller Co. and Merritt-Chapman & Scott, New York, joint contractors.

300 tons, garage and offices, Coca Cola plant, Chicago, to Inland Steel Co., Chicago.

235 tons, highway project, West Springfield, Mass., to Northern Steel Co., Boston; Lane Construction Co., Meriden, Conn., contractor.

200 tons, Riverside high school, Milwaukee, to W. H. Pipkorn Co., Milwaukee; Walter W. Oeflein Inc., Milwaukee, contractor.

150 tons, building, Lukenweld Inc., Coatesville, Pa., to Concrete Steel Co., New York.

150 tons, reception buildings, state hospital, Deer Park, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

110 tons, dike, East Hartford, Conn., to Truscon Steel Co., Boston.

105 tons, sewage requirements, two dry docks, navy yard, Brooklyn, N. Y. to Jones & Laughlin Steel Corp., Pittsburgh.

100 tons, including mesh, Boeing Aircraft plant addition, Seattle, to Bethlehem Steel Co., Seattle; The Austin Co., contractor.

100 tons, addition, filtration plant, Leominster, Mass., to Northern Steel Co., Boston; James A. Monroe & Sons, North Attleboro, Mass., contractor.

100 tons, plant addition, Hamilton Watch Co., Lancaster, Pa., to Bethlehem Steel Co., Bethlehem, Pa., through D. S. Warber, contractor, that city.

REINFORCING STEEL PENDING

5000 tons, housing project, Fort Greene houses, 3501-apartment projects, structures from six to 13 stories, Brooklyn, N. Y.; D. M. W. Contracting Co., New York, low.

3500 tons, tentative, bulkhead, Edgewater Park yacht basin, Cleveland.

2400 tons, S. James Herman Gardens housing, Detroit; Cauldwell-Wingate, contractors.

2250 tons, flood control project, Cincinnati, U. S. engineer.

1600 tons, army air field, Bermuda, B. W. I.; Johnson & Necaro Co., contractor.

1000 tons, estimated for delivery over rest of year, Plum Brook TNT plant, Sandusky, O.

800 tons, bomber plant, Tulsa, Okla.

700 tons, highway projects, Kansas; bids June 11.

512 tons, flood wall, Cairo, Ill., for U. S. engineer; Lake States Engineering Co., Chicago, low; bids June 5.

415 tons, flood wall, Lawrenceburg, Ind., U. S. engineer.

400 tons, Indian hospital building, Tacoma, Wash.; bids June 11.

400 tons, state highway, Berks county, Pennsylvania; bids June 27.

352 tons, bridge, Los Angeles River and Southern Pacific Co. tracks, Los Angeles county, California, for state; bids June 26.

325 tons, highway mesh, New York state projects; bids June 18, Albany.

300 tons, addition of two more floors, department store, Akron, O.

261 tons, grade elimination, contract 700, Wilmington, Del.

250 tons, two highway bridges, Arkansas.

235 tons, bars and mesh, state highway project, including bridge, route 6, section 21A, Denville relocation, New Jersey; Union Building & Construction Corp., Passaic, N. J., low.

200 tons, addition, telephone building, Providence, R. I.

200 tons, U. S. engineer, Inv. 643-41-225, Fort Crook, Nebr.

200 tons, building, University of Nebraska, Lincoln, Nebr.

200 tons, elementary school, Bellingham, Wash., Hoard Engineering Co., Seattle, low.

184 tons, Lancaster county highway project, R-36068, Sect. 1, Pennsylvania.

178 tons, housing project, Quincy, Ill., for government; J. R. Barnes, Logansport, Ind., contractor; bids May 22.

160 tons, contract 6, East river drive, New York.

154 tons, highway overpass, St. Johnsbury, Vt.; Charles I. Hosmer Inc., Greenfield, Mass.; bids June 13, Montpelier.

135 tons, Bird street bridge, Boston; bids June 24, R. W. Coburn, chief engineer, department of Public Works, Boston.

125 tons, state highway overpass, Landover, Md.

123 tons, purchasing agent, Los Angeles county, California; bids opened.

113 tons, Chapline street bridge, Wheeling, W. Va.

105 tons, highway project, Somerset county, R-186, sect. 7, Pennsylvania.

104 tons, Epiphany school, Chicago; bids May 20; cost regarded too high, may change construction.

100 tons, paving, Milwaukee avenue, city of Chicago; Standard Paving Co., Chicago, low; bids May 19.

100 tons, state highway work, Somerset and Westmoreland counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 20.

Ferroalloys

Ferroalloy Prices, Page 110

Tennessee Products Corp., Nashville, Tenn., announces its contract position on 78 to 82 per cent ferromanganese for third quarter at $145 per gross ton for carlots, f. o. b. its southern furnaces, with usual differentials for less than carload shipments.

This position is taken because of

higher production costs, due to sharp advances in ore, in ocean freights, fuel and labor.

By third quarter the company will have three furnaces in blast, capable of producing over 7000 tons monthly.

Pig Iron

Pig Iron Prices, Page 110

Demand for foundry pig iron still exceeds supply and there is little immediate hope for relief. Silicon irons and ferrosilicon are particularly difficult to obtain. Strict priorities are being observed on these and non-defense consumers have little chance of getting much tonnage.

Many sellers believe the situation will be much tighter within the next two months and expect priorities to apply on all shipments. However, it appears that there will be ample iron for all defense priority orders and some will be available for commercial users, though this supply may be limited and probably will be prorated.

In all districts foundry melt is heavy. Form orders for deliveries over the remainder of June are appearing under inventory control regulations. Suppliers for months have been rationing customers and inventories in most cases are already well known.

In New England castings for machine tool builders are being spread among a larger number of foundries than usual, which tends to increase costs, especially for patterns.

Some producers are not booking third quarter tonnage, except for regular customers and allotments to these are being keyed to actual needs. Melters producing non-defense material, unable to obtain iron from regular sources, are shopping about to obtain it elsewhere, usually with little success. Third quarter prices have not been announced and it seems likely price in effect at delivery will continue to rule. In southern Ohio northern foundry iron is being sold on a Hamilton, O., base, plus freight, instead of on a competitive basis with southern grades.

Hanna Furnace Corp. is scheduled to blow in its fourth blast furnace at Buffalo this week, giving that district 100 per cent operation, setting a new record for pig iron production there. Alan Wood Steel Co. has relighted a stack at Swedeland, Pa., after relining.

Scrap

Scrap Prices, Page 112

Steel and iron scrap is being consumed at considerably higher rate than present shipping rate in most centers and mill reserves are shrinking as a result. A factor in limiting supply is higher pay in industry, which has attracted workers from scrap collecting jobs. Melters are taking practically anything offered with resultant decline in average quality of scrap. Yard stocks are the smallest in months and the bottom is being scraped in many instances.

Continuation of present conditions will bring an acute shortage by midsummer, it is believed. While some difficulties under the ceiling price plan have been solved others continue to hamper trading. Inequalities in spread between related grades are causing trouble. In New England the differential of $8 between No. 1 cast at $14 and stove plate at $22 is the widest spread in the country. At Buffalo the difference is $1, at Pittsburgh $2, in eastern Pennsylvania $4.50 and at Sparrows Point $4. Cincinnati dealers have asked OPACS to raise the ceiling on stove plate from $13 to $17.50 to prevent supplies being attracted to Pittsburgh, where $19, delivered, is the ceiling. Steel grades in the same district should be raised $1, scrap interests maintain, for the same reason.

New England conditions are far from settled and dealers are reluctant to release stocks at current levels. A few barges of cast and steelmaking grades are moving southward from Boston, although water rates have been increased.

Cast scrap is scarce in all districts, partially due to shortage of pig iron, which has increased proportion of scrap melted. No. 1 machinery cast is in especially heavy demand by foundries. Some

Behind the Scenes with STEEL

New Freedom

■ To repeat the crack of a local punster the day the army took over the N. A. A. plant, we seem to be paying less attention to the old freedom of the seas, and more to the new freedom of the seize. Or as it is developing now, some strikers are liable to find themselves heading for army camps under forced draft.

Mirage Training

■ And speaking of the draft, we see where they may exempt men over 27 because modern army training is too tough for the older gents. They say it's very trying on the nerves to shoot guns and operate tanks which are still on order.

How To Get Ahead

■ Here are a few simple mathematics on the aluminum strike in Cleveland last week: Day-shift workers, along with others, were out on strike for three days and then gained an increase of 1 cent an hour rasing the minimum hourly rate to 73 cents. At the previous minimum each worker lost $17.28 over the three days, which means he will have to work 1728 hours or 216 days to break even.

Repercussions

■ And that same "little" three-day strike resulted directly in laying off 1000 men at the Allison Division of General Motors because of a shortage of parts since it had been impossible to build up a bank of accessory housings, heads, etc.

The Army

■ It happened during the recent Cook's tour of war correspondents around the country. The newsmen were inspecting a plant which had several large orders for bombs and shells. One writer had for a guide an Army inspector who was diligently explaining all the ins and outs of bomb production. Turning to the other side of the aisle, the visiting scribe pointed to a big stack of bombs which looked to be completed and asked his guide if they were all ready to ship. "Oh," said the Army man, "I don't know anything about those. They're just like these others, but they're for the *Navy*."

The Navy

■ And on the Navy side of the fence, recently a visiting fireman was going through a plant making small boats for the defense program—lighters, mine sweepers, etc. The visitor asked his host if the boats were heavy enough for ocean work and on being assured they were, he remarked, "Well, I don't suppose any enemy would bother wasting a torpedo on anything as light as that." "No," said the fabricator in his most facetious manner, "we figure their chief danger will come from a good fast swimmer with a can opener."

Missing Page Numbers

■ A good reader presented us this week with a very justifiable complaint about missing page numbers. He says there are times when he has to leaf through three or four pages in a row to find the number. He gets thoroughly disgusted and we don't blame him. The problem is this. In trying to design STEEL to conserve space and reading time, the editors skilfully resort to "bleed" illustrations where possible and to complicate it further advertisers do the same. The result is the page number must be dropped where this is done, leaving the poor editors dangling halfway between the fire and the sizzling frying pan.

Newcomer

■ A warm welcome this week to the Sisalkraft Co. for the first of a new series of ads (p. 62) and congratulations on the stopper—*So They Wrapped Up A Bowling Alley*.

Vacating

■ We hope you'll forgive us if we play hooky next week. We're going hunting—for birdies and eagles!

SHRDLU.

material is being bought in truck lots, but this usually is not well prepared and thus inferior to yard material.

Buffalo melters are getting much scrap by the lakes but not sufficient to build up stocks for winter when the lakes are closed, as has been possible in other years.

Bids for supplying 280,000 tons for shipment to Great Britain were rejected last week by the procurement division of the treasury, because of a change in policy with respect to geographical origin of the scrap. Bids were asked for shipment from Savannah, Ga., and north. Later it was deemed desirable to have the scrap move from Gulf ports. No date has been set for receiving new bids on the altered basis.

Most steel grades moving from the New York area are going to eastern Pennsylvania but some is moving to Buffalo by barge. Brokers find difficulty in obtaining material to fill export orders for Britain, the situation also being complicated by lack of shipping.

Pacific Coast

San Francisco—Demand for material for defense work continues heavy, though little business was placed during the past week. Private interests seek large lots of steel but are unable to get delivery on time. The strike situation, both in Los Angeles, as regards airplane production, and in San Francisco and the bay area in the shipbuilding industry is now well in hand and work is expected to be resumed on the same full time basis that existed before the strikes were called.

No new inquiries of size have developed in the plate market and awards were confined to lots of less than 100 tons. Further contracts for vessels for the United States Maritime Commision are expected to be placed soon and Pacific Coast shipbuilding yards are believed to be in line for some of the work. To date this year 422,603 tons have been placed, compared with 29,723 tons for the same period a year ago.

Demand for small lots of cast iron pipe from distributors continues strong but renewal of stock from Alabama producers is difficult, due to lack of shipping space and inability of producers to furnish material when shipping space is available. Awards aggregated 1100 tons and brought the total for the year to 24,161 tons, compared with 14,640 tons for the corresponding period in 1940.

Seattle—National defense materials are getting priority, increasing the problem of contractors on private projects who are unable to obtain delivery guarantees. Steamer space on the intercoastal route has been reduced more than one-third thereby throwing a heavy load upon railroads whose rates are considerably higher than by water, which means that delivered costs on the Pacific coast will be sharply advanced.

Revival of wooden shipbuilding,

which uses a proportion of steel items, is indicated by award of contracts for fourteen 135-foot wooden minesweepers costing $330,000 each, six to Associated Shipbuilders, Seattle, and four each to Seattle Shipbuilding & Drydock Corp. and Ballard Marine Railway, Seattle.

Rolling mills are trying to work out from under a 90-day backlog and are not interested in several important tonnages up for figures. When possible they are taking small jobs of less than 50 tons, Bethlehem Steel, Seattle, having booked 300 tons or more involved in small lots for both public agencies and private contractors. Many large projects, calling particularly for shapes, are developing.

Cast iron pipe dealers, unable to guarantee deliveries, are discouraging projects that can be postponed. Stocks of pipe are greatly reduced and water shipments are practically out of the question.

The scrap market is steady, mill prices for No. 1 and No. 2 melting pegged at $14.50 and $13.50 gross. This price is not attracting much volume from the interior. Cast iron continues scarce with a strong demand, particularly from foundries. The top price of $19.50 gross is generally being paid. Receipts are under consumption.

Canada

Toronto, Ont.—Further restrictions on sale of steel for other than war industry are said to be pending and it is reported that priority schedules will be more rigidly enforced. Announcement was made at the beginning of the week that the steel controller had issued instructions to the effect that all contracts for pig iron had been cancelled and all future business would come under the war priorities schedule, with deliveries to consumers on a hand-to-mouth basis. For the immediate future Canadian steel consumers are faced with a rather severe shortage on a number of materials and despite capacity production by primary producers sufficient steel is not available to meet all requirements for war production.

Orders and inquiries are consistently appearing for plates. While most of this business is for ship construction, large tonnage is pending for rolling stock and other needs. It is stated that plans are underway which may lead to larger imports of plates from the United States.

Under pressure of rapidly expanding demand for merchant bars, mills now are reducing the number of sizes rolled and are giving more attention to lines in specially heavy demand for war production.

Structural steel orders are in large volume with most of the business directly connected with war industry and army construction projects. Awards for the week topped 12,000 tons, with another 10,000 tons pending for early closing.

Steel in Europe

Foreign Steel Prices, Page 111

London—(*By Cable*)—Second quarter steel production in Great Britain is practically all booked and third quarter contracts are being placed. The position in steelmaking pig iron is good, but hematite iron continues scarce. Domestic iron ore industry is expanding. Larger American imports of pig iron are in prospect. The semifinished steel position is good and some reserves have been accumulated. Shipbuilding material demand continues to expand. Tin plate export demand is substantial and some business has been transferred to producers in the United States.

Refractories

Refractories Prices, Page 110

Refractories for steelmaking purposes are in sufficient supply and users have been able to obtain their requirements without undue delay. In a few grades stocks have been fairly depleted and shipments have been less than consumers desire.

Heavy demand is expected to appear at any time for blast furnace linings as a number of stacks have been running close to the point where they must be relined. This situation is not expected to cause trouble as most furnaces carry material for new linings for half their stacks, which can be used at once and replaced later.

Refractory makers believe they will be able to meet demand in case the 10,000,000-ton steel expansion is undertaken, as shipments would be spread over a considerable period as construction progresses.

Equipment

New York—Contracts for hundreds of machine tools being placed by government agencies include 600 tool room lathes, 14 and 16-inch, to Reed-Prentice Corp.,

Worcester, Mass., $2,607,300, by the ordnance department, for delivery at scattered points. Orders being placed by the procurement division, treasury department Washington, are tremendous. R. K. Le Blond Machine Tool Co., Cincinnati, appears low on most of 291 lathes, and orders are being allocated on the following maximum inquiries on which bids have been taken: 155 back-geared 20-inch shapers; 553 milling machines, including hand screw feed and V-belt drive, with extra equipment and accessories; 153 universal cutter and tool grinders, 140 additional lathes and scores of other units. This heavy direct government buying is superimposed on renewed and additional purchases by aircraft engine builders who are being forced to tool up for supplemental engine orders of new design, requiring complete lines of metal working equipment. Included are the Wright, Chevrolet and Lycoming interests while Pratt & Whitney shops at Hartford are still buying against an expansion program. Floating machine shop and mobile units for the army require in the aggregate large equipment programs. The machine tool building industry, first to voluntary imposed priorities, is practically on a 100 per cent basis as to defense needs. In the main steel, under top priority rating, is reaching machine building shops in sufficient volume to maintain production schedules, with new facilities getting into operation. There are scattered delays in receipt of spindle stock and in some cases castings, orders for the latter being widely spread with increased costs involved in new patterns.

Testifies to Oliver's Iron Ore Sales in 1940

■ Claim by the Oliver Mining Co., United States Steel Corp. subsidiary, asking assessment of its 1940 occupational taxes upon its own selling prices for iron ore, rather than upon the Lake Erie base price quotations, as has been customary, last week was disallowed by G. Howard Spaeth, Minnesota tax commissioner.

Action followed two hearings at St. Paul. Principal witness was Guy E. Diehl, Duluth, vice president of the Oliver company. The claim was made by the company that its ore sales in 1940 were 40 cents a ton below the Lake Erie base price of $4.45 a gross ton for Mesabi nonbessemer ore, 51½ per cent iron content, making the company's selling price $4.05 a ton.

At the second hearing, it was disclosed the Oliver company in 1940 had sold 860,000 tons of ore to consumers other than subsidiaries of the United States Steel Corp. It reported 25,536,563 tons produced in 1940 for occupational tax purposes. It was early in 1940 that

the Oliver company entered the open market as a seller of iron ore, but formerly had billed the U. S. Steel subsidiaries that it served with ore at the Lake Erie base quotations. At the hearing, it developed these subsidiaries had complained that competitors had been obtaining ore at lower prices, thus giving them an advantage in steelmaking costs.

It also disclosed that the mining company and its affiliates made a profit of 7.3 cents a ton of ore shipped, after taxes, over a 10-year period, 1931 to 1940 inclusive, and during that period it paid $1.0721 a ton in taxes.

Company's protest involved a claimed excess of $10,396,777.66 in the state's total assessment of the Oliver company's ore for occupational tax purposes; and had the commissioner made the claimed allowance, the company's total tax would have been reduced by $935,709.

Few Advances Made in Mill Supply Prices

Price advances in mill supply items recently have been few, considering persistent demand and scarcity of many items, states George J. Zimmerman, president, Strong, Carlisle & Hammond, mill supply house, Cleveland.

Among the few items which have been marked up recently have been: All precision tools, 10 per cent; the entire line of transmission hangers, couplings, bearing blocks, etc., because of higher prices on castings; industrial castors; cap screws, machine bolts, etc.; also vanadium wrenches.

Higher prices of castings are perhaps the most prominent and these have gone up because of the recent advance of 75 cents per ton in foundry coke, rises in wages, in pig iron a few months ago, scrap and other foundry raw materials, stated Mr. Zimmerman.

Nonferrous Metals

New York—OPM extended the government's control over nonferrous metals last week, placing aluminum scrap and zinc under full priority and making three changes in the copper control order.

Copper—Stocks of refined copper dropped 3221 tons last month to only 95,568 tons, the lowest level to be recorded in a number of years. Consumption reached a record high of 141,801 tons, including metal of both foreign and domestic origin. Production of blister copper rose to 90,292 tons, the largest output since August, 1937. OPM will take 20 per cent of April duty-free refined production, or some 18,000 tons, for June allocation. In addition, Metals Reserve Co. will import some 35,000 tons for distribution.

Lead—Indications now are that the import dfuty on refined lead and ore may be reduced or removed as a means of alleviating the tight supply situation. Lead pigment prices advanced ½-cent a pound, effective as of June 12.

Zinc—General preference order for zinc is not expected to change the present distribution system whereby producers contribute a certain tonnage to an OPM pool which is subsequently distributed by OPM for urgent defense needs. Balance of supplies is distributed

Nonferrous Metal Prices

June	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
7	12.00	12.00	12.25	52.62½	52.50	5.85	5.70	7.25	17.00	14.00	35.00
9	12.00	12.00	12.25	53.25	53.12½	5.85	5.70	7.25	17.00	14.00	35.00
10	12.00	12.00	12.25	52.87½	52.75	5.85	5.70	7.25	17.00	14.00	35.00
11	12.00	12.00	12.25	53.12½	53.00	5.85	5.70	7.25	17.00	14.00	35.00
12	12.00	12.00	12.25	53.00	52.80	5.85	5.70	7.25	17.00	14.00	35.00
13	12.00	12.00	12.25	52.37½	52.12½	5.85	5.70	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	9.25
Cleveland	9.50-10.00
Chicago	9.00-9.25
St. Louis	9.00

Heavy Copper and Wire

New York, No. 1	10.25-10.37½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	10.00-10.25
St. Louis	10.00

Composition Brass Turnings

New York	9.00

Light Copper

New York	8.25-8.37½
Cleveland	8.00-8.50
Chicago	8.00-8.25
St. Louis	8.00

Light Brass

Cleveland	4.50-5.00
Chicago	6.25-6.50
St. Louis	5.00

Lead

New York	4.85-5.00
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00

by producers to both defense anud nondefense users.

Tin — Prices fluctuated from 52.37½c on Friday to a high of 53.25c on Monday. The market rose sharply due to tension in the Dutch East Indies and reacted on liquidation abroad of speculative holdings.

Aluminum—OPM's supplementary order regulating distribution of aluminum scrap and secondary aluminum directed all scrap through defense channels except when specific allotments are made to meet emergencies in civilian industries. The order also erects barriers against bootlegging by providing that a violator shall be prevented from obtaining further supplies of scrap. Transactions between dealers are exempt.

Construction and Enterprise

Ohio

AKRON, O.—Atlantic Foundry Co., 182 Beaver street, with completion of foundry addition now under way will build a second extension. Each covers about 2500 square feet and costs $10,000.

AKRON, O.—Ferriot Bros. Inc., 219 East Miller avenue, has bought site and one-story building 60 x 120 feet on Mogadore road and will add 1800 square feet, for manufacture of machinery and dies. Will occupy plant about August 1.

CLEVELAND—McKinney Tool & Mfg. Co., 1688 Arabella road, will build a one-story addition 85 x 179 feet to give additional space for tooling operations. E. W. McKinney is president.

CLEVELAND — Towmotor Co., 1226 East 152nd street, Lester M. Sears, president, will build an addition, one and two stories, 41 x 57 feet, for added capacity for manufacturing industrial trucks and tractors.

CLEVELAND—Meters & Pumps Inc., 9615 Meech avenue, will build new plant 50 x 175 feet with wing 60 x 85 feet, to cost about $35,000, at Broadway and East 104th street. Some further machine tool equipment will be bought. Charles J. Bellar is president. C. E. Lewis & Son, 1200 Green road, will handle construction.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 118 and Reinforcing Bars Pending on page 120 in this issue.

CLEVELAND — Haserodt Machine & Tool Co., recently incorporated by Raymond H. Haserodt, former official of Geometric Stamping Co., has bought equipment of Marty Machine Co., 1824 Columbus road and leased its quarters. Some additional equipment will be purchased.

CLEVELAND—Lakewood Machine & Tool Co., 1306 Hird avenue, Lakewood, has started general machine shop business. John Keppler is president.

CLEVELAND—Acme Plating Co., 1331 East Fifty-first street, will move August 15 to 1563 East Twenty first street where double present space will be available. Additional automatic machinery will be installed. E. F. Durken is president.

DAYTON, O.—Acme Pattern & Tool Co., 232 North Findlay street, will build a one-story 132 x 306-foot foundry, general contract to B. G. Davis Co., 1518 East First street, to cost about $130,000.

MANSFIELD, O.—Westinghouse Electric & Mfg. Co., East Fourth street, is preparing for additional expansion, including $240,000 addition to new vitreous enameling building and additional enameling furnace. George Parkman, East Pittsburgh, Pa., works, is chief engineer. C. L. Van Derau is local plant manager.

MASSILLON, O.—Griscom-Russell Co. will build a one-story 70 x 140-foot welding shop extension costing $75,000, general contract to B. & H. Construction Co., Massillon, O.

RAVENNA, O.—City, Wilbur Zoll, service director, has approved $100,000 bond issue for complete sewage system and disposal plant and will advertise about July 15 for bids on $130,000 project. Floyd Browne & Associates, Marion building, Marion, O., are consulting engineers.

YOUNGSTOWN, O.—Commercial Shearing & Stamping Co., 1775 Logan avenue, will build new $35,000 plant to handle defense work. Building will have 16,000 square feet floor space. Charles B. Cushwa is president.

New York

BUFFALO—Bliss & Laughlin Inc., 110 Hopkins street, has let general contract to N. J. Hobson, Harvey, Ill., for 100 x 175 and 100 x 350-foot plant additions, at cost of about $100,000. (Noted May 26.)

CORNING, N. Y.—Corning Glass Works, Walnut street, has let general contract for a two-story 100 x 350-foot plant to H. K. Ferguson, Hanna building, Cleveland, to cost about $200,000.

ROCHESTER, N. Y.—Brighton sewer district, 10 Gibbs street, plans a sewage disposal plant at Brighton to cost about $318,000. William S. Lozier Inc., 10 Gibbs street, is engineer.

SCHENECTADY, N. Y.—General Electric Realty Corp., River road, has let contract to Turner Construction Co., 420 Lexington avenue, New York, for a 240 x 380-foot turbine building costing about $250,000. (Noted June 2.)

TONAWANDA, N. Y.—Linde Air Prod-

ucts Co., 30 East Forty-second street, New York, will build a plant, general contract going to John W. Cowper Co., 775 Main street, Buffalo, costing $250,000. S. R. Donellon, 205 East Forty-second street, New York, is engineer.

New Jersey

RAHWAY, N. J.—Merck & Co., 126 East Lincoln avenue, will build a 3-story 49 x 89-foot boiler house costing $60,000. general contract to Salmond Scrimshaw Construction Co., 526 Elm street. (Noted June 2.)

Pennsylvania

READING, PA. — Richard E. Meinig Co., McKnight street, will build a boiler and power house, general contract to H. T. Horst Construction Co., 522 Court street, costing $40,000, with equipment.

WILLIAMSBURG, PA. — Pennsylvania Edison Co., E. H. Werner, president, Penn Central building, Altoona, Pa., plans a power plant addition, improvements and transmission lines to cost about $3,500,000. Burns & Roe, 233 Broadway, New York, are engineers.

WILLIAMSPORT, PA. — Boro council is considering construction of a sewage disposal plant costing over $70,000.

ANTRIM, PA.—Hunter Coal Co. Inc., Antrim, will develop 5800 acres of coal land, including tipple, breaker, washer, transmissions and conveyor, to cost over $50,000.

Michigan

DETROIT—Stamping Service Inc. has let contract to H. B. Culbertson Co., Detroit, for a plant addition from plans by Lyndon & Smith architects, Highland Park, Mich.

DETROIT—Production Parts Inc., 40 West Hancock avenue, has been incorporated with $5000 capital to deal in production parts for defense work, by John Fauver, 27367 Ten Mile Road, Birmingham, Mich.

GRAND RAPIDS, MICH. — National Brass Co. is taking bids through Harry L. Mead, architect, Grand Rapids, for a plant addition.

LANSING, MICH.—Motor Wheel Corp., Larch and Ferris streets, will build one-story 60 x 185-foot addition to hub plant, to cost about $35,000. General contract has been given Reniger Construction Co.

NEWBERRY, MICH. — City council plans $60,000 bond issue for improvements and extensions at municipal light and power plant. Roger Fretz is city clerk.

Illinois

BEARDSTOWN, ILL.—Cargill Inc., 135 South La Salle street, Chicago, has let general contract to H. G. Onstad, 307 North Michigan avenue, Chicago, for a grain elevator and terminal here, costing $500,000.

CHICAGO—Chicago Lock Co., 2024 North Racine avenue, manufacturer of locks, keys and coin chutes, plans two-story addition 50 x 175 feet.

CHICAGO—Iroquois Steel & Iron Co., 4620 West Roosevelt road, has been incorporated with 100 shares $10 par value. Gordon L. Bazelon, 38 South Dearborn street, is representative.

CHICAGO—Armstrong Bray & Co., 308 North Loomis street, will build machine shop, general contract to J. Emil Anderson, 3659 Belle Plaine avenue.

EAST MOLINE, ILL.—Deere & Co. have given contract to Axel Carlson Co., Moline, Ill., for a five-story plant addition 80 x 160 feet, top floor for experimental shops and remainder for manufacturing.

SPRINGFIELD, ILL.—City will take new bids on additional filters at Lakeside filtration plant, estimated to cost $50,000. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is engineer. (Noted May 19.)

Indiana

HAGERSTOWN, IND.—Perfect Circle Corp., manufacturer of piston rings etc., L. Teetor, president, will build a plant addition costing $200,000, with equipment.

Maryland

BALTIMORE—Milcor Steel Co., Fayette and Oldham streets, has plans for a manufacturing building at Erdman avenue and Philadelphia road.

Kentucky

LOUISVILLE, KY. — Defense Plant Corp., RFC subsidiary, has authorized increase of $415,969 in its lease agreement with Reynolds Metals Co. for its plant here, $69,581 for land and buildings and remainder for equipment. Extruded aluminum products for aircraft will be made.

Tennessee

MEMPHIS, TENN.—Southern Forge & Foundry Co., 506 Bodley avenue, has been incorporated with 1000 shares $100 par to do general machine shop and foundry business, by Thomas C. Fuller, J. W. Dyess and J. L. Hutter Jr.

West Virginia

CHARLESTON, W. VA.—Hope Natural

Gas Co., Union building, is buying right of way for a gas pipeline from eastern Kentucky to a point near Clarksburg, W. Va., at cost of several million dollars.

Virginia

ALLOY, VA.—Electro-Metallurgical Co. has let general contract for plant extensions 90 x 760, 80 x 100, 40 x 100 and 35 x 200 feet, costing $250,000, to Hughes-Foulkrod Co., 1505 Race street, Philadelphia.

Missouri

ST. LOUIS—American Smelting & Refining Co. has let contract for one-story 57 x 100-foot plant at 4041 Park avenue for its Federated Metals division, to J. S. Alberici Construction Co., 1719 Boatmens Bank building. A second building 80 x 100 feet is in prospect.

ST. LOUIS—Combustion Engineering Co., 5319 Shreve avenue, has let contract for two-story 29 x 43-foot addition, to Fruin-Colnon Contracting Co., 502 Merchants-Laclede building, 408 Olive street.

ST. LOUIS—National Bearing Metals Corp., 4930 Manchester avenue, has let contract for one-story 37 x 71-foot molding shop addition to Fruin-Colnon Contracting Co., 502 Merchants-Laclede building.

Arkansas

LITTLE ROCK, ARK. — War department will establish a $33,000,000 fuse and detonator plant at Jacksonville, Pulaski county, 13 miles north of here.

Minnesota

HASTINGS, MINN.—Winston Bros. Co., 1470 Northwestern Bank building, Minneapolis, has been given general contract for lock at lock and dam No. 2 at Hastings on a bid of $1,532,878. Bids will be received later for miter gates and operating machinery. Major J. W. Moreland, 1217 Custom House, St. Paul, district army engineer. (Noted April 28.)

MINNEAPOLIS—Crown Iron Works Co., E. L. Anderson, president, steel fabricator and manufacturer of stokers, has given general contract to Standard Construction Co., National building, for one-story plant addition 40 x 106 feet.

MINNEAPOLIS—Char-Gale Mfg. Co., manufacturer of oil burner and furnace supplies, has given general contract to C. N. Johnston for one-story plant addition 31 x 85 feet.

MINNEAPOLIS — Hollinbeck Bronze Co., 2936 Pillsbury avenue, manufacturer of bronze and aluminum tablets, will move to larger quarters at 312 Erie street Southeast.

RED WING, MINN.—Rock Wool Co. of Minnesota has given contract to Augus/ Cedarstrand Co., 966 Central avenue, Minneapolis, for one-story plant 82 x 250 feet, to cost $100,000. (Noted May 5.)

SHAKOPEE, MINN.—War department has announced munitions plant will be built near here, for small arms ammunition loading, to cost $27,000,000.

ST. LOUIS PARK, MINN.—Rodgers Hydraulic Pump Mfg. Co., 721 Laurel avenue, Minneapolis, manufacturer of hydraulic pumps and jacks, has let contract to Peter Pearson, for construction of one-story plant 52 x 80 feet, at 7401 Walker street, St. Louis Park, to which it will move its operations.

ST. PAUL—Northern States Power Co. has announced plans for another $4,000,000 addition to its High Bridge steam generating station to house a large turbo-generator, boilers and other equipment. (Previous addition noted April 14.)

Texas

TEXAS CITY, TEX.—Carbide & Carbon Chemicals Corp. plans enlargement of its chemical plant. Ford, Bacon & Davis, New York, will handle construction work.

Kansas

WICHITA, KANS. — Defense Plant Corp. has completed agreement with Boeing Airplane Co., 200 West Michigan avenue, Seattle, for expansion of bomber assembly plant here at cost of more than $17,000,000.

Nebraska

OMAHA, NEBR.—Paxton-Mitchell Co., foundry and machine shop operator, has bought machine shop of Interstate Machinery & Supply Co., the latter continuing in production of road machinery supply.

Iowa

CEDAR RAPIDS, IOWA—Iowa Steel & Iron Works, steel fabricator, had given general contract to O. F. Paulson Construction Co. for a one-story plant addition, 40 x 103 feet.

CEDAR RAPIDS, IOWA—Transport Trailers Co., George T. Ronk, president, manufacturer of heavy-duty trailers and gun carriages, has moved to larger quarters at 600 D avenue Northwest.

DAVENPORT, IOWA—M. A. Ford Mfg. Co. has given contract to Soller Construction Co. for one-story plant addition.

GRUNDY CENTER, IOWA—Voters

have approved $200,000 bond issue for municipal light and power plant. Stanley Engineering Co., Muscatine, Iowa, is consulting engineer. (Noted April 12.)

California

BURBANK, CALIF.—Vega Airplane Co., 2555 North Hollywood way, will build a steel storage tank and pump house, costing about $30,000.

GLENDALE, CALIF.—Valley Machine Shop, 3462 Verdugo road, will build a new plant costing $5400.

LOS ANGELES—U. S. Spring & Bumper Co., Leones boulevard, is building a crane runway costing $6500.

LOS ANGELES—Paul Vokal, 1960 East Forty-eighth street, will build a machine shop 60 x 140 feet, costing about $17,000.

LOS ANGELES—Pacific Coast Elevator Co., 4031 Goodwin avenue, will build a plant addition 24 x 36 feet, costing about $4000.

LOS ANGELES—Air Associates, 1100 Air Way, Glendale, will build a factory 200 x 200 feet at 5827 West Century boulevard, Los Angeles, costing about $54,000.

VERNON, CALIF.—Wire & Metal Mfg. Co., Alcoa avenue, will build a 60 x 200-foot plant costing $18,000.

Washington

SEATTLE, WASH.—Duwamish Shipyards, capital $30,000, has been incorporated by Ivar Hille and associates, 1118 Joseph Vance building.

Canada

VANCOUVER, B. C.—Burrard Drydock Co. will build at once a 12,800-ton capacity dry dock, costing $600,000, to supplement present 20,000-ton plant unit. Clarence Wallace is president.

CORNWALL, ONT.—Cornwall Chemicals Ltd., subsidiary of Canadian Industries Ltd., Montreal, Que., has given general contract to Fraser Brace Engineering Co. Ltd., 107 Craig street West, Montreal, for a carbon bisulphide plant to cost $300,000.

ETOBICOKE, ONT.—Ingran Canadian Clock Co., Grand avenue, will build a factory costing $75,000 for which plans are being prepared by John B. Parkin, 1104 Bat street, Toronto, Ont.

NEW HAMBURG, ONT.—Hahn Brass Works Ltd., Waterloo street, is building an addition costing $35,000, with equipment. Structural steel has been awarded to Frankel Bros. Ltd., Don roadway and Eastern avenue, Toronto, Ont.

NORTH BAY, ONT.—Craig Bit Co. Ltd., P. Robertson, 65 Fraser street, in charge, will build plant costing $60,000, general conract to Carrington Construction Co., 11 Elm street East, Sudbury, Ont.

PETERBORO, ONT.—Western Clock Co. Ltd., Hunter street, is having plans prepared for plant addition costing about $100,000, with equipment. J. H. Vernor is manager.

TORONTO, ONT.—John Inglis Co. Ltd., Strachan avenue, will build an addition to its machine shop costing $20,000, general contract to A. W. Robertson Ltd., 57 Bloor street. Company also is engaged in building $5,000,000 addition to its Bren gun section, financed by the government.

TORONTO, ONT.—Selberling Rubber Co. of Canada, R. J. Thomas, president, is building an addition 100 x 100 feet, two stories, costing about $100,000. This follows recent installation of about $200,000 worth of equipment.

WINDSOR, ONT.—Border Cities Industries Ltd., subsidiary of General Motors Products of Canada Ltd., Oshawa, Ont., has let general contract to Dinsmore McIntyre Ltd., 100 Adelaide street West, Toronto, Ont., for machine gun plant costing $1,250,000.

AMHERST, N. S.—Canadian Car & Foundry Co. Ltd., 29 Lansdowne avenue, has let general contract to Rhodes Curry Ltd., 35 Lansdowne avenue, for a plant addition costing $140,000.

HALIFAX, N. S.—Dominion Steel & Coal Corp. Ltd., will install an additional open-hearth furnace and make improvements to plate mill and other facilities, to cost about $3,000,000, to be financed by the government.

LONGUEUIL, QUE.—Department of munitions and supply, Ottawa, Ont., is taking bids for a machine shop addition costing about $100,000. Plans are with T. Pringle & Son Ltd., 485 McGill street, Montreal. G. K. Shields is deputy minister.

MONTREAL, QUE.—Keating & Sons Co., 312 St. Paul street West, will build $30,000 addition to steel plant and foundry on Ste. Madeleine street.

MONTREAL, QUE.—Drummond McCall & Co. Ltd., 930 Wellington street, sheet metal products, will build an addition costing $100,000, with equipment, general contract to A. F. Byer & Co. Ltd., 1226 University street. T. Pringle & Son Ltd., 485 McGill street, are consulting engineers.

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