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STEEL

ESTABLISHED 1882

Contents

Volume 108—No. 3 January 20, 1941

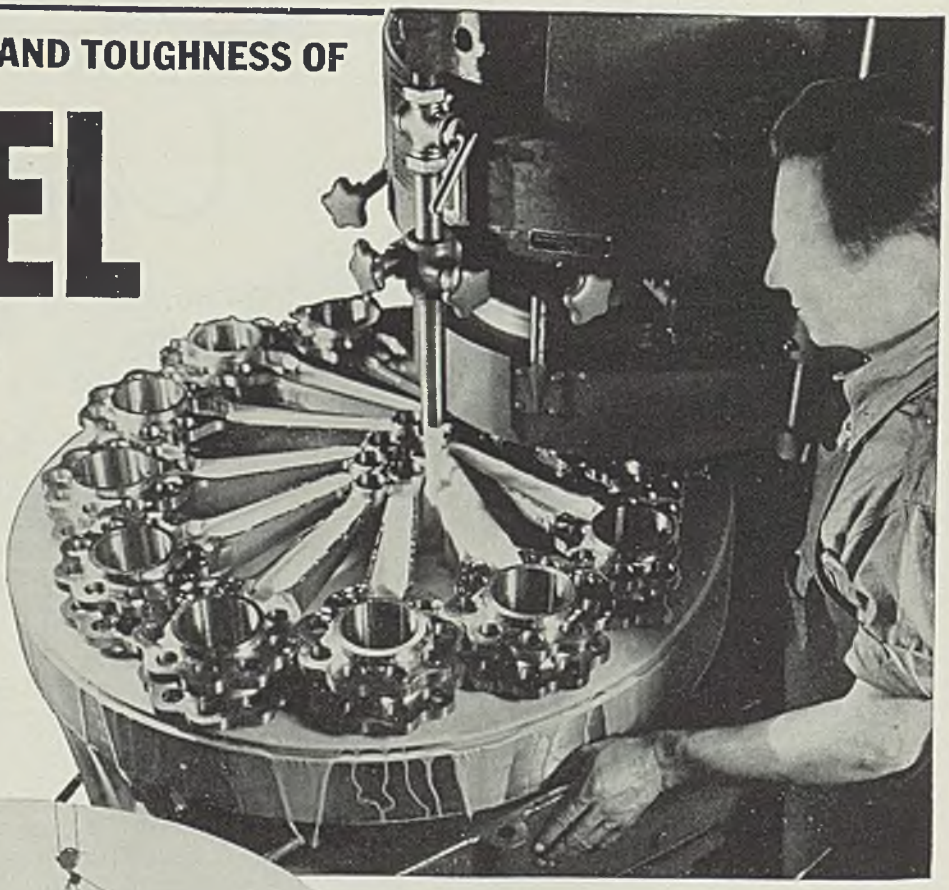
PRODUCTION • PROCESSING • DISTRIBUTION • USE

Safe DEFENSE against breakdowns . . .

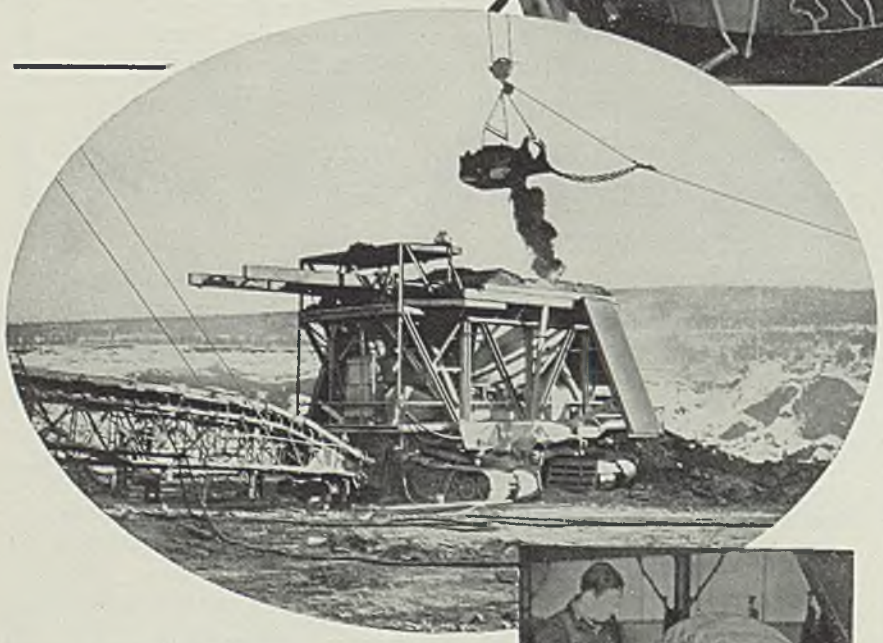
INCREASED STRENGTH AND TOUGHNESS OF

NICKEL

ALLOY STEELS



NEW JERSEY—Compactness, light weight, high strength and fatigue resistance are life-and-death requirements for aircraft engine parts. Here you see connecting rods of Nickel-chromium-molybdenum steel machined at the Paterson, New Jersey, plant of WRIGHT AERONAUTICAL CORP. Through their uniform response to heat treatment and ready machinability at high hardness, Nickel alloy steels simplify production.



ALASKA—Stripping 60 million cubic yards of frozen soil from 16 million cubic yards of gold bearing gravel is the job of this Bucyrus-Monighan electric drag line and BUCYRUS-ERIE traveling feeder. Working near Fairbanks, Alaska—more than 2,000 miles away from replacement parts—embrittlement and breakage at subzero temperatures must be avoided. More than 17 tons of 3½% Nickel low carbon steel forgings were used, chiefly for shafting. Three tons of 1.50/2.00% Nickel steel castings are also employed. Gears, pinions and crawler parts are heat-treated Nickel-chromium steel. The mile long conveyor belt system, furnished by the PACIFIC CAR & FOUNDRY CO., depends on speed reducer shafts of tough Nickel-chromium-molybdenum steel, SAE 4340.

NEW YORK—Cost records show this power-driven INGERSOLL-RAND Impact Wrench 6 to 8 times faster and more efficient than hand methods for applying and removing nuts. The hammers and anvils which withstand up to 1100 torsional impacts per minute are Nickel-chromium-molybdenum steel. Nickel alloy steel is readily hardened to prevent battering and stoutly resists wear and fatigue.

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AVOID BREAKDOWNS and costly delays by specifying new equipment and replacement parts in tough, shock-resisting Nickel alloy steels. For practical information about recommended applications of Nickel alloyed materials, please address:

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

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

HIGHLIGHTING
THIS ISSUE

■ AS STEEL production moved up another point last week **(p. 27)**, to 98 per cent of ingot capacity, the general attitude with reference to the steel supply was considerably calmer than that which only recently prevailed. This is because both producers and consumers have become adjusted to unusual conditions. Experience under the voluntary rationing system is ripening and there is increasing confidence among consumers that as their needs arise there will be steel to meet them. One fact whose import is reassuring is that there are no known cases where production has been interrupted or slowed down by inability on the part of consumers to get required steel.

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Labor's Market?

Now that labor for the first time in a decade is on the threshold of a seller's market, the expected widespread demand for higher wage rates is beginning to materialize. Therefore, those companies that have adopted various plans under which pay automatically is adjusted to fluctuations in the cost of living, or in which employes get bonuses or a share of the profits, find themselves in a fortunate position. STEEL **(p. 21)** describes the chief features of some of these plans. . . . Walter P. Reuther's widely advertised plan for organizing the automobile industry to produce 500 airplanes a day is held to be impractical; not enough aluminum, for example **(p. 40)**, is available.

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Germany Looks Ahead

A North Dakota congressman **(p. 32)** again has introduced a bill under which the government might take over the steel industry by right of eminent domain and operate it through a board comprised of four workers chosen from the industry and five technicians to be named by the President; this action, the congressman holds, would be "consistent with our avowed purpose of arming to defend democracy". . . . B. T. Bonnot **(p. 47)** outlines a plan to permit more effective industrial mobilization of industry for defense. . . . Preparing to "blitzkrieg" postwar world markets, Germany **(p. 37)** is standardizing European models of automobiles. . . . Some 5,000,000 tons of steel have gone to Davy Jones' locker **(p. 40)** since the war's start.

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Vacuum In Ingot Molds

A new agent is available **(p. 82)** for making fluid electrolyte emulsion. . . . J. R. Longwell **(p. 70)** tells how to get the most out of tungsten carbide wire drawing dies. . . . A handy calculator **(p. 72)** quickly gives the answer to any Ohm's law problem. . . . A new device, by producing a partial vacuum in ingot molds, is aimed **(p. 82)** at preventing the inclusion of objectionable gases and foreign substances which cause piping in steel ingots. . . . Now available **(p. 28)** is a new dye for permanently coloring concrete floors. . . . Automatic bronze welding, says H. T. Herbst **(p. 84)**, shows a 50 per cent saving in consumption both of metal and gas; he discusses control equipment involved.

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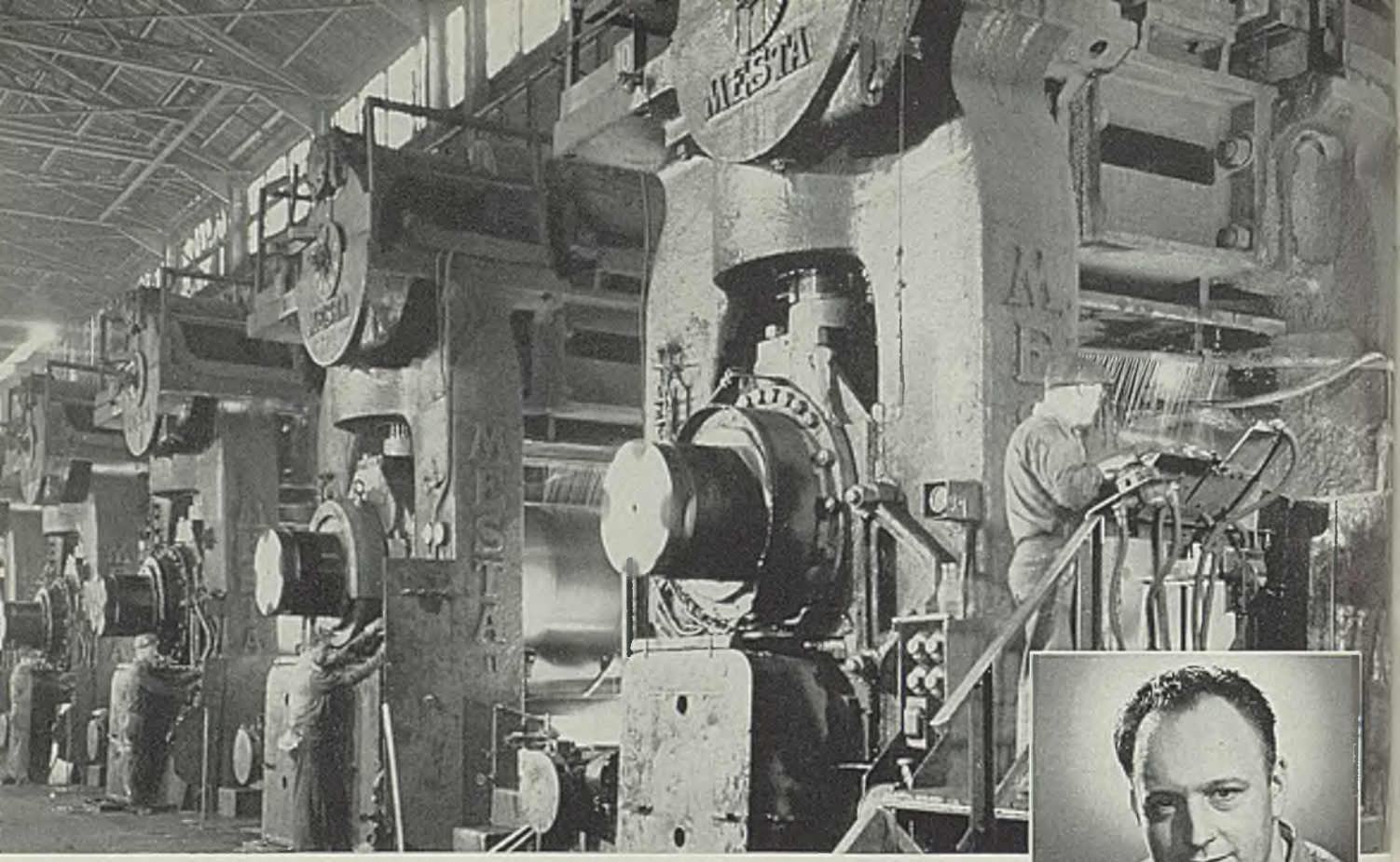
Heating Billets

Prof. W. Trinks **(p. 54)** sets forth recommendations to be followed in heating shell billets for forging. . . . Many factors, such as grades, speeds, doors, floors, elevators, loading docks, enter into the efficiency of powered trucks **(p. 58)** as materials handling units. . . . A "listening laboratory" **(p. 69)** is part of the testing line at a plant manufacturing household equipment; here human ears, rather than noise meters, are employed in checking operating noise. . . . J. R. Dawson and A. R. Lytle **(p. 62)** tell how to increase the ductility of welds obtained with the oxyacetylene process. . . . A. H. Allen **(p. 74)** describes method and equipment used in producing Packard V-12 torpedo boat engines.



Modern Mills and Skilled Men
CARRY ON THE
INLAND TRADITION FOR QUALITY

FROM the day Inland made its first steel, emphasis has always been placed on use of the most modern equipment available, the most advanced processes, and men of special training and great skill—the combination which assures highest uniform quality of steel mill products.

Because of this tradition most of Inland's steel-making and finishing equipment has been replaced within the past few years. Typical of recent improvements are: modern blast furnaces; new open hearth furnaces; a blooming mill of exceptional speed and flexibility; new 44-in. and 76-in. continuous sheet and strip mills; latest types of cold reduction mills, a completely rebuilt galvanizing department; new tin mills for production of tin plate by the modern cold reduction method; and, new furnace and mill control devices that automatically guard quality and uniformity. The Inland steel mill is as modern as any in the world.

Operating the Inland mills are steel makers and metallurgists who know and produce uniform, high quality steel. They are men who have added much to the science of steel processing, and they can be counted on for important advancements to meet the needs of the future.

Many users of steel profit by the Inland tradition for high uniform quality. It saves them time and money. Let Inland's modern mills and skilled men go to work for you.

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Will National Unity Prevent Runaway Labor Market, Avoid Critical Issue?

Most powerful factor toward promoting inflation and its concomitant economic disturbances would be, under present conditions, sharp advances in wages . . . Yet pressure for such increases is present and is growing stronger . . . Upon management's response to this pressure depends, to large extent (1) how far this country will move toward inflation, and (2) how well our economy can be readjusted when the rearmament emergency has passed . . . Future developments may necessitate moderate wage adjustments . . . How can these best be effected—with minimum disturbance to productive economy? . . . Accompanying article outlines several methods for gearing wages to the present situation, which warrant management's careful consideration NOW

By W. J. CAMPBELL
Associate Editor, STEEL

■ LABOR for the first time in a decade is on the threshold of a sellers' market. Pressure for increased wages has appeared and likely will expand during the coming months as the national defense program approaches a peak and as trained workers become more scarce. Defense contracts already let are expected to absorb approximately 4,000,000 workers by mid-year.

This is not to imply that wages will rise as rapidly or as much as during the first World war, when, for example, the steel industry's common labor rate advanced 131 per cent from 1915 to October, 1918. Wage rates already are at an all-time peak, in contrast to low hourly rates at the outbreak of the first World war, and the government's anti-inflation policy is expected to curb a runaway market in labor as in other commodities.

Little real cause for wage increases yet exists. Living costs have not advanced appreciably. At present they are only about 2 per cent higher than in August, 1939, the month before war broke out in Europe. But many workers think such costs have increased or are likely to increase in the near future.

Whereas living costs have advanced only 2 per cent since the war started, hourly wage rates in manufacturing industries have advanced from 5 to 6 per cent on an average, and weekly earnings much more as result of longer work weeks. Real weekly earnings have advanced from an index figure (1929 = 100) of 106.6 in August, 1939, to 116.8 in October, 1940, according to the National Industrial Conference board.

Notwithstanding these facts, labor is pushing for higher rates. Workers believe industry generally is making large profits due to the high rate of industrial activity. Labor leaders also realize periods of expanding production are the most favorable to press for increases.

Both major labor organizations are pledged to a drive for higher rates.

SWOC To Ask Higher Rates

Congress of Industrial Organizations last week announced its Steel Workers Organizing committee was requesting "informal" conferences with leading steel producers looking toward increases in wage rates to compensate for "increases in the cost of living." The CIO has announced wage increase drives in other industries and, through President Philip Murray, has stated flatly the union will not yield its right to strike in defense industries.

American Federation of Labor has urged affiliated unions to insist on insertion in all new labor contracts of a clause providing for the reopening at any time of the wage issue. *The American Federationist* comments: "During the World war living costs soared and wages followed lamely behind."

That the wage question may become a troublesome issue at any time is recognized by management and many executives are considering policies to be adopted. They recognize wage increases not only may become necessary, but also may be justified by events to come. The question is how to make fair adjustments for the duration of the emergency without being faced with a bitterly-contested downward readjustment when the defense boom has passed and industry perhaps confronted with a new depression. It is axiomatic that labor accepts wage increases casually but regards any downward readjustment in money wages as a setback—regardless of how living costs or other conditions have changed.

Most common form of wage readjustment, of course, is the straight increase in basic rates. It is most desired by workers and their unions. It has the advantage of being simple and easily understood by employes.

Its disadvantage, especially under present circumstances, is that to the worker it represents a more or less permanent advance; in his mind the increased hourly rate becomes "frozen" as his rate. Such increases granted during a temporary boom period, such as the present, are likely to cause management some difficulty when the emergency has passed and industry settles down to normal or depressed activity.

Another policy which has been

tried by several large companies and which now is attracting renewed interest is that of gearing wages to living costs. Advantages of this plan are that the worker is protected against increased expenses due to the emergency and its concomitant reactions in other fields, but the employer is not held to an absurdly high basic wage when prices and activity decrease.

Great Britain's metals industries soon after the war started instituted a plan for regulating wages under a sliding scale which follows closely the cost of living as officially declared in the *Ministry of Labour Gazette*. Thus if the cost of living is declared to be three points higher on Jan. 1, the workers will receive wages three points higher on Feb. 1.

Under this system it appears unlikely the workers ever will receive the extremely high wages paid during the first World war, but they are protected against uncontrollable advances in living costs. The British government has been holding a tight rein on commodity prices and as a result living costs and wages have advanced only about 20 per cent since the war began.

Under the sympathetic control of the government, in which mature labor leaders have an increasing voice, the plan is working to the entire satisfaction of all concerned, according to STEEL's British representatives.

American workers and unions, however, never have warmed to the idea of gearing wages to living costs. They have complained such a system freezes their standard of living at the status quo and they have no opportunity to achieve a larger share of the fruits of production.

Wage Trends in War Era

	Hourly rates	Weekly earnings	Index of "real" weekly earnings* (1929=100)
Aug., 1939	$0.720	$27.29	106.6
Sept.	0.723	27.58	105.4
Oct.	0.724	28.24	110.5
Nov.	0.727	28.49	110 5
Dec.	0.729	28 49	113.2
Jan., 1940	0.727	28.09	110.1
Feb.	0.728	27.61	108.9
March	0.731	27.61	110.4
April	0 734	27.66	109.3
May	0.737	27.67	109.7
June	0 740	28.23	110.7
July	0.740	28.16	109 3
Aug.	0 741	28.58	113.7
Sept.	0.742	28.99	114 7
Oct.	0.744	29.86	116.8

*Money weekly earnings divided by cost of living.

Figures are for all wage earners in 25 industries as compiled by National Industrial Conference board.

Present unsettled economic conditions, however, have been recognized by one AFL union as likely to result in violent changes in the cost of living and at least one recent contract includes a provision of periodical revision of wage rates in accordance with such changes. The United States labor [illegible] index of living costs governs and changes are to be made either up or down.

General Electric Co., Schenectady, N. Y., has operated under a cost of living bonus plan for more than four years. It provides that if the labor department's index goes up, corresponding increases will be made in employe earnings, up to a maximum of 10 per cent above the base. When this point is reached the company again will give consideration to the question. Should the cost of living decrease, a downward adjustment will be made to follow the index, but in no case will there be a deduction from the employe's basic rate.

Still another policy is the profit-sharing plan. This has been tried in varying forms and with varying degrees of satisfaction. Generally a certain base sum or percentage of profits is stipulated as going to stockholders and the profits in excess of that sum are divided between employes and stockholders.

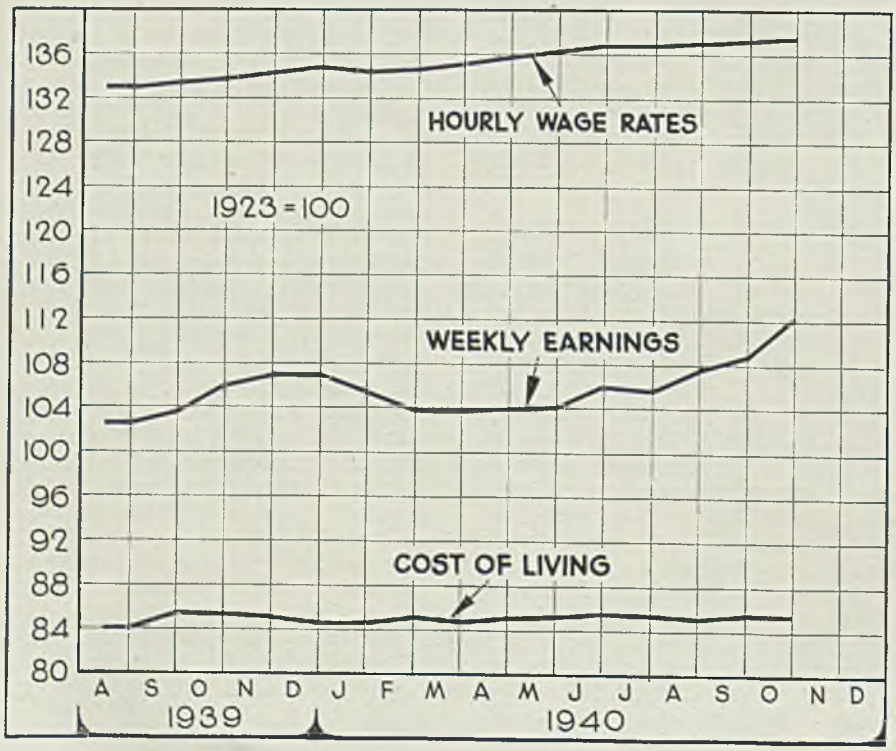
Organized labor also has objected to this plan at various times, although it is now in effect in a number of companies with union contracts. Most of such plans however, are in effect in unorganized plants.

One objection to profit-sharing is the difficulty employes have in comprehending what really constitutes profits and the time lag in transmitting the employe's share to his pay envelope.

Its advantage is that it adjusts the workers' basic earnings to the general prosperity of the business.

The profit-sharing plan placed in effect by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., several years ago is probably the best known among metalworking plants. It provides that whenever average monthly net income for any consecutive three months is more than $600,000, employes will receive 1 per cent increase in base pay for each $30,000 of additional income. When the average net income falls below $600,000 a month for three months, salaried employes receiving more than $125 a month base are subject to a 1 per cent reduction for each unit of $60,000 that net income is below $600,000. Hourly workers are exempt from the reduction in base pay.

Practiced to a lesser extent are wage-adjustment plans by which



■ Wages, both hourly rates and weekly earnings, in the United States have advanced more sharply than living costs since the war started in Europe. Chart shows comparative increases from August, 1939, last month before the war, through October, 1940. Impressive is the increase in wages over living costs since 1923, the year on which the charted indexes are based. Data from National Industrial Conference board

rates are geared to units of production or to price of product. Theoretical advantages for the former plan are incentives to greater productivity and greater efficiency. Its practical advantages depend to large extent upon the clarity with which the plan is presented to workers. In a sense it embodies the incentives of the piece-work plan.

Wages adjusted to price of product have been tried particularly in the nonferrous mining and smelting industry. Typical is the agreement between Anaconda Copper Mining Co. and the International Union of Mine, Mill and Smelter Workers. Minimum daily wages are based upon a price for electrolytic copper of less than 9 cents a pound. Agreement provides: "When the price of electrolytic copper is or exceeds 9 cents per pound and continues for a period of 30 successive days at or exceeding an average of 9 cents a pound, the minimums shall be increased 25 cents a day; when the price of electrolytic copper is or exceeds 9¾ cents per pound and continues for a period of 30 successive days at or exceeding an average of 9¾ cents per pound there shall be a further increase in the wage of 50 cents a day; when the price of electrolytic copper is or exceeds 11½ cents per pound . . . there shall be a further increase of 25 cents per day. . . ." Each further rise of 1½ cents carries a 25-cent daily wage increase.

In some instances wage rates in a particular plant are adjusted in accordance with the prevailing wages in the same industry or area. Advantage here is that employes remain more or less satisfied that they are receiving as much as their neighbors. All other conditions being equal, the employer maintains a fair competitive position.

Year-end bonuses based on profits sometimes are used. These vary in amount, sometimes are graduated according to length of service or salary. Some plans provide for distribution of uniform amounts to employes; an example is Chrysler Corp. which this year gave $40 each to hourly employes with one year's service in lieu of vacation pay next summer.

All of these possess certain advantages for certain types of companies. Whatever plan is adopted by a company faced with the necessity of making wage adjustments will depend to large extent on the nature of the company's business, on the bargaining agency of employes and on the groundwork for such adjustment laid by management.

Wherever any plan, other than straight increase in basic rates is involved, management will be well advised to take care that the employes fully understand the wage-adjustment plan.

SWOC To Ask Higher Wages, Other Contract Changes

Steel Workers Organizing committee will present demands for wage increases and other contract changes to three steel producing companies within the next few days, according to union sources. The three companies are the United States Steel Corp., Jones & Laughlin Steel Corp. and Crucible Steel Co. of America.

It is understood the union will ask for "friendly, informal conferences," but will not serve the formal written notice which might terminate the indeterminate contracts the union holds with U. S. Steel and Jones and Laughlin.

In addition to wage increases, the union will ask liberalization of vacations with pay provisions, measures to speed up grievance machinery and the closed shop, although the latter will not figure "too prominently" in the discussions.

Advise Voluntary Mediation To Avoid Defense Strikes

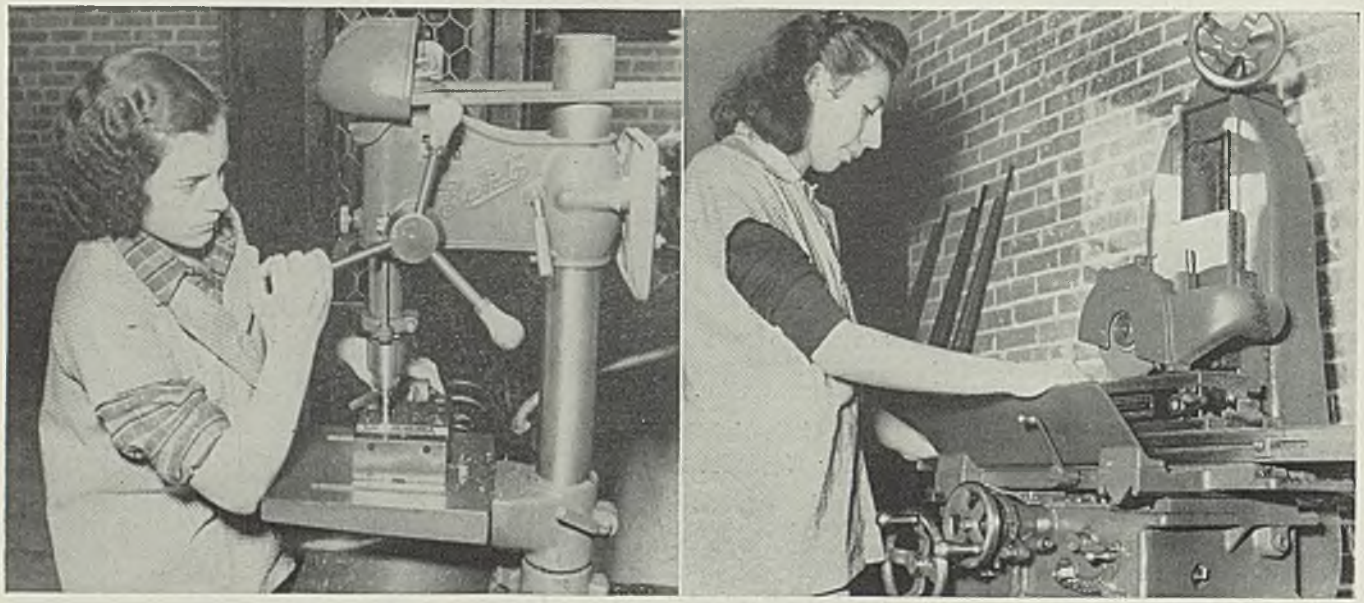
Since workers in defense industries are only "30 to 40 per cent unionized, and with aggressive organizing campaigns under way or projected in most fields . . . many disputes are likely to get out of hand and result in strikes, unless some agency outside the industry intervenes to facilitate a settlement."

Compulsory arbitration, however, has been found to be "unworkable" in a democracy, whereas the proportion of success in voluntary mediation cases usually runs above 90 per cent.

These are findings in a survey of labor policy under the defense program by the Twentieth Century Fund, New York.

The survey staff believes ques-

■ Workers flocking to jobs in defense plants are carefully identified. At this plant, even the contents of their lunch boxes are examined, to prevent entry of materials for sabotage. NEA photo



■ **GIRLS TRAIN FOR DEFENSE JOBS: Absorption of skilled workmen in defense industries and by the military training program eventually may necessitate women machine operators. Connecticut, through the state's expanded national youth administration's program, is training girls in operation of lathes, drills, planers and other tools. Above, two trainees operating drill press and surface grinder. NEA photos**

tions of union recognition are more likely to cause strikes in defense industries than questions of wages and hours.

"A union will usually compromise on questions of wages and hours or working conditions. But it cannot compromise on the issue of union recognition without sacrificing its existence."

Many of the defense industries, such as steel, machine tools, shipyards, electrical manufacturing and aircraft manufacturing, have been organized only recently. In few cases do union agreements cover 50 per cent of those engaged in the industry.

In discussing voluntary mediation as a means of avoiding strikes, the report emphasizes that "mediation is a service which has to be sold to both unions and employers," and describes some of the state and federal agencies available for this work. The researchers find "the United States conciliation service was able to adjust all but 146 of the 1678 disputes in which it intervened during 1938-1939. The New York state mediation board adjusted all but 30 of 310 cases during 1939."

The survey staff reports a demand in many quarters for compulsory arbitration, but says very few of its advocates understand the practical difficulties of "so drastic an innovation." In no democratic country has it proven possible to prevent strikes simply by law.

Work Simplification Best Way To Raise Production

Work simplification is the most effective way to increase industrial productivity, the most important problem now facing American industry because of the national defense program, declared Allan H. Mogensen, industrial consultant, Allan H. Mogensen Co., New York, last week in addressing the Chicago chapter, American Foundrymen's association. More than 200 foundrymen and invited guests attended.

Mr. Mogensen cited four reasons why industry does not increase productivity:

1. Resistance to anything new.
2. Resentment against criticism.
3. Conviction that machines and better methods cause unemployment.
4. A natural feeling that a job is being done as well as it can be done.

He emphasized that to be more productive a workman must like his work, and pointed out that in most cases the workman doesn't know how to work.

The speaker asserted that a manufacturing plant does not need efficiency or time-study experts to solve its production problems. Rather the solution can be found within its own executives, supervisors and workmen.

Three steps are necessary in job simplification, Mr. Mogensen said. First, is the investigation or study of a job. Second, is a decision to act upon the findings and to determine what is to be done. Third, is the carrying out of the program decided upon.

He warned against the use of the the term "speed-up" in referring to increased production, this word having a meaning offensive to labor. Speeding up does not in the long run necessarily increase production—it may decrease it because hurry produces defective work. By use of motion pictures, Mr. Mogensen illustrated how in several cases, productivity had been increased 200 per cent or more by job simplification.

Scrap Rails Diverted To Rerollers, Is Report

■ Producers of bars and other sections from rerolling rails are understood to have obtained a preference through government channels by which class I railroads will sell rerolling material direct to their mills. It is understood about 2000 tons of rails of this quality were diverted to rerolling mills from the Pennsylvania and Baltimore & Ohio lists recently. It was represented to the government that this industry could not maintain present prices if it competed for raw material with scrap consumers.

Gray Iron Founders' society, Cleveland, has asked a ruling from the national defense commission. Steel foundries use considerable of this class of scrap, especially the 3-foot lengths. If this supply is shut off, it will be necessary to turn to other grades.

■ Orders received by General Electric Co. in 1940 amounted to $654,190,000 compared with $360,748,000 in 1939, an increase of 81 per cent. Orders covering equipment for national defense totaled $250,000,000, with the result that the volume of business in 1940 was greater than that for any other year in the company's history.

Carle C. Conway

Walter S. Tower

Dr. Ernest M. Hopkins

Iron, Steel Priorities Committee's Policy To Be "Watchful Waiting"

■ "WATCHFUL WAITING" apparently will be the immediate policy of the recently appointed iron and steel priorities committee. Early applicaion of compulsory priorities is not in prospect, although the committee is expected to watch the supply-demand situation carefully and probably will prepare procedure for quick application should necessity arise.

Dr. Ernest Hopkins, president, Dartmouth college, Hanover, N. H., will be director of steel priorities. Committee members include: Walter S. Tower, president, American Iron and Steel institute, representing the steel producing industry; Carle C. Conway, chairman of the board, Continental Can Co. Inc., New York, representing industrial consumers; Capt. Paul Hendron, representing the navy; and Lieut. Col. Hugh C. Minton, representing the army.

Appointment of the steel committee marks the first occasion on which a priorities or rationing system has been foreshadowed for a basic industry during the present emergency. Priorities committees have been established only for machine tool and commercial aircraft industries, neither of which has so widespread or so important an influence in the national economy from the standpoint of nondefense industries.

Other priorities sections are expected to be announced soon by E. R. Stettinius Jr., head of the revised general priorities board under the office for production management. Industry advisory committees will be established under each of these sections.

The steel priorities committee last week had these figures to study in relation to defense needs and producing capacity:

Practical capacity this year will be about 85,000,000 net tons; in 1942, it will be at least 87,000,000 tons.

Defense and export demands will aggregate about 20,000,000 annually for this year and next, according to estimates based on army and navy buying schedules. These figures break down as follows: For the United States army, navy and maritime commission, 6,000,000 to 8,000,000 tons; British purchases, 7,500,000 tons; purchases by Canada and other British empire countries, 1,000,000 to 1,500,000 tons; other export demands, 3,000,000 tons.

Whether United States capacity will be sufficient to fill these needs in addition to normal needs still is a matter of controversy, with industry spokesmen insisting present capacity is adequate and certain government officials contending large expansion is necessary. Gano Dunn, of the J. G. White Engineering Corp., New York, and a member of the defense commission staff, is preparing a report on the demand-supply situation.

Mr. Stettinius last week announced the following appointments to his priorities board staff:

James F. Towers, assistant director in charge of administration. Mr. Towers is executive vice president, Ford, Bacon & Davis Inc., New York.

Blackwell Smith, assistant direc-

■ **Priorities board established by the executive order creating the office of production management, left to right: Capt. A. B. Anderson, representing the navy; Leon Henderson, William S. Knudsen, E. R. Stettinius Jr., Donald M. Nelson, Maj. Gen. R. C. Moore, representing the army, and John Biggers.**
Wide World photo

tor in charge of staff activities. Mr. Smith is an attorney, and previously was associated with Mr. Stettinius in the industrial materials division of the defense commission.

Charles E. Adams, as organizer of activities of the various industry committees to be appointed. Chairman of Air Reduction Co., New York, now on leave, Mr. Adams has been serving as special consultant to the industrial materials division.

A. C. C. Hill Jr., as deputy director. Mr. Hill formerly was associated with the director of national defense purchases and later served as deputy administrator of priorities under the old priorities board.

Isador Lubin, as labor consultant. He has been consultant to the defense commission's labor division and is commissioner of the labor department's bureau of labor statistics.

Engineering "Triumph" Goes West To Grow Up with the Country

■ LAST WEEK the world's largest waterwheel generator began its journey westward to the Columbia river where it will become part of Grand Coulee power project. Built in Westinghouse Electric & Mfg. Co.'s East Pittsburgh shops, this giant 108,000-kilowatt machine, first of three being built for Grand Coulee, was completely assembled for mechanical inspection before shipment.

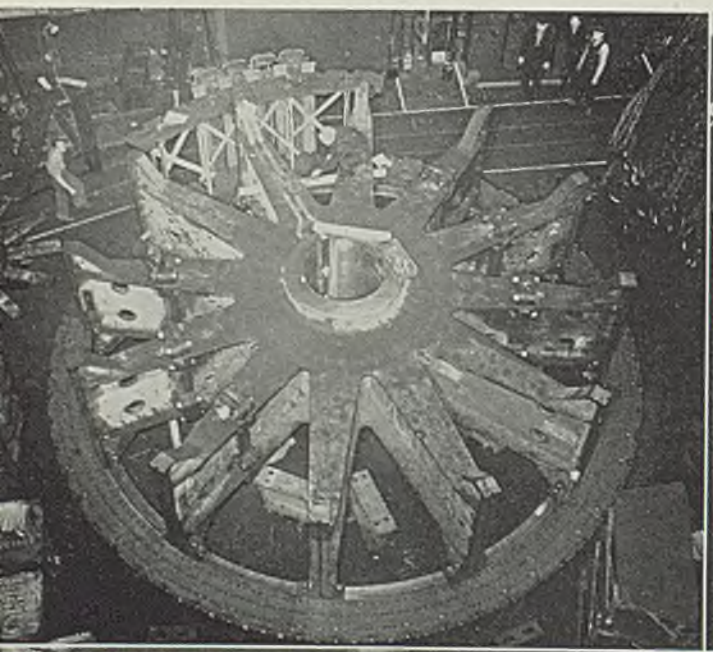
The machine weighs almost 1000 tons, is 24 feet high, 45 feet in diameter. Transportation will require 38 freight cars; travel will be over 12 railroad systems.

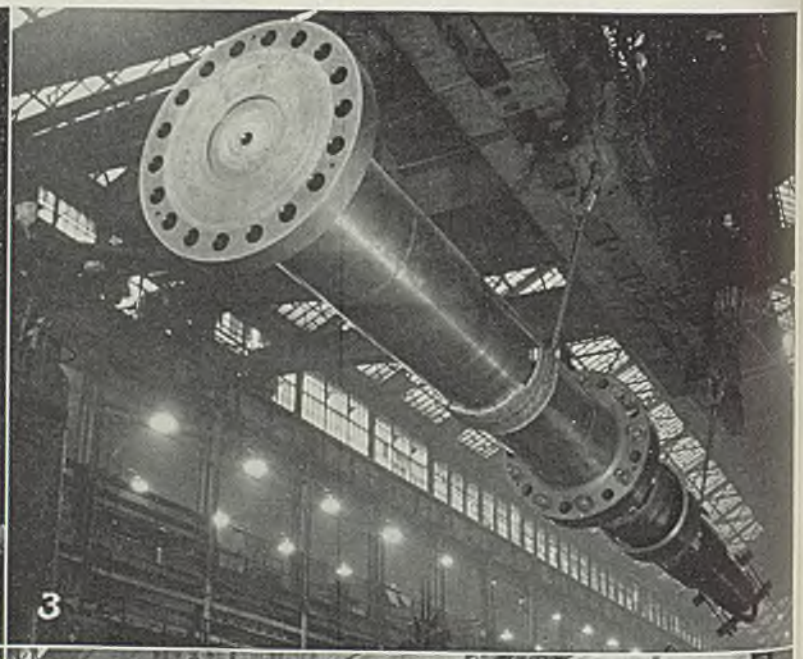
The first three generators required some 2255 tons of steel, over 300 miles of copper wire, and when completed will have provided over 1,000,000 man-hours of work. The other two machines are under construction, the second to be shipped early this spring; the third during the summer. All are scheduled to be ready for operation by the spring of 1942.

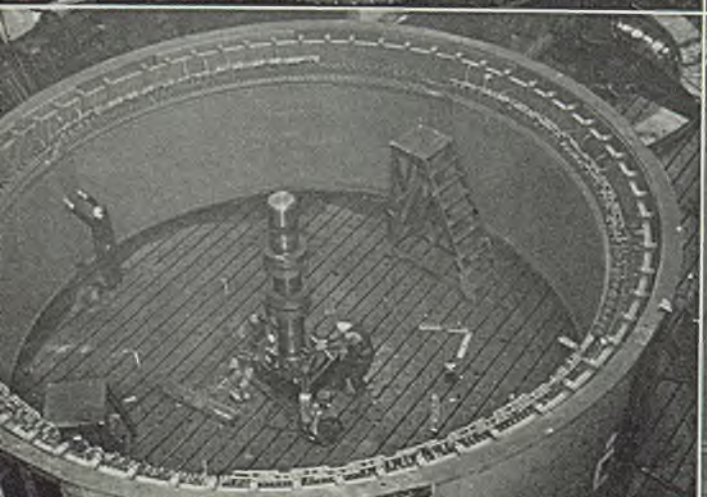
Each of these three new generators, rated at 108,000 kilowatts apiece, have a power capacity 30 per cent greater than any other waterwheel generators ever built in the United States. Their combined capacity would be sufficient to completely light the cities of New York and Chicago. They will help furnish power to drive six 65,000 horsepower motor driven pumps; each pump capable of lifting 12,000 gallons of water per second.

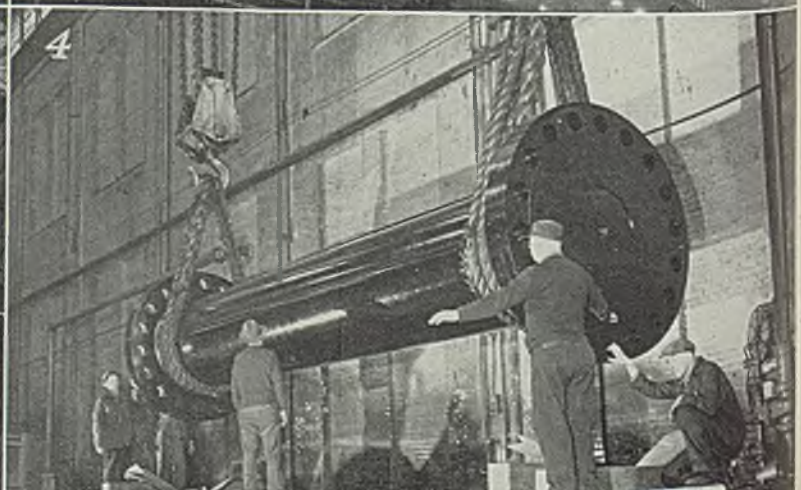
✦

1. Fifty-ton spider, to support the rotating mechanism of the waterwheel generator
2. Steel and copper winding in the stator of the generator
3. Main stem for generator. This shaft, largest ever assembled at Westinghouse's East Pittsburgh, Pa., works, weighs 150 tons
4. The loading job. Two cranes were required to start this 72-ton section of the steel shaft on its way to Grand Coulee









MEETINGS

Defense To Keynote California Industrial Conference Feb. 6-8

■ NATIONAL defense will keynote the seventeenth annual conference of the Iron, Steel and Allied Industries of California, Del Monte, Calif., Feb. 6-8. Particular attention will be paid to skilled labor and strategic materials.

Tentative program lists among speakers: J. H. Van Deventer, editor, *Iron Age*, New York, on "The Steel Industry Outlook"; Arthur H. Young, lecturer on industrial relations, California Institute of Technology, Pasadena, Calif., "What of Employer-Employe Relationships?"; E. C. Mausshardt, United States maritime commission manager for the Pacific coast, "Shipbuilding as It Applies to National Defense"; John E. Canaday, public relations manager, Lockheed Aircraft Corp., Burbank, Calif., "The Aircraft Industry on the Pacific Coast"; and "Industry's Part in National Defense," by a representative of the army air corps.

Special Train to Coast For Warehouse Groups

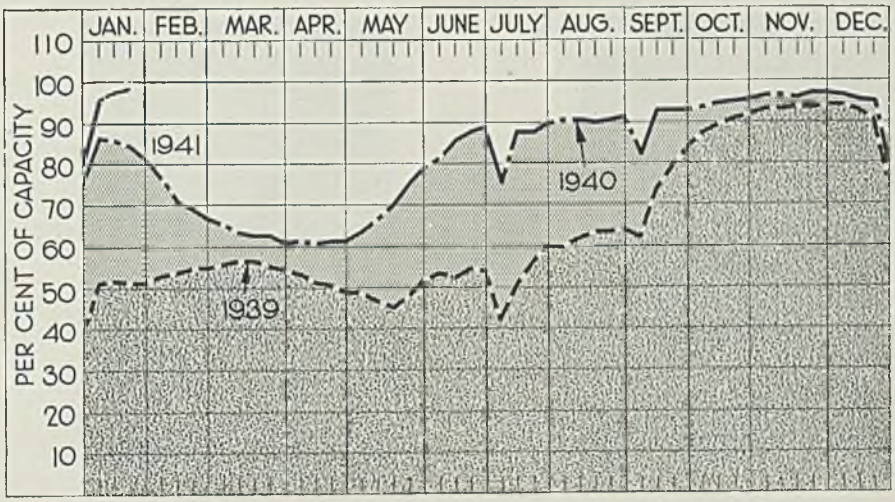
American Steel Warehouse Association Inc. will hold its thirty-second annual convention in San Francisco, May 12-14. A special streamline train will leave Chicago at noon, May 10, making only one scheduled stop for Kansas City and Omaha members. Upon arrival, special buses will transfer members across the 8½-mile Bay bridge to Hotel Fairmont.

Coke Supplies To Meet Requirements-Biggers

■ Survey of the steel industry has shown all companies are fully supplied with coke even at current capacity operations, according to John D. Biggers, of the division of production in the office for production management. Mr. Biggers declared last week indications are this condition will be maintained.

Most steel companies, he said, are producing enough coke to meet their own requirements. Others are purchasing by-product and beehive coke, in some cases importing it from England.

Estimated 3,000,000 or 4,000,000 tons of new by-product coke capacity is expected by year's end. Plans for considerable additional capacity are under consideration. These factors, he said, point to a supply of domestic coke sufficient for all requirements of the steel industry at capacity operations.



PRODUCTION . . . . Up

■ STEELWORKS operations last week rose 1 point to 98 per cent, a new high since 1929. Five districts increased, one declined slightly and six were unchanged. A year ago the rate was 84½ per cent; two years ago it was 51½ per cent.

Youngstown, O.—Operations were steady at 94 per cent last week, and the schedule is for 96 per cent this week. This will be the highest rate since 1929, with three bessemers and 75 open hearths active. Carnegie-Illinois Steel Corp. blew in its sixth Ohio Works blast furnace Thursday, after some delay for lack of coke. Only one partially dismantled blast furnace is idle in the district.

Pittsburgh — Unchanged at 95½ per cent as producers keep every available unit in production.

Wheeling—Relighting of repaired furnaces advanced the rate 9 points to 100 per cent.

Central eastern seaboard — Increased 1 point to 96 per cent.

Detroit—Up 1 point to 95 per cent, only one open hearth in the district being idle.

New England—Gained 14 points to 100 per cent, all open hearths active.

St. Louis — Steady at 87½ per cent, 23 open hearths active. This rate has been consistently maintained since November, except for the holiday week.

Cincinnati—Held at 88½ per cent. Some furnaces are being repaired.

Birmingham, Ala.—Remained at 100 per cent for the third consecutive week.

Buffalo—The rate held at 90½ per cent.

Cleveland—Addition of an open hearth brought an increase of 4½ points to 89 per cent. A slight decline is forecast for this week.

Chicago — Necessity for open hearth repairs caused a loss of 1½ points to 98.5 per cent. Some producers are operating above rated capacity.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Jan. 18	Change	Same week 1940	Same week 1939
Pittsburgh	95.5	None	82	42
Chicago	98.5	— 1.5	92	48
Eastern Pa. ...	96	+ 1	80	34
Youngstown ..	94	None	74	52
Wheeling	100	+ 9	96	64
Cleveland	89	+ 4.5	82.5	59
Buffalo	90.5	None	70	44
Birmingham ..	100	None	94	77
New England..	100	+14	83	70
Cincinnati	88.5	None	74.5	55
St. Louis.....	87.5	None	83	40
Detroit	95	+ 1	91	88
Average	98	+ 1	84.5	51.5

Inventories Index Up 3.1 Points in November

■ Index number of the value of iron and steel manufacturers' inventories in November was 126.9, compared with 123.8 in October, and 111.7 in November, 1939, taking Dec. 31, 1938, as 100, according to the industry survey of the department of commerce.

Index of new orders in November was 214, compared with 211 in October and 151 in November 1939, with January 1939 as 100. Index of shipments in November was 177, against 175 in October and 166 in November 1939, taking January 1939 as 100.

Increase in value of iron and steel manufacturers' unfilled orders from October to November was 14 per cent, compared with a 12 per cent increase in October over September. Increase for last November over the month in 1939 was 23 per cent.

MEN of

George L. Norris

G. Donald Spackman

■ **GEORGE L. NORRIS,** chief metallurgical engineer of Vanadium Corp. of America, was tendered a luncheon Jan. 10 by officers and department heads of the company as a tribute to his long years of service. The day was the thirty-second anniversary of his association with Vanadium and its predecessor American Vanadium Co., and the following day was the seventy-fifth anniversary of his birth.

His services with Vanadium have been continuous except for a period during the World war when he was chief metallurgist of the bureau of aircraft production and manager of the Pittsburgh office of the bureau.

♦

Francis A. Smith has been appointed vice president and general manager, Sargent & Co., New Haven, Conn. He formerly was associated with Greenfield Tap & Die Corp., Greenfield, Mass., in a similar capacity.

♦

D. Hewitt Wood was honored at a dinner Jan. 4 on his completion of 45 years' continuous service as chief engineer, president and chairman of the board, Converse Bridge Co. and Converse Bridge & Steel Co., Chattanooga, Tenn.

♦

L. E. Smith, heretofore superintendent of masonry, Continental Steel Corp., Kokomo, Ind., has been named chief engineer of the corporation's Kokomo plant. He succeeds L. H. Mandeville, resigned. Mr. Smith has been associated with Continental six years.

♦

Arthur S. Hoff has been named assistant manager of sales of plates, shapes and steel sheet piling, Inland Steel Co., Chicago. Since 1933 he has been in the shape, plate and piling division of the company, specializing primarily in sales engineering. Prior to his association with Inland, Mr. Hoff was identified with Jones & Laughlin Steel Corp., Chicago, three years as a sales engineer, and before that three years with American Bridge Co.

♦

G. Donald Spackman has been appointed general manager, Lukens Steel Co., Coatesville, Pa., and its subsidiaries. Associated with Lukens about 21 years, Mr. Spackman has served in the following capacities: Fuel engineer, superintendent of the flanging department, assistant general superintendent, president of Lukenweld division, and general superintendent. Mr. Spackman is a member, American Society of Mechanical Engineers and American Iron and Steel institute.

♦

Ray H. Morris has been elected vice president, Hardinge Brothers Inc., Elmira, N. Y., and will be in charge of the Hartford branch at 7 South Main street, West Hartford, Conn. Prior to joining the Hardinge organization in 1932, he was sales engineer, Davenport Machine Tool Co., Rochester, N. Y., and before that was identified with the Rochester office of Brace, Mueller, Huntley Inc., and R. C. Neal Co., Buffalo. Mr. Morris is a member, American Society of Tool Engineers and American Society for Metals.

♦

Henry A. Roemer, president, Sharon Steel Corp., Sharon, Pa., was honored at a banquet Jan. 16 in observance of his tenth anniversary as head of the Sharon corporation. More than 450 employes of the Sharon and Lowellville, O., plants attended.

♦

J. L. Brown has been elected a vice president, United Engineers & Constructors Inc., Philadelphia. In 1919 he became general superintendent of construction, Dwight P. Robinson & Co. Inc., New York, and in 1928, upon organization of United Engineers & Constructors, went to Philadelphia as its construction manager.

♦

W. S. Roberts, general manager of the Linden, N. J., division of General Motors Corp., has been appointed vice president and general manager of General Motors of Canada Ltd., Oshawa, Ont. He succeeds **Harry J. Carmichael,** who has

Ray H. Morris

W. S. Roberts

INDUSTRY

Oliver E. Mount

D. C. Bakewell

resigned to accept a key position in Canada's war industries production program. Mr. Roberts' early experience was with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in the automotive starting and lighting equipment field.

♦

M. C. Bellamy, since 1934 sales engineer of the Seattle office of Timken Roller Bearing Co., Canton, O., has been made district manager of industrial bearing and steel sales for the Seattle territory. A graduate of Purdue university, Mr. Bellamy spent several years in other industrial capacities before joining Timken in 1928. He was appointed sales engineer in 1930.

♦

J. H. Sanford has been appointed manager, mining division, Ohio Brass Co., Mansfield, O. He succeeds the late John C. Wilson. **Floyd F. Smith,** formerly engineering secretary, has been named assistant manager, mining division.

Mr. Sanford, associated with the company since 1920, has worked in the engineering and sales departments. In 1923 he became affiliated with the mining sales department, being promoted to the assistant managership in 1930. In the ensuing period he served for several years as district sales manager in the Johnstown, Pa., area.

Mr. Smith joined Ohio Brass as a commercial engineer in 1923, and in 1935 became engineering secretary.

♦

Harold F. Falk, production manager, Falk Corp., Milwaukee, has been promoted to general superintendent. He joined the Falk organization following graduation from the School of Engineering, University of Wisconsin. He served as superintendent of the welding department until 1936, a year later was placed in charge of shop production, and in 1940 became production manager.

♦

W. P. Wooldridge, manager of manufacturing and construction accounts in the San Francisco district for Columbia Steel Co., has resigned to join Pacific States Steel Corp., Rialto building, San Francisco, as general manager of sales. Mr. Wooldridge was with Columbia Steel the past eight years and before that was with National Tube Co., working out of the New York office.

♦

Donald C. Bakewell, vice president, Union Steel Castings division of Blaw-Knox Co., Pittsburgh, was re-elected president of Steel Founders' Society of America at a meeting of the new board of directors in New York, Jan. 8. **Oliver E. Mount,** vice president American Steel Foundries, Chicago, was elected vice president.

New executive committee includes Mr. Bakewell, Mr. Mount and **Lee C. Wilson,** general manager, Reading Steel Castings division of American Chain & Cable Co. Inc., Reading, Pa.

In addition to members of the executive committee the following are members of the new board: **J. A. Sauer,** vice president Symington Gould Corp., New York; **F. G. Russell,** president, Florida Machine & Foundry Co., Jacksonville, Fla.; **C. W. Howat,** district sales manager, Duquesne division of Continental Roll & Steel Foundry Co., Pittsburgh; **F. K. Donaldson,** superintendent, Machined Steel Casting Co., Alliance, O.; **C. L. Harrell,** vice president, Sterling Steel Casting Co., East St. Louis, Ill.; **I. L. Johnson,** president, Pacific Steel Casting Co., Berkeley, Calif.

Col. Merrill G. Baker was reappointed executive vice president, and **Raymond L. Collier,** secretary-treasurer.

♦

F. H. Frankland, chief engineer and technical director, American Institute of Steel Construction, New York, has become director of engineering and will devote his entire time to technical research related to the design and use of structural steel and to other matters of engineering economics with which the institute is concerned.

T. R. Higgins, who has been in charge of the institute's New York

J. H. Sanford

W. P. Wooldridge

metropolitan office the past year, has become chief engineer and will supervise and manage operations of the institute's district offices throughout the country.

♦

Louis R. Botsai has been appointed manager, gearing department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The past three years Mr. Botsai has been sales manager of the company's small motor division at Lima, O. Before that he was for eight years sales manager of gearing apparatus at the Westinghouse Nuttall works in Pittsburgh.

♦

George D. Keller, vice president in charge of sales, Studebaker Corp., South Bend, Ind., has been appointed assistant to H. S. Vance, chairman. In his new capacity Mr. Keller will be engaged in activities related to the company's defense manufacturing program.

K. B. Elliott, vice president and assistant to Paul G. Hoffman, president, succeeds Mr. Keller.

♦

Harold A. Hallstein, since 1934 vice president, The Austin Co., Cleveland, has also been named assistant general manager. Mr. Hallstein joined the organization in 1911 and has been its general auditor since 1926. **Allan S. Austin,** son of the late Wilbert J. Austin, who was president of the company until his death Dec. 4, is now secretary. He has been associated with the company since 1927. **George W. Plaisted,** vice president and general sales manager, who joined the company in 1916, has been elected a director. Other directors and officers have been re-elected.

♦

George B. Kutz was recently appointed district sales manager for the southeastern territory of Wright Mfg. division of American Chain & Cable Co. Inc., York, Pa., with headquarters in Atlanta, Ga. Mr. Kutz has been associated with American Chain & Cable many years and for several years was district sales manager at Chicago for the American Chain division. Recently he had been located at York.

♦

Arch T. Colwell, vice president in charge of engineering, Thompson Products Inc., Cleveland, has been elected president of the Society of Automotive Engineers.

David Beecroft, Bendix Products division, Bendix Aviation Corp., South Bend, Ind., is treasurer, and new members of the S.A.E. council for term of 1941-42 are: **N. C. Millman,** General Motors of Canada Ltd., Oshawa, Ont.; **H. O. Mathews,** Public Utility Engineering & Service Corp.; and **D. A. Fales,** Massachusetts Institute of Technology, Cambridge, Mass.

Louis R. Botsai

H. A. Hallstein

A. S. Austin

New vice presidents and their divisions include: Aircraft, **Mac Short,** Vega Airplane Co., Los Angeles; aircraft engine, **Dr. George W. Lewis,** National Advisory Committee for Aeronautics, Washington; diesel engine, **L. C. Lichty,** Yale university, New Haven, Conn.; fuels and lubricants, **J. B. Macauley Jr.,** Chrysler Corp., Detroit; passenger car, **Karl M. Wise,** Bendix Products division, Bendix Aviation Corp.; passenger car body, **J. R. Hughes,** Studebaker Corp., South Bend, Ind.; production, **E. S. Chapman,** Plymouth division, Chrysler Corp., Detroit; tractor and industrial, **Chauncey W. Smith,** University of Nebraska; transportation and maintenance, **T. L. Preble,** Tide Water Associated Oil Co., Philadelphia; truck, bus and railcar, **R. S. Reed,** Brockway Motor Co. Inc., Cortland, N. Y.

♦

J. J. Curtin, the past 11 years in charge of sales promotion and publicity work in the motor division, industrial department, General Electric Co., Schenectady, N. Y., has been transferred to the wire and cable division, central station department, Fort Wayne, Ind. He is in charge of magnet wire sales, replacing **B. F. Ilsley,** who has moved to Schenectady to be general assistant to **W. V. O'Brien,** division manager of wire and cable. **O. F. Vea** has taken over the work formerly handled by Mr. Curtin.

P. A. McTerney has been named manager of sales, large motor and generator division, industrial department.

An apparatus agency sales section has been added to the industrial department, and is under supervision of **G. L. Irvine,** who has been appointed manager of apparatus agency sales. **G. E. Cassidy** has been named engineer, general applications section, a new division of the industrial engineering department, while **J. S. Overstreet** has been placed in charge of wire and cable sales, wire and cable division, Schenectady.

♦

W. Neal Gallagher, president and general manager, Automatic Washer Co., Newton, Iowa, was re-elected president, American Washer and Ironer Manufacturers' association, at the organization's annual meeting in Chicago, recently. He is beginning his fourth year as association head.

Oscar Lenna, president and general manager, Blackstone Corp., Jamestown, N. Y., was named first vice president; **Walter K. Voss,** general manager, Voss Bros. Mfg. Co., Davenport, Iowa, second vice president; **H. A. Bumby,** president, Barlow & Seelig Mfg. Co., Ripon, Wis., third vice president, and **Joseph R. Bohnen,** secretary-treasurer.

New executive committee includes: **L. C. Upton,** president, 1900 Corp., St. Joseph, Mich; **J. M. Wicht,** manager of home laundering equipment sales, General Electric Co., Bridgeport, Conn.; **George M. Umbreit,** vice president, Maytag Co., Newton, Iowa; **I. N. Merritt,** president, Meadows Corp., Chicago; and **Del Rizor,** vice president in charge of sales, Dexter Co., Fairfield, Iowa.

Forty Key Men Transferred from Buick Motor Division to Aircraft Engine Plant

D. E. Williams

J. G. Hammond

R. H. Archer

W. N. Larke

Ivan L. Wiles

Byron H. Newell

William G. Mixer

■ **D. E. WILLIAMS,** formerly comptroller, Buick Motor division, Flint, Mich., has been named operating manager of the new Buick aircraft engine division, in a transfer of over 40 key production and engineering men from the automobile company to provide a nucleus for the engine plant staff.

J. G. Hammond, formerly general superintendent, who incidentally laid out and tooled the Buick auto engine plant, has been appointed general manufacturing manager, assisted by **Harry C. Young** as comptroller and **John Bobay** as assistant comptroller; also by **I. H. Larkin,** formerly superintendent of tool manufacture, who becomes assistant manufacturing manager, **R. H. Archer,** formerly chief of standards, now general superintendent, and **James O'Neil,** formerly assistant superintendent of the gear and axle plant, becoming assistant general superintendent.

C. N. Ofield, Buick chief inspector, takes over duties of chief inspector in the aircraft organization. **H. E. Hardenbrook,** formerly assistant works engineer, becomes works engineer of the new plant, and **R. E. Mitchell,** formerly assistant master mechanic, becomes master mechanic. **C. L. Foreman,** hitherto assistant chief metallurgist, is chief metallurgist.

Engineering will be directed by **Charles A. Chayne,** Buick chief engineer, with **Harry Golden** assistant chief engineer of the new organization. Other engineers transferred are **E. E. Harts** on engine test, and **F. McNamara** on specifications and engineering accounting.

L. A. Stewart will direct purchases for the aircraft plant in addition to his duties as Buick purchasing agent. He will be assisted by **B. W. Stickney.**

C. E. Wooliever will have charge of personnel. **D. B. Barrett** is assigned as traffic manager.

Changes in the Buick organization occasioned by the shifts include: **Walter N. Larke,** who moves from assistant to general superintendent; **B. H. Newell,** from foundry to assistant general superintendent; **William G. Mixer,** foundry superintendent; **John F. Kennedy,** chief of standards; **John E. Weckler,** assistant foundry superintendent; **Albert R. Bender,** chief inspector; **Fred W. Moore,** superintendent of tool manufacture; **Albert A. Miller,** assistant works engineer; **Waldemar Velguth** moves from supervisor of specifications to assistant chief metallurgist; **John A. Hoholik,** assistant superintendent of the axle plant; **Homer Schultz,** assistant master mechanic. **Ivan L. Wiles** succeeds Mr. Williams.

Automobile Executive Named Liaison Officer

■ An automobile company executive 25 years, Fred Rockelman was recently appointed liaison officer between Douglas Aircraft Co., Santa Monica, Calif., and its automotive subcontractors in Detroit. Mr. Rockelman is assisting Fred Essig, Douglas production and procurement engineer, now eastern managerial representative. Offices are in Detroit-Leland hotel.

Mr. Rockelman started with Ford Motor Co. in 1913, in the mechanical department, and in 1927 was named sales manager. In 1930 he joined the staff of Walter P. Chrysler and was named president of the Plymouth division. He resigned in 1932 to join Continental Motors Corp., Muskegon, Mich.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

TNEC holds first meeting since national election, preparing to present final report to congress before April. Its secretary pens his observations on the steel industry . . . Congressman reintroduces bill to nationalize steel, saying "it's necessary for defense" . . . Brookings institution survey indicates how program can be financed "without increasing public debt"

WASHINGTON

■ TEMPORARY national economic committee, created by congress in 1938, met last week for the first time since the national election to discuss its final report. This is to be made to congress not later than April of this year.

Dewey Anderson, executive secretary, made what he termed a progress report to the committee. In his discussion of the iron and steel situation, Mr. Anderson said:

"The most extensive hearing conducted by the TNEC was on the subject of iron and steel. The United States Steel Corp. accepted its obligation to testify so seriously that it developed an elaborate research study which it published in three volumes. Its engineers and economists were engaged in this research for months before the hearings, assembling a body of data which adds much to our knowledge of this basic industry.

"The hearings directed attention to the iron ore industry, price policy and price behavior, and the position of exports in the industry. The ten largest companies own 88 per cent of the funds invested in the iron and steel industry; the five leading companies produce over 50 per cent of the total output of each steel product; two leading companies possess 55 per cent of the total assets invested in the steel industry.

"Steel's importance in the American economy is revealed by the fact that it ranks first in value of all manufactured products, in value added by manufacture, and in number of wage earners employed. Located largely in three centers, Pittsburgh, Chicago, and Birmingham, producing a heavy and bulky product, transportation and freight cost becomes a major problem to the industry.

"The demand for steel products fluctuates widely with changing factors in the business cycle, making the industry alternate between 'prince and pauper' among manufacturing enterprise. But while demand, production, employment, payrolls and earnings show enormous variations, steel prices do not. This appears due to the integration found in the industry, with various forms of rivalry rather than true competition prevailing among the several companies.

Price Determination Discussed

"The hearing went into the matter of price in detail, discussing the basing point system, price changes and deviations, 'extras,' the relationships of transportation to steel prices, delivered prices, 'phantom' freight, fabrication in transit, and identical bids. Numerous suggestions have been made to bring about price competition in the steel industry, among them the pricing of steel 'at the mill' rather than 'delivered,' and the allocation of government contracts according to the capacity of various bidders to produce the product.

"Representatives of the steel industry advanced other methods of meeting the issues raised in the hearings, such as reduction in costs, principally of labor, liberalization of government policies of taxation and labor relations to permit a larger flow of investment in order to increase capacity, and steel prices fixed for given periods of time by consultation."

Representative Burdick, North Dakota, last week introduced a bill (H. R. 2076) providing for government ownership of the iron and steel industry "necessary for national defense."

The bill is the same (H. R. 3756) as that which he introduced in the last session of congress and on which no hearings were held. The bill, referred to the house committee on ways and means, provides for government ownership "to assure the government needed iron and steel and their derivatives at a fair price, consistent with our avowed purpose of arming to defend democracy."

On the floor of the house last week Mr. Burdick said: "The industry is to be operated by a board composed of nine members, four to be chosen by workers in the industry and five to be appointed by the President, with advice and consent of the senate, representing the people.

"This board is given plenary powers to acquire iron and steel plants, negotiating as to the price, or exercising right of eminent domain.

"Actual past earnings are to be considered in arriving at a price and the real value of properties.

"This board will naturally put technicians, not politicians, in charge of control and to determine prices."

Arrangements have been made by the industrial materials division of the defense commission with the British for the shipment of large quantities of pig iron from the British Isles to the United States. This material will be carried in British ships which heretofore have been making the return journey to this country empty or with only partial cargoes.

The program for acquiring stock

piles of strategic and critical raw materials sufficient to carry through the emergency has been moving ahead. But this has been a difficult task, as W. L. Batt, deputy commissioner of the division, explained recently. "Huge stocks of these materials are not lying around the world waiting to be purchased," he pointed out.

"Negotiations are difficult. Trade restrictions are manifold. Sometimes production and deliveries, because of shipping difficulties, are slow. We were able to make a couple of quick purchases of substantial supplies of antimony and chrome ore in Indo-China and the Mediterranean, but those were the exceptions rather than the rule.

"The stock pile program, calling for the accumulation of about 2 years' reserves of the strategic materials, is well along from the standpoint of contracting for deliveries, but even if we had title to it a ton of chrome ore in the mountains of Turkey would not help us produce a single pound of high-grade steel.

"There are two other possible courses of action. One is to find substitutes. We are following this line, too, notably in the case of rubber, where we are arranging for greatly increased production of synthetic.

"The last course is salvage and reclamation. We try to save this one as a last resort. But, just to be on the safe side, we are developing detailed plans for gathering up waste products and re-using them wherever possible."

Financing Defense Without Increasing Public Debt

Whether economic disaster is inevitable at the end of the war emergency will depend chiefly upon the degree of success the nation has in maintaining economic and financial stability during the emergency, according to a study of fundamental economic issues in national defense, made public by the Brookings institution, a non-governmental organization. The study was made by Dr. Harold G. Moulton, president of the institution. It is part of a larger inquiry into the bases of national prosperity which is being financed by Falk Foundation.

The report states that the defense program can be financed without increasing the public debt, and without imposing an unbearable tax burden, assuming an increase in the national income to an average of 85 billions annually during the next three fiscal years. To meet all expenses, federal, state, and local, would require about 25 per cent of total national income. This would represent a somewhat lighter burden than the 22 per cent taken in taxes in the fiscal year 1938, when the national income was 66 billions.

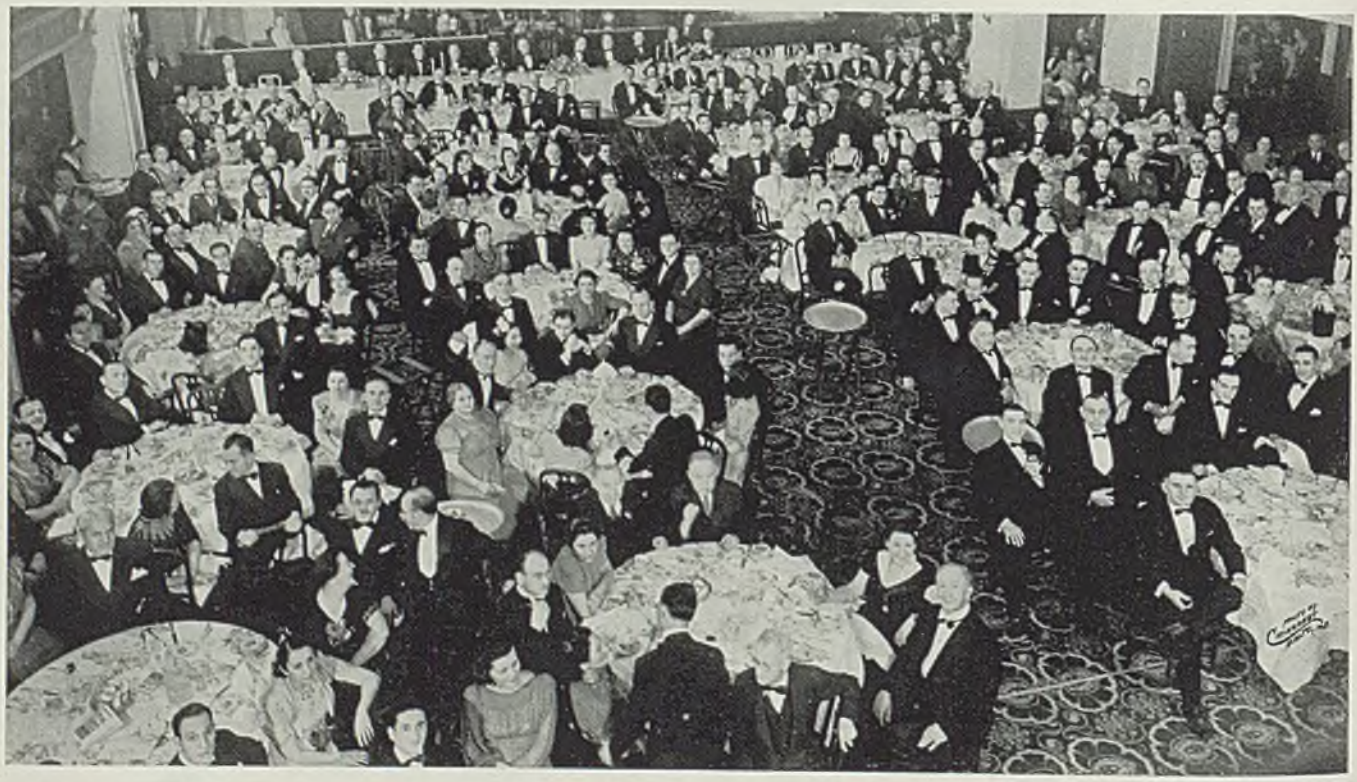
Prudent financial management, of course, is essential if the budget is to be balanced. This implies holding military appropriations to clearly established essentials, cutting non-military outlays to the bone, and broadening the base of the tax system as well as increasing tax rates.

The achievement of a balanced budget would prevent dislocations resulting from inflation during the emergency, and would also mitigate the depressing effects of post-war readjustment that would otherwise arise from deflation. At the same time, it would provide a basis for confidence in the nation's ability to maintain fiscal and financial equilibrium in the future.

The preparedness effort will not require profound readjustments in the nation's economic life. But there is danger of over-estimating the amount of additional war production that can be brought about by "taking up slack" in industry. As a practical matter, industrial slack is very unevenly distributed.

Thus the nation is faced with a crucial question of defense policy, whether to obtain increased output of war supplies by building additional plant capacity or by converting plants now engaged in producing peace goods into munitions establishments. This issue must be

At Scrap Iron and Steel Institute's Convention Banquet



■ More than 500 attended this function, incidental to the institute's annual meeting in Baltimore, Jan. 7-9. The organization, as reported in STEEL, Jan. 13, p. 18, is preparing to move its headquarters from New York to Washington

considered not only in relation to the efficiency and speed of the war program, but also with reference to post-war consequences. The building of additional plant capacity in concentrated lines would complicate the problem of post-war readjustment, as compared with converting peace production facilities to the manufacture of armament.

Vocational Training Project To Be Continued Two More Terms

Continuation of the defense vocational training project for at least two additional terms of three months each and an increase in the number enrolled are provided for in a new works progress administration allotment of $17,821,680, according to Fred R. Rauch, acting deputy commissioner.

Project was initiated last July with an allotment of $9,781,340. Funds made available for training unemployed men and women in skills and trades demanded by the defense program total $27,503,020. This was supplemented by $10,590,000 furnished by the office of education.

Purpose is to afford vocational training for unemployed workers in fields where shortages exist or are anticipated. Facilities of regular trade and vocational schools are used. Trainees are drawn both from WPA rolls and registers of the United States employment service. Those selected from WPA continue to receive their regular wages throughout the period of training.

Mr. Rauch pointed out that to Nov. 27 a total of 49,974 WPA workers had been enrolled for training. Approximately 8300 of these have left the project of their own accord, with more than two-thirds of them known definitely to have secured employment in private industry. It is reasonable to assume, Mr. Rauch said, that most of the remainder, although they did not report reasons for leaving, also found jobs.

FTC Reports on "Machine Tool Manufacturing Corporations"

Report on "Machine Tool Manufacturing Corporations," recently published by the federal trade commission, includes eight of the more important concerns in this industry, from the standpoint of investment and goods sold. Data are shown in combined form and in a manner that precludes identification of any individual corporation.

The 1939 preliminary report of the census bureau shows combined value of products for the machine tool industry was $218,044,728. Corporations included in the FTC survey reported consolidated sales for 1939 aggregated $79,045,896, or slightly over 36 per cent of total.

Costs and expenses applying to the goods sold, or the total operating outgo (including raw materials, wages, taxes, depreciation etc.) aggregated $65,424,294.

Net income on the average corporate net worth investment, or stockholders' equity, after provisions for income taxes, was $10,999,718, a rate of return of 14.6 per cent of the stockholders' investment. Rates for individual corporations ranged from a loss of 0.6 per cent to a profit of 26.2 per cent.

Combined net income, before deduction of interest on long term borrowings and income taxes, on the average total capital employed by these corporations in their machine tool manufacturing operations, was $13,868,256 in 1939. This represented a rate of return of 19.5 per cent on the total capital employed in manufacturing operations. The rates of return for individual corporations ranged from a loss of 0.01 per cent to a profit of 34.2 per cent.

Cash dividends paid, or accrued, on preferred shares totaled $57,754 in 1939, and on common, $6,622,340. These represented a return of slightly more than 8.8 per cent to the stockholders on the average ledger value (not market value) of their equity of $75,610,014.

Gear Sales Average Up 49.5 Per Cent in 1940

■ Industrial gear sales' comparative index figure in December, 1940, was 208, according to the American Gear Manufacturers association, Wilkinsburg, Pa. It was 20 per cent above November last year, when the index was 173, and 87 per cent above December, 1939. In latter month the index stood at 111. Highest comparative index last year was in October, 216; lowest was in March, 114.

Monthly average index for all of 1940 was 155; in 1939 the average was 103. Year ending December, 1940, was 49.5 per cent above the corresponding period in 1939.

Compilation as set forth by the association applies only to industrial gears. It does not include automotive gears or gears used in high-speed turbine drives.

301 Electric Trucks Booked in December

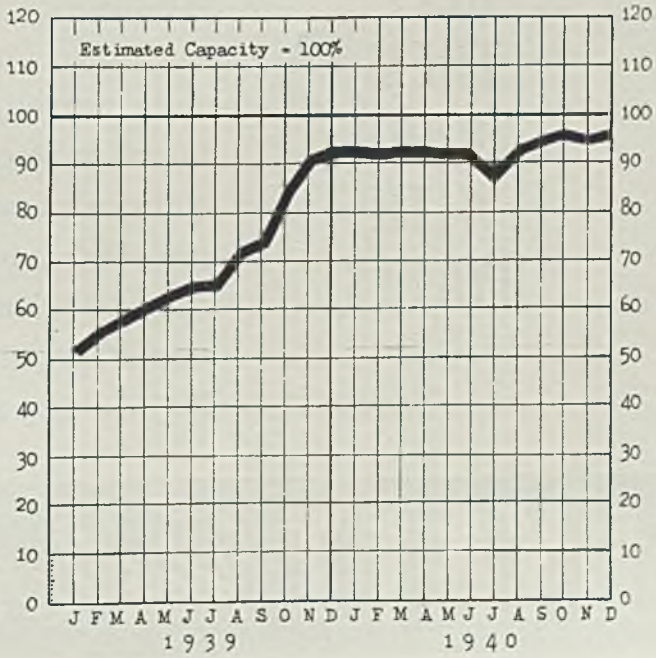
■ Domestic bookings of electric industrial trucks and tractors in December totaled 301 units, according to the Industrial Truck Statistical association, 208 South La Salle street, Chicago. Bookings last month continued the upward trend of 1940, were highest for any month in recent years, and compared with 249 units booked last November.

Total net value of chassis booked in December was $1,069,902.75, against $827,003.73 in the month preceding. Bookings included: Cantilever trucks, 270 units, with aggregate net value of $973,615.25; 14 nonelevating platform trucks, total value, $31,622.50; eight crane trucks with $41,450 total value; six tractors, valued at $12,265; and three special non-load carriers with a total net value of $10,950.

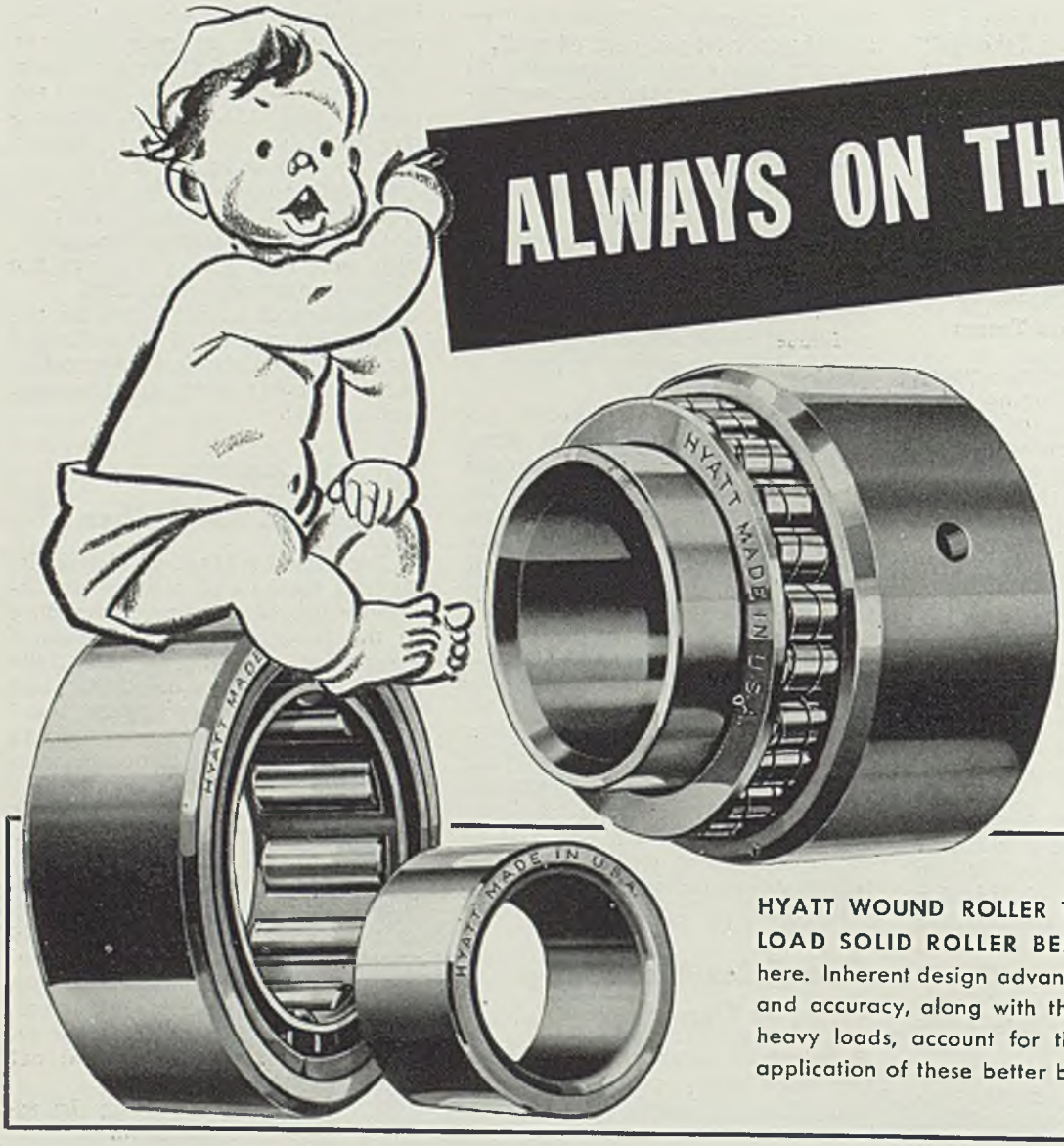
Detailed information may be secured from the association.

Machine Tool Output at Record High

■ December production by the machine tool industry established a new record. Operations, measured in payroll hours, averaged 96.8 per cent of capacity, equal to the former record established in October. Capacity was higher in December, however, having increased 4 per cent over November, and 61.2 per cent since the European war started in September, 1939. Chart by National Machine Tool Builders' association, Cleveland



ALWAYS ON THE GO



HYATT WOUND ROLLER TYPE AND HY-LOAD SOLID ROLLER BEARINGS shown here. Inherent design advantages, uniformity and accuracy, along with their capacity for heavy loads, account for the wide-spread application of these better bearings.

KEEP THEM YOUNG WITH HYATTS

BECAUSE OF FRICTION-FREE HYATTS at vital operating positions, very little bearing attention is required by the tables, cranes, motors, cars, etc. that handle the work around busy mills. With Hyatts carrying the loads, production is speeded up, and bearing wear and care eliminated. To keep your equipment on the go, always, be sure Hyatts are there when *you* next make additions or change-overs. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, N. J., Chicago, Pittsburgh, Detroit and San Francisco.

HYATT *Roller* BEARINGS

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Germans already laying groundwork to blitzkrieg world motor markets by standardizing types of vehicles . . . Tool and die programs for 1942 models not generally released although scattered instances of a start are noted . . . High-speed superhighways seen as placing new demands on motorcar stamina . . . Wide-base rims prolong tire tread life but call for minor engineering changes to prove acceptable

DETROIT

■ ABOUT a year ago it was pointed out in the British trade press that a complete standardization of the German motor industry has permitted release of important facilities for military purposes and also had placed the German industry in more favorable position with regard to foreign competition. What was done was to make sweeping reductions in the number of different types of vehicles produced. Thus, private car models were reduced from 55 to 30, commercial cars from 113 to 19, tractors from 72 to 18, three-wheelers from 20 to three and motorcycles from 150 to 30. This was done by the simple expedient of government decree.

The suggestion was made at the time that Britain might be wise to institute such standardization, looking ahead to the postwar period when competition for world markets resumes. However, the government turned a cold shoulder to the whole affair then.

Now it appears that Germany is spreading out its standardization efforts into France and Belgium, foreseeing the day when the entire continental motor industry will be under its thumb to constitute a powerful economic arm thrusting out for world trade, in which naturally the American producers comprise the only serious competition.

It is amusing to speculate on what would happen should the government in this country seek to effect such sweeping reductions in the number of different types of motor vehicles allowed on the market. Obviously, with the tremendous domestic market in this country, it would be foolish even to contemplate such a move, except perhaps in the interest of speeding up defense production. In the latter case, restrictions on production would be more likely than on number of vehicle types.

But even artificial restrictions on production would work tremendous hardships and create serious dislocations in the automobile picture. For example, suppose a certain make of 1942 model should prove unexpectedly popular and demand accelerated. At the same time output would be limited by government fiat, so when the limit was reached with demand unsatisfied, those models would begin to bring a premium out of proportion to their worth.

Scrap Price Reducion Was Arbitrary

Every interference with the normal functioning of supply and demand, whether in the guise of war emergency, political expediency or whatnot, brings with it only more confusion and inequalities. Current example is the arbitrary reduction of up to $2 a ton on iron and steel scrap forced by the government under threats of taking over the scrap industry. Scrap dealers found it useless to argue the point with Leon Henderson and his staff, who simply brushed complainants aside with the comment that they were sick of hearing about supply and demand.

Incidentally, the above threats were very real. Plans apparently have been completed whereby the government would take over scrap from all sources, including automobile plants, and ration it to steelmakers as it saw fit. One version is that the government has been assisted in perfection of these plans by an international broker who worked out scrap cartel arrangements for both Hitler and the British government.

■ WHILE decisions have been made to proceed with 1942 models by the leading manufacturers, no signs of any tool and die work in this connection have been detected among small shops in this area concentrating on automotive work. Briggs tool and die division is busy on dies for Packard and Chrysler models, the latter presumably 1942 creations, and they are scheduled for readiness late in the spring.

Assemblies of the Ford 6-cylinder engine are going ahead and the expected level of 600 per day is just about reached. A bank of better than 3000 has been built up and is being expanded rapidly.

Possibility of more steel being used in motor car tire rims is seen, based on observations made at a symposium on wide-base tires and rims at the recent S.A.E. meeting here. Engineers have been discussing the matter for the past year and now are proposing the use of existing tire sizes on rims from 1 to 1½ inches wider than at present, giving a rim ratio of 75 to 82 per cent of tire width, against 60 to 68 per cent now. This ratio is that of rim width, between vertical rolled flanges, and inflated tire width.

Dr. Sidney M. Cadwell, United States Rubber Co., Detroit, speaking at the symposium, cited principal benefits of wider rims and lower inflation pressures as: More stability in the car and a 20-22 per cent increase in tire tread life. Disadvantages include more tire harshness, more pavement seam bump absorption, greater parking effort, more rim damage from curbs and

more tire tread shoulder cracking. Changes in steering, suspensions and shock absorber systems can overcome most of these adverse results, with the exception of rim damage from curbs. This can be minimized by more careful handling of cars by drivers when approaching a curb.

Dr. Cadwell mentioned a new condition of tire and car service which has made its appearance during the past year, in connection with new nonstop, limited access highways such as the Pennsylvania turnpike, the latter a 160-mile superhighway which has been traversed by experienced drivers at speeds of 110 miles per hour. Average motor cars have not been designed for such prolonged high-speed operation. Tires, bearings, lubrication and other elements may be coming in for changes as these highways are extended.

This may be an important clew to the direction of model changes. It would call for accent on ruggedness and dependability rather than on revised appearance. This fits in well with present conditions since extensive retooling probably is out, permitting concentration on mechanical changes in engines, axles, transmissions and differentials and wheels.

Hudson directors have approved changes in the company's charter permitting it to engage in ordnance manufacture for the navy department. A $14,000,000 plant will be erected at Mound and Nine-Mile roads, outside the city, in the general vicinity of the Dodge Truck, Rotary Electric Steel, Carboloy and Chrysler tank plants. Eventual employment will run to about 6000.

President of one of the leading truck building companies in this district, already swamped with army truck orders, recently was called to Washington and informed of another large order for his company. He protested mildly that his plant was now booked solidly some months ahead and that it would be exceedingly difficult to accommodate the new order. Essence of the government reply: "That's too bad, but here's the order. Now take it back home and get started."

An itinerant inventor has brought to Detroit to show to a number of engineering experts here what he considers a potent new weapon for airplanes. It is an aerial bomb, the shell of which is made of glass onto which is fitted the usual nose with percussion cap. His theory is that the glass has much better fragmentation characteristics than steel, that the bomb will not dig out a crater when it hits and will spend its full destructive force at the surface.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,692	449,492
Feb.	202,597	317,520	422,225
March	238,447	389,495	440,232
April	237,929	354,266	452,433
May	210,174	313,248	412,492
June	189,402	324,253	362,566
July	150,450	218,494	246,171
Aug.	96,946	103,343	89,866
Sept.	89,623	192,678	284,583
Oct.	215,286	324,688	514,374
Nov.	390,405	368,541	510,973
11 mos.	2,248,211	3,263,600	4,185,407
Dec.	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
Dec. 21	125,350	117,705
Dec. 28	82,545	89,365
Jan. 4	76,690	87,510
Jan. 11	115,935	111,330
Jan. 18	124,025	108,545

†Comparable week.

Chevrolet 1940 Sales Second Best

Motor company statisticians have had a pleasurable task this month in adding up sales figures for 1940. In numerous cases, the year was an all-time high; in others it was close to this level. Chevrolet, for example, experienced its second best sales year, with a total movement of 1,046,069 cars and trucks, a gain of 32 per cent over 1939. This figure, incidentally, constitutes 56 per cent of entire sales of all General Motors divisions to dealers in the United States for the year, although the addition of Canadian production and export shipments brings the GM total to 2,025,343, a 31 per cent gain over 1939.

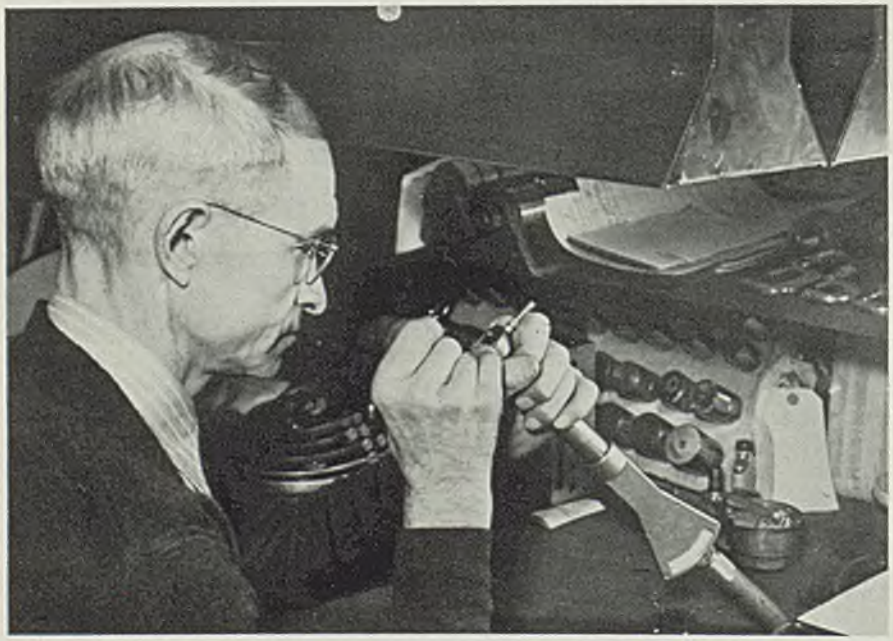
In selling a million new cars Chevrolet dealers turned over 1,909,972 used cars to bring their grand total of sales nearly to 3,000,000. This appears to maintain the ratio of two used cars sold for every new unit retailed, which has been the industry's average for a number of years.

Oldsmobile had the biggest sales year in its 43-year history, 37 per cent ahead of 1939 and 9 per cent ahead of the previous high in 1937. Olds officials point out that more than 40,000 cars equipped with Hydra-Matic drive are now in the hands of 1941 owners, or about 20 per cent of total 1940 sales.

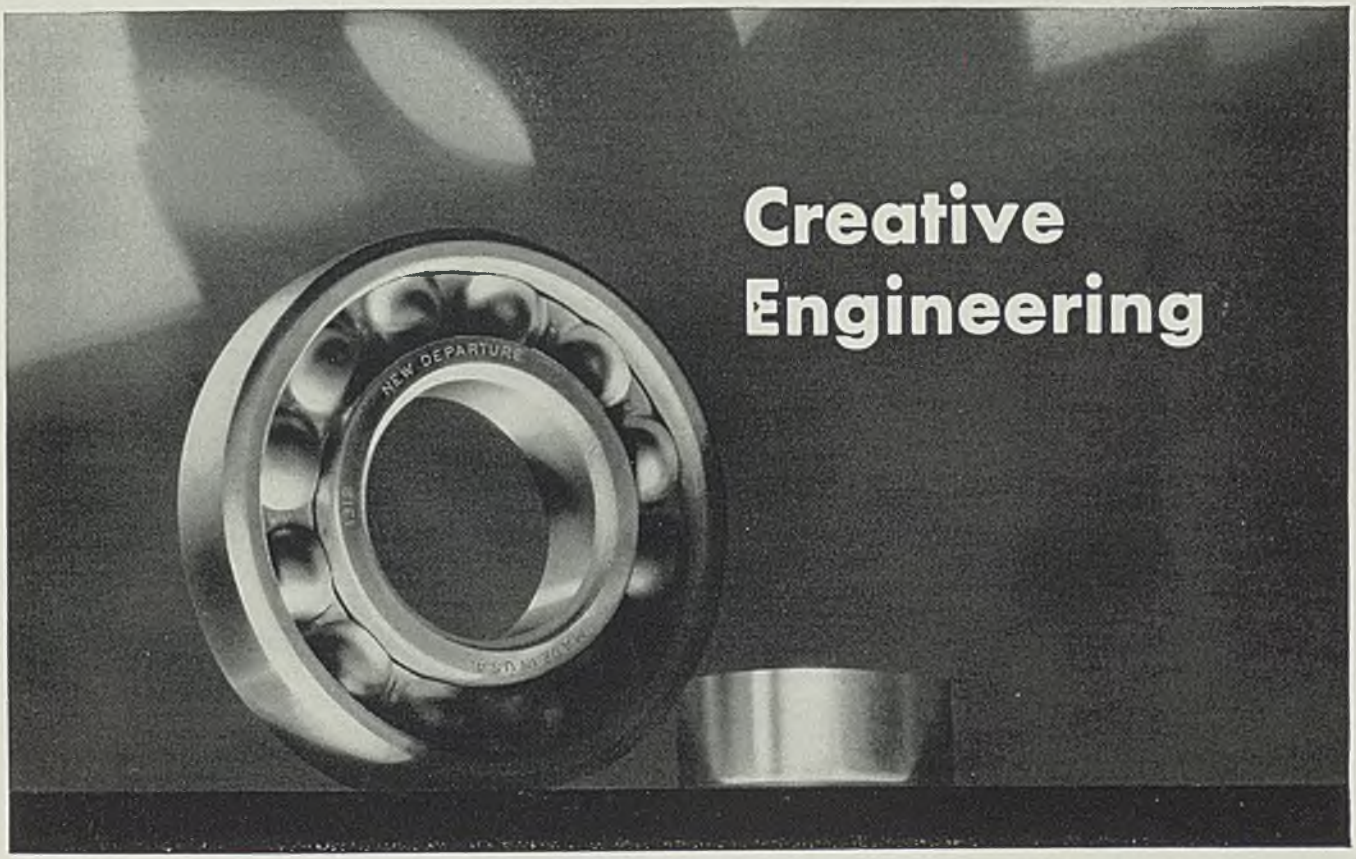
Studebaker had the best year since 1928, moving 119,500 cars and trucks. Sharp curtailment of export volume, normally accounting for 15 per cent of the total, was a feature of the year. Buick 1940 sales hit an all-time high at 297,381, a 34 per cent gain. Ford car and truck sales passed the million mark and the company produced 35,683 tractors. Pontiac dealers sold 239,402 new cars and 449,097 used cars during the year. Hudson domestic retail sales added up to 80,500, representing a 22 per cent increase

(*Please turn to Page* 105)

Peers Into Differentials



■ For peering into differentials Pontiac has adopted this Swedish internal gage to check bearing diameters in the differential carrier. It replaces the common "plug" gage and was adopted because it not only measures but records the measurement on the handle dial, thus making a selective fit possible. Differential bearing diameters are kept within one-thousandth of an inch. Here Van Smith, veteran Pontiac gage expert, makes a periodic check of the new gage's accuracy



New Departure's Famous "Firsts" include:

first coaster brake for bicycles
first yellow taxicab
first monobloc engine
first dual purpose ball bearing
first preloaded bearing
first self-sealed pump shaft bearing
first bearing with oil-circulating system
first self-sealed conveyor roll bearing
first successful treadle roll ball bearing
first "lubricated-for-life" ball bearing
first self-sealed mine car bearing

This company has been pioneering for over fifty years. It is "young enough to venture, old enough to know how." These new departures by New Departure are evidence of the creative ability of its engineers, which is freely at your disposal to improve your machine performance. New Departure, a division of General Motors, Bristol, Connecticut.

NEW DEPARTURE

THE FORGED STEEL BEARING

2954

Automobile Builders See Flaws in Labor Leaders' Airplane "Plans"

DETROIT

■ A PLETHORA of "plans" for new approaches to defense manufacture is being showered on the national defense advisory commission and the administration in Washington by labor union officials. First was the proposal of Walter P. Reuther, UAW-CIO official, to gear up the automotive industry in six months time to produce 500 airplanes a day; then the proposal of J. J. Griffin, executive of the Society of Tool and Die Craftsmen, for expediting government work in smaller tool and die shops; then a proposal by the CIO to expand steelmaking capacity.

Reception of the plans naturally has been cordial. On their face, they represent honest efforts by labor unions to offer constructive suggestions. No good can be accomplished by dismissing them as the work of upstarts, since union leaders would quickly seize on such an attitude and raise the cry that they were being persecuted by management.

Publicity given the plans creates the impression in some quarters that labor leaders are working actively in the interest of defense and raises their prestige. It is good politics.

This being the situation, such proposals must be handled with kid gloves and given careful scrutiny. But no matter how patriotic and feasible a plan may appear, its application can be determined only in the light of sound manufacturing principles and economics.

Would Postpone New Models

Official sources are silent as far as expressing definite opinions on the plans. Automobile and parts companies, tool and die shops and other suppliers now are in process of gearing up for production under the setup worked out by the defense commission and the automotive committee for air defense. Until final details of this planning are completed and work is started, officials are chary of either welcoming or condemning the proposals.

Reuther's plan essentially involves restricting automobile production to predetermined levels, postponing new model development, "borrowing" motor plant facilities for aircraft parts manufacture, assembling engines in idle plants in the Detroit area and bringing engines and plane subassemblies together in new hangars at airports.

He claims that peak production of motor cars in certain months is against the national interest and unnecessary. Since 1933 auto companies have been trying to spread production out more evenly through the year, and with considerable success.

Obviously there must be a dip in production during model changes, but given good retail demand, which is itself a most unpredictable thing, car manufacturers can keep production within well-defined limits and still fill orders.

Automobile production facilities, it has been shown time and again, cannot be used interchangeably on motorcars or aircraft contrary to popular belief. Much of the machine and tool capacity mentioned by Reuther could not be applied to any large extent in airplane manufacture.

National defense commission officials in Washington privately believe Reuther's plan is unpractical because sufficient raw materials, especially aluminum and steel castings, could not be obtained to manufacture 500 planes a day. One official, in an off-the-record remark, said he doubted there was "enough aluminum produced in all the world" to supply materials for 500 planes daily.

Reuther, when questioned about the raw materials aspect at a Washington press conference, said his plan did not consider this angle but only the men and machines required.

5,000,000 Net Tons Steel Lost by Ship Sinkings since War Started

■ BASED on reports of the number and classes of vessels sunk as a result of the war it is estimated 5,000,000 net tons of steel was lost in 1940. In addition to ships, there were other permanent steel losses, such as in underwater mines, submarine nets, equipment used by minesweepers, torpedoes, and airplanes which crashed into the sea.

By far the largest loss was in merchant steel ships, estimated as equivalent to 4,800,000 tons of steel. Naval ships sunk and not recoverable are estimated to represent 200,000 tons of steel. Many ships were sunk in harbors and may be salvaged or recovered as scrap. Because of heavy steel members and special steels in naval ships, recovery is more profitable than in the case of merchant ships.

A basis, in part, for the estimate is found in the report by the British admiralty as of Dec. 18, covering the first 67 weeks of the war. These losses were: British, 615 ships, or 2,583,895 maritime (not steel) tonnage; allied and neutral, 1000 ships, 4,155,109 tons; German, sunk or captured, 226 ships, 1,132,639 tons; Italian, sunk or captured, 72 ships, 365,661 tons; totaling 1913 ships, or 8,237,304 tons.

British Library of Information, New York, has some figures on naval losses as of last September. According to these the British lost 245,429 tons; the Germans, 56,780 tons. The German figures do not include submarines, gunboats or torpedo boats, while the British do. This source does not give figures for Italian, French or Scandinavian naval losses.

At the start of 1941 the German high command issued a report of ship losses since the signing of the armistice with France on June 25, 1940. It was stated the German navy and air forces in that period sank 190,000 tons of British ships of war and over 3,900,000 tons of merchant ships. These tonnages did not include ships sunk by mine,

"Tons" as used in the foregoing are maritime, or displacement tons. To convert them into actual steel in the hulls and superstructures, one computes two-thirds in the case of merchant ships and one-third for naval ships, the latter being figured in displacement tons instead of gross tons.

The German high command also stated that in the period since June 25, 43,000 tons of high explosives and 1600 tons of incendiary bombs were dropped on Britain in the course of more than 2000 attacks.

Much ammunition of that kind was also used in the invasion of the low countries, in the fighting in Norway, the bombing by the British of Italy and Germany, operations in Greece, Egypt and elsewhere. Bombardments by navies and by land artillery also swelled the total loss of steel.

Carnegie-Illinois Widens Homestead Plate Mill

■ Carnegie-Illinois Steel Corp. will rebuild its 100-inch plate mill at Homestead, Pa., to enable the rolling of plates up to 120 inches in width. Work will be accomplished with minimum interruption to production and is intended to increase plate capacity.

Aircraft Construction Work Leads In Structural Steel Distribution

■ FABRICATED structural steel sales devoted to manufacture and servicing of aircraft increased from 3.69 per cent of the total in 1939 to 17.78 per cent in 1940, gaining in rank from seventh to first place.

The proportion used in shipbuilding was stepped up from 6.42 per cent in 1939 to 12.69 per cent in 1940.

The percentage devoted to industrial buildings changed from 10 per cent in 1939 to 16.89 per cent in 1940.

Structural steel has proved a first line of defense—at least first from the standpoint of the time element since additional housing had to be provided before manufacturing of munitions and related items could proceed.

These and additional facts are gleaned from a study of the distribution of fabricated structural steel in ten leading classifications. Compilations were made from weekly listings of fabricated shapes, 100 tons or over, in STEEL, which report both tonnages and uses.

Ten Classifications

The ten classifications decided upon arbitrarily are industrial buildings, bridges, aircraft, shipbuilding (including all navy work), armament (direct), engineering, railroads, public buildings, residential and miscellaneous.

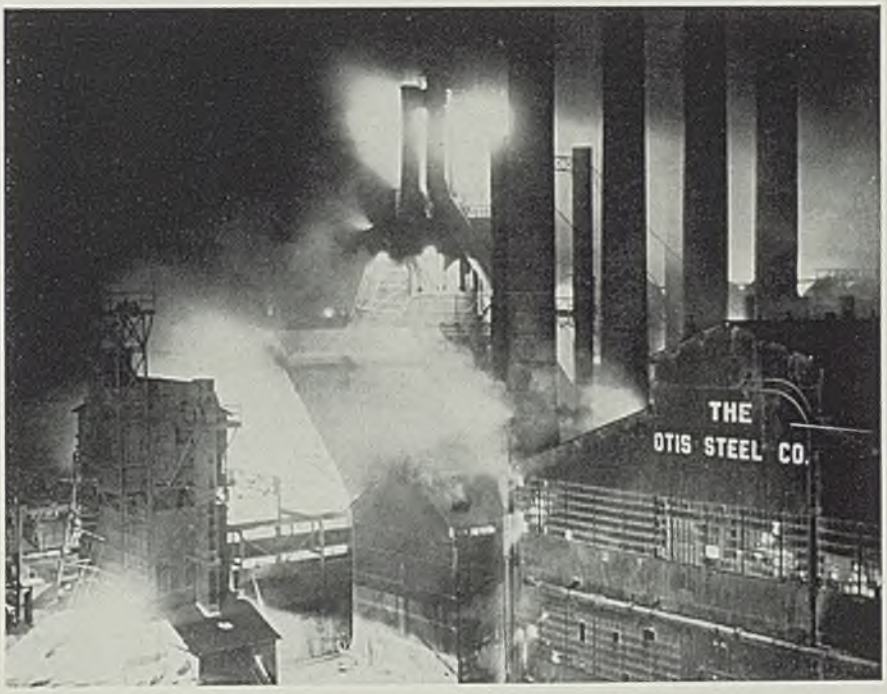
Obviously many projects could have been classified in either one or two or three designations. A railroad bridge could be put in the column of bridges, or railroads. In this study it was placed under railroads. Nearly all items, however, fell naturally into one of the ten listings.

In 1939 bridges proved No. 1, but in 1940 their rank was second. Public buildings in 1939 stood second, but became sixth in 1940. Engineering, which includes construction of dams, river straightening, highway work, etc., was third in 1939; fourth in 1940. General industrial buildings were fourth in 1939 and third in 1940.

Shipbuilding stood fifth in both years, but the percentages of actual tonnage involved about doubled, as would be expected. Railroads were sixth in 1939 and seventh in 1940, but percentage nearly doubled, better transportation having been necessary to transport defense materials. Most striking of all was aircraft and aviation construction requirements which ranked seventh in 1939 and advanced to first place in 1940.

A further, though purely arbitrary conclusion, from the figures is that 525,000 tons of fabricated structural steel in 1940 went into defense efforts.

Experts estimated that total defense needs would require between 6,000,000 and 8,000,000 tons of all kinds of steel annually.



■ NO BLACKOUT HERE: Typical of the steel producing sections is this night scene at Otis Steel Co., Cleveland, working at capacity to help make this country strong

Distribution of Structural Steel by Principal Uses

	1940			1939		
	Net tons	Per Cent	Rank	Net tons	Per Cent	Rank
Aircraft	264,275	17.78	1	43,419	3.69	7
Bridges	257,032	17.29	2	352,291	29.93	1
Industrial buildings	251,071	16.89	3	117,704	10.00	4
Engineering	204,149	13.73	4	210,337	17.87	3
Shipbuilding	188,631	12.69	5	75,556	6.42	5
Public buildings	124,912	8.41	6	274,485	23.32	2
Railroads	100,419	6.76	7	44,614	3.79	6
Armament	68,004	4.58	8	10,131	0.86	10
Residential	16,260	1.09	9	37,368	3.17	8
Miscellaneous	11,658	0.78	10	11,132	0.95	9
Total	1,486,411	100.00		1,177,037	100.00	

Figures represent totals of STEEL'S weekly compilations of orders for 100 tons or more.

Sells Wood Preserving Interests to Koppers

■ Grant B. Shipley, chairman and director, Wood Preserving Corp., Pittsburgh, a subsidiary of Koppers Co., Pittsburgh, last week reported selling his interests in the former to the Koppers Co. Wood Preserving Corp. now is operated as a division of Koppers.

Mr. Shipley has been associated in the wood preserving business 35 years, having organized a number of wood preserving companies. He also developed and improved plant equipment and processes which decreased required treatment time and power requirements.

Formerly an executive of the Mond Nickel Co. of America and England, Mr. Shipley has been a director and member of the executive committee of the International Nickel Co. of Canada Ltd.

Government Plant Expansion Awards Feature National Defense Contracts

■ INCREASING proportion of government awards for national defense in recent weeks has been for plant expansion and construction. Majority of the new factories are being scattered throughout the midwest, in keeping with the federal policy of locating plants vital to defense as far inland as practicable.

Largest plant expansion recently reported negotiated, with approval of the President and the national defense advisory commission, was that of the Curtiss Propeller division of Curtiss-Wright Corp., New York. Estimated to cost $14,090,350, the proposed expansion provides for a new plant at Pittsburgh, enlargement of the plant at Indianapolis, and expansion of facilities at Caldwell, N. J. Construction of a new plant by Ohio Crankshaft Inc., Cleveland, at Cleveland, to manufacture Wright airplane engine crankshafts was also approved. Its cost was estimated at $3,968,130. These contracts have not yet been awarded.

Navy Contracts for Expansions

Navy department reported last week it had entered into a contract with Bohn Aluminum & Brass Corp., Detroit, for acquisition, construction and installation of additional plant facilities and equipment for manufacture of airplane engine parts at the company's plant in Detroit; cost was estimated to be $1,216,000. Other expansion awards reported placed by the navy for enlargement of aircraft engine part manufacturing facilities:

Ex-Cell-O Corp., Detroit, $1,669,678; Lawson Machine & Tool Co., Malden, Mass., $60,000; M B Mfg. Co., New Haven, Conn., $96,000; and Worthington Pump & Machinery Corp., Holyoke, Mass., $269,000.

Contract for construction of a plant for manufacture and assembly of ordnance equipment was entered into between the navy and Reynolds Corp., a subsidiary of Reynolds Metal Co., Richmond, Va. Cost is not to exceed $1,673,315. Camden Forge Co., Camden, N. J., also contracted with the navy for additional facilities and equipment to cost not more than $3,125,619.

War department reported last week contracts totaling $10,000,000 were being negotiated by the chemical warfare service for procurement of gas mask charcoal and other chemicals. Large part of this sum is said to be for construction of government-owned plants.

Other construction awards reported by the army: Hospital facilities at Ft. Francis E. Warren, Wyoming, to cost about $311,500; hospital at Ft. Sheridan, Illinois, $295,500; and $190,500 for additional construction at the new air base at Borinquen field, Puerto Rico.

Total of contracts last week reported awarded was $63,741,807.91. Ordnance and quartermaster corps for the army, and bureau of supplies and accounts for the navy, were heaviest contractors.

War department last week reported the following:

Medical Department Awards

Aluminum & Brass Co., Lockport, N. Y., high pressure cylinder valves, $13,500.75.
Anchor Products Co., Chicago, needles, $7134.50.
Art Metal Construction Co., Jamestown, N. Y., filing cabinets, $7600.
Baker & Co. Inc., Newark, N. J, gold foil and wire, $9615.90.
Becton Dickinson & Co., Rutherford, N. J., surgical instruments and appliances, $5089.50.
Brooklyn Hospital Equipment Co., Johnstown, Pa., hospital equipment, $134,300.
Doehler Metal Furniture Co. Inc., New York, cabinets, $73,199.68.
General Electrical Supply Corp., Washington, refrigerators, $27,900.04.
General Fireproofing Co., New York, steel office equipment, $35,881.90.
General Refineries Inc., Minneapolis, pure gold and silver, $24,642.10.
Harris Hub Bed & Spring Co., Cicero, Ill., steel cabinets, $47,150.
Melrose Hospital Uniform Co., New York, metal strips, $972.
Oneida Ltd., Oneida, N. Y., mess equipment, $11,855.
Ransom & Randolph Co., Toledo, O., burs, $9447.75.
Royal Typewriter Co. Inc., Brooklyn, N. Y., typewriters, $5491.20.
Spencer Lens Co., Buffalo, microscopes and dark field apparatus, $50,496.
Stern, I., & Co., New York, casting gold, $21,932.80.
Torrington Co., Torrington, Conn., needles, $9992.50.
Tower Co. Inc., Seattle, surgical instruments and appliances, $9319.92.

Chemical Warfare Service Awards

Acme Steel Co., Riverdale, Ill., flat steel strapping, $1269.98.
Chase Brass & Copper Co., Waterbury, Conn., brass, $21,465.58.
Doehler Die-Casting Co., Toledo, O., elbow nozzles and angle tubes, $68,174.29.
Eureka Vacuum Cleaner Co., Detroit, dies and tools, $10,276.31.
Farquhar, A. B., Ltd., York, Pa., hydraulic presses, $2360.
Harrisburg Steel Corp., Harrisburg, Pa., shipping containers, $4270.
International Machine & Tool Works Inc., Chicago, dies, $2790.
Lloyd & Arms Inc., Philadelphia, honing machine, $3320.
Michigan Smelting & Refining Co., Detroit, tin-lead solder, $1299.77.
North & Judd Mfg. Co., New Britain, Conn., slides, claps, tips, $32,003.77.
Sall, George, Metals Co., Philadelphia, copper scrap, $10,930.
Scoville Mfg. Co., Waterbury, Conn., clinch tips, $2261.34.
Seaboard Brass & Copper Co., Baltimore, tubing, copper bar and nuts, $1390.17.
Timmes Spring Co., Elyria, O., springs, $2256.
United Carr Fastener Corp., Cambridge, Mass., fasteners, buttons and washers, $11,932.10.
United Pressed Products Co., Chicago, molded faceforms, $48,750.

Air Corps Awards

Alock Leitman Lite Mfg. Co., New York, assemblies, $27,600.
Arnold, Schwill & Co., Chicago, wheel assemblies, $63,918.
Bendix Aviation Corp., Pioneer Instrument division, Bendix, N. J., octants, $362,362.
Candler-Hill Corp., Detroit, pump assemblies, $141,775.
Denison Engineering Co., Columbus, O., stand assemblies, $127,952.
Fairchild Aviation Corp., Jamaica, L. I., N. Y., octants, $303,600.
Federal Motor Truck Co., Detroit, truck tractors, $185,200.
Heil Co., Milwaukee, trailers and dollies, $992,550.
Kaufmann, K., & Co. Inc., Newark, N. J., assemblies, $35,100.
Link Aviation Devices Inc., Binghamton, N. Y., octants, $62,500.
Sharpsville Steel Fabricators Inc., Sharpsville, Pa., fuel tanks, $373,200.
Steel Products Engineering Co., Springfield, O., vacuum chamber equipment, $54,417.
Studebaker Corp., South Bend, Ind., aeronautical engines, $33,657,580.20.

Signal Corps Awards

Akeley Camera Inc., New York, theodolites and spare parts, $21,173.65.
American Automatic Electric Sales Co., Chicago, telephone equipment, $259,038.30.
Cardwell, Allen D., Mfg. Corp., Brooklyn, N. Y., antennae, $14,463.75.
Climax Engineering Co., Clinton, Iowa, power units and instruction books, $58,938.
Cook Electric Co., Chicago, jacks, $35,278.30.
Couch Co., S. H., Inc., North Quincy, Mass., terminal strips, $21,758.80.
Davis, Dean W., & Co., Chicago, coils, $11,233.74.
Dietz, H., Co., Brooklyn, N. Y., chests, $15,378.
Eicor Inc., Chicago, dynamotor units, $11,125.
Froiland Mfg. Co., Springfield, Mass., antennae, miscellaneous control units and couplings, $31,059.
General Electric Co., Schenectady, N. Y., radio transmitting equipment for radio sets and instruction books, $241,475.
Gussack Machined Products Inc., Long Island City, N. Y., cable, $9660.
Holtzer-Cabot Electric Co., Boston, headsets, $25,987.50.
Horni Signal Mfg. Corp., New York, tuning units, $71,402.80.
Jacobsen Mfg. Co., Racine, Wis., reel units, $37,380.
Kellogg Switchboard & Supply Co., Chicago, microphones and jacks, $12,358.50.
Molded Insulation Co., Philadelphia, switch boxes, $14,948.
North Electric Mfg. Co., Galion, O., head and chest sets, $18,873.
Rauland Corp., Chicago, miscellaneous radio parts, $74,735.10.
R. C. A. Mfg. Co. Inc., Camden, N. J., radio sets, $594,992.70.
United Transformer Corp., New York, coils, $41,157.
White, David, Co., Milwaukee, theodolite and tripods, $43,056.
Widin Metal Goods Co., Garwood, N. J., mast sections for radio sets, $18,020.

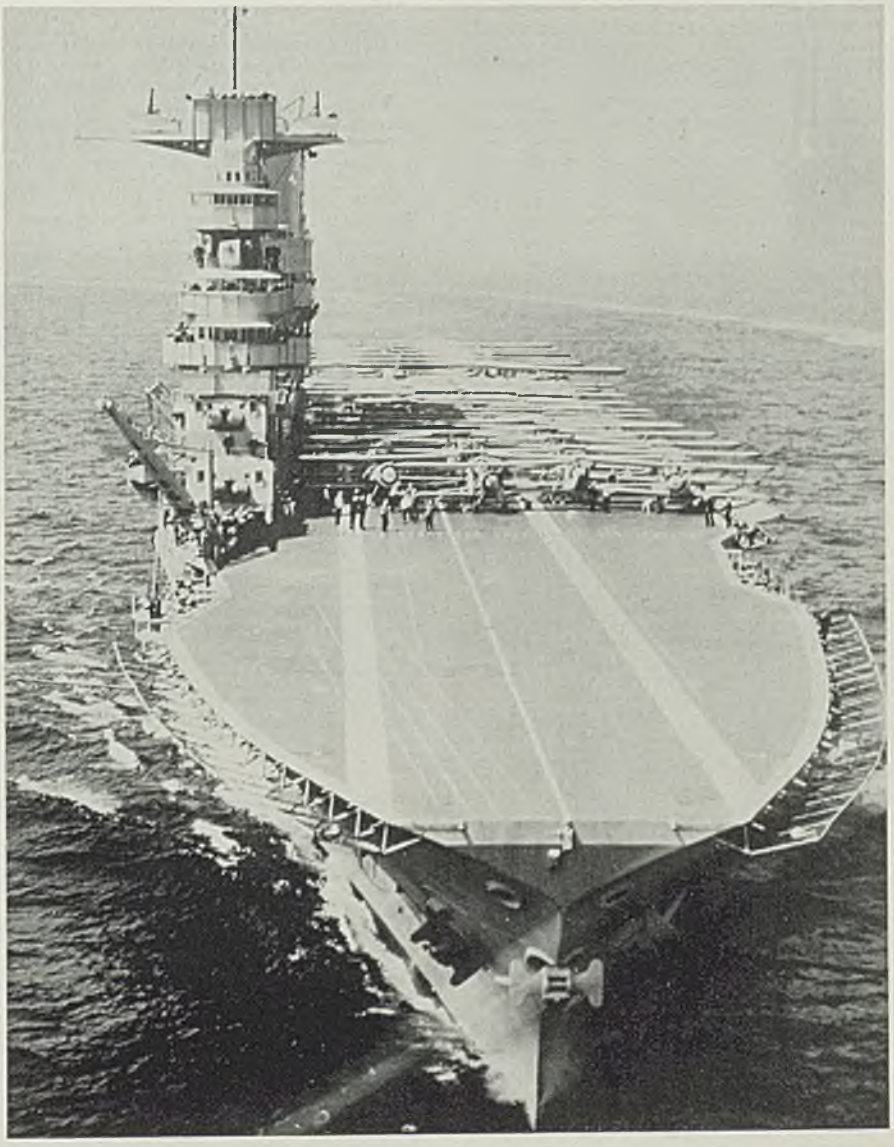
Corps of Engineers Awards

Barco Mfg. Co., Chicago, portable gas hammers, $394,542.
Brunswick-Balke-Collender Co., Muskegon, Mich., chests, $63,378.50.
Carver Pump Co., Rock Island, Ill., pumping sets, $71,869.90.
Continental Motors Corp., Muskegon, Mich., electric generating sets, $35,427.60.

Davenport Besler Corp., Davenport, Iowa, locomotives, $61,185.
General Electric Co., Erie, Pa., locomotives, $135,225.
Gurley, W. & L. E., Troy, N. Y., compasses, $363,500.
Industrial Brownhoist Corp., Bay City, Mich., cranes, $25,950.
Sperry Gyroscope Co. Inc., Brooklyn, N. Y., searchlight parts, $61,776.50.
Vulcan Iron Works, Wilkes-Barre, Pa., locomotives, $61,100.
Walsh, M. J., & Sons, Holyoke, Mass., construction of buildings, Westover field, Chicopee Falls, Mass., $204,000.
Watz, Oscar C., Mt. Clemens, Mich., construction of electrical distribution system, Selfridge field, Michigan, $19,400.
Whitcomb Locomotive Corp., Rochelle, Ill., locomotives, $61,460.

Ordnance Department Awards

Adirondack Foundries & Steel Inc., Watervliet, N. Y., castings, $3373.45.
Allegheny Forging Co., Pittsburgh, forgings, $2160.
Allegheny Ludlum Steel Corp., Brackenridge, Pa., gages, $41,900.
Aluminum Co. of America, Fairfield, Conn., aluminum alloy castings, $8389.16.
American Brake Shoe & Foundry Co., American Forge division, Chicago, forgings, $4400.
American Brass Co., Waterbury, Conn., artillery ammunition components, ammunition, $166,362.94.
American Chain & Cable Co. Inc., Bridgeport, Conn., small arms ammunition components, $55,000.
Apex Tool & Cutter Co. Inc., Shelton, Conn., cutters, holders, $8727.20.
Atlantic Elevator Co., Philadelphia, ammunition components, $10,000.
Atlantic Mfg. Co., Philadelphia, artillery ammunition components, $5125.
Autocar Co., Ardmore, Pa., automotive equipment, $40,775.90.
Barker Tool Die & Gauge Co., Detroit, gages, $1756.
Barwood & Co., Philadelphia, gages, $6485.
Bates Shoe Co., Worcester, Mass., small arms materiel, $636,000.
Bausch & Lomb Optical Co., Rochester, N. Y., fire control equipment, $12,141.
Bay State Tool & Machine Co., Springfield, Mass., small arms materiel, $3022.50.
Bearings Co. of America, Lancaster, Pa., ball bearings, $3534.30.
Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., electric starters, $739,240.95; Eclipse Machine division, Elmira Heights, N. Y., artillery materiel, $5,848,653; Marine division, Brooklyn, N. Y., fire control equipment, $78,710.
Bridgeport Brass Co., Bridgeport, Conn., ammunition components, artillery ammunition, $139,925.
Brown & Sharpe Mfg. Co., Philadelphia, gages, grinding machines, $17,566.47.
Canister Co., Phillipsburg, N. J., machines, $3636.
Cape Ann Tool Co., Pigeon Cove, Mass., artillery materiel, $7362.18.
Carboloy Co. Inc., Detroit, reamers, $2600.
Central Steel Tube Co., Clinton, Iowa, tripod mounts, $302,240.
Chain Belt Co., Milwaukee, artillery materiel, $2,747,708.
Champion Machine & Forging Co., Cleveland, forgings, $8091.
Chase Brass & Copper Co. Inc., Waterbury, Conn., artillery ammunition components, $715,644.92.
Christianson, C. B., Newark, N. J., machinery, $14,940.
Cincinnati Gilbert Machine Tool Co., Cincinnati, milling, boring and drilling machines, $28,650.
City Steel Door Corp., New York, chest accessories, $4200.
Clearing Machine Corp., Chicago, presses, $27,700.
Cleveland Cutter & Reamer Co., Cleveland, side milling cutters, $1794.50.
Cleveland Twist Drill Co., Cleveland, reamers, $2320.18.



■ EYES OF THE FLEET: A close-up of aircraft carrier U. S. S. Saratoga, illustrating means of establishing air bases at sea. Official United States navy photo

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, artillery materiel, $595,366.44.
Continental Tool Works, Detroit, broaches, $14,925.
Cowdrey, C. H., Machine Works, Fitchburg, Mass., artillery materiel, $3,566,800.
DeLisser Machine & Tool Corp., New York, gages, $9408.
Detroit Broach Co., Detroit, broaches, $2250.
Dienelt & Eisenhardt Inc., Philadelphia, artillery ammunition components, $30,060.
Doehler Die Casting Co., Pottstown, Pa., artillery ammunition components, $20,860.
Du Pont, E. I., de Nemours & Co., Wilmington, Del., small arms ammunition components, $4561.01.
Duriron Co. Inc., Dayton, O., machines, $140,000.
Elgin National Watch Co., Elgin, Ill., watches, $240,346.70.
Emeis Electrical Service, Davenport, Iowa, gages and speedometers, $5708.25.
Evans Products Co., Detroit, tripod mounts, $1,278,440.88.
Ex-Cell-O Corp., Detroit, grinding machines, cutters, $4374.60.
Federal Screw Works, Detroit, artillery ammunition components, $1199.93.
Fischer, Charles, Spring Co., Brooklyn, N. Y., small arms materiel, $3627.84.
Foote-Burt Co., Cleveland, drill presses, $11,305.
Friez, Julian P., & Sons, Baltimore, artillery materiel, $10,000.
Frost Co., Kenosha, Wis., artillery ammunition, $301,696.
Gilbert & Barker Mfg. Co., Springfield, Mass., boiler plates for boilers, $3085.
Globe Machine & Stamping Co., Cleveland, artillery ammunition, $491,000.
Goodman Mfg. Co., Chicago, forgings, $1932.
Graybar Electric Co. Inc., Davenport, Iowa, ammeters, $1190.
Greenfield Tap & Die Corp., Greenfield, Mass., taps, gages, $6000.72.
Gulberson Diesel Engine Co., Chicago, combustion type starters, $269,875.
Hanson-Whitney Machine Co., Hartford, Conn., gages, $44,966.58.
Hartford Machine Screw Co., Hartford, Conn., ammunition components, $6257.80.
Hebard, W. F., & Co., Chicago, industrial tractors, $1427.
Hobart Mfg. Co., Troy, O., fire control equipment, $51,343.30.
Hoover Ball & Bearing Co., Chicago, ball bearings, $2071.95.
Imperial Brass Mfg. Co., Chicago, bronze connectors, $1397.50.
International Harvester Co., Chicago,

diesel tractors and miscellaneous parts for tractors, artillery ammunition, $473,371.35.
Illinois Tool Works, Chicago, reamers, $3019.50.
Johnson Engineering & Mfg. Co., Wilkes Barre, Pa., ammunition components, $18,430.
K-D Lamp Co., Cincinnati, combination tail and stop lamps, $2089.
Kelly, John P., Philadelphia, bronze and aluminum castings, $2971.25.
Landis Tool Co., Waynesboro, Pa., machinery, $33,806.41.
LaPointe Machine Tool Co., Hudson, Mass., machines, $5586.
Lincoln Engineering Co., Baltimore, automotive equipment, $2040.02.
Lloyd & Arms Inc., Philadelphia, machines, $17,375.
McCord Radiator & Mfg. Co., Detroit, small arms materiel, $958,584.12.
McReynolds Die & Tool Co., Detroit, dies, $3607.
Machinery Builders Inc., Long Island City, N. Y., machines, $1320.90.
Magnaflux Corp., Chicago, machines, $4796.
Magnus Tool & Die Co., Newark, N. J., tools, $3444.
Marshall & Huschart Machinery Co., Chicago, broaching machines, $9004.
Mattison Machine Works, Rockford, Ill., cut off saws, $1520.
Midvale Co., Nicetown, Philadelphia, artillery materiel, $18,765.
Minneapolis-Honeywell Regulator Co., Minneapolis, fire control equipment, $1598.50.
Modern Tool & Die Co., Philadelphia, gages, $9250.
Moore, George W., Boston, ammunition components, $1430.
Moore, J. W., Machine Co., Everett, Mass., gages, $1180.
Murdock Tool Co., Detroit, tools, $2938.22.
Narragansett Machine Co., Providence, R. I., small arms materiel, $27,586.70.
National Acme Co., Cleveland, machines, $1,971,330.
National Gas Furnace Co., Providence, R. I., gas fired furnaces, $2167.70.
National Malleable & Steel Castings Co., Cleveland, artillery ammunition, $147,000.
National Tube Co., Chicago, steel tubing, $1655.28.
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., grinders and contour cutters, gages, $12,865.32.
Nutley Engineering Works, Nutley, N. J., machinery, $3835.
Onsrud Machine Works Inc., Chicago, router, $1442.
Otis Elevator Co., Buffalo, steel castings, $42,568.54.
Pacific Foundry Co. Ltd., San Francisco, machines, $71,200.
Pangborn Corp., Hagerstown, Md., ventilating system, $2786.
Peco Mfg. Corp., Philadelphia, artillery ammunition components, $359,960.
Peters Engineering Co., Philadelphia, gages, $1488.
Poor & Co., Canton, O., artillery materiel, $4784.85.
Porter Forge & Furnace Inc., Everett, Mass., artillery materiel, $1267.93.
Precise Tool & Mfg. Co., Farmington, Mich., gages, $35,795.50.
Production Tool & Die Co. Inc., Springfield, Mass., press machines, $6500.
Putnam Tool Co., Detroit, cutting tools, $1012.50.
Remington-Arms Co. Inc., Bridgeport, Conn., small arms ammunition, $11,982.20.
Republic Steel Corp., Cleveland, steel, ammunition components, $102,441.98.
Revere Copper & Brass Inc., Baltimore, brass, $361,350.
Rose, Frank, Mfg. Co., Hastings, Nebr., artillery ammunition, $206,323.20.
Ryerson, Joseph T., & Son Inc., Chicago, artillery materiel, $38,328.50.
Schutte & Koerting Co., Philadelphia, tumbling, polishing machines, $2200.
Sears Saddlery Co., Davenport, Iowa, ammunition components, $2120.
Sheffield Gage Corp., Dayton, O., gages, $16,116.58.
Shuler Axle Co. Inc., Louisville, Ky., artillery materiel, $20,679.30.
S. K. F. Industries Inc., Philadelphia, ball bearings, $3929.50.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $17,457.60.
Standard Machinery Co., Providence, R. I., roller bearings, artillery materiel, $8232.
Steadfast & Roulston Inc., Cincinnati, boring mills, $61,154.80.
Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $14,092.41.
Thomson-Gibb Electric Welding Co., Lynn, Mass., welders, $1876.
Thurston Mfg. Co., Providence, R. I., cutters, $1180.
Timken-Detroit Axle Co., Wisconsin Axle division, Oshkosh, Wis., automotive equipment, $1810.40.
Timken Roller Bearing Co., Canton, O., bearings, $3394.80.
Tools & Gages Inc., Cleveland, gages, $24,670.
Tredegar Co., Richmond, Va., artillery ammunition, $157,512.
True Alloys Inc., Detroit, castings, $3719.30.
Tucker Aircraft Co., Detroit, automotive equipment, $22,750.
Union Twist Drill Co., Athol, Mass., cutting tools, taps, drills, $4564.80.
United Engineering & Foundry Co., Pittsburgh, artillery materiel, $3,221,294.62.
Veit & Young, Philadelphia, tools for small arms, dies, $9130.
Vernco Specialties Co., New York, artillery ammunition components, $12,739.05.
Waltham Machine Works, Waltham, Mass., gear cutting machines, $3070.
Weatherhead Co., Cleveland, automotive equipment, $1380.
Weldon Tool Co., Cleveland, cutters, tools, $2697.
Wellman, S. K., Co., Cleveland, steel clutch and rivet facing, $6738.92.
Western Cartridge Co., East Alton, Ill., small arms ammunition, $33,385.20.
Wiedemann Machine Co., Philadelphia, gages, $21,280.
Winchester Repeating Arms Co., New Haven, Conn., artillery ammunition components, $7500.
Wright Aeronautical Corp., Paterson, N. J., flywheel hubs, $1072.50.
York Safe & Lock Co., York, Pa., gun carriages, $1,043,328.

Quartermaster Corps Awards

A-AN-E Mfg. Corp., Chicago, steel repair parts for cots, $44,250.
American Safety Razor Corp., Brooklyn, N. Y., safety razors, $68,750.
Anderson-Coffey Co., Boston, additions to electrical system and street lighting, Ft. Adams, Rhode Island, $15,800.
Barnes, James I., Co., Santa Monica, Calif., construction at Ogden ordnance depot, Utah, $67,000.
Beck, A. H., Foundation Co., San Antonio, Tex., foundation piers and foot-

PURCHASES UNDER

(In Week Ended Jan. 4)

Iron and Steel Products	Commodity	Amount
American Bridge Co., Pittsburgh	Steel towers	$178,080.93
American Chain & Cable Co. Inc., American Cable division, Wilkes-Barre, Pa.	Jackstays	330,678.16
Astrup Co., Cleveland	Tent slips	23,923.32
Baldt Anchor, Chain & Forge Corp., Chester, Pa.	Hoist chains	23,976.00
Bethlehem Steel Co., Bethlehem, Pa.	Trash racks	12,900.00
Bethlehem Steel Export Corp., New York	Steel pipe	66,525.86
Broderick & Bascom Rope Co., St. Louis	Jackstays	177,243.00
Chicago Bridge & Iron Co., New York	Water tank	29,920.00
Crane Co., Chicago	Valves	64,327.48
Crucible Steel Co. of America, New York	Slab steel	11,385.20
Detroit-Michigan Stove Co., Detroit	Army ranges	409,250.00
Doehler Die Casting Co., Pottstown, Pa.	Nozzles and anglelubes	26,579.29
Flocknart Foundry Co., Newark, N. J.	Stretcher weights	11,356.00
Harrold, H. J., Tool Co., Columbiana, O.	Screwdrivers	16,465.92
Hershey Metal Products Inc., Derby, Conn.	Steel cores	106,675.00
Hickman, Williams & Co., New York	Pig iron	14,655.10
Indianapolis Stove Co., Indianapolis	Heating stoves	14,665.00
Irving Subway Grating Co. Inc., Long Island City, N. Y.	Clip hammers	203,845.00
Laclede Steel Co., St. Louis	Reinforcing bars	20,529.00
Leach Co., Oshkosh, Wis.	Buoy shackles	19,466.05
Machine Products Corp., Detroit	Cast iron blocks	14,482.00
McKay Co., Pittsburgh	Chains, rings	162,848.44
Noblitt Sparks Industries Inc., Columbus, Ind.	Chemical bombs	352,073.20
Noland Co. Inc., Washington	Plumbing fixtures	17,915.10
Phillips & Buttorff Mfg. Co., Nashville, Tenn.	Heating stoves	21,731.25
Pollak Mfg. Co., Arlington, N. J.	Cartridge containers	515,440.80
Portland Forge & Foundry Co., Portland, Ind.	Shells	94,940.00
Protectoseal Co. of America Inc., Chicago	Gasoline cans	20,060.00
Rainear, C. J., & Co. Inc., Philadelphia	Steel flanges	18,724.57
Republic Steel Corp., Cleveland	Sheet steel, nuts, machine bolts	56,907.25
Russell Harrington Cutlery Co., Southbridge, Mass.	Bread knives	37,375.00
Simonds Saw & Steel Co., Boston	Cross-cut saws	10,580.49
Spengler-Loomis Mfg. Co., Automatic Pencil Sharpener Co. division, Chicago	Sharpeners	12,618.75
Talon Inc., Meadville, Pa.	Slide fasteners	18,139.00
Texasteel Mfg. Co., Ft. Worth, Tex.	Projectiles	1,195,000.00
Timken Roller Bearing Co., Steel & Tube division, Canton, O.	Steel tubing	19,061.44
Tippett & Wood, Phillipsburg, N. J.	Buoys	10,600.00
Truscon Steel Co., Youngstown, O.	Reinforcing bars	*22,876.70
U. S. Pipe Bending Co., San Francisco	Pipe fittings	11,000.00
United States Steel Export Co., New York	Tracks, pipes	20,209.00
Wheeling Corrugating Co. Inc., Louisville, Ky.	Stovepipe hoods	10,521.00
Williams, J. H., & Co., New York	Wrenches	11,082.75
Nonferrous Metals and Alloys		
Aluminum Co. of America, Pittsburgh	Aluminum alloy, magnesium powder	$74,039.10
American Brass Co., Waterbury, Conn.	Cartridge discs, tubing	*684,835.74

ings for warehouses, San Antonio general depot, San Antonio, Tex., $16,346.
Bennett, R. C., Box Co. Inc., Hoboken, N. J., locker boxes, $32,500.
Bogert & Hopper Inc., New York, locker boxes, $60,250.
Central Stamping Co., Newark, N. J., pie plates, $8666.65.
Corbetta Construction Co. Inc., New York, warehouses, Columbus general depot, Ohio, $2,357,000.
Corporation de Ingenieria, S. A. Panama City, R. de P., sewage treatment plant, Ft. Kobbe, Canal Zone, $34,738.
Cullen & Goverman, Dorchester, Mass., recreation building, Ft. Constitution, Newcastle, N H., $11,700.
Diamond T Motor Car Co., Chicago, trucks, $3885.
Dorland, E. H., Salt Lake City, Utah, pump and pump house, Salt Lake municipal airport, Salt Lake City, $1221.
Early, Fred J., Jr. Co., San Francisco, gasoline storage tanks, Albrook field, Canal Zone, $27,740.
Federal Motor Truck Co., Detroit, trucks, $87,105.50.
Flinn, Henry I., Montgomery, Ala., temporary housing, Ft. Screven, Georgia, $74,772.
Foley Construction Co., Cincinnati, additions to existing water lines, Jeffersonville depot, Indiana, $14,440.
General Box Co. Inc., Brooklyn, N. Y., locker boxes, $60,000.
Herschel Engineering & Supply Co., Philadelphia, generator and steam turbines, $5000.
Hersey, A. A., & Son Co., Chelsea, Mass., repair of wharf, Ft. Duvall, Massachusetts, $1974.
Honeycutt, A. J., Co., Birmingham, Ala., gasoline storage and dispensing system, Drew field, Tampa, Fla., $4983.
Huckins Yacht Corp., Jacksonville, Fla., aircraft rescue boat, $6800.
Industrial Steel Co., Salt Lake City, Utah, fire escape, Ft. Douglas hospital, Utah, $2313.
International Silver Co., Meriden, Conn., utensils, knives, forks, spoons, $31,523.40.
Ivey, Henry A., Columbus, O., recreation hall, Ft. Benning, Georgia, $59,358.
Kier, W. E., Construction Co., San Diego, Calif., supplemental contract for temporary buildings, San Diego, $599,547.
Kilby Steel Co., Anniston, Ala., steel repair parts for cots, $54,000.
Kreamer, A., Inc., Brooklyn, N. Y., tin kitchenware, $3900.
Kuckenberg Construction Co., Portland, Oreg., railroad spur track, Ft. Lewis military reservation, Washington, $118,465.
Logan Electric Specialty Mfg. Co., Chicago, steel repair parts for cots, $60,000.
McCarthy, Robert, San Francisco, temporary housing, Ft. McDowell, California, $189,814.
Merrill, R. D., Helena, Mont., temporary buildings, including utilities cantonment, Boulder City, Nev., $358,487.
Merritt-Chapman & Scott Corp., New London, Conn., repairs to dock, Ft. H. G. Wright, New York, $40,622.
National Enameling & Stamping Co., Long Island City, N. Y., water containers, $160,390.
O'Driscoll & Grove, New York, additions to hospital, Ft. Dix, New Jersey, $468,000.
Olson Construction Co. and Dobson & Robinson, Lincoln, Nebr., increased ammunition loading facilities, Ogden ordnance depot, Ogden, Utah, $708,500.
Pearson Construction Co. Inc., Benton Harbor, Mich., warehouses, Jeffersonville quartermaster depot, Indiana, $708,000.
Pittsburgh-Des Moines Steel Co., New York, water storage tank, new reservation, harbor defense, Portsmouth, N. H., $9950; water tank, Camp Upton, New York, $26,490; steel tank, piping and accessories, Ft. Dix, New Jersey, $52,885; and gasoline storage tanks, Mitchel field, Hempstead, Long Island, N. Y., $2760.
Rendle, James B., Malden, Mass., repair of wharf, Ft. Duvall, Massachusetts, $6200.
Scott, Palmer & Co., New Bedford, Mass., motor boats, $20,778.
Southwest Boat Corp., Southwest Harbor, Me., motor boats, $13,750.
Twaits, Ford J., Co., and Morrison-Knudsen Co. Inc., Los Angeles, miscellaneous buildings, Ft. Ord military reservation, California, $1,351,642.
Wester, John N., Metuchen, N. J., temporary buildings, Ft. Monmouth, New Jersey, $79,715.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., turbo-generators, $74,121.
Wheeler Shipyard Inc., Brooklyn, N. Y., motor boats, $33,000.
Williams Lumber Co., Columbus, Ga., miscellaneous buildings, Ft. Benning, Georgia, $61,546.
Yellow Truck & Coach Mfg. Co., Pontiac, Mich., trucks, $31,507,635.

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Navy department last week reported award of a $1,658,208.31 contract to Midvale Co., Nicetown, Philadelphia, for the manufacture of armor. Navy department also announced the following:

Bureau of Supplies and Accounts Awards

Acme Machine Tool Co., Cincinnati, universal, brass finishing lathes, $23,616.
American Brass Co., Waterbury, Conn., bronze and copper, $44,109.44.
American Hoist & Derrick Co., St. Paul, shackles, clamps, clips and thimbles, $10,109.90.
Armstrong Bros. Tool Co., Chicago, wrenches, $59,875.80.
Austin-Hastings Co. Inc., Cambridge, Mass., angle bending roll, $5820.
Basalt Rock Co. Inc., Napa, Calif., oil barges, $1,800,000.
Bausch & Lomb Optical Co., Rochester, N. Y., ship telescopes, $46,845.
Bigelow-Sanford Carpet Co. Inc., New York, bucket cutting machines, $63,000.
Billings & Spencer Co., Hartford, Conn., wrenches, $6501.80.
Bucyrus-Erie Co., South Milwaukee, Wis., crane, $60.275.
Caterpillar Tractor Co., Peoria, Ill., gasoline driven tractors, $62,232.97.
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, $66,776.50.
Cleveland Trencher Co., Cleveland, ladder type ditcher, $7750.
Crane Co., Chicago, composition valves, $16,479.
Electric Products Co., Cleveland, motor generator sets, $100,511.
Fairbanks, Morse & Co., Chicago, spare parts for auxiliary engines, $24,456.39.
Fairmount Tool & Forging Co., Cleveland, wrenches, $14,677.91.
Fisher Boat Works Inc., Detroit, hull and

WALSH-HEALEY ACT

Nonferrous Metals and Alloys	Commodity	Amount
American-LaFrance-Foamite Corp., Elmira, N. Y.	Fire extinguishers	$31,130.48
American Smelting & Refining Co., New York	Copper ingots, pig lead	146,020.00
Bridgeport Brass Co., Bridgeport, Conn.	Brass tubes	31,507.00
Calumet & Hecla Consolidated Copper Co., New York	Ingot copper	48,200.00
Chase Brass & Copper Co. Inc., Waterbury, Conn.	Brass, pipe, tubing	294,479.51
International Silver Co., New York	Forks, knives, spoons	31,523.40
Lewin Mathes Co., East St. Louis, Ill.	Copper ingots	14,568.00
Northwest Lead Co., Seattle	Sheet lead	13,408.20
Oneida Ltd., Oneida, N. Y.	Forks, knives, spoons	86,600.00
Revere Copper & Brass Inc., Baltimore	Rotating bands, cartridge discs, cartridge cups	1,248,551.03
Sall, George, Metals Co., Philadelphia	Copper scrap	10,930.00
Scovill Mfg. Co., Waterbury, Conn.	Copper-nickel tubing	10,778.25
Wallace, R., & Sons Mfg. Co., Wallingford, Conn.	Plated ware	23,421.18

Machinery and Other Equipment		
American Chain & Cable Co. Inc., York, Pa.	Rings and shackles	$10,923.15
American Laundry Machine Co., Cincinnati	Laundry machines	294,457.00
Buda Co., Harvey, Ill.	Engine parts	19,610.95
Carey Machine & Supply Co., Baltimore	Lathes	11,415.33
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Milling machines	71,349.80
Colson Corp., Elyria, O.	Stand assemblies	36,270.00
Duplex Truck Co., Lansing, Mich.	Generator plants	140,800.00
Florence Pipe Foundry & Machine Co., Philadelphia	Flanging press	19,170.00
Food Machinery Corp., Peerless Pump division, Los Angeles	Pumping units	14,414.00
Gisholt Machine Co., Madison, Wis.	Lathes	48,773.80
Green-Winkler Co., Seattle	Galley equipment	30,930.51
Gumpper, Harold D., t/a Ready Power Co., Detroit	Generating units	43,960.00
Hobart Mfg. Co., Troy, O.	Dishwashers	38,060.80
Hyde Windlass Co., Bath, Me.	Steering gears	103,080.00
International Metal Hose Co., Cleveland	Flexible tubes	73,750.00
Knight, Maurice A., Akron, O.	Dryer units	11,957.90
Kohler Co., Kohler, Wis.	Generating units	76,869.13
Lidgerwood Mfg. Co., Elizabeth, N. J.	Windlasses	83,560.00
Monarch Machine Tool Co., Sidney, O.	Lathes	11,866.00
National Twist Drill & Tool Co., Detroit	Twist drills	455,140.93
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn.	Machines	39,391.65
Northern Commercial Co., Seattle	Excavators	70,267.78
Omaha Steel Works, Omaha, Nebr.	Machining	2,570,750.00
Orton Crane & Shovel Co., Chicago	Locomotive crane	13,087.00
Pomona Pump Co., Pomona, Calif.	Pump equipment	23,958.00
Providence Mill Supply Co., Providence, R. I.	Vises	31,987.59
Reading Chain & Block Corp., Reading, Pa.	Chain hoists	40,950.00
Snow & Petrelli Mfg. Co., New Haven, Conn.	Gears	24,888.50
Standard Machinery Co., Providence, R. I.	Rollers	15,753.00
Worthington Pump & Machine Corp., Harrison, N. J.	Pumps, construction equipment	34,645.57
Yale & Towne Mfg. Co., Philadelphia	Chain hoists	56,700.00

*Estimated.

fittings for submarine chasers, $247,000.
Franklin Sales Co. Inc., Ft. Myers, Fla., mowers, $11,627.60.
General Cable Corp., New York, electric cable, $44,543.74.
General Electric Co., Schenectady, N. Y., diesel-electric operated locomotive, $19,879.
General Excavator Co., Marion, O., crawler, gasoline engine driven cranes, $251,103.
Graybar Electric Co. Inc., New York, shackles, clamps, $48,919.
Greenport Basin & Construction Co., Greenport, N. Y., coastal mine sweepers, $631,400.
Hanson-Van Winkle-Munning Co., Matawan, N. J., motor-generator sets, $79,636.
Hardware Supply Corp, New York, wrenches, $12,704.90.
Herreshoff Mfg. Co., Bristol, R. I., coastal mine sweepers, $304,000.
Indestro Mfg. Corp., Chicago, wrenches, $11,914.56.
Industrial Brownhoist Corp., Bay City, Mich., crane, $58,500.
International Minerals & Metals Corp., New York, metallic mercury, $7592.40.
Intertype Corp., Brooklyn, N. Y., typesetting machine, $5166.46.
Kilby Steel Co., Anniston, Ala., spike and star cutters, $167,193.90.
Klein, J., & Son, Chicago, wrought iron and steel pipe, $370,390.24.
Kollmorgen Optical Corp., Brooklyn, N. Y., spyglasses, $136,269.95.
Kraeuter & Co. Inc., Newark, N. J., combination pliers, $20,807.25.
Lake Superior Shipbuilding, Superior, Wis., oil barges, $2,184,448.
Luders Marine Construction Co., Stamford, Conn., hull and fittings for submarine chasers, $280,000.
McKay Co., Pittsburgh, releases, $28,584.80.
Mack-International Motor Truck Corp., New York, full diesel truck, tractor truck and semi-trailers, $10,530.
Maine Steel Inc., South Portland, Me., shackles, clamps, clips and thimbles, $174,883.20.
Manning, Maxwell & Moore Inc., Jersey City, N. J., saw blades, $5205.
Mathis Yacht Building Co., Camden, N. J., hull and fittings for submarine chasers, $287,000.
Midvale Co., Philadelphia, nickel steel, $35,136.16.
Mill Factor Products Co., New York, carbon-steel reamers, $11,236.08.
Mine Safety Appliances Co., Pittsburgh, submarine escape apparatus; eye and nose protectors, $525,018.80.
Mueller Brass Co., Port Huron, Mich., naval, rolled brass, $230,359.76.
Noland Co. Inc., Washington, wrenches, $10,409,97.
Northwest Engineering Co., Chicago, combination lifting and clam shell crane, $9150.
Ohio Injector Co., Wadsworth, O., bronze valves, $37,238.59.
Peck Stow & Wilcox Co., Southington, Conn., wrenches, $47,118.83.
Philadelphia Gear Works, Philadelphia, speed reducers, $71,688.
Phosphor Bronze Smelting Co., Philadelphia, phosphor bronze, $10,978.60.
Prentiss, Henry, & Co. Inc., New York, universal, brass finishing lathes, $39,228.
Quicksilver Producers Association Inc., San Francisco, metallic mercury, $13,519.20.
Reed-Prentice Corp., Worcester, Mass., engine lathes, $25,630.
Rice Bros. Corp., East Boothbay, Me., hull and fittings for submarine chasers, $272,800.
Roebling's, John A., Sons Co., Trenton, N. J., shackles, clamps, clips and thimbles, jackstays, pendants, wire rope, lines, $223,222.17.
Sciaky Corp., Chicago, electric welding machines, $89,770.
Seabrook Yacht Corp., Seabrook, Tex., hull and fittings for submarine chasers, $270,000.
Seagrave Corp., Columbus, O., fire engines and equipment, $15,800.
Seneca Falls Machine Co., Seneca Falls, N. Y., lathes, $35,930.
Thorrez & Maes Mfg. Co., Jackson, Mich., steel bodies, $216,383.
Tidewater Supply Co. Inc., Norfolk, Va., angle bending roll, $5925.
Trimont Mfg. Co., Roxbury, Mass., wrenches, $8575.86.
Utica Drop Forge & Tool Corp., Utica, N. Y., nippers and pliers, $104,537.83.
Van Norman Machine Tool Co., Springfield, Mass., milling machine, $5325.
Walworth Co., New York, wrenches, $55,288.71.
Westergard Boat Works Inc., Rockport, Tex., hull and fittings for submarine chasers, $240,628.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., forced draft blower, tools and wrenches, $15,000.
Wire Rope Corp. of America, New Haven, Conn., wire ropes, $10,896.
Wolverine Pressed Steel Co., Grand Haven, Mich., release handles, $17,094.
Young Engine Corp., Canton, O., generator, electric sets, $6548.

Canada's 1940 Machine Tool Output Increased 800 Per Cent Over 1939

TORONTO, ONT.

■ CANADIAN machine tool production in 1940 increased 800 per cent over 1939, according to Angus L. Macdonald, acting minister of munitions and supply. Production last year aggregated $10,821,949, against $1,548,419 the preceding year. Further substantial increase in output is anticipated this year, Thomas Arnold, machine tool controller and member of the wartime industries control board, declared last week.

To overcome the severe shortage of machine tools required by Canada's vast munitions program, said Mr. Arnold, the dominions government has set up a crown company, Citadel Merchandising Co. Ltd. Since its inception June 1, 1940, Citadel has purchased or arranged for the purchase of $40,000,000 of tools for essential war industries.

Commenting on the small tool situation in Canada, which he declared is acute, Mr. Arnold said steps taken recently to expedite production have been successful. Gratifying results have attended the order issued last November prohibiting introduction of new models. Manufacturers are reported well satisfied, are standardizing their equipment and fabricating their requirements in Canada. "Freezing" of models has made it possible for many industries to divert machine tools and expert workmen from domestic to war production, he said.

Six 9500-Ton Freighters Ordered

Burrard Drydock Co., Vancouver, B. C., reported last week it had received orders for six freighters totaling almost 60,000 tons. The ships, for the British government, will cost approximately $2,000,000 each, will have carrying capacity of about 9500 tons each. Powered by steam, they will have speed of about 10 knots.

Order for two 112-foot submarine chasers was placed with Midland Boat Works, Midland, Ont. Vessels are to cost $87,000 each. Further orders are expected. Midland Shipyards, Midland, also received orders for corvettes totaling $1,000,000.

Munitions and supply department last week reported placing new orders aggregating $1,664,814. Awards placed with United States companies totaled $101,498. Orders reported last week include:

Shipbuilding: Marine Industries Ltd., Sorel, Que., $240,000; Star Shipyard Ltd., New Westminster, B. C., $108,000; Greenwood Canoe Co., Vancouver, B. C., $17,000; A. Linton & Co. Ltd., Vancouver, $11,400.

Mechanical transport: Canadian Pacific Railway Co., Montreal, $10,902; J. S. Innes Ltd., Toronto, $96,764; Ross Cycle & Sports, Toronto, $34,136; Ford Motor Co. of Canada Ltd., Windsor, Ont., $9611; Gar Wood Industries of Canada Ltd., Windsor, $11,112.

Aircraft: Air Ministry, England, $9720; Canadian Pratt & Whitney Aircraft Co Ltd., Longueuil, Que., $242,524; Fairchild Aircraft Ltd., Longueuil, $213,840.

Electrical equipment: Canadian General Electric Co. Ltd., Ottawa, Ont., $17,220; Canadian Westinghouse Co. Ltd., Ottawa, $18,666; Northern Electric, Ottawa, $80,666; Outboard Marine & Mfg. Co. of Canada Ltd., Peterborough, Ont., $143,880; Smith & Stone, Georgetown, Ont., $6123.

Machinery: Federal Belting & Asbestos Co. Ltd., Toronto, $9658; William M. Brennan, London, Ont., $38,352.

Tools: Canadian Trade Corp. Ltd., Montreal, $8454; Exide Batteries of Canada Ltd., Toronto, $6875.

Munitions: Canadian Industries Ltd., Montreal, $16,971.

Miscellaneous: General Steel Wares Ltd., Toronto, $72,499; Canadian Motor Lamp Co., Windsor, $65,938; Coulter Copper & Brass Co. Ltd., Toronto, $110,000; Standard Chemical Co. Ltd., Toronto, $21,677; Crane Ltd., Halifax, N. S., $15,830; Crane Ltd., Calgary, Alta., $6302; Crane Ltd., Vancouver, B. C., $5864; Canadian Gypsum Co. Ltd., Toronto, $17,942; Gypsum Lime & Alabastine Ltd., Toronto, $17,942; Anderson Plumbing Co. Ltd., Calgary, $11,334; Canadian Comstock Co. Ltd., Toronto, $16,000; Lundy Fence Co. Ltd., Toronto, $11,400; Canadian Wood Pipe & Tanks Ltd., Vancouver, B. C., $8580; Moncton Plumbing & Supply Co., Moncton, N. B., $22,000; Waterman-Waterbury Mfg. Co. Ltd., Regina, Sask., $15,000; Senicaust Engineering Co., Toronto, $5000; N. H. McManus Ltd., Halifax, N. S., $78,000.

War construction projects: Stewart Construction Co., Sherbrooke, Que., $283,000; W. E. Emerson & Co. Ltd., St. John, N. B., $72,600; Bremner Norse & Co. Ltd., Montreal, $189,990; Dominion Bridge Co. Ltd., Lachine, Que., $82,747; Partridge Holliday Co. Ltd., Winnipeg, Man., $108,140; H. G. Macdonald & Co., Edmonton, Alta, $236,244.

Suggests Program for More Effective

Industrial Mobilization of Subcontracting Plants

By B. T. BONNOT

Canton, O., is one of many progressive industrial communities that have undertaken programs aimed at enlisting all facilities in the national defense effort.

The Canton chamber of commerce has a national defense committee which acts as a clearing house for subcontracting defense work. This committee has a complete list of all capacities in the district, including the equipment and personnel ability of even the smallest shops. Yet, because of the absence of a workable national plan for complete industrial mobilization, industry at Canton, as well as elsewhere, is prevented from delivering maximum performance.

The accompanying article, by B. T. Bonnot, president, The Bonnot Co., Canton, and vice chairman of the Canton national defense committee, outlines a plan for making all existing capacity easily available.

■ **NATIONAL NEED:** The objectives sought by government and business as the writer views conditions are:

a. To utilize to the maximum efficiency existing man and machine capacity throughout the country, irrespective of company size.

b. To utilize man and machine power on the particular classes of work for which they are best adapted.

c. To minimize time and effort required to attain effective and satisfactory output on each job or part.

d. To sift out quickly and tag for special handling specialized or new work for which existing facilities and man power are inadequate or unavailable and then accelerate preferentially the provision of such specialized facilities and the training of such man power, as against forcing competition between demand for such specialized facilities and demand for increased standard facilities when the latter may be available but unused for lack of adequate information and co-ordination.

e. To avoid the unsettling of labor resulting from over-concentration in large plants at the expense of others; to utilize man power where presently employed and thus to attain greater stabilization throughout industry.

Some Present Difficulties: From extensive reading and discussion with government and industrial officers it appears:

a. That only a fraction of the facilities and man power of secondary plants are listed or classified by government procurement agencies.

b. That a substantial part of the productive capacity of the country is among such unlisted plants.

c. That by reason of size, facilities, etc., these secondary plants are not adequately qualified to serve as prime contractors on volume work, or production of entire units.

d. That these secondary firms know this and will not in most cases see fit to apply for such prime contracts though qualified and anxious to serve as subcontractors.

Canton Repository photo

B. T. Bonnot

e. That any attempt to carry complete data in usable form at Washington on smaller plants will be prohibitive in detail and impossible of effective use.

f. That these smaller concerns, now trying to serve, are almost completely dependent upon random information or job brokers, there being no organized set-up—so far as the writer can determine—for most effectively putting their resources at the disposal of the government, or at the disposal of the prime contractors.

g. That prime contractors likewise are handicapped for lack of organized methods for working with and through such prospective subcontracting plants.

h. That present working methods all too frequently involve the risk that local plants, if known, could better handle work now done by distant plants, with consequent loss of time, expense of travel, freight costs, and freight tie-ups inevitably resulting.

i. That positive danger lies in a system whereby brokers carry about drawings and data and seek suppliers on diverse important parts or units with no apparent insurance against misuse of such data.

j. That such brokerage involves fees and costs which possibly could and should be saved if a district clearing agency system were available for subcontracting procedure.

Proposed Divisional Clearing Agency System for Subcontracting: Purpose:

a. To assure standardization of procedure.

b. To clothe the program with maximum authority.

c. To make necessary expense funds quickly available.

d. To provide action with minimum time loss.

e. To avoid conflict of interest

and procedure between various procurement agencies of army, navy, etc.

f. To overcome the tangle and time loss that would result if a system were developed from the bottom up, rather than from the top down.

Proposed Method: It is urged that the co-ordinating authority, or other authority, of the national defense commission adopt a procedure embodying the following, or similar, provisions:

a. Select some one of the several present plans of geographical division of the country, e. g., state boundaries, Reserve Bank districts, army or navy procurement divisions, or other units, but preferably not too large.

b. Consolidate and list at Washington, according to such adopted geographical divisions, the names of all prime contractors now or hereafter serving any and all branches of the defense departments, e. g., navy, ordnance, aviation, signal corps, emergency, etc.

c. Designate, assign, or provide for each such geographical division, a centralized authority to act as a co-ordinating or divisional clearing agency between the prime contractors within such area and the prospective subcontractors in such area.

d. Provide each such divisional clearing agency with a full list of all prime contracts already awarded or to be awarded from whatsoever division of the service such contracts originate.

e. Directly from Washington instruct all such prime contractors to file monthly, semimonthly, or weekly with his divisional clearing agency, basic and detailed data covering items on which such prime contractor needs or desires production aid. Such data should include quantities, specifications, tolerances, and any other data or drawings essential for the intelligent study thereof by prospective subcontractors.

f. Authorize and instruct such divisional clearing agencies to circulate regularly through the area served by it, a condensed summary of such items listed by all the prime contractors in the area. This summary need only refer to prime contractor by number or other code designation, but should indicate location in a broad degree at least, such as Northeastern Ohio, or Southwestern Indiana, or Central Pennsylvania. Such summaries should then be supplied regularly to local chambers of commerce (perhaps only in county-seat cities or towns) or to other similar available local units. There existing personnel or defense committees now organized or to be organized will see that this data is available for study by local plants seeking to, or qualified to, aid in the defense program.

g. Following local examination of such summarized divisional lists, local firms can filter out items they deem their plants best suited to provide. The very heart of the program is this phase, namely that trained plant officials take the initiative in searching out lines of action which they know then can perform and when they can perform them.

It is an application of their normal sales and engineering procedure to government problems. Given a system under which to work, they can be relied upon to render far more effective defense service by this method than under conditions prevailing to date. Obviously, no outsider can possess or maintain adequately intimate data to know what they can best do or when they can best do it.

h. Then, after preliminary local study of summarized divisional clearing agency lists and with proper credentials or identification (names and signatures of local identifying officials — banks, or chambers of commerce, or defense committee officers could be on file with the divisional clearing agency) they contact the divisional clearing agency for more detailed study of data there filed. They then obtain names, etc., of prime contractor filing such needs and by direct negotiation contract or bid on the work.

i. If, within 30 days or 15 days of divisional publication on items wanted by prime contractors, no progress is made in clearing of such bottleneck items through subcontractors within the area, then such items should be declared emergency needs and they should be so reported to a central Washington office.

j. Immediately consolidated lists of such emergency needs from all areas should be distributed by Washington to all divisional clearing agencies through which summaries of such emergency items would be circulated through each local area as supplements of general lists being regularly circulated.

k. When such emergency items still fail to clear, then is established beyond any doubt a clear warrant for preferential plant construction or personnel training or both, which is a separate major problem that requires special handling not falling within the scope of this program.

Personnel:

a. It is the conviction of the writer that well qualified talent can be mobilized for the proposed program from industry, from engineering agencies, from universities, etc.

b. Local agencies and committees throughout the country are ready and eager to do the rest, if mobilized under a clear-cut uniform and authoritative system.

Time:

a. Once approved, this system could be put to work within 30 to 45 days of two-fisted effort, because uniform in pattern it would be effective ages ahead of any method resting solely upon broad general appeals or upon unfinanced, over-diversified, over-diluted, voluntary local effort.

b. It would spur and enable local chambers of commerce and other groups to brush aside less worthy work and to perform promptly a preferred patriotic service with minimum lost motion or time.

No Interference with Present Agencies:

a. It is believed that such a plan would in no sense interfere with, but rather supplement and expedite the work of the departmental procurement offices now so sorely loaded with work.

b. By providing a clear-cut avenue and routine for subcontracting for all departments, the present departmental procurement offices will be more free to perform their major and indispensable duties, as prime contracting, technical, and expediting offices.

Forms and Procedure:

Complicated procedure forms are unnecessary. A simple and very limited number will suffice and can be rapidly prepared to cover all steps and records required in the divisional clearing agency system.

Listing Plant Facilities: While complete listing of detailed plant facilities and capacities would be desirable if practical, it appears:

a. That such task is of prohibitive proportions except for larger plants.

b. That far too much time and effort would be needed to accomplish this result with reference to secondary plants.

c. That sound interpretation or use of results would be impossible because of diversity of equipment listed as to age, condition, capacity, rating variations, fluctuations in use on normal products, etc.

d. That even if ultimately well listed, the use thereof is contingent upon constantly changing individual plant operations, thus necessitating continuous rechecking of availability and much lost motion in finding open capacity.

e. That such a detailed plant listing program, if attempted simultaneously with the divisional clearing agency system proposed, would confuse and defeat the latter. If attempted at all with reference to small plants, it should be as a secondary national phase.

180,000 Tons Steel Being Placed in 900,000-Ton Shipbuilding Program

NEW YORK

■ ORDERS for 180,000 tons of steel for the 60 cargo vessels to be built in this country for the British government are being distributed.

These ships will be built by the Todd Shipyards Corp., which has organized two subsidiaries to handle the work, namely, the Todd-California Corp., Richmond, Calif., and the Todd-Bath Shipbuilding Corp., South Portland, Me.

This tonnage consists of plates, shapes and bars but does not include forgings, specialties, power units or machinery.

In addition, of the 180 boilers required, which will take 7000 tons of steel, 90 have been placed with American Locomotive Co. and 90 of the furnaces which go inside the boilers have been let to American Car & Foundry Co. The furnaces will take 1000 tons.

About 400,000 tons will be required for 112 7500-gross ton prefabricated merchant ships for the government which are reported as tentatively placed recently with four yards, including the Oregon Shipbuilding Corp., Portland, Oreg., California Shipbuilding Corp., Los Angeles, the Houston Shipbuilding Corp., Houston, Tex., and the Newport News Shipbuilding & Dry Dock Co., which latter is going to handle the work at a new shipyard at Wilmington, N. C.

The first two companies are scheduled to build 31 each, while the Houston and Newport News organizations are to build 25 each. Contracts for the construction of shipyards for the first three companies have been let, while contracts for work on four others at New Orleans, Mobile, Baltimore and Wilmington, N. C., are expected to be placed shortly. Contracts for the construction of the first three yards involve $14,233,000, while awards for the latter four will probably amount to about $20,000,000.

Contracts for the remaining 88 ships of the government's proposed program of 200 pre-fabricated merchant ships are expected to be awarded in the near future. These ships, it is estimated, will require more than 300,000 tons of steel, making for a total of about 700,000 tons for the entire program.

Due to type of construction considerable work will be fabricated before yards are ready for operation. In fact, it is pointed out, the middle sections, from keel to deck can be fabricated in shops, leaving the rounded sections and general assembly to the yards. Owing to simplified design these ships will not take as much steel as ships of similar gross tonnage ratings.

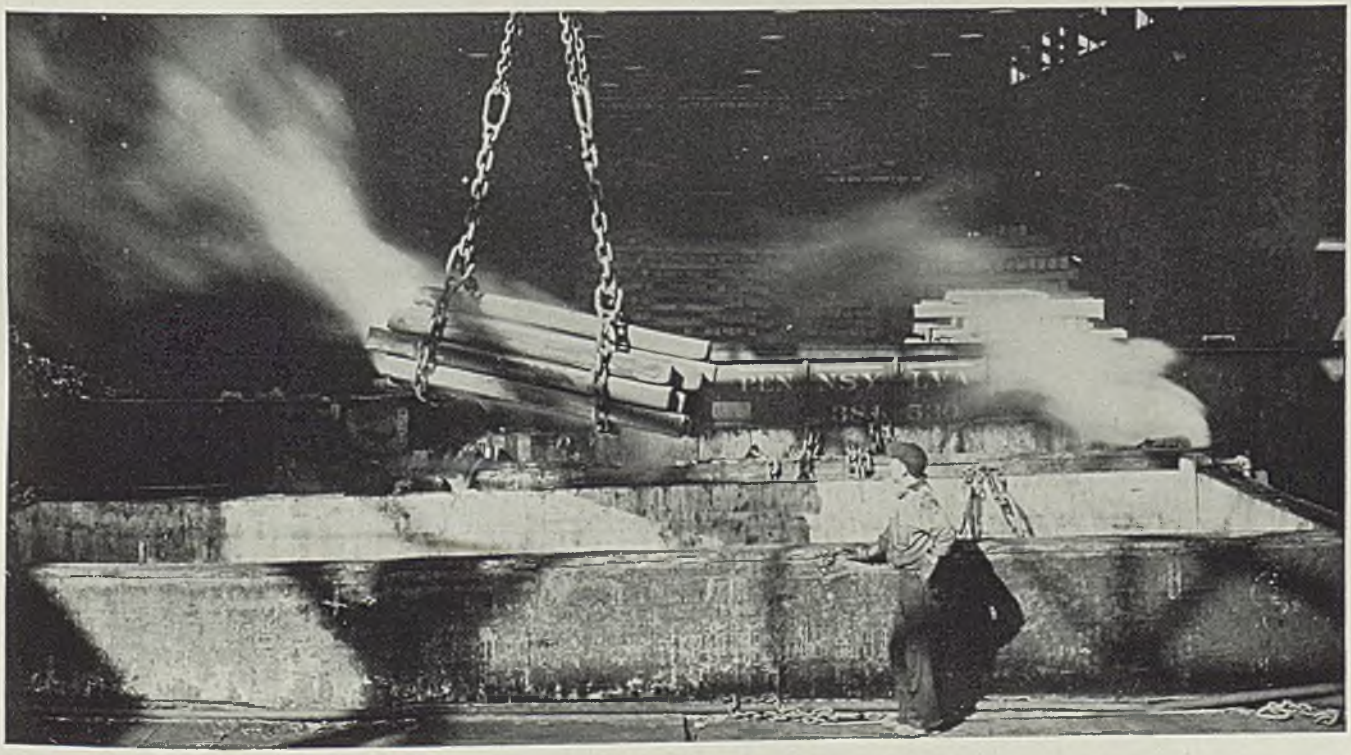
It is indicated, according to reports here, that the Bethlehem Steel Co. will build 50 of these ships at Baltimore and the Alabama Dry Dock Shipbuilding Co., 13, at Mobile. A new shipbuilding company to be formed by Norman O. Petrick, president, Mississippi Shipping Co., may be awarded the remaining 25.

In addition to these two programs large navy releases against ships placed early last fall are expected late this month or early next. As a result plate deliveries, now possible in 12 to 14 weeks, within a month may be extended sharply.

Approximately 18,400 tons of steel will be required for four C-2 type cargo ships on which the maritime commission recently opened bids. Apparently the low bidder was the Western Pipe & Steel Co., whose bid on a fixed price basis was $3,650,000 for each vessel and $2,350,000 each on an adjusted price basis. The Seattle-Tacoma Shipbuilding Co. bid $4,339,729 and $3,471,783, respectively.

A drydock of all-welded steel construction and weighing, with machinery, approximately 4800 tons, will be constructed and operated by Todd.

It Takes Tons of Acid To Make Good Steel



■ The amount of sulphuric acid used by the steel industry in the United States in the past year, to remove surface scale, is reported as 980,000 tons. Nearly half the acid produced in this country is made from sulphur. Here steel blooms are emerging from a pickling tank containing the hot acid solution

Watch Wages as Well as Prices!

■ A HEARTENING sign in the present confusion is the consciousness of the need for strong safeguards against inflation.

Certain governmental agencies, many financial authorities and most private institutions of economic research today are much more alert to the danger of inflation than were their predecessors in the early days of the World war.

This vigilance is important because the threat of inflation is serious. We embark upon defense with a national debt much higher than it was at the end of the World war and with a current deficit of wartime proportions. We are almost begging the lightning of inflation to strike.

The most effective safeguard against wartime inflation is control of prices. Harold G. Moulton, president of the Brookings institution, states that the principal factors provocative of price disturbances during periods of war are (1) the placing of large government orders on a competitive basis, (2) the placing of orders by private business "for inventories or for plant expansion—in anticipation of coming shortages or expected price advances," and (3) increases in wage rates.

* * *

Fortunately the first factor is not as serious now as in the World war. Then the competitive orders of the Russian, French, British and Italian governments had stimulated prices even before contracts with the United States government assumed importance. Today the needs of Great Britain and the United States are fairly well co-ordinated.

The second factor—buying for protection—has not seriously affected prices. The defense commission thus far has been quite effective in fending off price advances —as witness last week's dramatic episode on scrap prices.

But the third source of price inflation, namely wage increases, remains an untamed factor. In fact there are disturbing indications that it is getting out of hand.

Numerous increases in hourly wage rates have been granted in the automobile industry. SWOC has announced that this week demands will be presented to three steel companies for "wage increases and other contract changes."

* * *

These grants and demands have serious inflationary possibilities. For instance, consider the automotive industry pacts some of which provide for increases of from 3 to 7 cents per hour.

An increase of say 5 cents on a dollar an hour rate looks like an increase of only 5 per cent—quite trivial on the surface. But suppose that conditions shortly will make a 48-hour week imperative. Under the wage-and-hour laws, an employe will be paid 52 hours pay for 48 hours work. The increase of 5 per cent per hour becomes an increase of 13.7 per cent per hour. His real income (purchasing power) jumps 36.5 per cent.

We will do well to remember that wages advanced *ahead* of living costs in the World war. They will do it again today and will provoke inflation unless the vigilance now exercised on commodity prices is extended to unit wage rates.

E. L. Ahlers

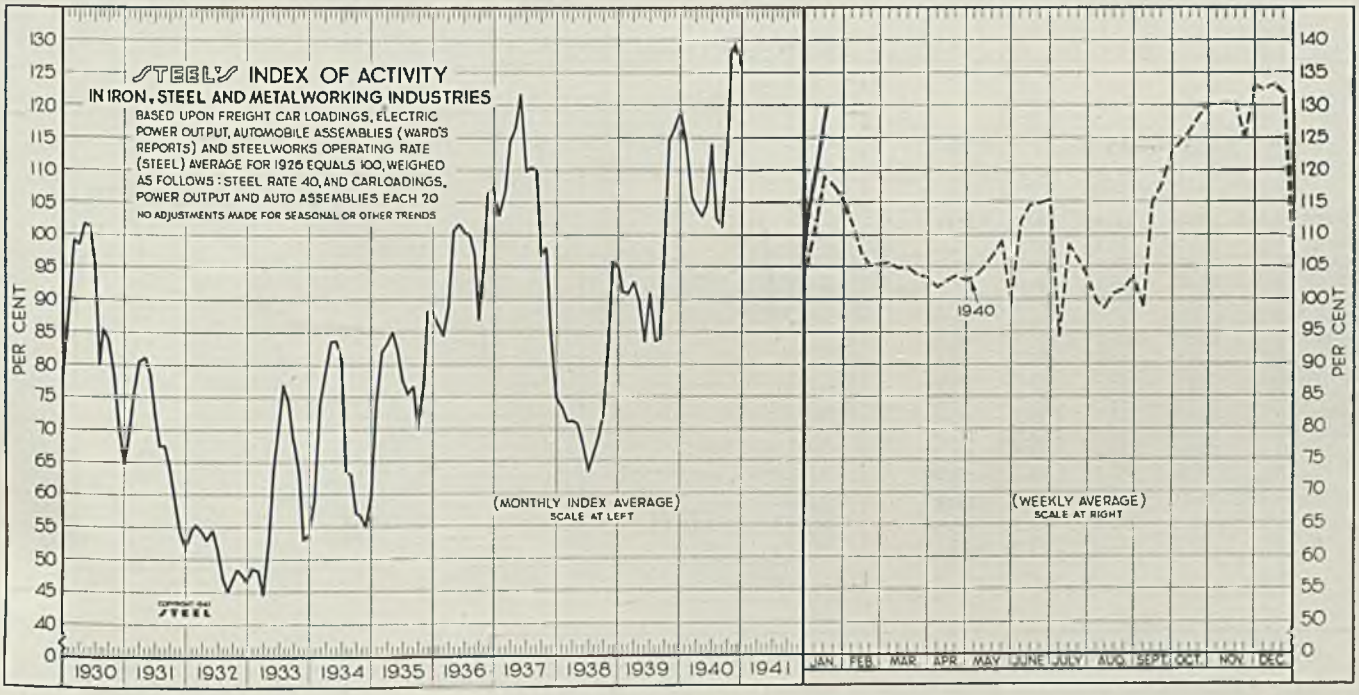
The BUSINESS TREND

Business Pace Resists Seasonal Influences

■ IN THE first full week following the holiday interruptions most industrial indicators rebounded to the pre-holiday levels and in some instances moved into new high ground. Encouraging volume of incoming business together with the large order backlogs accumulated in recent months is sustaining industrial production at the highest level in history. A seasonal tapering off in industrial activity normally develops during January, but this is not the apparent trend at this time.

During the week ended Jan. 11, STEEL's index of activity advanced 14.2 points to 129.9. This compares with an increase of 8.9 points to 119.2 in the comparable period of 1940. In the corresponding weeks of 1939 and 1938 the index stood at 91.9 and 70.1 respectively.

Encouraging gains were recorded in each of the four business indicators comprising STEEL's index, during the week ended Jan. 11. Steelmaking operations gained 1½ points to 97 per cent, to match the peak level attained last year during the closing weeks of November. Returning to a five-day week basis, automobile output rebounded to the highest level on record for any January week, totaling 115,935 units.



STEEL'S index of activity gained 14..2 points to 129.9 in the week ended Jan. 11:

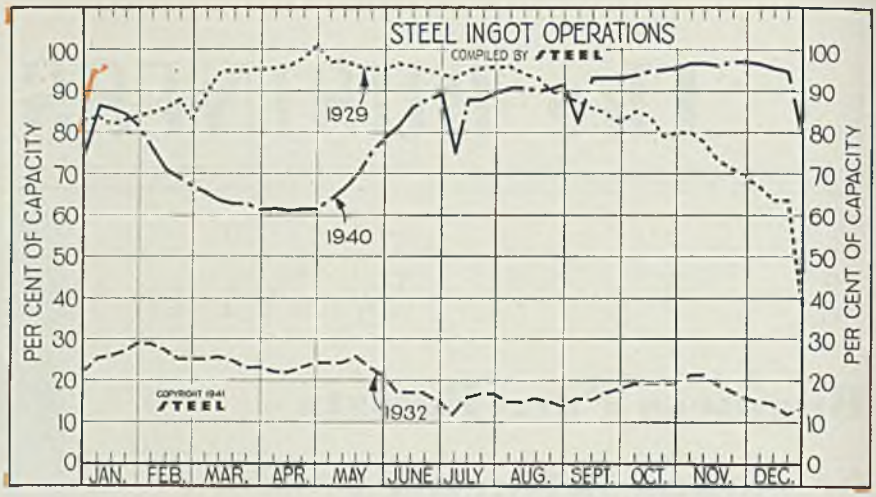
Week Ended	1940	1939
Nov. 9	130.3	117.2
Nov. 16	130.3	117.3
Nov. 23	124.7	111.4
Nov. 30	132.6	117.9
Dec. 7	132.5	123.9
Dec. 14	132.6	124.2
Dec. 21	132.4	123.4
Dec. 28	107.5	104.0
Week Ended	**1941**	**1940**
Jan. 4	115.7	110.3
Jan. 11	129.9	119.2

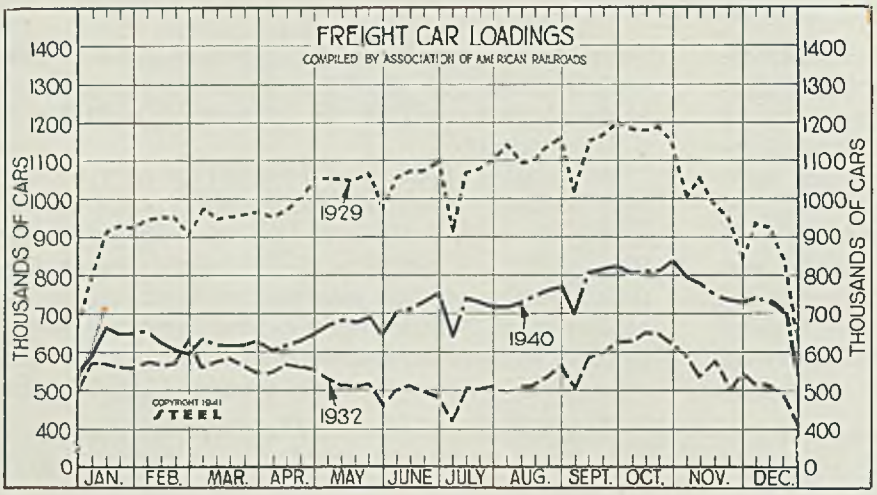
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
Sept. 28....	93.0	84.0	47.0	74.0
Oct. 5....	93.5	87.5	48.5	66.0
Oct. 12....	94.5	89.5	51.5	63.0
Oct. 19....	95.0	91.0	51.5	53.0
Oct. 26....	95.5	92.0	54.5	51.0
Nov. 2....	96.5	93.0	57.5	47.0
Nov. 9....	96.5	93.0	61.5	39.0
Nov. 16....	96.0	93.5	63.0	35.0
Nov. 23....	97.0	93.5	62.0	31.5
Nov. 30....	97.0	94.0	61.0	30.5
Dec. 7....	96.5	94.0	61.0	27.0
Dec. 14....	95.5	92.5	58.0	27.0
Dec. 21....	95.0	90.5	52.0	23.0
Dec. 28....	80.0	75.5	40.0	21.0
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	95.5	86.5	51.5	21.0
Jan. 11....	97.0	86.0	52.0	26.0





Freight Car Loadings

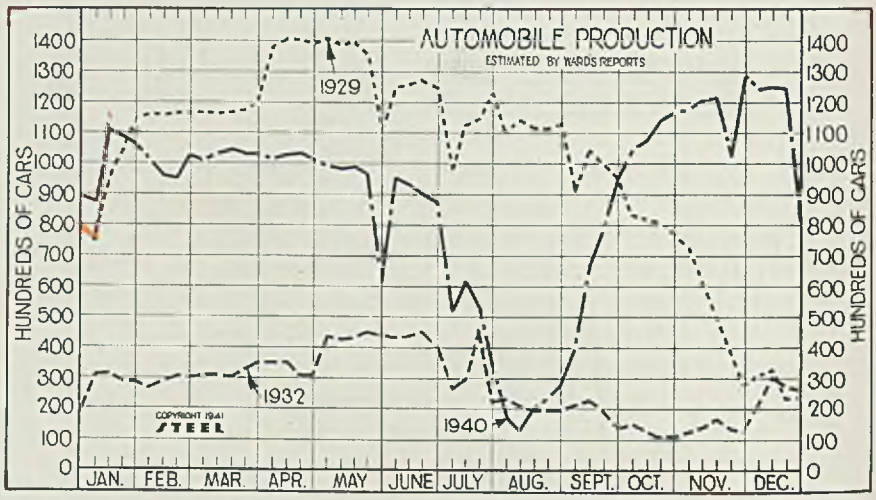
(1000 Cars)

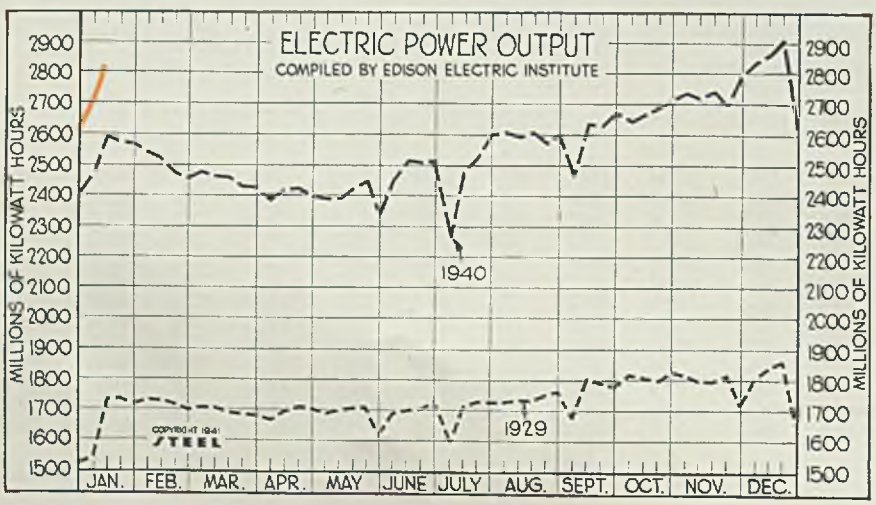
Week ended	1940	1939	1938	1937
Oct. 5.....	806	835	703	815
Oct. 12.....	812	845	727	810
Oct. 19.....	814	861	706	773
Oct. 26.....	838	834	709	772
Nov. 2.....	795	806	673	732
Nov. 9.....	778	786	637	690
Nov. 16.....	745	771	657	647
Nov. 23.....	733	677	562	559
Nov. 30.....	729	689	649	623
Dec. 7.....	739	687	619	622
Dec. 14.....	736	681	606	603
Dec. 21.....	700	655	574	460
Dec. 28.....	545	550	500	457
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4.....	614	592	531	457
Jan. 11.....	712	668	587	552

Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Oct. 5....	105.2	76.1	37.7	72.0
Oct. 12....	108.0	75.9	50.5	89.7
Oct. 19....	114.7	70.1	68.4	91.9
Oct. 26....	117.1	78.2	73.3	90.2
Nov. 2....	118.1	82.7	80.0	89.8
Nov. 9....	120.9	86.2	86.3	85.3
Nov. 16....	121.9	86.7	96.7	85.8
Nov. 23....	102.3	72.5	84.9	59.0
Nov. 30....	128.8	93.6	97.8	86.2
Dec. 7....	124.8	115.5	100.7	85.8
Dec. 14....	125.6	118.4	102.9	82.0
Dec. 21....	125.3	117.7	92.9	67.2
Dec. 28....	81.3	89.4	75.2	49.6
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4....	76.7	87.5	76.7	49.6
Jan. 11....	115.9	111.3	86.9	54.1





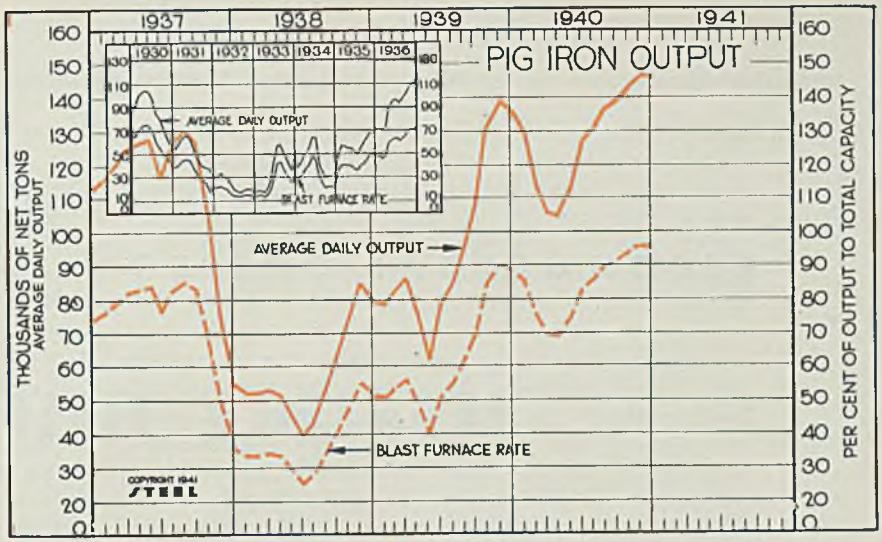
Electric Power Output

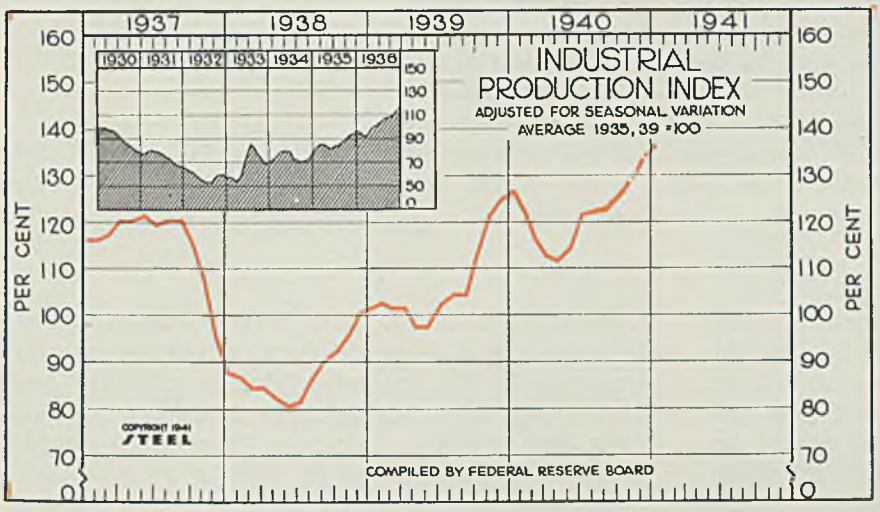
(Million KWH)

Week ended	1940	1939	1938	1937
Oct. 5...	2,641	2,465	2,154	2,280
Oct. 12...	2,665	2,495	2,183	2,276
Oct. 19...	2,687	2,494	2,214	2,282
Oct. 26...	2,711	2,539	2,226	2,255
Nov. 2...	2,734	2,537	2,207	2,202
Nov. 9...	2,720	2,514	2,209	2,176
Nov. 16...	2,752	2,514	2,270	2,224
Nov. 23...	2,695	2,482	2,184	2,065
Nov. 30...	2,796	2,539	2,285	2,153
Dec. 7...	2,838	2,586	2,319	2,196
Dec. 14...	2,862	2,605	2,333	2,202
Dec. 21...	2,911	2,641	2,363	2,085
Dec. 28...	2,623	2,404	2,121	1,998
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 4...	2,705	2,473	2,169	1,998
Jan. 11...	2,835	2,593	2,270	2,140

Pig Iron Production

	Daily average —Net Tons—			Blast furnace —Rate (%)—		
	1940	1939	1938	1940	1939	1938
Jan.	129,825	78,596	52,201	85.4	51.0	33.6
Feb.	113,943	82,407	52,254	75.0	53.5	33.6
Mar.	105,502	86,465	53,117	69.5	56.1	34.2
Apr.	104,635	76,732	51,819	68.9	49.8	33.4
May	112,811	62,052	45,556	74.2	40.2	29.4
June	127,103	79,125	39,601	83.6	51.4	25.5
July	130,984	85,121	43,827	86.1	55.0	28.2
Aug.	136,599	96,122	54,031	89.9	62.4	34.8
Sept.	139,085	107,298	62,835	91.5	69.7	40.5
Oct.	143,152	131,053	74,697	94.2	85.2	48.0
Nov.	146,589	138,883	85,369	96.4	90.3	55.0
Dec.	146,544	136,119	79,943	96.4	88.5	51.4
Ave.	128,128	86,375	51,752	84.3	62.6	37.3





Industrial Production
Federal Reserve Board's Index

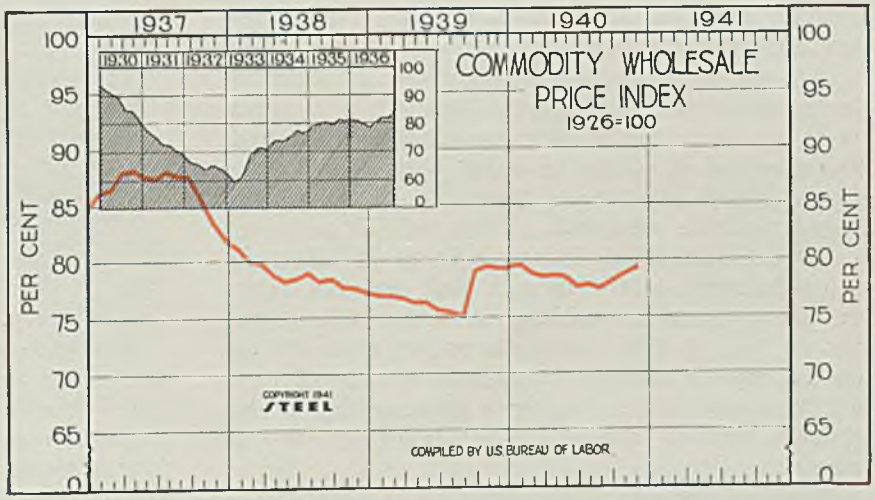
(1935-39 = 100)

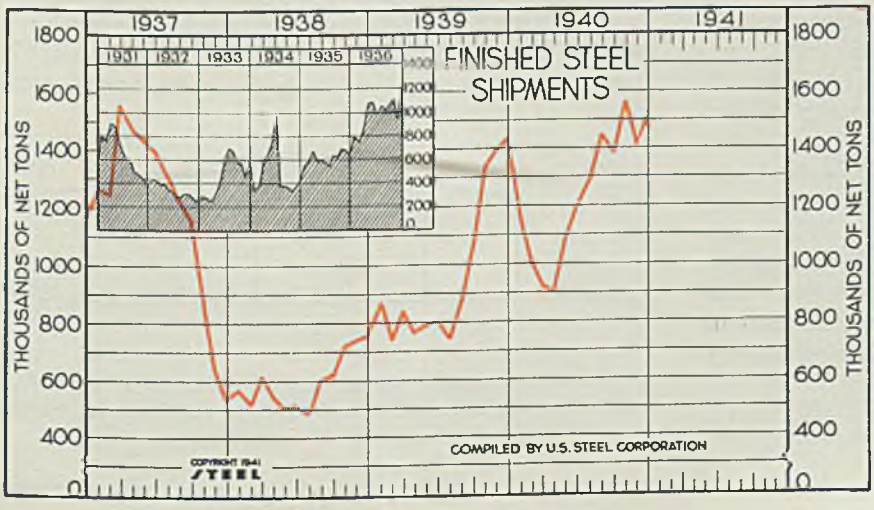
	1940	1939	1938	1937	1936
Jan.	122	102	86	116	95
Feb.	116	101	84	117	92
March	112	101	84	120	94
April	111	97	82	120	99
May	115	97	80	121	101
June	121	102	81	119	103
July	121	104	86	120	105
Aug.	121	104	90	120	107
Sept.	125	113	92	115	108
Oct.	129	121	95	107	109
Nov.	133	124	100	95	113
Dec.	136	126	101	87	116

All Commodity
Wholesale Price Index
U. S. Bureau of Labor

(1926 = 100)

	1940	1939	1938	1937	1936
Jan.	79.4	76.9	80.9	85.9	80.6
Feb.	78.7	76.9	79.8	86.3	80.6
March	78.4	76.7	79.7	87.8	79.6
April	78.6	76.2	78.7	88.0	79.7
May	78.4	76.2	78.1	87.4	78.6
June	77.5	75.6	78.3	87.2	79.2
July	77.7	75.4	78.8	87.9	80.5
Aug.	77.4	75.0	78.1	87.5	81.6
Sept.	78.0	79.1	78.3	87.4	81.6
Oct.	78.4	79.4	77.6	85.4	81.5
Nov.	79.3	79.2	77.5	83.3	82.4
Dec.	....	79.2	77.0	81.7	84.2
Ave.	....	77.1	78.6	86.3	80.8





Finished Steel Shipments
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1940	1939	1938	1937	1936
Jan.	1145.6	870.9	570.3	1268.4	795.2
Feb.	1009.3	747.4	522.4	1252.8	747.4
Mar.	931.9	845.1	627.0	1563.1	863.9
Apr.	907.9	771.8	550.5	1485.2	1080.7
May	1084.1	795.7	509.8	1443.5	1087.4
June	1209.7	807.6	525.0	1405.1	978.0
July	1296.9	745.4	484.6	1315.3	1050.1
Aug.	1455.6	885.6	615.5	1225.9	1019.9
Sept.	1392.8	1086.7	635.6	1161.1	1060.7
Oct.	1572.4	1345.9	730.3	876.0	1109.0
Nov.	1425.4	1406.2	749.3	648.7	947.3
Dec.	1544.6	1444.0	765.9	539.5	1178.6
Tot.†	14976.1	11707.3	7315.5	14097.7	11905.0

†After year-end adjustments.

RECOMMENDATIONS FOR.....

Heating Billets For Shell

As Professor Trinks points out, there really are only four items of significance in heating billets to prepare them for forging into shells. However, a number of these are inter-related which means, for instance, that the furnace must be designed not only for efficient utilization of fuel but to prevent melting down of corners and edges of billets, provide easy means of loading and unloading, permit adequate temperature and atmosphere control, produce a type of scale that is easily removed, prevent decarburization of the metal. These subjects, their importance and relation to each other are discussed here

■ TO HEAT billets for forging into shells, several results are desired. First, the billets must be heated uniformly throughout their entire cross section to a forging temperature somewhere around 2200 degrees Fahr. Second, the scale produced should be easily removable. Third, decarburization must be prevented. Fourth, cost must be low. The latter includes fixed charges, fuel cost, power cost, labor cost and cost of rejection.

In some cases the furnace engineer is asked to design a furnace for square billets, while in other cases a furnace for heating round billets is desired. The question of square or round billets will not be discussed here, but furnace designs to suit both styles of billet will be presented.

Assume that sawed, broken or burnt-off billets are being delivered to the furnace, and that the sawed or burnt ends are reasonably square and without projecting fins. It first becomes necessary to decide upon the type of furnace. This may be a batch type, a straight-line continuous or a rotating-hearth continuous furnace. These various types will be explained.

Types of Furnaces: A batch-type furnace, Fig. 1, usually has a rectangular horizontal cross section with burners at one or both ends. The billets are stood or laid on the hearth. Many batch-type furnaces are regenerative and then are known as Siemens furnaces.

Pusher-type or straight-line continuous furnaces have a hearth which is usually covered with steel billets from one end to the other. The whole mass of steel is moved forward intermittently by the pusher which is located at the cold or charging end. This type of furnace may discharge either at the far end, Fig. 3B, or at a side near the far end, Fig. 3A.

From paper presented at the meeting on shell manufacture sponsored by the American Society of Mechanical Engineers in Cincinnati, Oct. 16, 1940. Illustrations from *Industrial Heating*.

About 15 years ago, zone heating was introduced. It consists of dividing the furnace into two or more sections. In the first zone, firing is brisk and heat input to the billets is high. In the second zone but little heat is added, this zone being given over to temperature equalization or soaking as a uniform temperature throughout the billet is one of the most essential requirements. Other zones may be added to fit a particular set of requirements.

In rolling mills, the continuous pusher-type multiple-zone furnace has been quite generally adopted as standard equipment.

The rotating-hearth furnace is of circular cross-section in the plan view. The furnace proper is stationary, but the hearth rotates. It rests on wheels and on a central bearing if the furnace is large, see Fig. 4; hearths of small diameter rest on a central bearing only.

Comparison of Types: The batch type of furnace inevitably involves high cost of billet handling because the billets must be laid down and picked up again in many different places. Furthermore, a number of batch-type furnaces are needed wherever that type is used. While one furnace is being charged, one is being heated up; another is being given a soaking heat; and still another is being "worked out" or emptied. Carrying the billets from the several doors

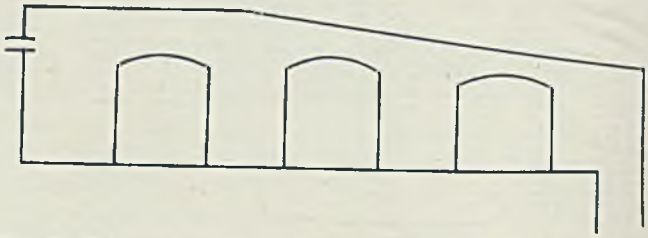


Fig. 1—Schematic vertical section through a batch-type billet-heating furnace. The burner is indicated at the left end of the drawing

Forging

With textile machine manufacturers building automatic rifles, camera makers producing shell parts—it is evident that almost anyone who makes anything may be called upon to produce work for the defense program. One of the largest volume items that will be required is shells. For this reason, STEEL takes this opportunity to present the fundamentals of heating billets for shell forging, written by a recognized authority in that field.

This is another in the outstanding series of articles on munitions and armament manufacturing methods being presented to readers of STEEL. For others, see Modern Shell Production Methods—the design, machining and heat treatment of shrapnel, STEEL, March 11, 1940, p. 38; Naval Torpedoes, STEEL, Dec. 30, 1940, p. 38; Mobile Repair Shops for the Army, STEEL, Nov. 11, 1940, p. 46; Bofors Antiaircraft Guns, STEEL, Dec. 2, 1940, p. 50; How Technical Progress Aids Defense, STEEL, Oct. 14, 1940, p. 160 and Jan. 6, 1941, p. 219; Some Typical Shell Forging Methods, STEEL, Jan. 13, 1941, p. 44.

By W. TRINKS
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of these several furnaces to the press is a complicated and expensive job. The same is true about transportation from the billet storage to the furnaces when loading.

The pusher-type furnace or straight-line continuous furnace was invented for the express purpose of reducing these labor costs. In heating square billets, it actually accomplishes wonders. But pushing round billets is not feasible if the cylindrical surfaces are allowed to touch each other because any slight irregularity in the furnace hearth causes the billets to climb on top of each other. In the straight-line continuous furnace, round billets are pried forward by hand. This method of moving is not only expensive because of the labor involved but it also interferes with automatic control of furnace pressure and of furnace atmosphere because doors must necessarily be open almost all the time.

Round billets can be laid end to end in grooves and pushed through a furnace in that manner. However, that method is seldom practiced because uniform heating requires either a very long furnace or hard labor in turning the billets for the purpose of putting the cold side on top. These facts have caused most forge superintendents to use either batch furnaces or rotating-hearth furnaces for round billets.

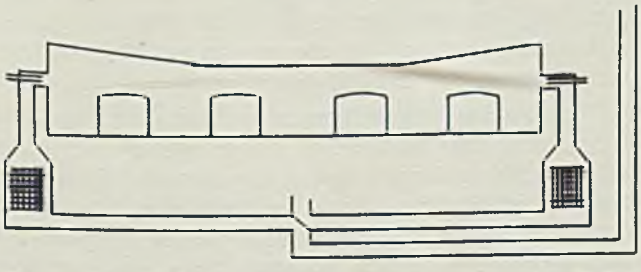

Fig. 2—Simplified diagrammatic representation of a design employed to apply regeneration to a batch-type furnace. This type of unit is called a Siemens furnace

Uniformity of Temperature Distribution: Let us now turn to a consideration of uniformity of temperature throughout the cross section of the heated billet. The necessity for such uniformity is brought out by anyone who discusses billet piercing for it is astonishing how much the piercing plunger is deflected by a small difference of temperature. The primary reason for differences in temperature in the heated billet is the limited conductivity of steel itself. When heating thin sections, say up to 2½ inches in diameter, this low conductivity is not important because great temperature differences cannot develop in thin sections.

But in heavier sections, this matter becomes of the greatest importance, particularly in pusher-type furnaces because heat enters from the top only in that type of furnace. When heating shell billets in continuous furnaces, little heat can be imparted from below because the billets are too short to rest on water-cooled skids.

In any case, the following rule holds for heating: Impart heat to the cold billets as fast as they can take it without cracking or overheating at edges and corners. Then slow down the supply of heat so the edges and corners will not melt down. Finally, furnish only enough heat for soaking—to allow thorough temperature equalization throughout the piece. It is important to turn billets over on the soaking hearth if they are receiving heat from one side only —as is usually the case.

In straight-line continuous furnaces, the imparting of great quantities of heat at the cold or charging end is accomplished either by long flame burners at the hot end or by side burners near the cold end or else by inverted firing (firing from the cold end). Each of the three methods has been practiced successfully. Skillful adjustment of the burners is necessary in any case.

Heating Round Billets: For round billets, the ro-

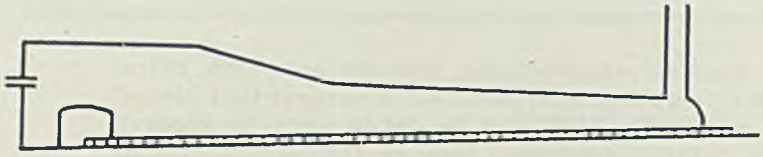

Fig. 3A—Vertical cross section through a continuous pusher-type furnace with side door discharge. Pusher mechanism is installed at right end of the drawing. Burner is indicated at the left or hot end of the unit, although some modern furnaces are fired from the right or cold end and then are called "inverted" furnaces

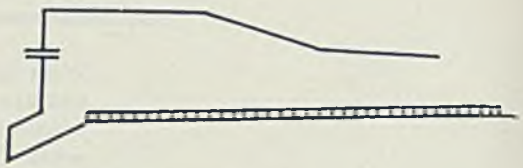

Fig. 3B—This is the end discharge type of continuous pusher furnace. Billets are discharged down the incline as successive billets are charged into the cold end of the furnace at right

tating-hearth furnace appears preferable, both for labor saving and for uniformity of heating. See Fig. 4. The writer and another Pittsburgh engineer independently designed and built large rotating-hearth furnaces as early as 1918. Today, the majority of furnace builders offer them for shell billets and particularly for round billets. The billets are stood on end on the hearth.

The dinnerplate hearth is preferred to the doughnut hearth for heating shell billets because the solid hearth does away with the inaccessible sand seal on the inside of the doughnut hearth. The dinnerplate hearth frequently extends all the way under and to the outside of the circular wall, Fig. 4, thus making the sand seal readily accessible. The roof is usually of the suspended type—but not always. Firing is often tangential, using many burners.

One wide door or two narrower doors are provided. In the latter case, a partition curtain is placed between the doors. Enough furnace pressure is carried to force flame out through the top of the door into a venting hood. In accordance with regular forge furnace practice, a curtain of air is blown up in front of the door as a protection for the furnace attendant.

The billets usually are handled with tongs suspended from a monorail or with a gooseneck charger. The motion of the hearth is either continuous or intermittent. The latter motion offers the advantage that the hearth can stand still while one row of billets is being worked out and another row is being charged.

Scale and Slag: Scale is formed during the heating process. To prevent furnace scale, the charge would have to be surrounded with a perfect protective atmosphere. Even a so-called reducing atmosphere produces scale at high temperatures because the oxygen in carbon dioxide and water vapor likes the iron better than the carbon or the hydrogen. So let her scale, boys, and then remove the scale by a scalebreaker, by cross-rolling, or by a spray of high-pressure water.

In 1918, the writer saw a rotating-hearth forge furnace which had been designed by a famous Pittsburgh engineer. Slag ran out of the furnace, found its way into the turning mechanism and shut down operations. The problem is, how to avoid this same trouble in our modern furnaces. The answer lies in slow and careful heating.

You cannot overheat the walls of a room by a candle burning in the center of the room, no matter how hot the flame of the candle may be. In the same way, you cannot overheat the edges and corners of the billets, even by the hottest oil flame, if it is guided properly at a safe distance from the billets.

If, in addition, the hearth is made of a material that does not combine with iron oxide, (such as chromite or magnesite), only dry scale will be knocked off by the tongs to lie on the hearth. This is then easily removed with a peel or by laying a feather-edge plate on the hearth and through the door and raking or hoeing the loose scale through the door.

If flame is allowed to impinge directly on edges or corners of the billets, melting will occur at these points. The molten steel will run down the billet to form a pasty mixture of steel and scale on the hearth. Such a mixture offers great resistance to removal and its formation should be carefully avoided.

Heating Rate Limits: The recommended limits of careful and slow heating have often been expressed in terms of heating rate in pounds per square foot per hour and also by maximum furnace temperature. The furnace builders association has set the highest safe heating rate at 60 pounds of steel per square foot per hour and maximum furnace temperature as 2300 degrees Fahr. If long billets are stood on end, the unit of pounds heated per square foot per hour is somewhat misleading because of the greater loading per square foot that then exists.

Fuels: Gas as well as oil has served successfully as fuel. If absolutely necessary, powdered coal may also be used. With gas or oil, the furnace atmosphere can be controlled with reasonable accuracy. Such accurate furnace atmosphere control is highly desirable. Although scaling occurs with reducing flames almost as much as with oxidizing flames, fuel is saved because fuel and air are mixed in the correct proportion for maximum combustion efficiency.

Recuperation: Heat salvage by recuperation is seldom practiced in forge furnaces. In connection with rotating-hearth furnaces, it is thoroughly impractical because there are so many venting places—at the door or doors, the center vent and the auxiliary vents around the circumference.

The rotating-hearth furnace has the advantage that it permits the heating of either square or round billets with uniformly low labor cost and equal uniformity of heating. However, it is not intended to convey here the impression that pusher furnaces are impractical for square billets. *They are practical* and have produced excellent results when properly designed and operated. However, the tendency in

the most recent installations is toward the round furnace.

Modernization: There are many reputable builders of furnaces in the United States. Thus anyone who contemplates equipping for manufacture of shells will have no trouble in procuring a suitable furnace installation outside, possibly, of the time element. Perhaps an owner of a forge plant or of a rolling mill may wish to convert his existing equipment and adapt it to shell forging. In such cases, there are many consulting engineers who will gladly assist in the conversion. No difficulty will be encountered if the principles laid down in this paper are observed.

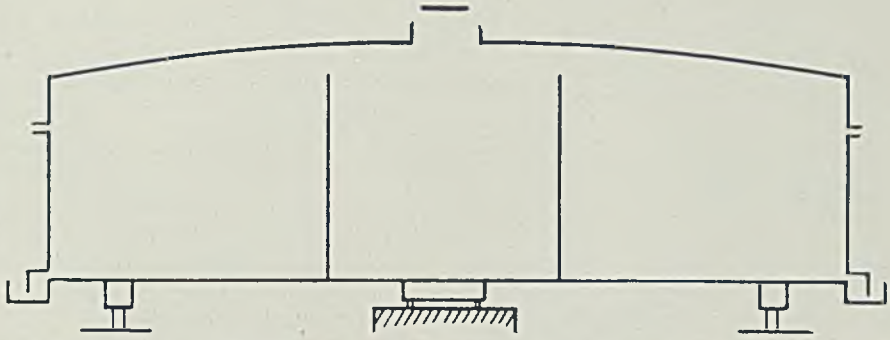

Fig. 4—This is an idealized vertical section through a rotating-hearth type of furnace. Note external sand or water seal all around, side vents and general method of supporting the hearth on rollers and center pedestal

Control: A few words may be said about temperature and atmosphere control. With careful and experienced men as heaters, automatic control for either temperature or atmosphere is not necessary, particularly if the heater is guided by pyrometer indications and flue gas analyses. On the other hand, if one wishes to be free from the effects of ignorance or carelessness, automatic controls are necessary. However, use of such equipment only shifts the burden from the heater to the instrument maintenance crew for without proper supervision and maintenance, automatic controls may be little better and can be, at times, much worse than human controls.

Burners: Much depends upon the burners. They should be so designed and arranged that fuel and air are controlled by one single movement. By rights, one single movement should control all burners and yet permit individual adjustment of each burner, but this is an ideal condition that can only be approached.

Induction Heating: The latest development in the heating of rounds for forging is to use the high-frequency electric induction method. Heating of rounds by the electric resistance method has been practiced for many years but only for rounds up to about 1-inch diameter as far as is known.

New Steel Has Free Machining Qualities

■ Speed Case, a recently developed low carbon open hearth steel plate, is announced by W. J. Holliday & Co., Speed Case Plate division, Hammond, Ind. It machines without tearing and usually without resorting to the use of cutting oils.

The machined surface frequently is so smooth that grinding or polishing are unnecessary. It can be machined at speeds up to 150-250 square feet per minute.

Ductile, resistant to impact and abrasion because of the manganese throughout the matrix of this steel, it has high shear and compression values and good physical properties with a tensile strength of 62,000 to 72,000 per square inch. When hot rolled, a 4-inch thick plate shows a brinell hardness of from 141 to 156.

Its characteristics make it ideal for forging, cold forming, pressing as well as machining. It also can be readily welded.

A typical analysis of Speed Case reads:

Carbon 0.20, manganese 1.25, sulphur 0.250, phosphorous 0.03 maximum, silicon 0.02 maximum.

The case derives its name from the fact that it can be rapidly carburized in 5 to 25 per cent less time than steels of similar usage. Its penetration is deep with a uniform case of from C62 to C66 rockwell, combined with a tough core that averages from C15 to C27 rockwell. It is recommended for bearing, bolster, wear and stripper die casting, metal forming roller and other dies, machinery and candy cooling tables, bed plates and composing tables, gears, sprocket wheels and molds for plastics, rubber and fiber, jigs and fixtures.

Reaffirms Practice On Roofing Ternes

■ Simplified practice recommendation R30-37, "Roofing Ternes," has been reaffirmed without change by the standing committee of the industry, according to the division of simplified practice of the national bureau of standards, Washington.

The seven weights of coating for roofing terne which were established when this recommendation was originally promulgated in 1925, are still in effect. The recommendation also specifies that no roofing terne is to be manufactured lighter than the IC gage. In 1937 the scope of the program was enlarged to include a packaging schedule and a method of marking roofing terne sold in rolls.

Copies of R30-37 may be obtained from the superintendent of documents, government printing office.

Bulletin Discusses Photoelasticity

■ "Numerical Solution of LaPlace's and Poisson's equations with Applications to Photoelasticity and Torsion" is the title of bulletin No. 7 recently issued by the engineering experiment station of Ohio State university, Columbus, O. It embodies in 57 pages discussions on the general methods of numerical computation, applicable to photoelasticity as a special case.

These computational methods are capable of extension to many problems involving the numerical solution of differential equations. One such problem is that of stress distribution in circular shafts of varying cross-section.

The bulletin is divided into three chapters and an appendix. One chapter deals entirely with LaPlace's equation, and another discusses Poisson's equation as related to the solution of torsion problems. The third chapter is devoted to the calculation of stresses within photoelastic models.

Guide For Building And Modernizing

Make all doors and aisles large enough for easy passage of the largest truck and load.

Equip doors with automatic electric openers and pull-rope switches on both sides in the path of travel.

Space and locate columns in all stock-room and store-room areas to facilitate use of most efficient handling and stock unit.

Make loading docks, elevator entries, aisle ends and aisle intersections of ample widths and clearances for right-angle turn of the largest loaded truck to be used.

Select elevators to accommodate the largest loaded truck to be employed above the ground floor.

Use automatic elevator signals and controls to minimize truck waiting time.

Design all structural floors for the necessary load bearing capacities.

Widen long aisles at intervals sufficiently to allow largest loaded trucks to pass.

Keep the plant on one floor level if possible.

Where ramps must be employed, hold grades to lowest practical minimum.

How to Get the Most from

POWER-TRUCK HANDLING

As is explained here, the efficiency of a power truck handling system depends not only upon proper layout of routes but on many other factors as well. Also given are check lists of items to consider when building or modernizing your plant, and for analyzing your truck operations. Prepared by a body of experts, they may prove extremely helpful to any man charged with supervision of mechanical handling operations. For the three preceding articles in this series on materials handling fundamentals, see STEEL Dec. 23, 1940, p. 72; Dec. 30, 1940, p. 54; Jan. 13, 1941, p. 66

■ MANY conditions in the plant affect the efficiency of a power-truck handling system. These may very profitably be taken into account when planning modernization or new plant construction. Some of the conditions are listed in the accompanying "Guide for Building and Modernizing."

Floors obviously should be hard, smooth and level. For power trucks equipped with solid rubber tires, a smooth surface of concrete, asphalt, wood block or brick results in a tractive resistance of approximately 40 pounds per ton of gross weight of truck and load. If the same floors are not properly maintained and allowed to grow rough and uneven, tractive resistance easily may increase to 50 pounds or more per ton. Tests on granite blocks or cobblestones have shown a tractive resistance as high as 70 pounds per ton.

Grades: The influence of grades also is important as each 1 per cent of up-grade requires 20 pounds of additional tractive effort per ton. Thus, to haul a load up a 2 per cent grade requires double the power necessary on a good level floor, and up a 10 per cent grade about 6 times as much. This emphasizes how much less useful transportation is obtainable from a given amount of energy or power when grades are to be climbed than when all floors and runways are at the same level. The 10 per cent grade is to be regarded as a maximum.

In laying out ramps—installation of which often is cheaper than elevators—it is desirable to keep the severity of the grade as far below the maximum as possible. Avoid wherever possible right-angle approaches which require acceleration after the truck is on the ramp. Also ease all approach and departure grades to conserve power and avoid fouling of platform or pedal guards at bottom of ramp or center sills or undercarriage at the top.

In laying out aisles, be sure they are of ample width for travel and that long aisles have clearance intervals at about 50 to 100 feet to allow two loaded trucks to pass.

Spacing and columns may be difficult to alter in an old building. In designing a new building, however, if the best and most efficient sizes of handling and storage units are known in advance, it may be possible to space columns at intervals that will permit better utilization of the entire floor area. Right-angle tiering proves quite advantageous in long narrow bays with narrow aisles.

Single or Multistory Buildings: From a materials handling standpoint, a one-story building is preferable to a multistory structure. Whether carried by an elevator or by an industrial truck on a ramp, the power required to raise a weight 1 foot may easily be 50 times more than to move the same weight 1 foot on the level. It is doubtful if this loss can be regained by gravity systems, although they should be

Abstracted from *Material-Handling Handbook*, published by The Industrial Truck Statistical association, 208 South LaSalle street, Chicago.

"...and the Greatest of these is MEN"

Youngstown Wire is a combination of fine materials, excellent production equipment, and highly skilled men. And the greatest of these is men.

Anybody can buy machinery and materials but the skill in a man's hands must be built by years of the most painstaking effort -- an effort that must be continuous, untiring, and inspired by ambition and loyalty.

That this is the stuff of which Youngstown's steel makers are made has been recognized by many of our steel mill visitors, who never cease to marvel at the obvious spirit of cooperation that inspires this force. We in the sales department know of it, of course, which is one very important reason why we are proud to offer you Youngstown Wire as a product that is perfectly fitted to your needs.

MANUFACTURER'S YOUNGSTOWN WIRE

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HIGH CARBON YOUNGSTOWN SPRING WIRE

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Manufacturers of Carbon, Alloy and Yoloy Steels

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employed wherever possible.

A single-story structure usually affords more usable space per dollar of investment than any other, due partly to wastage of space for elevators and stairs and partly to the higher cost of a structure of sufficient mechanical strength to support the higher stresses. In a single-story building, new types of construction with longer spans, arched or curved welded trusses designed for self and snow load support only afford a means of reducing cost substantially. Advantages of this type of building construction can be obtained when the handling method employs the supported-load principle as does an industrial-truck system. Handling systems of the suspended-load type require heavy mechanisms which in turn must be supported by a correspondingly heavier building framework.

Guide for Analysis of Truck Operating Conditions

A. Handling Routes:

What is the smallest number of different unit loads into which all materials may be standardized for handling?
What are the weight, length, width and height of each?
Are the unit loads best handled on skids, pallets or trailers?
Over how many different routes is each size of unit load moved?
What is the length of each route?
How many of each unit over each route per day?
What are the lengths and per cents of grades on each route and are the grades with or against the loads?
If loads are to be tiered at the end of any hauls, to what height?

B. Physical Plant Conditions:

What kind of floor and in what condition?
What is the minimum height and width of doors on the routes?
What are the minimum elevator dimensions and capacity?
What is the minimum width of intersecting right-angle aisles?
Will truck enter box cars? If so, what is the minimum width of the door?
What is the width of the loading dock?
What is the distance of the cars from the dock?
What is the maximum variation in height of the cars and the dock?

Elevators, if used, often prove a material-flow bottleneck in old buildings. This can be avoided in new buildings only by taking into full consideration the volume of material flow and arranging for the installation of a sufficient number of elevators of ample capacity and size. Automatic signaling systems also will help reduce delays at elevators. The time required for an elevator to respond to a call can be cut considerably by locating the signal switches far enough in front along the trucking lines to enable the truck operator to make his call in advance of reaching the elevator itself. When elevators are used also for passenger traffic, the truck operator may be supplied with a key that enables him to use a preferential signal. This system is susceptible to high refinement.

Another means of avoiding elevator delays when size of load permits is by use of live skids which are taken off and on by the elevator operator. In this way the power truck and its operator merely move to and from the shaftways but do not wait for the elevator to appear. Only the load waits.

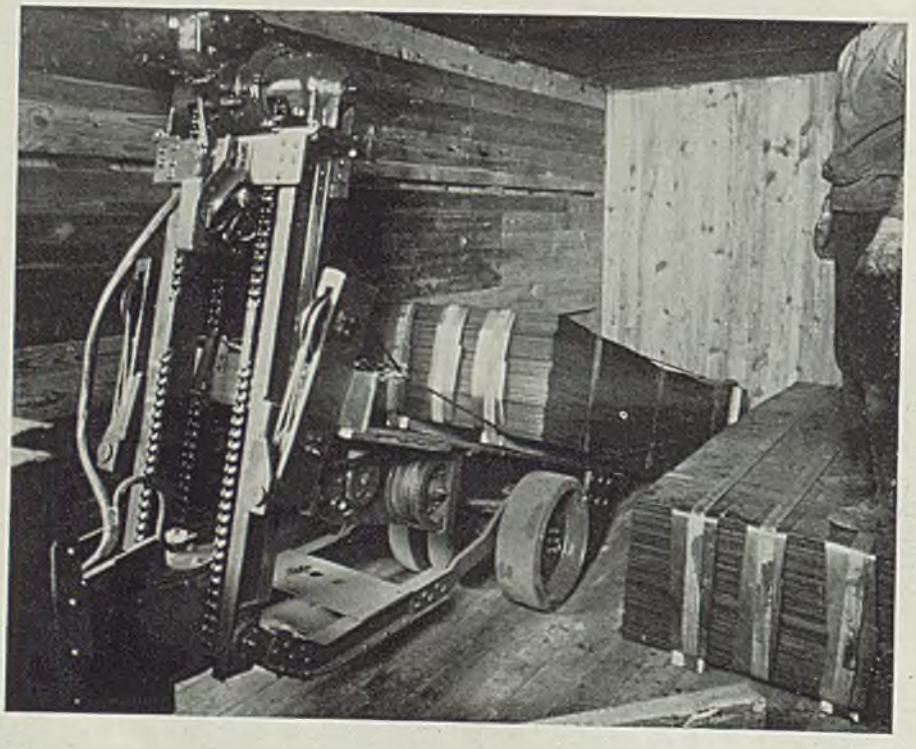
Doors: Delay by nominally closed doors can be reduced if not entirely eliminated by use of automatic electric openers actuated by overhead switches 10 to 20 feet away from the door and operated by pull ropes suspended within easy reach of the truck operator as he passes underneath. Automatic "electric eye" door openers have been very satisfactory in a number of recent installations.

Loading Docks: Since there is considerable variation in the floor heights of railway freight cars and highway trucks, loading docks usually must be built to form a compromise. Where tonnage warrants, motor truck deliveries may be facilitated by building the truck dock at a slight slope to obtain varying heights above the pavement. Truck drivers quickly learn to stop at the place where the height corresponds to the floor level of their particular truck.

Power Truck Speeds: The industrial power truck can be engineered to operate over a wide range of speeds, but those from 90 to 500 feet per minute are best adapted to usual service conditions. Due to relatively short distances of travel, narrow aisles, short turns and the like, higher speeds are rarely useful or safe. In general the high ton-foot work capacity of a power truck is due more to its quick pickup and release of load than to rapid travel.

From an energy cost standpoint, it is desirable to keep speeds as low as possible as power truck operation is essentially stop-and-go, involving repeated accelerations and decelerations. Since the energy consumed by acceleration is proportional to the square of the attained speed, high speeds are not desirable. Since tire

(*Please turn to Page* 82)



Large packages of sheet steel, especially highly finished sheet, are loaded in box cars without damaging the surface by using articulated sheet handlers like the one shown here. A typical carload consists of five 10-ton packages placed in the four corners and the center of the car

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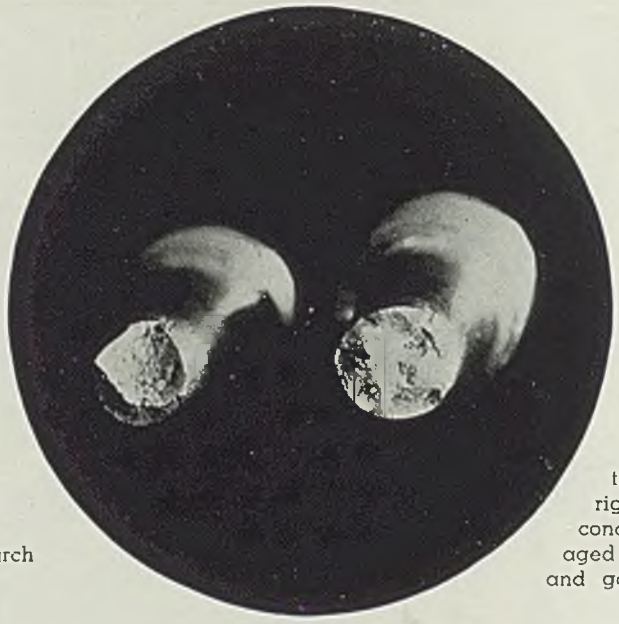


Difference in appearance of the fractures is shown here. The one at right was tested in the "as-welded" condition. The one at left had been aged at 110 degrees Cent. for 72 hours and gave a partial-cup-and-cone fracture

By J. R. DAWSON
and
A. R. LYTLE
Union Carbide & Carbon Research Laboratories Inc.
Niagara Falls, N. Y.

Welds Can Stretch 30 to 50 Per Cent More After This Heat Treatment

To find out how to increase the ductility of welds 30 to 50 per cent with corresponding improvement in reduction of area, read this article. Procedure and equipment involved are quite simple and are easily applied. Treatments work equally well on low-carbon and low-alloy steels. Yield points and tensile strengths are not affected

■ IN STUDYING the effect of heat treatment on physical properties of oxyacetylene welds, it was found that the ductility of the weld metal could be improved materially by treatment at lower temperatures than ordinarily employed for annealing welds. This discovery led to more experimentation, and a considerable amount of data on the effect of treatment of welds and weld metal at temperatures from 110 to 650 degrees Cent. has been secured. Treatment at these temperatures may be considered as accelerated aging.

Oxyacetylene welds in plate ½-inch or less in thickness are ordinarily satisfactory in physical properties.

Such welds are often readily and conveniently made in a single pass under conditions that favor a high degree of strength and ductility in the weld metal. However, for plates ⅝-inch or more in thickness, experience has shown that the weld metal should be applied in layers. There are good practical as well as economic reasons for this. Such layer-deposited weld metal may not quite meet the requirements of some specifications in respect to the value for per cent elongation in the all-weld-metal tensile specimen. Thus a suitable aging treatment appears to provide a practical means of securing an important improvement in these welds.

Most welds in the experiments were made in ¾-inch-thick flange-quality steel plate having tensile strength of 60,000 to 65,000 pounds per square inch with a few welds in ½-inch plate of the same grade also included. Two grades of welding rod were used; one, rod No. 1, was a plain carbon steel containing about 1 per cent manganese. The other, designated rod No. 2, was a similar steel containing about 0.35 per cent chromium. Average chemical analyses of these rods were as follows:

	Rod No. 1 Per Cent	Rod No. 2 Per Cent
Carbon	0.12	0.12
Manganese	1.10	1.10
Silicon	0.25	0.20
Chromium	...	0.30

A considerable number of welds were made with experimental low-alloy steel rods of various compositions to obtain information about the effect of various small additions of alloys on the response of the steel to the aging treatments at temperatures from 110 to 300 degrees Cent. For comparison, each group of experiments included welds finished without subsequent treatment and welds treated at 650 degrees Cent.

In preliminary tests, welds in ¾-inch steel plates were made, some with three layers of weld metal and others with four, five and six layers. Within this range of layers of weld metal, there was no appreciable difference in the properties of the resulting welds, so either three or four layers of weld metal were used for all subsequent welds in the ¾-inch plates. The welds were all of the single-V type, and all were 12 inches in length, so each weld provided two standard 0.505-inch all-weld-metal specimens consisting of weld metal that had been recrystallized when the top layer of weld metal was added. The specimens

From paper presented at twenty-first annual meeting of the American Welding society, October 1940, Cleveland.

were machined ready for testing before the treatments were applied for convenience. Laboratory furnaces having accurate temperature controls were used for heat treating. The composition of welding rods, the temperature and time of treatment, as well as the results obtained in the tensile tests are set down in Tables I to VI. With only a few exceptions, each of the values represents an average of the results obtained in testing two specimens.

From Table I on layer welds with No. 1 rods it is seen that treatment at 110 degrees Cent. for 24 hours resulted in a substantial increase in per cent elongation of the tension specimens and a still further increase by a longer treatment of 72 hours, but treatment for 168 hours gave no additional increase. Treatment at 300 degrees Cent. for only 1 hour improved elongation as much as lengthy treatments at 110 degrees Cent. In this instance the elongation value was actually higher after the 110 degrees and 300 degrees Cent. than after the 650 degrees Cent. treatment.

TABLE I—Tension Tests, All-Welded-Metal, No. 1 Rods

Weld	Treatment	Pounds Per Square Inch Yield Point	Pounds Per Square Inch Tensile Strength	Per Cent Elong. 2 Inches	Per Cent Red. of Area
		¾-Inch Plates			
H-72	As welded	34,500	61,500	20.0	35.0
H-73	110°C. — 24 hr.	37,500	62,700	26.8	45.1
H-74	110°C. — 48 hr.	37,500	63,200	30.0	56.0
H-75	110°C. — 72 hr.	37,500	63,100	34.0	59.2
H-76	110°C. —168 hr.	36,000	62,700	26.5	51.0
H-77	300°C. — 1 hr.	36,800	64,000	28.0	48.0
H-78	300°C. — 5 hr.	35,000	63,200	28.5	54.5
H-79	300°C. — 24 hr.	34,700	65,000	27.3	43.1
H-80	650°C. — 1 hr.	38,500	65,700	24.5	43.6
		½-Inch Plates, 0.375-Inch Specimens			
H-1	As welded	40,000	63,700	16.0*	31.0
H-2	110°C. — 24 hr.	34,300	62,700	21.5	39.0
H-3	110°C. — 48 hr.	32,700	60,400	19.5	42.0
H-4	110°C. — 72 hr.	32,700	60,100	24.9	47.0
H-5	110°C. —168 hr.	32,000	62,500	24.6	42.3
H-6	300°C. — 1 hr.	33,900	62,500	25.3	49.2
H-7	300°C. — 5 hr.	37,300	61,900	25.3	58.0
H-8	300°C. — 24 hr.	35,200	61,800	23.3	48.0
H-9	650°C. — 1 hr.	36,600	61,100	29.0	54.0

*Per cent elongation in 1½ inches.

Yield Point Unchanged

Table I shows that similar increases of elongation were produced by the aging treatments in single-pass welds made with the same No. 1 rod in ½-inch-thick plates. The enhancement in the values for reduction of area was in the same proportion as the increase in elongation values, but the treatments appeared to have been without effect on the values for yield point and tensile strength.

Results of testing welds made with the No. 2 rod are set down in Table II. These rods give welds higher in yield point and tensile strength both as welded and after treatment, but lower in elongation and reduction of area in the as-welded condition than welds produced with the No. 1 rods. The response of the weld metal from the No. 2 rods to treatment at 110 degrees Cent. was sluggish, but a marked improvement was obtained when the 300 degrees Cent. temperature was used. Again, the yield point and tensile strength values were not affected by the low-temperature treatments.

Since the weld metal with the No. 2 rods showed only small response to the 110 degrees Cent. treatments, additional experiments were carried out to find whether aging would take place if longer times were employed. The results for periods up to 576 hours are shown in Table III. Note a gradual increase occurred in the per cent elongation and reduction of area values as the time of heating was increased.

Some experiments were carried out to find whether the treatments could be applied satisfactorily by means of a blowpipe flame and also whether short-time treatments would be effective. The treatments with the torch flames were applied before the test specimens were removed from the plates. The welds were heated to the desired temperature and held for periods of 10 or 15 minutes as shown in Table IV. These temperatures were determined by thermocouples placed in holes drilled into the weld from the back side of the plate. The results show that marked improvement was secured even by treatment for 15 minutes at temperatures of from 300 to 500 degrees Cent.

The effect of low-temperature treatments on welds previously normalized with a torch flame was investigated. These welds were made in one pass in ½-inch-thick plates. When completed, welds were allowed to cool well below redness and then were reheated with the flame until the top surface was brought to a temperature of about 900 degrees Cent. After cooling to room temperature, the welds were cut from the plate and subjected to the aging treatments. Table V shows results although some of the values for the low-temperature-treated specimens were higher than those for specimens not receiving the treatment, it is believed these were variations that should be expected among such welds, and that low-temperature treatment actually was without appreciable effect on the properties of the welds previously normalized.

Table VI shows results of tests to find the effect of various alloy additions to the welding rods on response of the welds to aging. Specimens as-welded, treated at 110 degrees Cent. for 96 hours and at 650 degrees Cent. for 1 hour were tested. The time of 96 hours was used because it was thought some alloy steel welds might require a longer time of treatment at this temperature than was found necessary in the case of the welds with the No. 1 rods. Welds made with rods containing small additions of chromium, molybdenum and nickel, and combinations of chromium and copper, and molybdenum and nickel were improved generally even more by the aging than were welds made with the plain carbon No. 1 rods. Welds containing vanadium were not improved by the treatment nor were welds containing 1.02 per cent copper, although welds made with rods containing 0.64 per cent copper were improved. The response

TABLE II—Tension Tests, 0.505-Inch All-Weld-Metal Specimens ¾-Inch Plate, No. 2 Rods

Weld	Treatment	Pounds Per Square Inch Yield Point	Pounds Per Square Inch Tensile Strength	Per Cent Elong. 2 Inches	Per Cent Red. of Area
H-81	As welded	40,000	73,600	14.5	28.2
H-82	110°C. — 24 hr.	40,000	75,500	15.5	28.0
H-83	110°C. — 48 hr.	39,500	72,300	14.5	28.5
H-84	110°C. — 72 hr.	43,300	75,200	16.5	35.0
H-85	110°C. —168 hr.	41,500	76,200	19.5	40.1
H-86	300°C. — 1 hr.	40,000	73,700	22.2	48.1
H-87	300°C. — 5 hr.	41,000	78,000	24.5	52.5
H-88	300°C. — 24 hr.	41,500	75,000	26.0	57.5
H-89	650°C. — 1 hr.	42,000	71,600	27.0	63.0

TABLE III—Tension Tests, ¾-Inch Plate, No. 2 Rods 110 Degrees Cent. Treatment of Engine Welded Plate

Time in Hours	Pounds Per Square Inch Yield Point	Pounds Per Square Inch Tensile Strength	Per Cent Elong. 2 Inches	Per Cent Red. of Area
72	43,500	70,800	14.2	34.5
144	42,200	72,200	17.0	35.7
288	41,500	70,100	21.0	42.0
432	41,500	72,200	19.8	36.0
576	41,200	71,700	25.0	46.0

TABLE IV—Tension Tests, No. 1 Rod, All-Weld-Metal Specimens Treatment with Torch Flame

Treatment	Pounds Per Square Inch Yield Point	Pounds Per Square Inch Tensile Strength	Per Cent Elong. 2 Inches	Per Cent Red. of Area
As welded	35,750	62,500	16.5	31.1
300°C. — 10 min.	34,100	64,000	15.0	28.7
300°C. — 15 min.	34,250	63,625	21.0	35.9
400°C. — 10 min.	34,750	62,500	22.7	39.1
400°C. — 15 min.	36,000	63,500	23.0	43.2
500°C. — 10 min.	37,375	65,375	19.9	36.6
500°C. — 15 min.	33,000	60,000	20.0	36.3

TABLE V—Tension Tests, ½-Inch Plate, No. 1 Rod 0.375-Inch All-Weld-Metal Specimens

Weld	Treatment	Pounds Per Square Inch Yield Point	Pounds Per Square Inch Tensile Strength	Per Cent Elong. 2 Inches	Per Cent Red. of Area
H-40	T.N.	41,700	65,500	27.6	47.3
H-41	T.N. + 110°C. — 72 hr.	38,700	64,200	32.0	63.8
H-42	T.N. + 110°C. —168 hr.	35,400	62,200	28.0	52.7
H-43	T.N. + 300°C. — 24 hr.	34,200	64,500	26.6	51.0
H-44	T.N. + 650°C. — 1 hr.	37,800	63,900	30.4	63.2

T.N.—Torch Normalized.

to the treatment appeared to be increased by the presence of fairly high manganese, and the data presented in Table V indicate that this element may be at least as high as 1.36 per cent.

Tension tests on welds with low-alloy steel rods also were made. These again revealed that low-temperature treatments including even the 650 degrees Cent. treatment have no appreciable effect on tensile strength of the welds.

A considerable number of tests of welds with both No. 1 and No. 2 rods, and also the alloy rods, were made to find whether the aging treatments would affect the hardness or impact properties of the welds, and in neither case was there appreciable change as a result of the treatments. For example, after the 110-degree treatments for the 96-hour period there was average increase of hardness of one or two points rockwell B, and after heating at 650 degrees for 1 hour there was a loss of about two points in hardness. The impact strength was improved on the average by an amount represented by five points in the Izod test results; for example, from 45 to 50 foot-pounds by the 110 and 300-degree treatments.

The effect of the aging treatments on the appearance of the fracture was easily noticed in many of the tension test specimens. In those not subjected to the aging treatment, crystalline fractures were occasionally obtained but in general the fractures were of the shear type containing small flat areas that were rosette-like in appearance. None of the tension specimens that responded favorably to the treatment had either the rosette markings or even the crystal fracture but the break was by shear, and the fractures were silky and of the partial cup and cone type.

The difference in appearance of the fractures of the tension specimens is illustrated in Fig. 1. Both specimens consisted of weld metal from the No. 1 rod. The one on the right was tested in the "as-welded" condition, and several of the small areas having the rosette-like appearance can be noticed. These rosettes appeared to have localized the fracture, which was greater in area than the fracture of the specimen on the left aged at 110 degrees Cent. for 72 hours. The treated specimen on the left aged at 110 degrees Cent. for 72 hours. The treated specimen had the partial cup and cone type of fracture and was free from the rosettes. High values for per cent elongation and reduction of area were obtained in specimens that broke with this fracture.

No explanation of the improvement in ductility as shown by per cent elongation and reduction of area in tensile tests of all-weld-metal is offered, although it has been stated that hydrogen when present in solid steel may have the effect of lowering these values, and also that heating at low temperatures is effective in removing hydrogen from steel. This may be the clue.

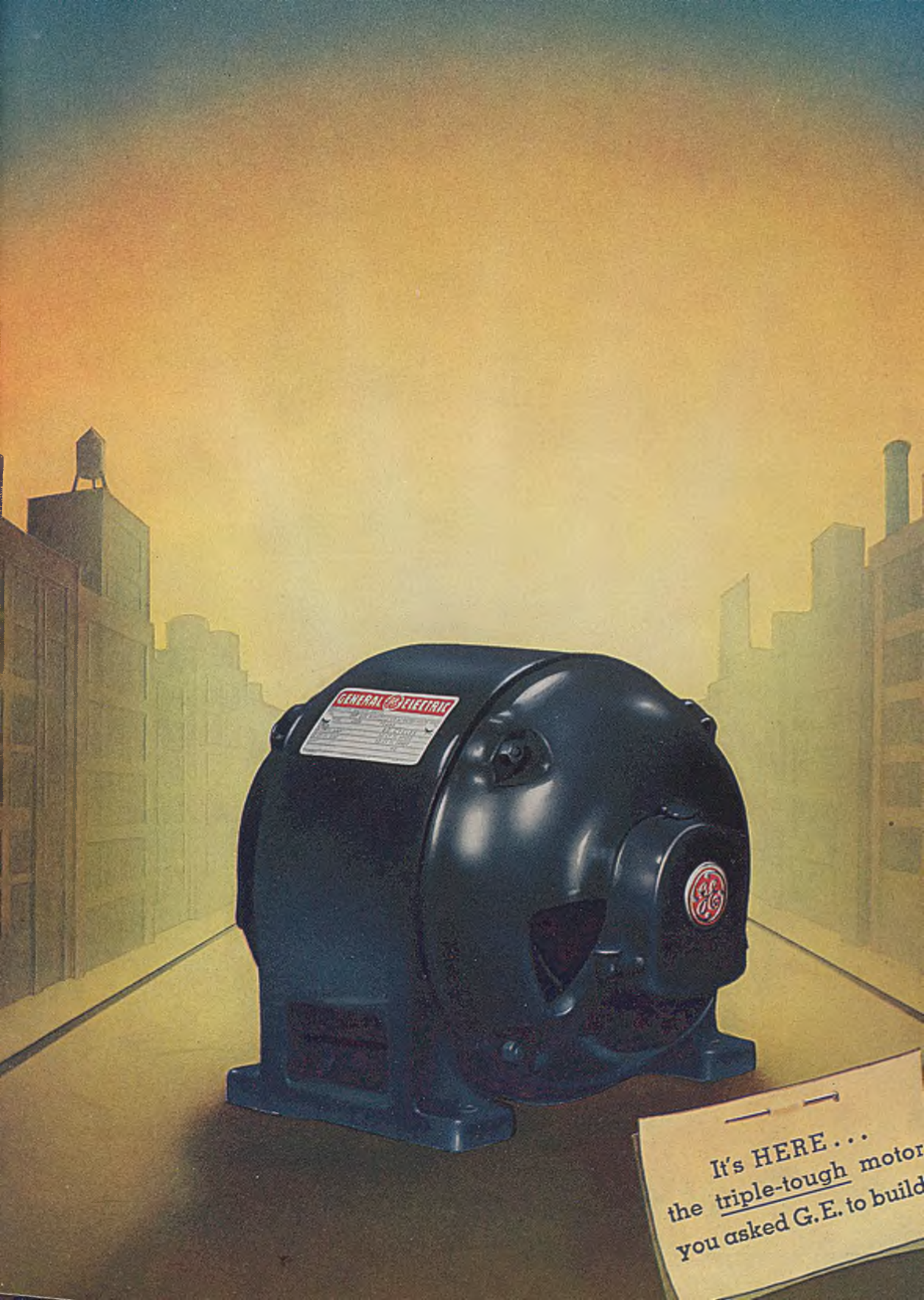
Summary: From the experiments it is concluded that:

Oxyacetylene welds, when heated from 24 to 72 hours at temperature of 110 degrees Cent. or for one hour at 300 degrees Cent. are improved on the order of 30 to 50 per cent in the value for percentage elongation in tension tests, with corre-

(*Please turn to Page* 81)

TABLE VI—Tension Tests, Welds with Low-Alloy Steel Rods

Heat No.	Composition of Welding Rod—Per Cent C	Mn	Si	Cr	Cu	Mo	Ni	0.505-Inch All-Weld-Metal Specimen—% Elongation, 2 Inches— As Welded	110° 96 Hr.	650° 1 Hr.	—% Reduction of Area— As Welded	110° 96 Hr.	650° 1 Hr.
919	0.10	0.74	0.15	0.31	....	....	....	19.5	27.5	25.0	40.1	45.9	38.6
891	0.12	1.10	0.21	0.32	....	....	....	16.5	22.0	21.0	28.5	40.5	47.0
927	0.09	1.05	0.11	0.31	0.52	....	....	20.5	27.0	27.7	36.0	55.7	47.2
924	0.13	0.71	0.22	....	....	0.55	....	15.0	22.0	21.0	32.5	36.4	33.4
940	0.15	0.58	0.24	....	....	....	....	12.0	15.0	16.0	25.4	32.1	28.5
901	0.12	0.82	0.22	....	....	....	....	21.7	23.0	26.0	36.0	42.0	46.6
876	0.13	1.04	0.24	....	....	....	....	15.0	24.0	25.0	23.3	39.1	42.4
945	0.13	1.36	0.13	....	....	....	....	19.5	28.5	26.2	39.8	50.5	44.4
942	0.12	0.82	0.17	....	....	....	0.62	20.0	21.2	27.0	35.5	36.2	44.5
943	0.11	0.97	0.15	....	....	....	1.13	21.7	28.5	28.0	38.6	53.8	48.3
941	0.11	1.32	0.15	....	....	....	0.56	14.0	17.0	28.2	23.4	42.2	45.8
935	0.13	1.49	0.30	....	....	....	1.08	16.0	24.2	22.5	26.5	46.0	36.7
948	0.11	1.09	0.24	....	....	0.68	0.68	12.0	18.0	23.5	22.7	40.7	40.8
947	0.10	0.78	0.22	....	..	0.64	0.59	18.0	23.5	25.5	32.8	42.5	45.4
896	0.12	1.10	0.26	....	1.02	....	....	9.0	19.0	15.5	21.0	40.0	30.0
944	0.13	0.85	0.15	....	0.64	....	....	22.5	25.0	18.5	33.4	41.6	36.3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We combined 500 man-year
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# of RESEARCH of motor EXPERIENCE

1 *Extra Protection* against physical damage

2 *Extra Protection* against electrical breakdown

3 *Extra Protection* against operating wear and tear

THE Tri-Clad motor is all new—and it's built to industry's own specifications. Five years of asking questions among motor users in all types of industry and studying industrial processes told us what you want in a general-purpose motor—what you want in styling—in convenience and adaptability—in extra protection on the job. At the same time, through its research and engineering organizations General Electric was developing new and unique materials, such as insulations based on synthetic resins; new manufacturing processes, such as the "booking" method of casting; and new ways of getting the most out of the active material in a motor, such as controlled annealing. Out of these new ways of doing things came the ability to build the triple-tough motor you asked for.

We call this new motor "Tri-Clad" because extra protection has been built into it in three basic ways:

1. The sturdy, cast-iron frame and end shields with no openings above the center line protect the vital parts against physical damage. There's no chance for falling materials or dripping liquids to get inside.
2. The new motor windings of Formex* wire, together with improved insulating materials and methods, give extra protection against electrical breakdown.
3. Fundamental improvements in bearing design give extra protection against failure or excessive wear in service. A scientifically improved lubricating system and double-end ventilation augment this protection.

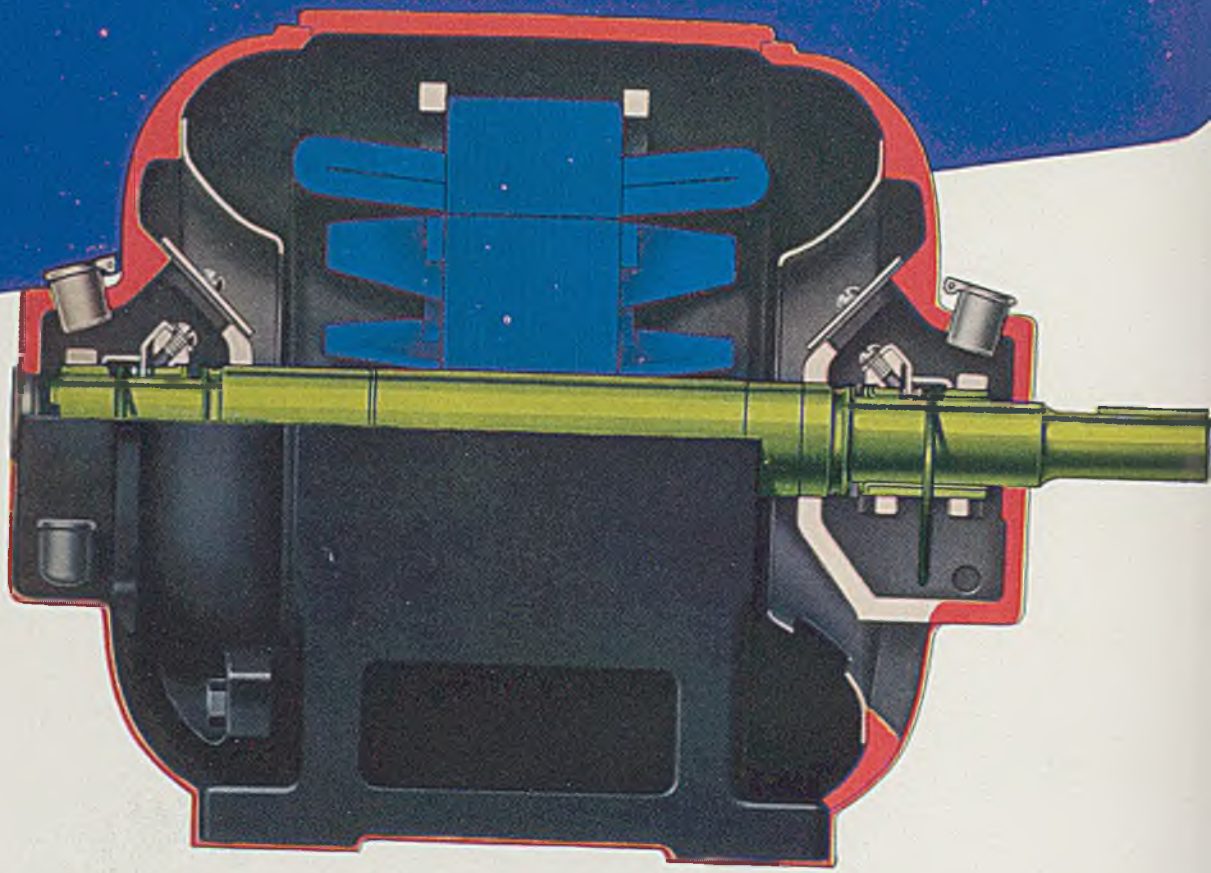
Here's a test: Recall every point of weakness that has ever cropped up in a general-purpose motor to cost you money. Then check them against the features listed on the next page. Don't stop with protection; consider the characteristics, the convenience features, the sleek styling—even the paint job and the name-plate. We'll rest our case for Tri-Clad on how close it *then* comes to your ideas of what a truly modern motor ought to be. *Reg. U.S. Pat. Off.

GE

. . . TO LAST

TURN PAGE FOR IN

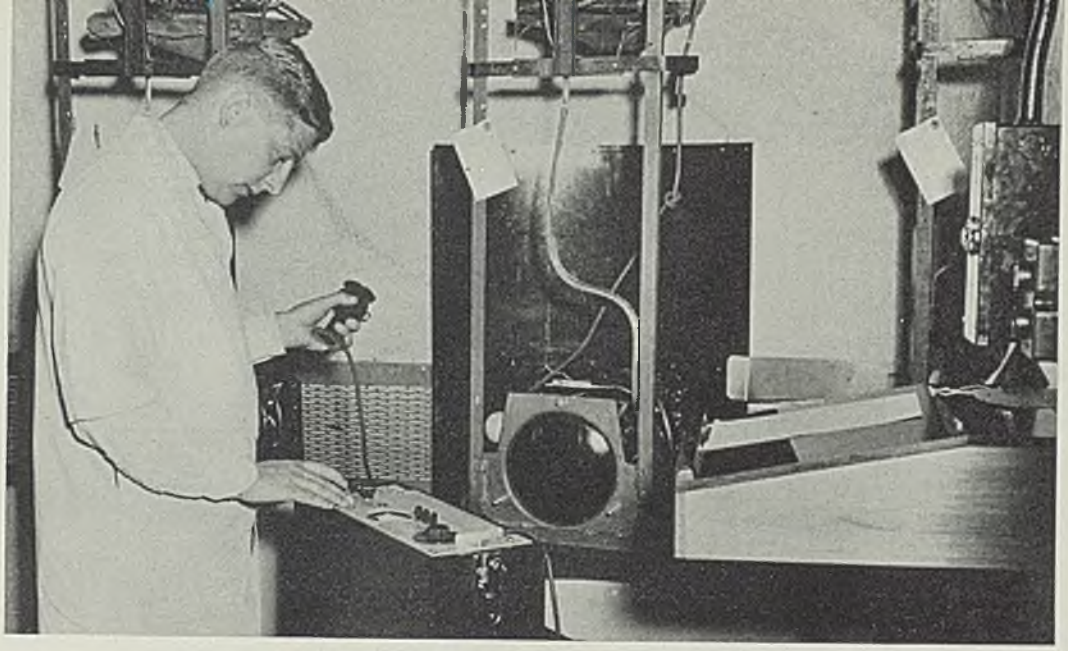
Check THIS "INSIDE STORY" OF MOTOR VALUE



- One-piece, cast-iron frame and rigid cast-iron end shields protect the motor against external blows and accidental abuse.
- Enclosed construction protects against entry of falling objects and dripping liquids; keeps chips and the like from vital motor parts.
- Low-velocity, double-end ventilating system provided by fans cast integrally with rotor winding keeps the motor running cool and prolongs insulation life.
- New winding methods give shorter end turns, reduce the number of internal connections, and improve characteristics.
- Mounting features adding to convenience include reversible stator and four-position end shields.
- Synthetic-resin insulating varnish, with exceptional bonding strength and high resistance to heat, bonds the conductors together and prevents movement of the windings.
- Steel-shell bearing linings of hard-tin-babbitt are of fundamentally new design and have a new method of grooving which provides positive lubrication for either direction of rotation.
- New and simple ball-bearing mounting assures correct alignment and exclusion of foreign materials. Easily cleaned and regreased by means of the G-E pressure-relief system.
- Big, roomy, four-direction conduit box is quickly removed from its base to give unrestricted working space for making connections. Flexible leads are clearly marked.
- Formex wire—the toughest magnet wire yet developed—assures a continuous dielectric film under the most severe conditions. Formex is highly resistant to abrasion, moisture, varnish solvents, and heat aging.
- End windings are coated with Glyptal No. 1201 red, providing a tough, hard finish that is highly resistant to heat, moisture, oil, and abrasion.
- One-piece cast-aluminum rotor winding with fans cast integrally is practically indestructible, has no joints, and gives a cool-running low-inertia rotor.
- All laminations, both in stator and rotor, are annealed for low iron losses and uniform characteristics. Special rotor treatment improves operating characteristics.

General Electric Company, Schenectady, N. Y.

GENERAL ELECTRIC



Inside the sound-proof room: This operator is conducting final tests on the structure with a decibel meter. Under normal operation, no decibel meter will be used. The operator will place his ear in front of the black sound reflecting panel and listen to the sound of the refrigerator unit as it runs

Human Ears "Outlisten" Sound Meters

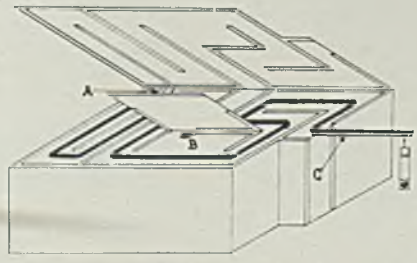
So quiet that the snap of your fingers sounds like the "crack" of a pistol, the new Westinghouse "listening laboratory" at its East Springfield plant utilizes the aid of human ears to test the hundreds of household refrigerator motors and compressor units which pass through it on a conveyor from the production line.

■ EVERY DAY on the production line at the East Springfield, Mass., plant of Westinghouse Electric & Mfg. Co., hundreds of household refrigerator motors and compressor units pass through the new "listening laboratory" to be checked for noise. And the testing, queer as it seems, is not done with the aid of noise meters—but with the aid of human ears.

The units are carried through the laboratory on an endless conveyor chain. And, as each of them pauses before a small sounding board, the inspector bends close and listens to it run. If it fails to meet the silence standards—back it goes.

The factor behind all this—that which caused the human ear to "outshine" the machine—is the new "listening laboratory" itself. It is the only soundproof chamber known not completely sealed from the outside when in operation. Its construction resembles a labyrinth, or maze, and consists of a series of winding passages with 90 and 180-degree turns.

Located in about the middle of these passage-ways is the actual sound proof chamber. It is a 21,000-pound "floating room," completely hung in the air—supported by 20 springs, freeing it of any plant floor vibration. The walls of the room are 1-foot thick, and are composed of eight layers of concrete, tile, dead air space, rock-wool and airplane felting. The labyrinth walls, which are 6 inches thick, are made of concrete with a sound absorbing surface. Most of the sound is eliminated by this passage.



This 3-dimensional sketch shows the labyrinth-like passages which surround the "listening laboratory" used for sound-testing refrigerator units. The main room B. floats on 20 steel springs and weighs 21,000 pounds

To further increase the quietness, soft padding on the insides of the room and passageways absorbs vagrant noises, which otherwise would strike the concrete surfaces and be reflected, back and forth, until their energy was dissipated.

Final tests made with sensitive noise meters show that the noise level of the "lab" measures 37 decibels. This sounds pretty high, but when you consider that the vibrations of the earth itself would measure between 5 and 10 decibels—and that a human being entering such a room would raise this total another 5 decibels, due to life pulsations — 37 decibels represents an almost infinitesimal level. This is evident here where conversation must be carried on in low voices, as normal converation can not be carried on as it gives the effect of shouting.

Thus human ears perform the inspection tests here because of necessity. The inspectors, because of their acute hearing can detect variation in sound as small as one decibel.

TUNGSTEN CARBIDE DIES

Production of wire drawn through carbide dies increased rapidly when mills performed their own servicing and finishing operations. Making shaped dies involves no complications. Remarks by the author at the annual meeting of the Wire association, Cleveland, Oct. 21-24 include many interesting observations covering certain phases of wire mill practice east of the Rocky mountains during the past decade

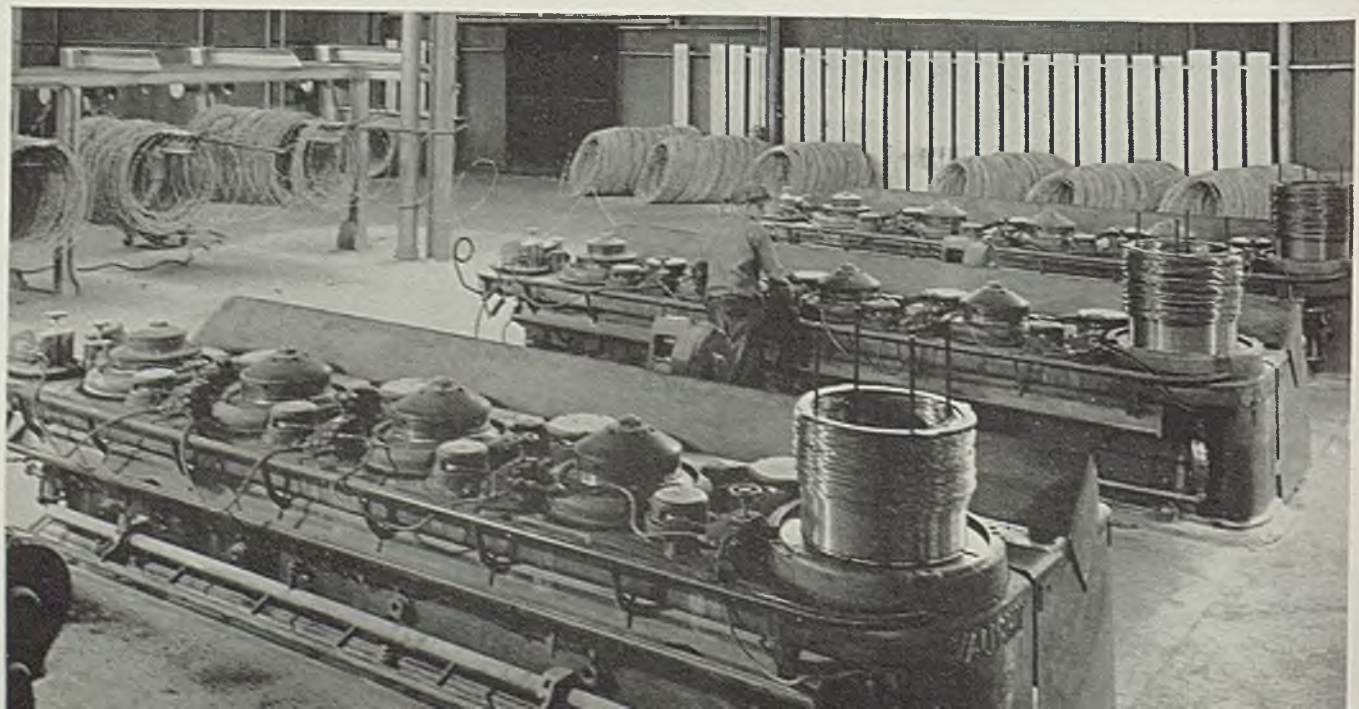
By J. R. LONGWELL
Chief Engineer
Carboloy Co. Inc.,
Detroit

■ ALMOST ALL wire mills in 1931 used a few carbide dies. They were put in the block and operators drew wire through them as best they could. Few mills were equipped to handle or to service the dies, so that at the end of 1931 relatively few wire mills produced any great quantity of wire through carbide dies. From this it was evident that if wire mills were going to gain any advantage through the use of these dies, they would have to set aside portions of the die rooms and install equipment for servicing the dies. This was done rapidly. It was a short step from the servicing to the actual finishing of carbide dies in the wire mill. This was highly desirable, in that the wire mill itself was better prepared to determine the shape of the die and the repair needs and what type of surface finish was required in the die itself. The result was that production through carbide dies increased by leaps and bounds.

Other changes were required in the wire mill in order to make the application of these dies successful. These went hand-in-hand with the die application; the die was not the only tool which they used in the mill but like any other tool application, it must be serviced. Machine tools were required to make use of the dies. Practically every mill today has occasion to produce some shaped wire, that is, wire other than round. During the last ten years there has been a steady growth in the insulation of dies for drawing shapes other than round. However, wire mills today are nearly in the position they were in 1931 and early 1932 regarding the application of shaped dies in wire mills. Makers of shaped wire are not going to get far until they are in a position to service and finish dies as required.

Shaped wire is made in wire mills in two ways, rolling and drawing through dies. A number of turksheads also are used for producing certain types of shapes. Rolling is more adaptable in producing

Five-block drawbenches for the continuous drawing of wire. Each block is served by a water-cooled tungsten carbide die



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Each has the same temperature rating, each is a good insulating firebrick. But the lighter one will save more money than the other. It is lighter because it has a greater proportion of tiny pores or air cells . . . that block heat-flow and soak up less heat than the heavier, denser brick.

The test shown above is simple, clear and conclusive—but it need not be made if B&W Insulating Firebrick are used. To secure the most economical of the six B&W Insulating Firebrick for a given service, it is only necessary to select the B&W brick that will withstand the temperature involved—the rest is automatic. That brick will have the lowest weight, lowest heat losses, and greatest economy that can be realized with modern brick manufacturing methods.

All this is described in detail in a new bulletin—R-2-G—a copy of which will be sent upon request.

THE BABCOCK & WILCOX COMPANY
REFRACTORIES DIVISION: 85 LIBERTY STREET, NEW YORK, N. Y.

R-120

BABCOCK & WILCOX

shapes with an inside angle, especially the lock spring or lock ring type of wire, which is a square wire with one corner notched. It is a difficult shape to draw through dies. Mills produce wire with a deep groove for use in the bed spring industry. This type wire is better produced by rolling either through a turkshead or on a rolling mill. Other shapes can best be produced through a die.

Since the beginning of the conflagration of Europe, there has been an increased demand in this country for oval wire used in South American countries for fencing. Requests for and production of shaped dies has increased rapidly. There has been an increased demand on the part of the sales department to get the production department to allow them to sell shaped wire to customers who have been buying large amounts of round wire.

A careful and thorough investigation of the manufacture of shaped dies discloses that there is nothing complicated about them. In fact, one of the fundamental principles used in making round dies can be applied in making shaped dies, provided means are available for producing lap dies. A machine is required for giving the motion necessary for lapped and shaped dies.

Shaped die manufacture is not new. In many wire mills they are employing ingenious methods of making this type of die. Some have been made from round dies. In the production of some shapes, it has been found unnecessary to have a shaped entrance or approach to the die; only a shaped lead or bearing is essential. In order to make a die, it is first necessary to make a shaped lap. This can be done on an ordinary machine tool like a shaper, and has been done for years in the maintenance department of wire mills where they have produced shaped wire through steel dies and have made their dies by driving a drift or punch into the steel. The drift or punch is first shaped and from that the die is made. Many round hole dies have been made in the same way in the past 50 years, so that making a shaped die in any wire mill is no particular problem.

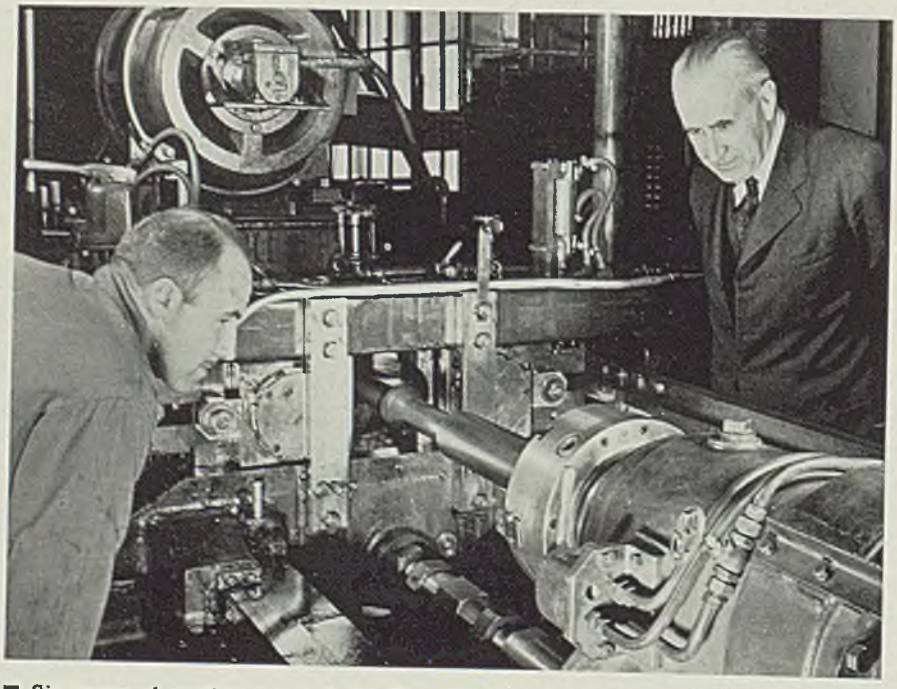
The more complicated the shape, the more skillful must be the man who makes the lap, but the operation of a shaper is not difficult to learn. It is also necessary to have a lathe handy to turn shanks on these shaped dies, but the lathe is a commonplace tool in every die room. The shaper is a small modern unit for bench work that has all the motions of any other shaper, on which is mounted a fixture, a dividing head, index head, a swivel plate on the base to allow you to get the correct direction of tool marks, and index plates are used to give you the shape required. Many shapes are turned up on a lathe and finished on a shaper; some, of course, are finished with form tools. Not only can shaped dies be made in your own plant but it is possible to finish, re-size and take care of them with no particular difficulty.

In many plants a search through hundreds of dies is required before one that is satisfactory can be found. Some are without a back relief; others are chipped so badly that they produced poor wire, many are ringed in front.

Recently two plants in the same town equipped with the same die-making machines have been drawing copper wire from rods purchased from the same source. One plant found it difficult to get 12,000 or 13,000 pounds of copper wire 0.057-inch through a carbide die. The other shop gets 65,000 to 75,000 pounds through the same die; in fact the dies from the plants have been interchanged without any effect on production. The dies are not at fault nor are the machines. It is not the copper because the metal comes from the same source. The answer is lubrication. Preparation for cleaning house also is important. Some factories have increased their die production ten times by careful application of cleaning house practice.

♦

The Deweys "in Action"



■ Six years of continuous work by Clarence L. Dewey, right, and his son Sidney, left, went into the development of this machine described in STEEL, Dec. 30, p. 40, 1940, which is now producing shaped tubular parts by the Dewey process at Steel & Tubes, division of Republic Steel Corp., 224 East 131st street, Cleveland. A modified spinning process, the tubing is shaped by rolls in a moving carriage, the action of which is determined by a cam parallel to the tube

Offers Engineers New Ohm's Law Calculator

■ A new handy Ohm's law calculator which gives the answer to any Ohm's law problem in a jiffy, with one setting of the slide, is offered by Ohmite Mfg. Co., 4835 Flournoy street, Chicago. It does not require any knowledge of a slide rule to operate, and has scales on both sides so as to cover the range of currents, resistances, wattages and voltages commonly used in the industrial, electronic and radio fields. It covers the current and wattage range for motors, generators, lamps, electrical apparatus and other applications up to 100 amperes or 1000 watts—also the low-current high-resistance radio, sound and electronic applications.

The calculator has a convenient stock unit selector, listing hundreds of stock values, immediately available, in dividohms, fixed resistors, (including Ohmite brown devils) and rheostats. A setting of the slide shows the stock number of the resistor or rheostat needed.

Simple instructions appear on the calculator. Multiplication, division, the finding of squares and square roots can also be performed on the calculator. It is offered to engineers, laboratory men, production managers, maintenance men, purchasing agents, etc., who write in on a company letterhead, enclosing 10 cents to cover handling charges.

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IT'S A PERFECT
RUNNING MATE
FOR YOUR
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with G-E COMBINATION STARTERS

GENERAL ELECTRIC

Making Cylinder Barrels for Packard V-12 Torpedo Boat Engines

By A. H. Allen

Detroit Editor

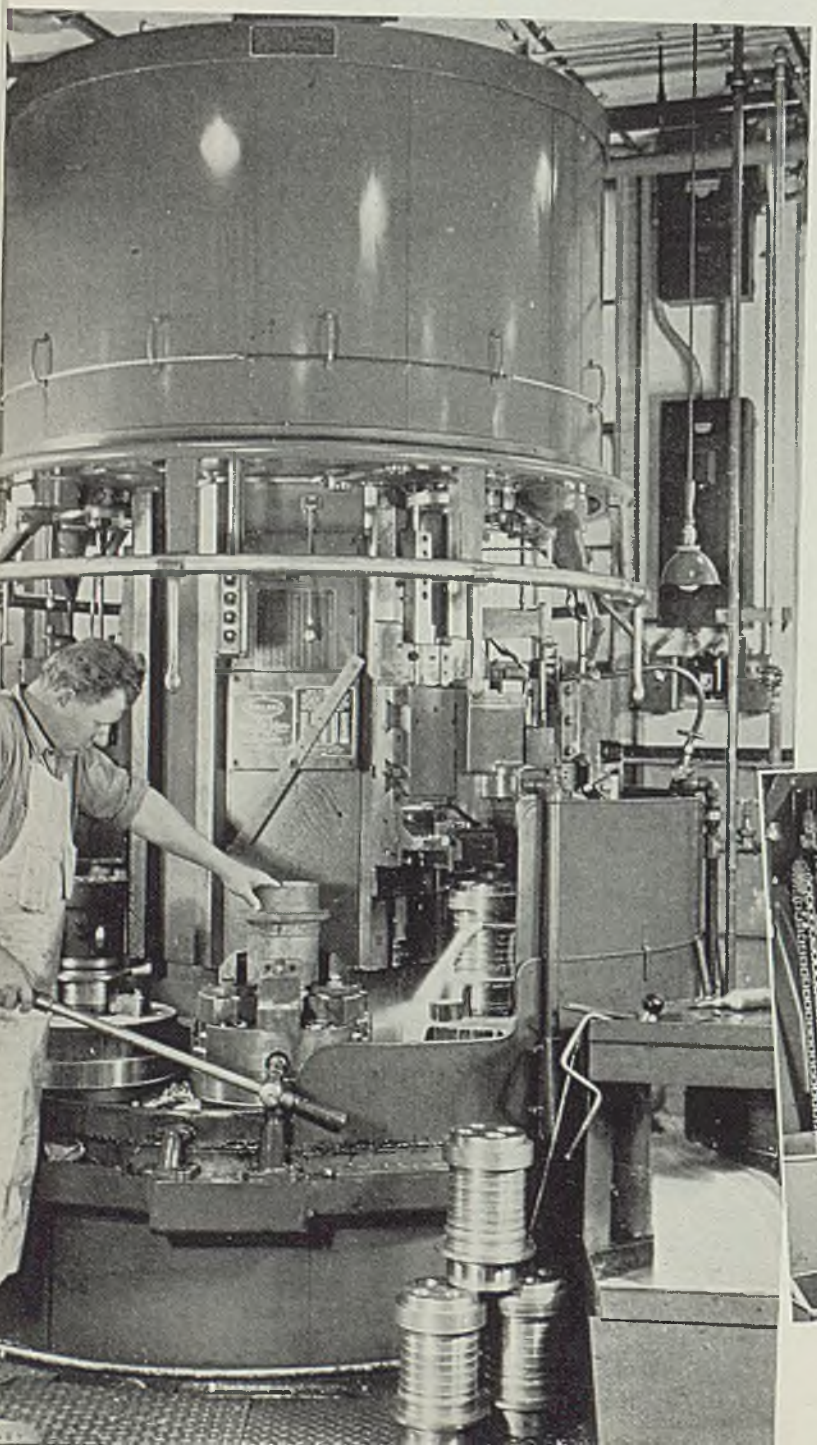
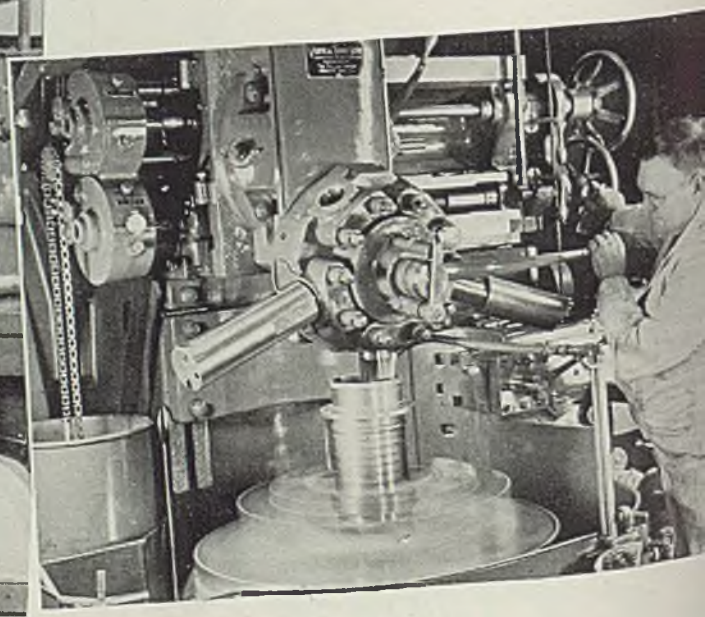


Fig. 1—Bullard eight-spindle type D Mult-Au-Matic which rough finishes and semifinishes cylinder bore and rough turns various diameters on the outside. The unit, left, weighs 48,000 pounds costs $50,000. It employs an interesting two-at-a-time setup. It indexes two steps at a time, alternate barrels being in reversed position, so one end is machined while opposite ends of alternate barrels are machined. Upon making a circuit of the chuck-carrying turntable, parts are turned over so their opposite ends are machined the second time around. Thus machine becomes, in effect, two 4-spindle machines in one

Fig. 2—Bullard vertical turret lathe, below, performing secondary boring operations on cylinder barrels already through the setup in Fig. 1

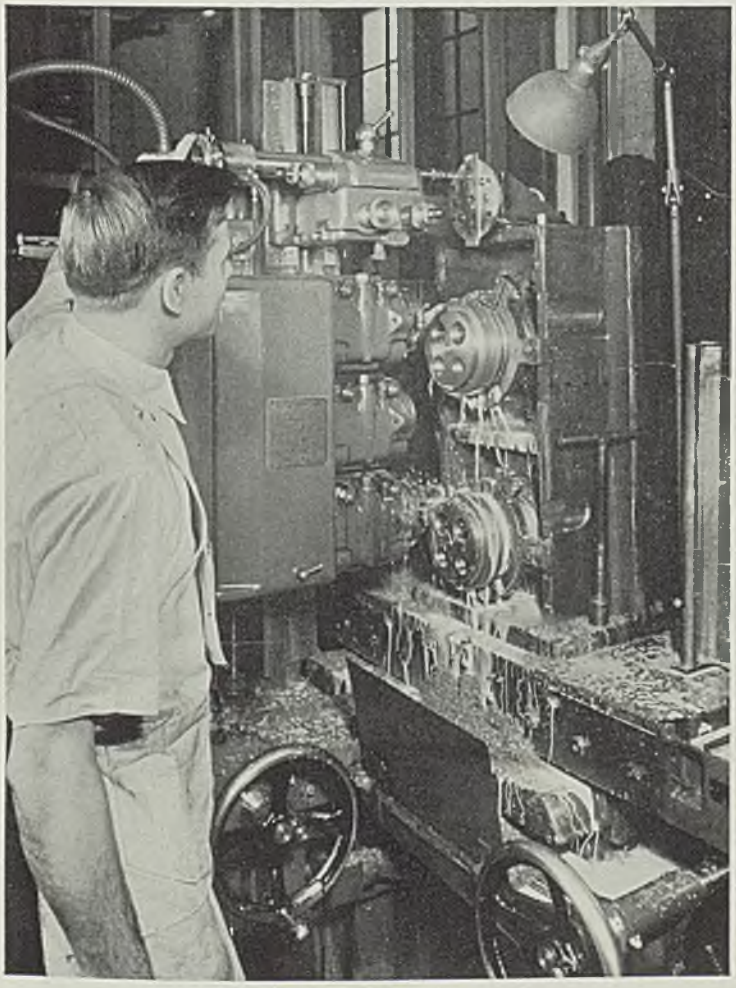
Fig. 3—Keller profiling machine, opposite page, milling spark plug bosses on tops of two barrels simultaneously. Note templet and tracer at top of work-holding fixture



Each cylinder of this engine develops 100 horsepower, a greater output than the entire engine of most automobiles. Thus manufacturing tolerances and techniques are of exceptional interest. In the full details presented here will be found many unusual features of design, protection against corrosion, machining methods, welding procedures, testing and the like

■ TWELVE forged-steel cylinder barrels, marvels of exactly controlled metallurgy and of precision machining and grinding, "harness" the 1200 horses whose combined "kick" represents the power of the Packard V-12 marine engine. These engines are now being built at a rate of three every two days at the Packard plant in Detroit for torpedo boat installations. Of SAE 4140 aircraft quality steel, the machining and assembly of these barrels with their 18-8 stainless steel water jackets entails many unusual and interesting techniques.

Rough forgings, weighing 56 pounds each, are supplied to Packard by Bethlehem Steel Co. These forgings, which are produced by hot piercing and drawing sections of billets, are given a preliminary rough machining by Bethlehem before shipment. They are furnished to Packard fully heat treated, quenched and drawn to a hardness of 286 to 331 brinell. Steel specifications require that reports on steel production be certified, that analysis be notarized, that forgings be free from any defects which can be detected by 100 per cent Magnaflux inspection. All rejects are the liability of the steelmaker. So far, in connection with more than 100 engines already built, representing more than 1200 barrels, rejects have been practically negligible.



Analysis limits assigned to SAE 4140 steel are: Carbon, 0.35 to 0.45 per cent; manganese, 0.60 to 0.90; chromium, 0.80 to 1.10 and molybdenum, 0.15 to 0.25. Produced in the electric furnace, this steel has maximum sulfur and phosphorus of 0.04 and 0.05 per cent respectively. The steel is similar, except for somewhat higher physical properties, to SAE 4130 which is used widely for a variety of heat treated automotive parts, including driveshafts, axle shafts, steering knuckles, connecting rods.

Forgings as received are marked with paint of a color to indicate the heat number from which they were made. A code letter is stamped on the flange of each cylinder. This is for identification during the process of various fabricating operations and also serves to identify finished cylinders.

The rough forged barrel is 7⅛ inches in outside diameter at the center section, 12⅞ inches long and 6⅛ inches in inside diameter. One end is closed, outside diameter at this end being increased to 8⅛ inches for a depth of 2⅝ inches. Stock thickness at the end is 1½ inches. Starting at a point 2 11/16 inches from the open end, is a ⅝-inch flange 9¼ inches in diameter. Below this flange outside diameter is reduced to 6 15/16 inches.

These figures are cited to give an indication of the heavy section of the barrel before machining. By the time the barrel is finished, better than 60 per cent of this steel has been cut or ground away, its final weight being only 21 pounds—including jacket. This remarkable evolution is made clear by Figs. 1 and 9, wherein both rough and finished barrels appear in close proximity.

To convey some idea as to how the barrel is positioned in the engine, it should be explained that the function of the skirt or flange just mentioned is to provide space for holes for bolting the barrel to the engine crankcase. The closed end is the top. In it are drilled holes for exhaust and inlet valves (two of each), as well as holes to receive studs to which the aluminum alloy valve cover housing is attached. Incidentally, the precision checking of one of those cover housings was illustrated on page 41 of the Dec. 2, 1940, issue of STEEL. Extra stock at the top of the cylinder barrel is provided so that two diametrically opposed spark plug bosses can be profiled out. The plugs are screwed into threaded holes in these bosses. Wall thickness of the barrel in the zone of piston travel is reduced by final machining to about ⅛-inch.

Six fins, each about 1/16-inch in height, are form machined on the outside surface of the barrel to insure effective cooling. Over this portion of the barrel is welded a stainless steel jacket, so that water can be circulated around the wall of each cylinder. Water cooling of the top portion of the cylinder,

around the valve seats, is provided for by milling out the excess metal around the valve holes, then welding on a hollow milled plate of SAE 4140 steel and finishing off the top and edge. Space is left between this plate and the top of the cylinder through which water will circulate after passing through the space between jacket and cylinder. The water passes out of this space through two holes drilled in opposite sides of the top plate. In operation, these engines are cooled by means of fresh water circulated around the cylinders and then through a heat exchanger—the latter being cooled by sea water.

To get an idea of the painstaking care exercised in machining and finishing these barrels, just consider that machining and grinding time alone amounts to 23½ hours per barrel, which represents a total of 282 hours for each engine's complete set of cylinders.

Table I is a study of operations showing steps and sequence followed.

Details of welding operation No. 37 are interesting. The semifinished barrels are placed in welding fixtures with the plates fitted snugly into position. Operators using gas torches and Oxweld No. 1 welding rod weld a bead around each of the four valve holes and also around the five stud bosses. Two hours are required to weld each cylinder. Following the welding, the barrel is given a 2-hour draw at 850 degrees Fahr. to relieve welding strains. Low draw temperature is necessitated by the fact that a higher heat

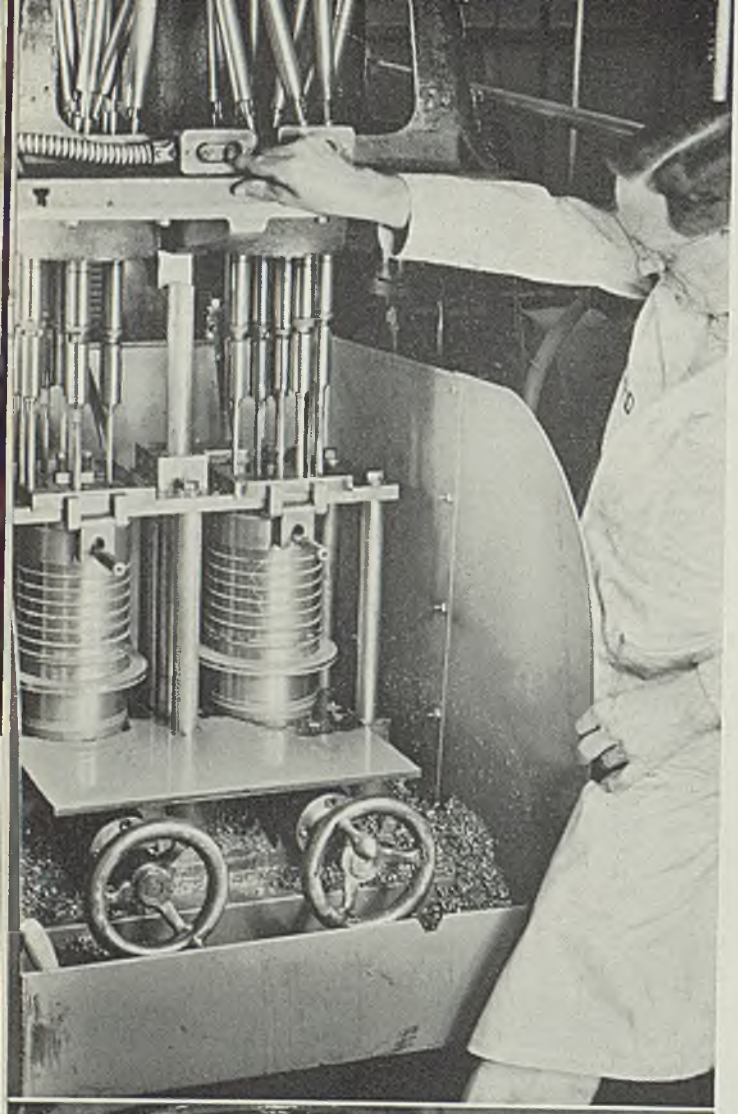


Fig. 4. (Top)—Multiple-spindle drill for removing excess stock by drilling 16 holes in top of cylinder barrel

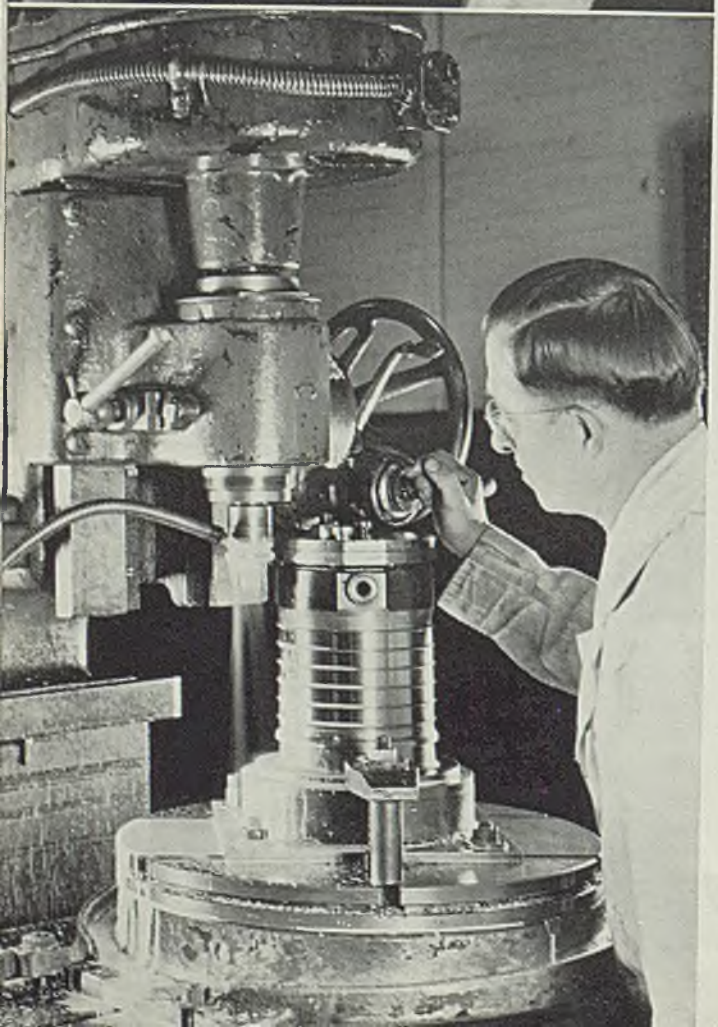


Fig. 5. (Below)—Gas welding SAE 4140 steel top plate to cylinder barrel, using Oxweld No. 1 rod. Operator must weld around four valve holes and around five stud boxes, two hours per cylinder being required for this welding

Fig. 7. (Lower left)—Form milling periphery of top plate of cylinder barrel in vertical milling machine provided with revolving work table

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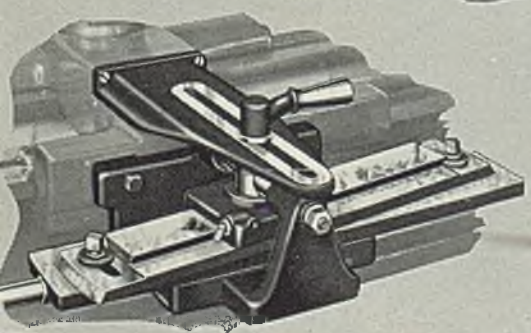

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might change the hardness of the cylinder wall over its piston ring travel area.

In connection with plating operation, No. 53, Packard engineers made an interesting discovery. Inasmuch as water continually circulates around the outside of the barrel within its water jacket, it is necessary to provide some corrosion protection for this 4140 steel barrel. First idea was to use cadmium plate for this protection. It was found, however, that under engine operating conditions the cadmium melted off the surface. Some also was burned off at the welds.

Experiments then were made with Corronizing, a patented surface treatment for steel involving nickel and zinc. In this case, it was found that the zinc caused embrittlement of the stainless jacket during welding. For the time metallurgists were "stumped." Finally, an entirely new combination of metals was evolved on which patent applications are being made. This combination gives the necessary corrosion protection and is not affected by the welding.

Water jackets are of 18-gage chromium-nickel steel of the 18-8 type, with columbium added for stabilization against intergranular corrosion. A strip, slightly over 8 inches wide, is cut to a length sufficient to encircle the barrel over the fins. This is rolled to a cylindrical shape; the inlet hole blanked out; and two shallow grooves or corrugations for reinforcing rolled in the center portion.

The rolled water jackets are then fitted to the cylinder barrels, the assemblies being supported in special fixtures while welders with gas torches close the seam in the jacket, secure the outlet fitting and make the top weld around the circumference. Welding wire used is the same material as the jacket—18-8 chromium-nickel steel stabilized with columbium.

To make the bottom weld on the jacket where it meets the lower fin on the barrel, the cylinder is placed upside down on a steel plate with a rubber washer fitted between plate and cylinder to seal the end. The barrel then is filled with aviation engine oil and a steel cover plate is placed over the top to keep welding sparks from reaching the surface of this oil. As shown at the right in Fig. 6, a heavy copper clamp next is secured around the jacket just below the line of the weld. What with the oil on the inside of the cylinder and the copper clamp on the outside of the jacket, rapid conduction of heat away from the weld is assured. This heat conduction is further hastened by the fact that the lower fin on the barrel is undercut. No welding wire or rod is used to make this bottom weld, the operator simply playing his torch directly on the joint and slowly rotating the fixture as the weld progresses.

Any stresses which may have developed during the welding operation are relieved by a 2-hour draw—again at 850 degrees Fahr. Following this draw, soundness of the welds is tested by subjecting the assembly to 100-pound per square inch water pressure—this being applied in the space between water jacket and cylinder. This is the first of four such tests made on each barrel-jacket assembly during fabrication.

Some idea of the size and power of this engine can be gained from the fact each cylinder delivers approximately 100 horsepower, or the equivalent of the total output of the average automobile engine. As mentioned previously, cylinder bore is 6⅜ inches; stroke is 6½ inches. Therefore total piston displacement of the 12-cylinder plant is 2490 cubic inches. A compression ratio of 6.4 to 1 is used. A supercharger is driven through a gear train at the forward end of the engine. Tests show 1200 horsepower developed at 2400 revolutions per minute; 1350 at 2500 revolutions per minute.

In the operations sequence, mention of the Mag-

Fig. 6—Gas welding stainless steel water jacket to cylinder barrel. Operators in background are making top, side and outlet fitting welds, using 18-8 chrome-nickel rods, with columbium. Operator in foreground is making bottom weld, using no welding rod. Cylinder is filled with oil and sealed. This oil, together with a heavy copper clamp placed just below the weld line, insures rapid conduction of heat away from the area of the weld. Fixture is rotated slowly as weld progresses

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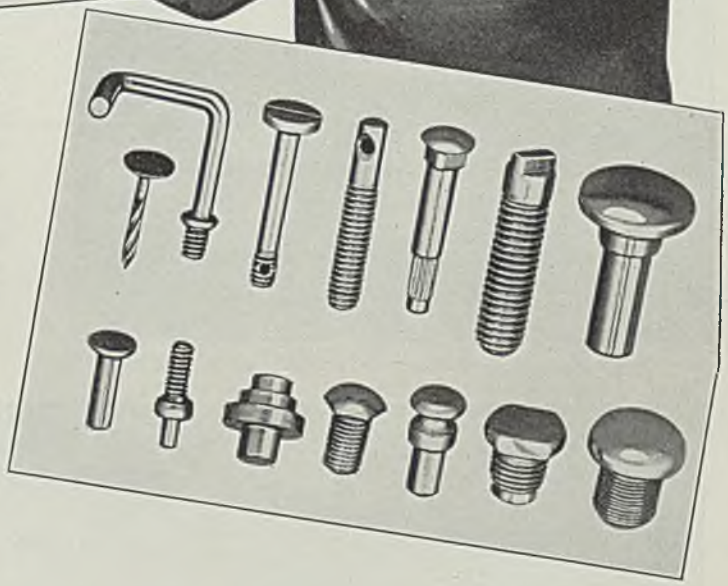

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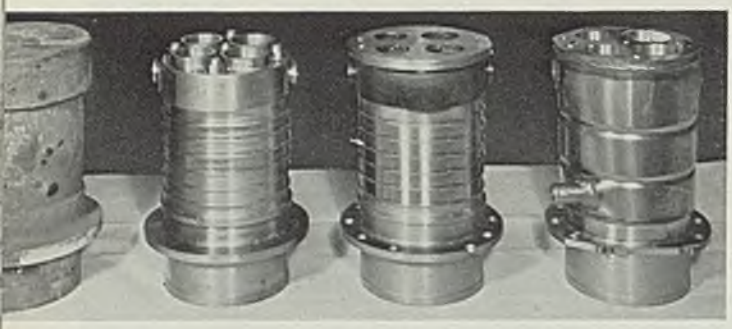


naflux test was omitted. As a matter of fact, each cylinder is given a very thorough Magnaflux examination, equipment being available for magnetizing the barrel either in a circular or longitudinal direction. Defects which escape detection when making the test in one direction are discovered when testing in the other direction.

No sharp corners are permitted on any part of the barrel assembly, since sharp corners and even fillets of too small a radius often are the foci of fatigue failures. Finish tolerances, which are exceptionally close, imply the need for the finest types of machine tools—together with expert operators.

Consider, for example, the following specifications, taken from blueprints:

Top surface of cylinder and bottom surface of flange must be parallel within 0.001-inch at edges.

Out-of-round of inside of cylinder bore must not exceed 0.002 micrometer reading.

Bore must be square with cylinder flange within 0.002 indicator reading taken above cylinder flange.

All holes and sharp corners to be burred 0.010 to 0.020-inch radius unless otherwise specified (and in most instances these radii are increased from these minimums).

Axis of each stud (in top of cylinder) must be square with top surface within 0.001 total indicator reading in 6-inch length.

Barrel must be smooth and show no tool marks on outside between flange and top fin.

Machine equipment for the most part involves standard types of tools, including: Vertical turret lathes; Keller machines for profiling; Bullard Mult-Au-Matics; standard horizontal lathes; radial drills; chucking grinders; and multiple drills of vertical and horizontal types. High-speed steel tools are used throughout, carbide tools not yet having proved satisfactory for this type of work.

In no sense a mass production type of operation,

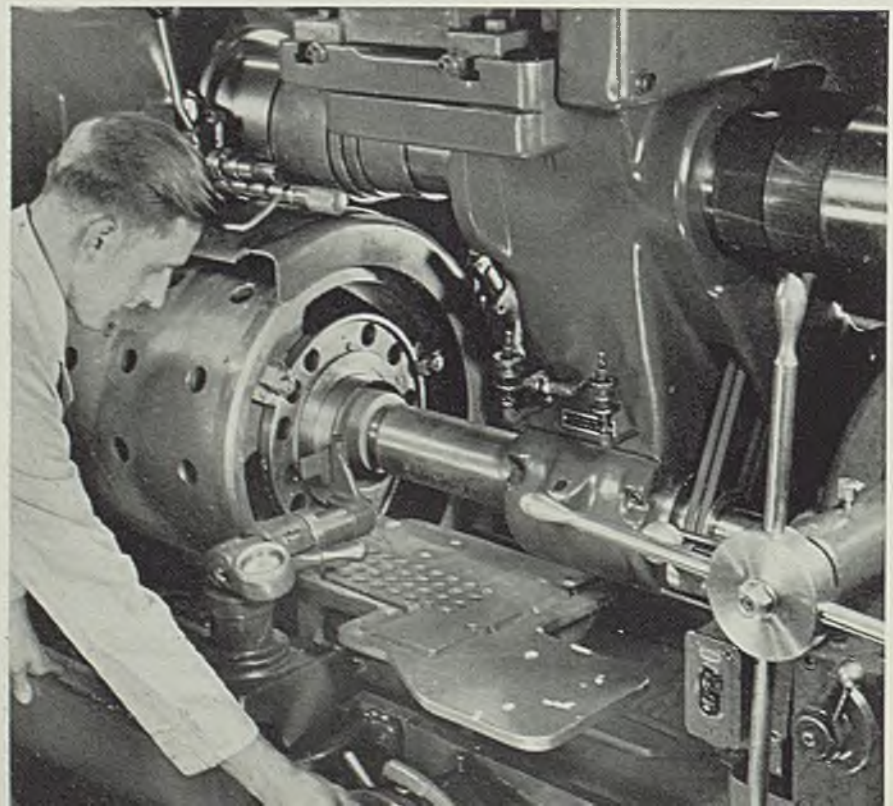


Fig. 8—Finish grinding cylinder bore, bottom, in Bryant chucking grinder provided with special locating and holding fixture. Note dial gage for checking bore diameter—this being an integral part of the tooling setup

Fig. 9. (Top)—Four stages in evolution of cylinder barrel; from left to right, rough machined, heat treated forging; semifinished machined barrel with top profiled; barrel with top plate welded, flange drilled and with top plate welded in place; and completed cylinder assembly finished machined with outside water jacket welded in place ready for assembly into engine

Fig. 10—Completed cylinder barrels, center, on surface plate being checked for accuracy of diameter with dial indicator reading to "split thousandths"

TABLE—I Operations in Making Cylinder Barrels

1. Rough and semifinish cylinder bore
2. Face flange on both sides
3. Turn flange outside diameter
4. Turn pilot adjacent to flange
5. Turn pilot adjacent to open end
6. Turn undercut between pilots
7. Face open end
8. Chamfer open end
9. Drill valve holes in top
10. Rough turn diameter for spark plug bosses
11. Rough turn outside diameter over fins
12. Rough form 1/16-inch radius each side of fins
13. Five undercuts between fins
14. Rough form 2¼-inch radius on outside diameter adjacent to top fin
15. Rough form radii blending in with lower fin
16. Turn and form flange for welding water jacket
17. Rough form radius and tapered diameter between lower flange and welding flange
18. Rough turn diameter above spark plug bosses
19. Rough bore and face combustion chamber
20. Face top of cylinder
21. Profile between spark plug bosses
22. Ream and drill spark plug hole
23. Counterbore and face
24. Turn outside diameter
25. Hollow mill outside diameter of shoulder
26. Form undercut
27. Drill excess stock 16 holes
28. Flat bottom drill 16 holes
29. Hollow mill five stud bosses
30. Bore four valve holes
31. Spotface valve bosses from bottom face of flange
32. Hollow mill four valve bosses
33. Profile outside of top and around bosses
34. Turn radius on edge above spark plug bosses
35. Hand chip, hand grind, remove all burrs, fit top plate
36. Weld water baffle (not jacket) to cylinder
37. Weld top plate to cylinder
38. Face off 0.020-inch from bottom of flange
39. Face top of cylinder, measuring from bottom side of flange
40. Recenter both ends
41. Finish form, turn outside diameter of barrel between lower flange and spark plug bosses
42. Drill water circulating holes through top plate
43. Form groove under flange
44. Turn pilot diameter at lower end
45. Turn under cut
46. Turn pilot diameter adjacent to flange
47. Form mill outside diameter of top plate
48. Drill and ream ten holes in flange
49. Mill plate across on top plate
50. Grind between fins
51. Remove all burrs
52. Polish outside diameter of barrel
53. Plate barrel
54. Recenter both ends
55. Finish turn outside diameter of flange
56. Face bottom side of flange
57. Finish turn undercut
58. Finish turn pilot diameter at open end
59. Finish grind bottom side of flange
60. Finish grind pilot diameter
61. Finish grind top side of flange
62. Underspotface eight holes in flange
63. Finish bore cylinder wall
64. Finish bore combustion chamber
65. Form 20-degree taper and ⅛-inch radius in combustion chamber
66. Face combustion chamber, measuring from bottom face of flange
67. Finish ream, spotface, rough tap and finish hand tap two spark plug bosses
68. Rough grind top of cylinder, measuring from bottom of flange (six at a time)
69. Finish bore exhaust holes and chamfer 45-degrees inside
70. Finish bore and ream intake holes, taper ream at outer end and counterbore
71. Ream four holes in top plate
72. Drill, counterbore, chamfer, ream and hand tap five stud holes
73. Mill flats on flange
74. Mill 31-degree angle and 11/16-inch radius on flange
75. Water test No. 2, 100 pounds pressure per square inch
76. Inspect and repair leaks if any
77. Assemble valve inserts (shrink with dry ice before locating)
78. Spin valve inserts in top of cylinder
79. Second rough grind on top of cylinder, measuring from bottom of flange (six at a time)
80. Water test No. 3 at 100 pounds per square inch pressure
81. Hand grind burrs from inserts in combustion chamber
82. Finish grind combustion chamber, chamfer ⅛-inch radius, 20-degree taper
83. Finish grind face of combustion chamber, measuring from bottom of flange
84. Finish grind cylinder bore
85. Finish hone cylinder bore to 6.375-inch, plus or minus 0.001-inch
86. Finish grind top of cylinder 9.8277-inch plus or minus 0.001-inch from bottom face of flange, allowing 0.0003-inch for lapping
87. Remove all burrs
88. Water test No. 4, at 90 pounds per square inch maximum pressure, this being varied from 0 to 90 pounds 30 times per minute for 7 hours
89. Enamel outside of barrel
90. Tap top of cylinder for studs
91. Wash and wipe off

the finishing of these cylinder barrels—like the operations of finishing connecting rods and various aluminum parts of the engine—is carried out slowly and painstakingly. Mistakes are costly. A slip near the end of the long sequence of operations outlined in Table I would mean a heavy loss represented by the many hours of costly man-and-machine time already "invested" in the part.

Transfer of the parts from one operation to another is done largely by truck, production not yet having attained the stage where conveyor systems would be warranted. Finishing and assembly work on these engines is being carried out on four different floor levels of the so-called "Y" division. Welding operations are performed in a separate building. Therefore, a certain amount of backtracking and crisscrossing of parts in process is necessary in order to take maximum advantage of the space available. The whole production plan, however, has been worked out so that steady flow of work is assured.

New Galvanized Sheet Gives Double Protection

A new galvanized sheet called Colorbond which is subjected to chemical and metallurgical processes that change the surface finish without in any way weakening the protective spelter coating is announced by Newport Rolling Mill Co., Newport, Ky. Its surface provides a primary protective coat, a dual-purpose safeguard, first to the metal itself, and second, between the base metal and paint, resulting in complete adhesion of finish to metal.

Paint, enamel, varnish, lacquer and other finishes may be used on this metal. It withstands the effects of abrasion, corrosive liquids, exposure to the elements and excessive heat and cold. It is easily fabricated and formed without special tools, and is made in three base metals—GOHI pure iron copper alloy; KCB copper steel and in Globe brand steel. It is available in all sizes and gages.

Welds Can Stretch

(*Concluded from Page 64*)

sponding improvement in values for reduction of area. This improvement is obtained both in single-pass and multi-pass welds.

Low-alloy steels containing chromium, molybdenum, nickel, copper up to about 0.64 per cent, and manganese up to about 1.36 per cent are improved in ductility as represented by the elongation and reduction of area values.

In the case of welds made with the chromium-containing rods, the aging takes place in one hour or less at temperature of 300 degrees Cent. while a long period at 110 degrees Cent. is required to give the same result.

The improvement in ductility appears to be even greater as a result of the low-temperature treatments than is secured by the commonly used 650 degrees Cent. stress relief treatment. The values for yield point and tensile strength in the tension tests and the results in hardness and impact tests were affected very little if at all by the treatments.

Power-Truck Handling

(*Continued from Page 60*)

wear is on the same basis, tires also last longer at low speeds.

Charging Batteries: Time required to charge a motive-power battery that has delivered its rated capacity in powering a truck during the shift is usually 6 to 8 hours. The number of duty cycles determines the life of a battery, so enough batteries should be available to keep the average discharge cycles at not more than 300 per year if maximum life from the batteries is to be obtained. Battery manufacturers usually plan for one discharge and one charge in the course of a 24-hour period—approximately 300 cycles yearly. Batteries operated on such a schedule give the best and most economical service.

Wide latitude is possible in the arrangement of charging equipment. Either single or multiple circuits are available for charging either one or a number of batteries simultaneously, and these facilities may easily be increased as required by added trucks or increased service requirements.

The automatic modified-constant-voltage method of charging represents best modern practice. An ampere-hour meter or other cutoff device automatically disconnects each battery from the charging circuit when fully charged. When the last battery has been disconnected, the motor-generator set shuts down automatically. A small resistance in series with the battery together with constant-voltage characteristics of the generator results in automatically controlling the rate of charge to conform to battery characteristics. Control equipment usually provides full automatic operation.

(*Concluded Next Week*)

Designs Device for Producing Partial Vacuum in Ingot Molds

■ AN APPARATUS has been developed for preventing the inclusion of objectionable gases and other foreign substances which cause pipe in steel ingots. By means of a box-shaped enclosure, a partial vacuum is maintained within the mold, while the metal is being poured, and before and after pouring.

The desired degree of vacuum is obtained by means of an air column acting through a venturi nozzle or by the use of a pitot tube. At its lower end the vacuum box is shaped to fit tightly around the edges of the upper end of the ingot mold. When it is seated properly there will thus be provided a relatively air-tight mold.

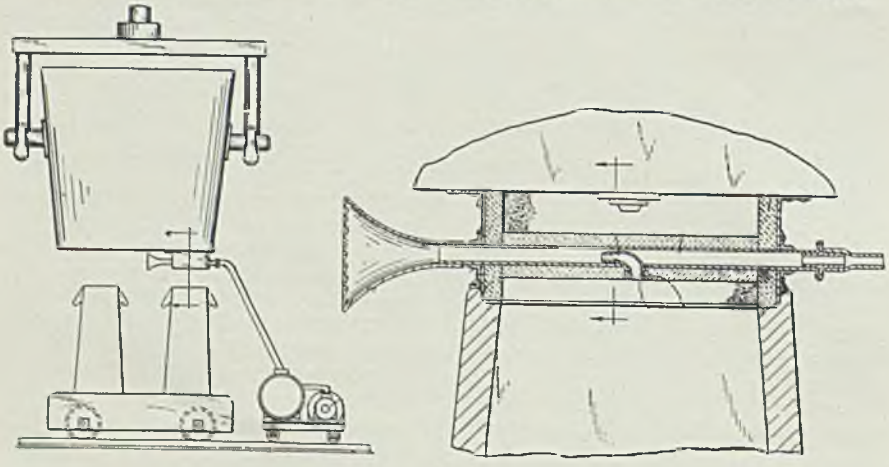
Evacuating the interior of an ingot mold during the pouring operation by suction created by a column of air is said to result in the production of steel ingots free from such defects as blow holes, fissures, pipe, etc. An apparatus for achieving the necessary vacuum is here described

The vacuum box is constructed of steel plates to form a flat rectangular metal chamber open at the top and bottom. The plates, riveted along the corners, have overlying flanges at the top for attaching the box to the underside of the ladle.

A pipe rectangular in cross section passes through the vacuum box and is covered with a protective layer of firebrick. At the outer end of the pipe a flared funnel decreases the pressure per unit area adjacent to the region where the air column is discharged into the atmosphere and thus protects the workmen against any powerful blast. An opening is provided in the central region of the lower sides of the pipe through which the mold is evacuated. A pitot tube is located at the bottom of this pipe in order to supplement the nozzle action.

The device has been patented by G. N. Hazey, Cleveland, and a portion of the patent assigned to R. C. Tuma, 3323 West Washington boulevard, Los Angeles.

Schematic diagram of device for preventing objectionable inclusions in ingots



New Agent Creates Stable Emulsion

■ Fluid emulsions containing sodium chloride, oxyquinoline sulphate, acetic acid, hydrochloric acid and other electrolytes now can be made easily with Emulgor A, a new emulsifying agent, manufactured by Glyco Products Co. Inc., 148 Lafayette street, New York. Stable emulsions of mineral oil, pine oil, toluol and other oils, waxes and solvents containing as high as 6 per cent concentrated hydrochloric acid and other strong electrolytes have been made with this emulsifying agent.

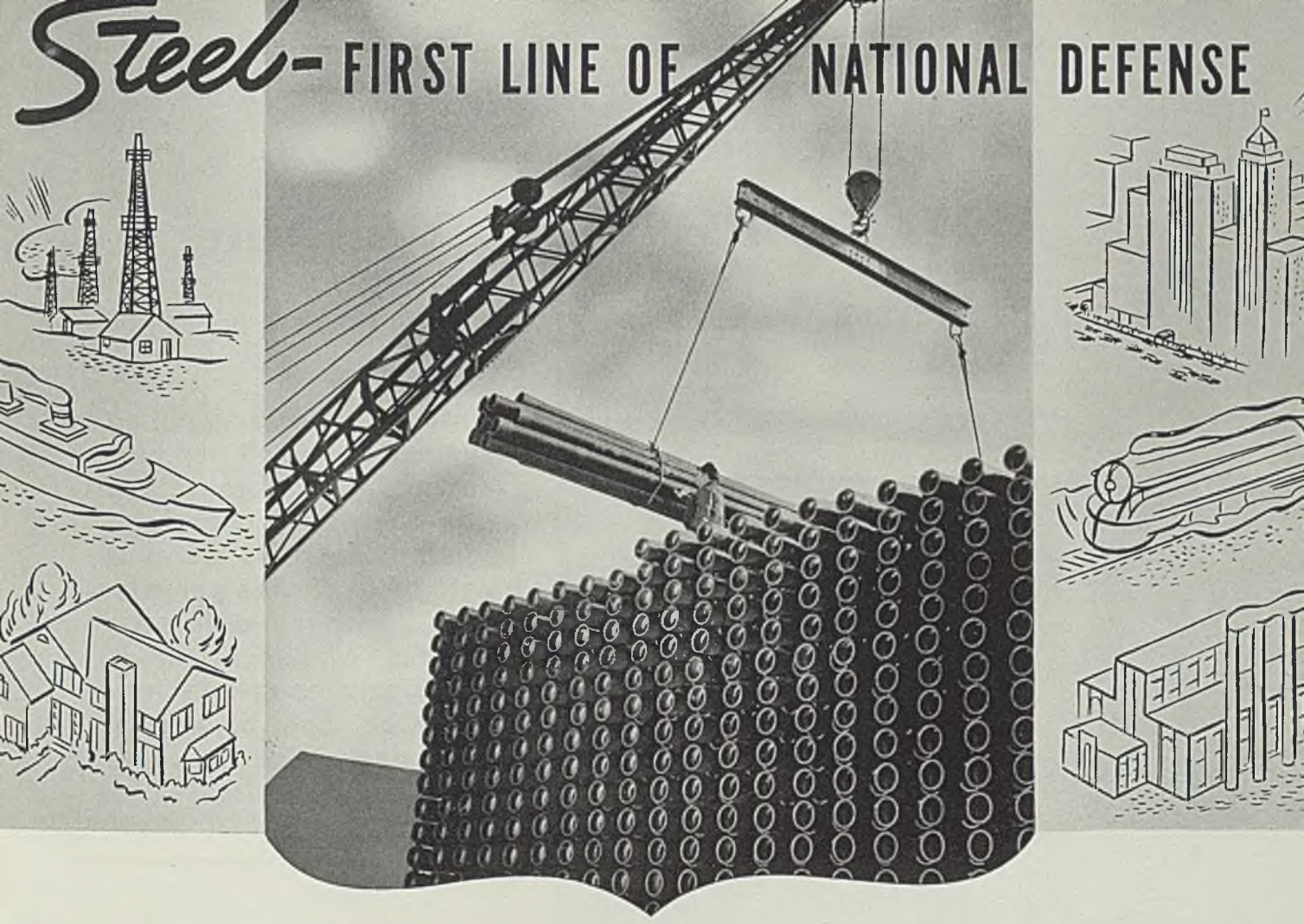
Emulgor A is a light-tan wax-like material with a melting point of 44-53 degrees Cent., and a specific gravity of 1.04 to 1.06 (25 degrees Cent.) It is dispersible in hot water, a 5 per cent dispersion having a pH of 2.6 to 2.8 at 25 degrees Cent.

Develop Permanent Dye For Concrete Floors

■ Truscon Laboratories, Caniff and G. T. R. R., Detroit, announce a new dressing for the Flor-Dye system of permanently coloring concrete floors. Known as Flor-Dye No-Buff, it actually dyes a concrete floor, the dye penetrating to varying depths from 1/16 to ¼-inch, depending on the porosity.

A floor once dyed by this patented process is said to require very little maintenance thereafter as the color is lodged in the concrete instead of being on the surface. Following the dying application, a dressing or finish is applied with a paint brush which sets the dye, uniforms the color and produces a richer and deeper hue.

Steel—FIRST LINE OF NATIONAL DEFENSE



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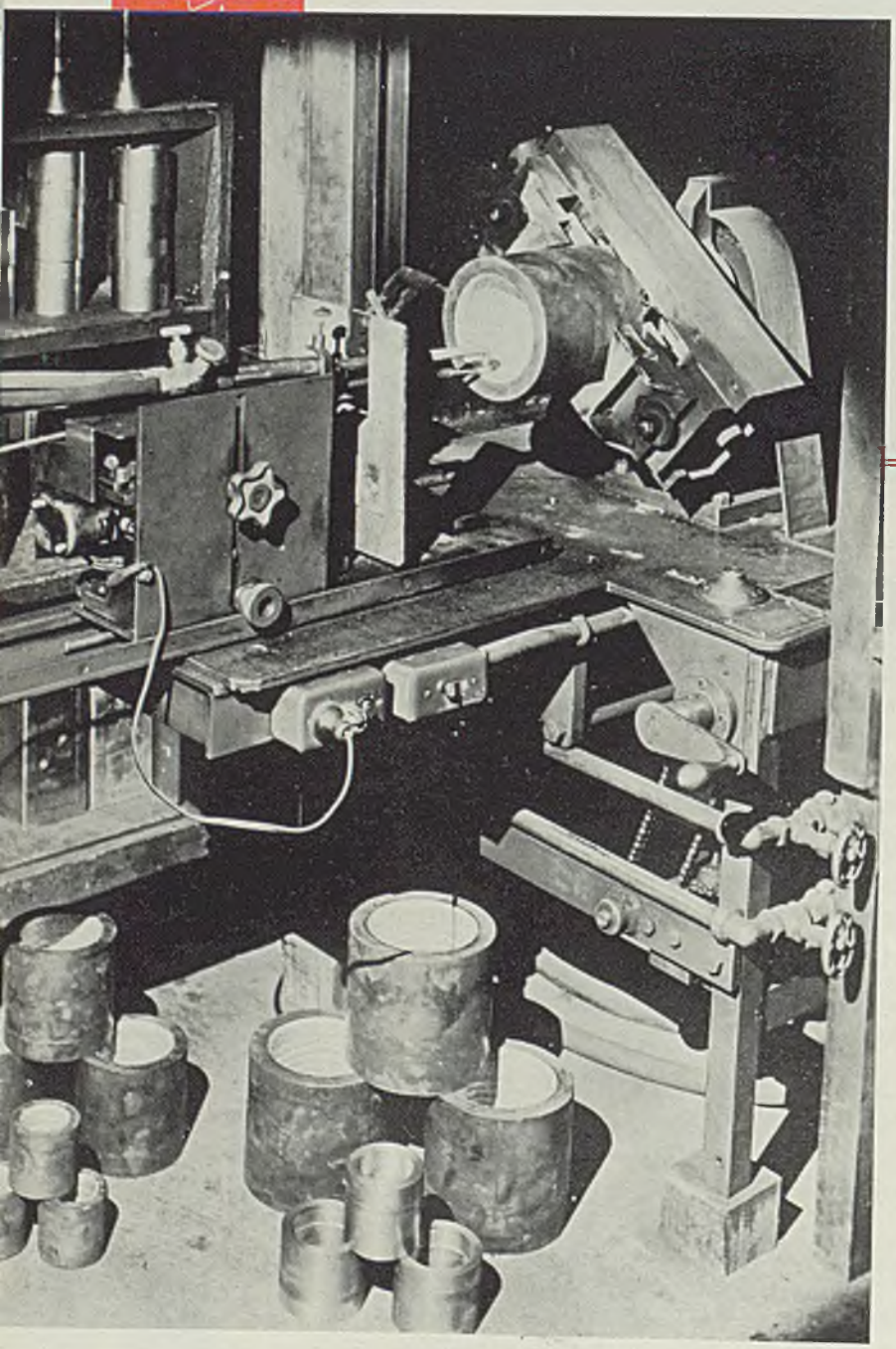
By H. T. HERBST
Development Engineer
The Linde Air Products Co.
Newark, N. J.

High-Speed Mechanized Gas Welding Now Is Feasible

Automatic bronze-welding system shows 50 per cent saving in both bronze and gas compared with hand joining; deposits metal at rate of 55 inches per minute. Proper automatic control for such setups now operates satisfactorily. One control system uses photo-electric tubes with good results



Setup and operation of depositing a bronze bearing surface on the inside surface of a liner. Several completed liners may be seen on the floor. Deposit is made automatically as work revolves, being fed lengthwise simultaneously to give the even coating shown

(Concluded From Last Week)

■ **Heavy Welding:** To obtain full-strength welds on material of 12-gage and heavier, other than flat sheets, welding rod is used. The rod feed is made automatic through a variable-speed feed mechanism. A single welding head that has several flames so designed as to fulfill the various operations of rod preheat, plate preheat and welding generally is used. This method is suited particularly to the fabrication of cylinders and tanks requiring joints that are leakproof to dry gases.

One example of this method is in the fabrication of the pressure chamber of a household gas refrigerator. This pressure chamber consists of a length of 2½-inch tubing with caps welded on either end. These two welds are made simultaneously on an automatic machine equipped with two welding blowpipes and a motor-driven rod feed using coiled welding rod. Here the requisite leakproof joints are obtained at high production rates and with a minimum number of rejects.

This process is also applied on

From paper presented at annual meeting of the American Welding society, Cleveland, Oct. 20-25, 1940.

similar but larger machines for the production of cylinders used in shipping gases for industrial and home-cooking purposes. Here two half-shells are drawn and joined with an automatic oxyacetylene girth weld. This construction results in lower costs than the method previously used wherein the tank was made from one full-length drawing with a dished head locked and dip-brazed in place.

Bronze Welding: The process described above for automatic fusion welding also can be applied to bronze welding. The necessary fluxing action required is provided most conveniently by the use of a volatile liquid flux.

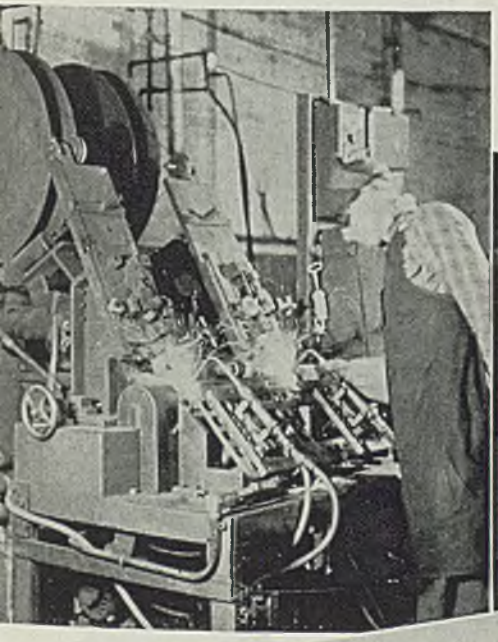
A variation of this process also is suitable for the assembly of steel parts on a production basis, such as the assembly of a fan for a portable electric-drill motor. Here a sheet stamping is bronze welded to a machined hub. Except for loading, operation of the machine is fully automatic. The hub and fan, staked together, are loaded at one end in any of the first four of ten positions. Then ten equally spaced positioner fingers intermittently move all units on the track to the next positions.

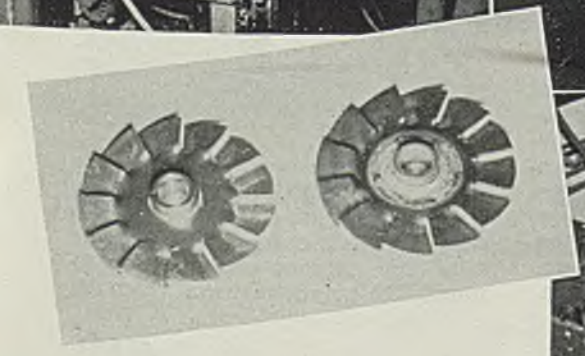
When each fan unit reaches the ninth position, a rotating stem automatically rises and engages the fan hub. At the same time, the blowpipe tips lower into position for the welding operation, and the welding rod is fed automatically at a predetermined rate from a reel. The stem under the ninth or welding position both raises the unit into position and revolves it during the bronze-welding operation. At the tenth position, the tenth finger moves the completed fan into a tote box. The various parts of the machine are adjustable to accommodate a variety of sizes. The average actual welding time is 3 seconds and the average production rate is 10 to 12 units per minute.

Operation Reduces Cost

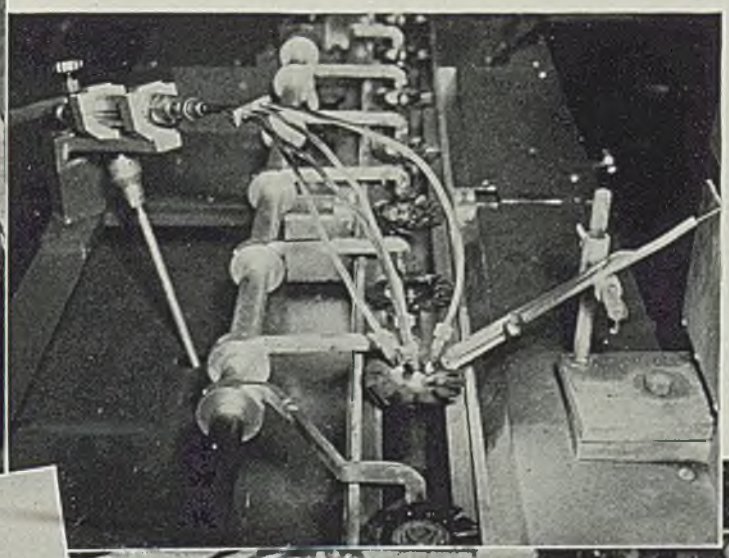
A different type of operation is represented in the mechanized application of bronze for bearing surfaces. A typical example is the bronze-surfacing of the cylinder lining for a rotary pump operating at 2000 pounds per square inch. Here a layer of bronze is deposited on the steel surface which will later be machined, leaving a nonporous surface. Bronze-rod feed and blowpipe movement are provided by a motor-driven carriage. While the part being treated is slowly revolved, the blowpipe is moved lengthwise the liner. Volatile liquid flux, introduced to the flame with the acetylene, leaves no deposit of slag to be removed. The rate of deposition of the metal is 55 inches per minute. This installation replaces hand operation at a saving of about 50 per cent in both bronze and gas.

Today the rapid method of mechanized oxyacetylene welding is being adopted to reduce costs, improve product quality and increase production. Installation costs are extremely low in comparison with competitive automatic welding equipment. Lower cleaning and maintenance costs and decreased reject losses usually make over-all operating costs comparable to other automatic welding methods which are notably less adaptable to changing production methods. It is universally recognized that oxyacetylene mechanized welding has a high degree of flexibility. Where a smooth, clean surface is required, gas welding often can be used when other mechanized methods would necessitate subsequent cleaning or grinding of the piece. With the properly designed heads available today, production rates with mechanized oxyacetylene welding are greater in many cases than those obtained with other automatic equipment. This is due in part to the great welding speeds and short setup time of the mechanized oxyacetylene equipment.

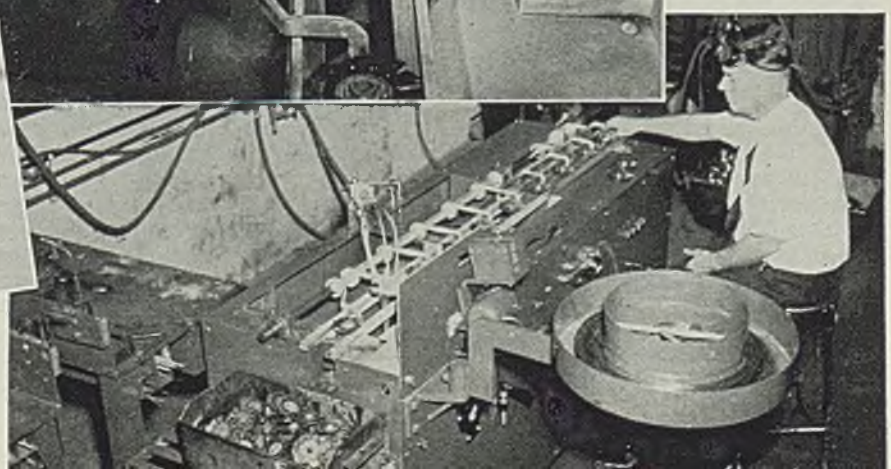




Top left, two caps are being welded simultaneously to the ends of 2½-inch diameter tubing. Note position of the blowpipes and automatic rod-feed mechanism. Welds are later subjected to a test pressure of 1000 pounds per square inch. Below, left, hubs are bronze welded automatically to stamped fan blades at a rate of 3000 to 4000 per day. Left, same view, hub in place ready for welding. Right, completed fan



General view of the machine used to bronze weld fans, right, bottom. Wire reel is in foreground with tote box containing the completed fans. Closeup, immediate left, of the bronze being deposited on the revolving fan blade



Industrial

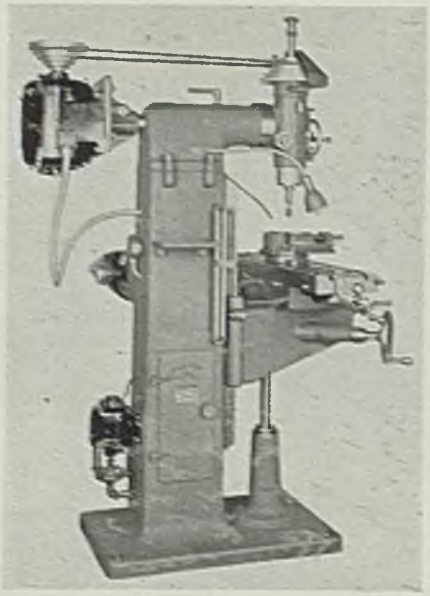
Skid Platform

■ Service Caster & Truck Co., 640 North Brownswood avenue, Albion, Mich., has placed on the market a new Steelwave skid platform which features greater lightness and resistance to wear from jamming. It is unaffected by standing loads as the skids are fabricated from light sheet metal, 16 to 12 gage. Deck and side angles are die formed and legs are of 5/16 x 1½-inch flat steel. All parts are electric welded. Platform sizes for standard models range from 24 x 42 inches minimum to 36 x 72 inches maximum. Minimum clear-

ance, floor to underside of deck, is 6½ inches—maximum 12 inches. Either 2 or 4-way lift truck entrance types are furnishable. Two standard capacities—3500 and 5000 pounds are offered, but special sizes and capacities can be built.

Millmaster

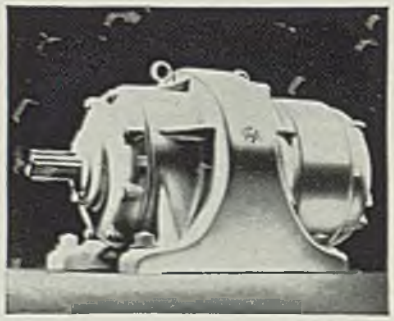
■ Midway Machine Co., 2324 University avenue, St. Paul, announces a new Mill-Master model for boring, milling, routing, drilling, grinding and die sinking operations on metal, wood or plastic materials. Similar to this company's other models, it is equipped with a 2-speed motor and special controller. The machine is for special applications where



very rapid speed changes are necessary. It employs a constant-torque 575-1140 revolutions per minute, 1-horsepower, 3-phase ball-bearing motor with drum type controller to instantly obtain either high or low speed. The speed range of the machine is 130 revolutions per minute to 4400 revolutions per minute with 14 separate spindle speeds available.

Gear Motors

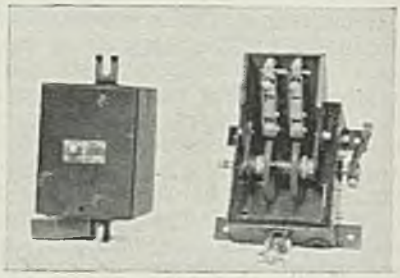
■ U. S. Electrical Motors Inc., Dept. 120, 80 Thirty-fourth street, Brooklyn, N. Y., has added to its line new double and triple reduction geared motors up to 30 horsepower at 91 revolutions per minute. The larger unit incorporates the pyramidal gear pedestal design which provides ample support to with-



stand the extra torsional strains and load shocks of geared power. All castings used are normalized, and permanent alignment of bearings and gears is thereby assured. Both primary and secondary gears dip in a large oil reservoir in the base.

Cam Limit Switch

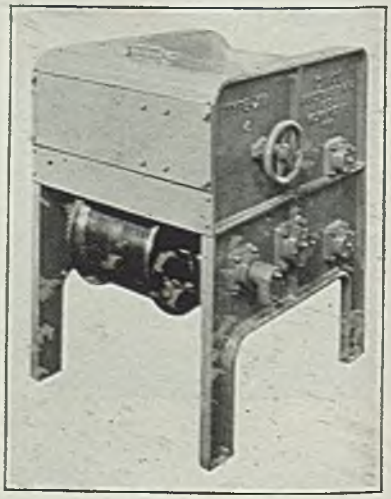
■ Westinghouse Electric & Mfg. Co., Dept. 7-N-20, East Pittsburgh, Pa., is marketing a new cam-operated limit switch with contacts arranged to swing open for easy inspection and maintenance, and designed for control circuits of such devices as hoists, industrial trucks and trolley coaches. Designated XC-23, it is available with ratings of 2 amperes at 600 volts direct current and 25 amperes at 110 volts alternating current. It has two contacts, either or both of which may be normally closed, or open. Special feature of the switch is the swinging Micarta fingerboard on which the contacts are mounted. The switch is housed in a sheet steel weatherproof case measuring about 4½ x 5½ x 6 inches. Four mounting brackets are provided for mounting. Its operation is by means of a cam-shaft on which rollers travel. The rollers make or break the contacts at any point on the travel. The



switch may be actuated either by a revolving shaft coupled to its cam shaft, or by the movement of an operating lever attached to this same shaft. The moving contacts are self-aligning, with a compensating type operating finger.

Magnetic Drum

■ Dings Magnetic Separator Co., 664 Smith street, Milwaukee, announces improvements in its type XF high intensity magnetic drum for separating ferrous and nonferrous cuttings, turnings and borings. It also is used to remove iron from foundry sand and for other separations. The machine consists of a



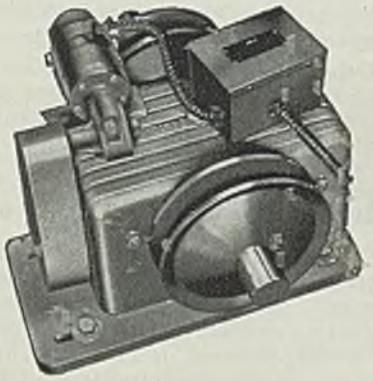
magnetic drum, enclosed in a box-like structure. Material to be separated is fed into the top of the machine which discharges two separate piles—one ferrous and one nonferrous. The magnetic drum which ac-

Equipment

complishes this separation consists of a magnetic coil within a revolving tubular shell. Particles are attracted and held fast to the outer surface of the drum until they are carried underneath and out of the magnetic field. Improvements include a redesigned, dustproof housing, a stainless steel drum shell, glass covered wire in the coils which will withstand heat without injury, antifriction ball bearings, a larger hopper and more powerful magnetic coils.

Motorized Control

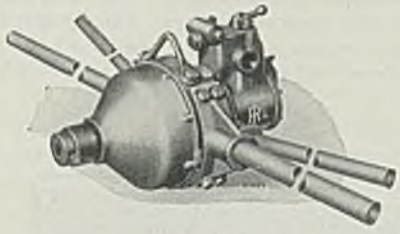
■ Ideal Commutator Dresser Co., 5076 Park avenue, Sycamore, Ill., announces a new series of Select-O-Speed transmissions equipped with electric motorized control. These



models supplement the standard line from fractional to 7½ horsepower capacity that are equipped with lever type and handwheel control. A 2-button switch controls the speed. Changes in speed adjustments are made by pushing and holding either the fast or slow button until the desired speed is obtained. Sizes from 1½ to 7½ horsepower capacity are available.

Flue Rolling Machines

■ Ingersoll-Rand Co., 11 Broadway, New York, announces two new flue rolling machines, sizes 55-Q and 55-R for rolling extra large tubes as used in oil refinery stills, or work of similar nature. Both machines are powered by a Multi-Vane type air motor. The working speeds of these machines are low with correspondingly high torque. The size 55-Q has an average working speed



of 32 revolutions per minute, while size 55-R has an average working speed of 20 revolutions per minute and approximately 50 per cent greater torque than the 55-Q.

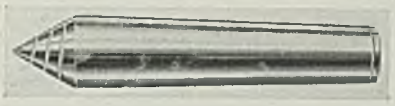
Screw-Holding Tray

■ Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, has introduced a new device which increases the efficiency of power screw driving. Known as the Thor Pix-Up Finder and Adjusto-Tray, it sorts, picks up and holds screws for driving. The Adjusto-Tray is a screw-holding tray that has a series of longitudinal slots in the bottom. A quantity of screws are spilled into the tray and shook, suspending the screws in the slots by their heads. Then a power screw driver equipped with the Pix-Up Finder is placed over a screw head,

pressed and, as the tray depresses slightly on its spring mounting, the finder grips the screw head firmly in perfect alignment, holding it ready for the driving operation. The operation is not magnetic, but entirely mechanical.

Lathe Center

■ Chicago Mfg. & Distributing Co., 1928 West Forty-sixth street, Chicago, has placed on the market a new CMD helical groove lathe center for use on all lathes and grinders. With its left-hand helical grooves,



it lubricates the entire surface of the work supported by the dead center on the tail stock. The grooves hold a supply of lubricant for replenishing the lubricant that dissipates or oxidizes. The grooves further prevent lubricant from dripping or being forced out of the work. This center has an operating ratio of about 15:1 in running time over the conventional type centers. It can be used for either slow or high speed work.

Metal Strainer

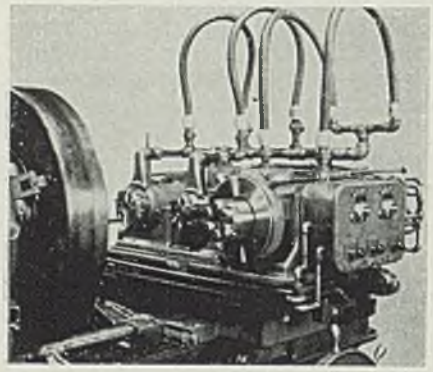
■ Spraying Systems Co., 4021-R West Lake street, Chicago, announces a strainer to be used in connection with spray nozzles when

foreign matter interferes with efficient operation. It is equipped with ¼-inch pipe connection for inlet and outlet. Standard stock construction is brass with Monel metal strainer.

Tapping Machine

■ Landis Machine Co., Waynesboro, Pa., has introduced a recessing, boring and tapping machine designed to machine the internal or tapped end of an integral joint type casing at one chucking. In place of the conventional carriage and receding chaser pipe threading die head it uses a special carriage on which is mounted the recessing, boring and tapping tools. The three tool slides are mounted on a cross slide which can be indexed to bring any one of the tool slides into working position. One tool slide finishes the recess, faces the end of the casing and chamfers three surfaces in the end of the casing. The three chamfers referred to are, one inside and one outside chamfer on

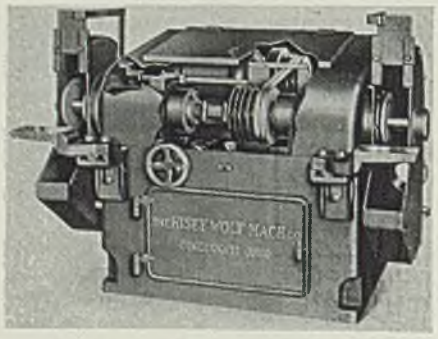
the extreme end of the casing, and one chamfer at the inside end of the recessed surface. The second tool slide finishes the taper bore preparatory to tapping, using a re-



ceding action to the cutters. A tool similar to the receding chaser collapsible tap is employed for the boring operation. The third tool slide is a special receding chaser collapsible tap arranged to chase the internal threads using the leadscrew mechanism which is built into the machine and which provides the accuracy in thread lead. All movements of the tool slides as well as the cross slide are hydraulically controlled with the circuits arranged with interlocks to assure correct operating sequences. The cross slide is hydraulically locked into position on the carriage when any one of the tool slides is in action. The operating controls for this hydraulic cycle are centralized on a panel at the front of the machine. The casing to be machined is positioned in the spindle against the arm of the pneumatically operated work stop and is then gripped by the front and rear pneumatic chucks mounted on the spindle of the machine.

Snagging Grinders

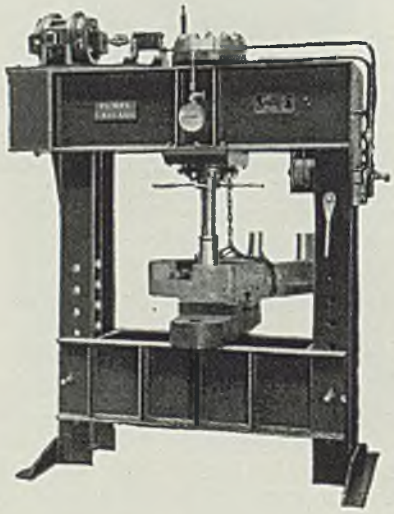
■ Hisey-Wolf Machine Co., Cincinnati, has introduced new snagging grinders available for high speed or vitrified grinding wheels in sizes of 18, 20, 24 and 30 inches. They incorporate wheel guards which make



it impossible for a piece of work to jam between the wheel and guard. The front of the guard extends beyond the periphery of the wheel so that all sparks and chips are arrested. Standard stock open-rated motors can be used. These are mounted on a dovetail slide base with screw adjustment. The screw extends through the front of the pedestal and has a quick acting handwheel which is used to transfer the belts from one set of sheaves to the next. The spindle of these grinders is made in two pieces and coupled. Machines can be furnished with 1, 2, 3 or 4 speeds.

Hydraulic Press

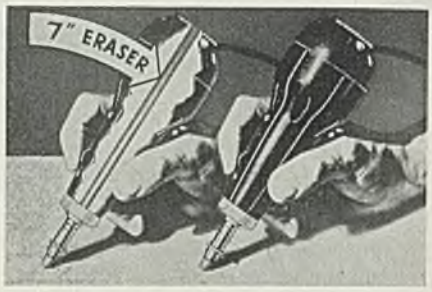
■ Charles F. Elmes Engineering Works, 230 North Morgan street, Chicago, has placed on the market a new hydraulic press for general shop work. It features a 12-inch screw adjustment, and a 12-inch



ram stroke. The platen is adjustable by means of a ratchet gear. The press is controlled by a single lever, and maximum accessibility during operation is obtained in a strong frame construction of all-welded steel. Capacities and sizes to suit any requirements are available, beginning with a model powered by a 1½-horsepower motor.

Electric Eraser

■ Charles Bruning Co. Inc., 100 Reade street, New York, announces a new electric hollow shaft eraser embodying an entirely new "core feed" principle for use in drafting rooms, bookkeeping, statistical and accounting departments, etc. To overcome the frequent changing necessitated by short "stubby" eraser tips, the machine uses an eraser 7 inches long, fitting into a tubular armature shaft. This can be fed out as it wears down and tightened at the lower end of the instrument by a chuck. The motor utilized is especially designed and has an impeller-type fan mounted on the shaft within the aluminum motor housing. A bearing at the chuck end assures trouble-free operation with a maximum of quietness. Operation of the



machine is controlled by a sliding control button. In the motor case is fitted a hinged ring which can be pulled out for hanging the machine on a hook.

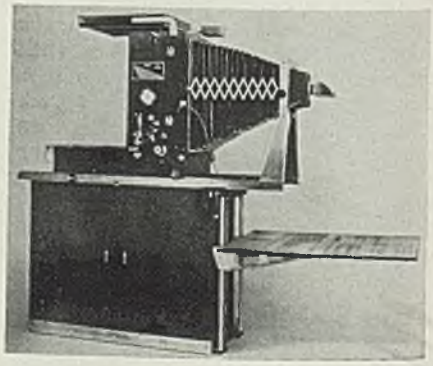
Plug-In Filter

■ Sprague Products Co., North Adams, Mass., announces an LF-2, multiple section, inductance and capacity filter for use on troublesome sources of radio interference. Designed for installation at the power outlet to which the interfering device is connected, it takes much of the guesswork out of selecting the proper filter for any electrical device drawing up to ½ ampere. It has proved successful in electrical equipment which frequently cause noise on nearby radio receivers.

Supplied in a 2½ x 1¾ x 17/16-inch case, the filter can be used on 115-volt, alternating or direct-current lines only.

Photo-Copying Machine

■ Haloid Co., Rochester, N. Y., has placed on the market a new "modernized" Rectigraph which copies anything written, printed or drawn in actual, reduced or enlarged size. It photographs the subject, develops



and fixes prints within the machine. New Bausch & Lomb lens and prism assure absolute accuracy. The machine is designed for industries and businesses requiring copies of plans, correspondence, contracts, etc, on short notice.

Sentiment on Steel Supply Is Calmer

Business in new phase where consumers are anticipating needs chiefly. Lack of distress so far inspires confidence towards future.

MARKET IN TABLOID ★

Demand
Surprisingly good.

Prices
Firm.

Production
Up 1 point to 98.

■ BUSINESS has entered a more orderly phase. Whereas a month ago orders were in large measure for immediate requirements, with pressure for rush shipments, ordering now is largely in anticipation of probable requirements, some consumers asking to be placed on order books as far ahead as fourth quarter to assure places on rolling schedules.

Incoming business is as great or even larger than before, but the situation seems calmer as both producers and consumers are better adjusted to unusual conditions. In the long run plenty of steel seems assured, though temporary scarcity may continue to be felt in certain items and instances. Producers are now better experienced in rationing steel to exact requirements. Consumers are more patient and reasonable as to getting places on order books and receiving shipments on current needs. Apparently no consumer has been compelled to shut down or curtail operations because of lack of material.

Having weathered several months of apparent stringency without suffering real distress, both producers and consumers are confident about the future. Moreover the trade realizes that the first few months of a boom are always the most confusing, order eventually settling out of complexities.

As an example of rigorous rationing on part of producers is the policy of many pig iron producers to refuse selling a pound until customers prove their urgent need and exhaustion of old stocks. Emphasis seems to be shifting from whether 83,000,000 tons of ingots per year is sufficient to whether consumers can fabricate and digest that much steel. In other words the live question becomes: Is there the ability to consume? Naturally, the more advanced the stage of manufacture, the scarcer becomes supply of skilled labor, housing and machines.

Steel ingot production gained 1 point last week to 98 per cent, a new high since 1929.

As was expected, labor starts to ask for increased wages at steelmaking plants. The industry believes that, since Washington is openly committed to the policy of holding prices down, to be consistent, it must insist on no advance in unit wages.

Many expect that the price reduction goal of $20 per ton for No. 1 heavy melting steel scrap at Pittsburgh will not be attained, but that the market will stabilize around $21.50. Railroad lists recently brought out bids of $22 and $23 per ton, Washington having advised the carriers to accept the lower bid.

In addition to 150,000 tons of steel needed for 60 cargo vessels to be built here for the British, awards for which are now being made, 280,000 tons more will be required for 112 7500-gross ton prefabricated merchant ships for the United States government which have been placed tentatively. For remaining 88 ships in the building program 220,000 tons will be needed.

In virtually all districts warehouse distributors have advanced hot-rolled sheets and strips $4 per ton, which is a much-belated adjustment to higher mill prices which went into effect last spring. Orders booked by warehouses generally are larger than average per lot as they take much business which would go to mills ordinarily.

Sales of fabricated structural steel last week were much larger than average at about 53,500 tons. For the new year to date sales have been about 133,500 tons, three times the total for the same span of 1940.

A rail maker, with 1,000,000 tons of rail orders on books for 1941 delivery, is temporarily manufacturing shell rounds.

Tin plate production has risen to 52 per cent of capacity, highest in months, with orders materially better.

Automobile production for the week ended Jan. 18 is estimated at 124,025 units, an increase of 8090 over a week before, comparing with 108,545 for the corresponding week of 1940.

Increases in ingot production last week took place in five districts as follows: Eastern Pennsylvania, 1 point to 96, Wheeling 9 points to 100, Cleveland 4½ points to 89, New England 14 points to 100 and Detroit 1 point to 95. Declines set in only at Chicago, off 1½ points to 98½. Unchanged were Pittsburgh at 95½, Buffalo at 90½, Birmingham at 100, Cincinnati at 88½, St. Louis at 87½ and Youngstown at 94 per cent.

Two composite price groups declined because of further recessions in scrap. Steelworks scrap fell 50 cents to $20.50, while iron and steel was down 14 cents at $38.33. Finished steel was unchanged at $56.60.

COMPOSITE MARKET AVERAGES

	Jan. 18	Jan. 11	Jan. 4	One Month Ago Dec., 1940	Three Months Ago Oct., 1940	One Year Ago Jan., 1940	Five Years Ago Jan., 1936
Iron and Steel....	$38.33	$38.47	$38.47	$38.30	$38.07	$37.33	$33.34
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	53.70
Steelworks Scrap..	20.50	21.00	21.71	21.37	20.56	17.48	13.15

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

	Jan. 18, 1941	Dec. 1940	Oct. 1940	Jan. 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	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
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

	Jan. 18, 1941	Dec. 1940	Oct. 1940	Jan. 1940
Bessemer, del. Pittsburgh	$25.34	$24.95	$24.34	$24.34
Basic, Valley	23.50	23.10	22.50	22.50
Basic, eastern, del. Philadelphia	25.34	24.84	24.34	24.34
No. 2 foundry, Pittsburgh	25.21	24.80	24.21	24.21
No. 2 foundry, Chicago	24.00	23.75	23.00	23.22
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	23.06	23.06	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	25.715	25.215	25.215
Malleable, Valley	24.00	23.60	23.00	23.00
Malleable, Chicago	24.00	23.75	23.00	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.17	23.35	23.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt, steel, Pitts.	$21.75	$22.75	$21.30	$18.15
Heavy melt, steel, No. 2, E. Pa.	19.25	19.75	19.75	16.81
Heavy melting steel, Chicago	19.75	20.70	19.85	16.45
Rails for rolling, Chicago	25.25	25.00	24.05	19.05
Railroad steel specialties, Chicago	24.25	23.95	23.25	18.50

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$4.75	$4.75
Connellsville, foundry, ovens	6.00	6.00	5.75	5.75
Chicago, by-product fdry., del.	11.75	11.75	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. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
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., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
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)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago Birmingham (except spring wire)	
Bright bess., basic wire.	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	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	68 off
Do., ⅝ and ¾ x 6-in. and shorter	66 off
Do., ¾ to 1 x 6-in. and shorter	64 off
1⅛ and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	66	70
⅝-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset 1-in., smaller	68 off

Square Head Set Screws

Upset, 1-in., smaller	74.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve, Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, 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—Pet Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm..	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago..	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.)	$2.00
Do., over ⅝ to ⅞-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur...	$5.00- 5.75
Connellsville, fdry...	5.25- 6.00
Connell, prem. fdry	6.00- 6.60
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..	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered..	11.75
Terre Haute, del.	11.25
Milwaukee, ovens..	11.75
New England, del...	12.50
St Louis, del.	11.75
Birmingham, ovens.	7.50
Indianapolis, del....	11.25
Cincinnati, del.....	11.00
Cleveland, del.....	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

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.	$24.00	$24.50	$23.50	$25.00
Birmingham, Ala.‡	19.38	....	18.38	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	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	....	....	....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	24.00	....	23.50	....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	24.78	....	23.66	....
Boston from Birmingham	24.12	....	....	....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brookyln, N. Y., from Bethlehem	26.50	27.00	....	....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	....	....	....
Cincinnati from Hamilton, O.	24.24	25.11	24.61	....
Cincinnati from Birmingham	23.06	....	22.06	....
Cleveland from Birmingham	23.32	....	22.82	....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	25.15	....	....	....
Newark, N. J., from Bethlehem	25.53	26.03	....	....
Philadelphia from Birmingham	24.46	....	23.96	....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
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	†23.12	....	22.62	....
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.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†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	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 36.00

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., 3 per cent carbon 113.00
2½% carbon 118.00
2% carbon, 123.00; 1%, 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
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

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots. 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., 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	4.40	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	4.65	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	4.60	3.22	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.25	....	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	3.20	3.80	8.70	7.05
Omaha	3.90	3.80	3.80	3.95	3.95	5.55	3.45	..	5.00	....	4.42	..	.
Cincinnati	3.60	3.47	3.47	3.65	3.68	5.28	3.22	4.00	4.67	3.47	4.00	8.75	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.25	4.10	4.60	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.50	4.35	4.75	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	6.88
St. Louis	3.64	3.54	3.54	3.69	3.69	5.29	3.19	4.12	4.87	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	3.55	3.55	3.70	3.70	5.30	3.45	....	4.76	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	..
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	..	...
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	3.99	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	.	.
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	..	..
Houston, Tex.	3.50	5.95	5.95	3.85	3.85	5.50	4.20	..	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	.
Los Angeles	4.15	4.60	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.50	4.00	6.00	3.50	3.50	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	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	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Oreg.; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 800-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 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.

CURRENT IRON AND STEEL PRICES OF EUROPE

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, 24 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 of 15s on certain conditions.

IRON AND STEEL SCRAP PRICES

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

HEAVY MELTING STEEL

Birmingham, No. 1.	18.00
Bos. dock No. 1 exp.	16.50
New Eng. del. No. 1	18.25-18.50
Buffalo, No. 1	21.00-21.50
Buffalo, No. 2	19.00-19.50
Chicago, No. 1	19.50-20.00
Chicago, auto, no alloy	18.50-19.00
Cincinnati, dealers	18.50-19.00
Cleveland, No. 1	21.00-21.50
Cleveland, No. 2	20.00-20.50
Detroit, No. 1	†17.00-17.50
Detroit, No. 2	†16.00-16.50
Eastern Pa., No. 1	20.00-20.50
Eastern Pa., No. 2	19.00-19.50
Federal, Ill., No. 2	17.00-17.50
Granite City, R. R. No. 1	18.00-18.50
Granite City, No. 2	17.00-17.50
Los Ang., No. 1 net	14.00-14.50
Los Ang., No. 2 net	13.00-13.50
N. Y. dock No. 1 exp.	†17.00
Pitts., No. 1 (R. R.)	23.50-24.00
Pittsburgh, No. 1	21.50-22.00
Pittsburgh, No. 2	20.50-21.00
St. Louis, No. 1	18.00-18.50
St. Louis, No. 2	17.00-17.50
San Fran., No. 1 net	14.50-15.00
San Fran., No. 2 net	13.50-14.00
Seattle, No. 1	15.00
Toronto, dlrs., No. 1	11.00-11.25
Valleys, No. 1	21.50-22.00

COMPRESSED SHEETS

Buffalo	19.00-19.50
Chicago, factory	19.00-19.50
Chicago, dealers	17.50-18.00
Cincinnati, dealers	17.50-18.00
Cleveland	20.50-21.00
Detroit	†18.50-19.00
E. Pa., new mat.	20.50-21.00
E. Pa., old mat.	17.00-17.50
Los Angeles, net	10.25-10.75
Pittsburgh	21.50-22.00
St. Louis	14.50-15.00
San Francisco, net	10.50-11.00
Valleys	21.00-21.50

BUNDLED SHEETS

Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	17.50-18.00
Cleveland	15.50-16.00
Pittsburgh	20.50-21.00
St. Louis	13.75-14.25
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	15.00-15.50
Cincinnati, dealers	13.00-13.50
Detroit	†15.00-15.50
St. Louis	13.00-13.50
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1.	16.00
Buffalo, No. 1	19.00-19.50
Chicago, No. 1	18.50-19.00
Cincin., No. 1 deal.	15.00-15.50
Cincin., No. 2 deal.	8.00- 8.50
Cleveland, No. 2	14.50-15.00
Detroit, No. 1 new	†17.50-18.00
Valleys, new, No. 1.	21.00-21.50
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	8.50
Buffalo	13.50-14.00
Chicago	15.00-15.50
Cincinnati, dealers	10.50-11.00
Cleveland, no alloy	13.50-14.00
Detroit	†11.50-12.00
Eastern Pa.	15.00-15.50
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	15.00-15.50
St. Louis	12.00-12.50
San Francisco	5.00
Toronto, dealers	7.25- 7.50
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	14.50-15.00
Cleveland	14.50-15.00
Chicago	14.75-15.25
Chicago, spcl, anal.	15.50-16.00
Detroit	†12.50-13.00
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.75- 9.00
Buffalo	13.50-14.00
Cincinnati, dealers	9.75-10.25
Cleveland	14.50-15.00
Eastern Pa.	13.00-13.50
Detroit	†12.00-12.50
New York	†10.00-10.50
Pittsburgh	15.50-16.00
Toronto, dealers	7.00- 7.25

AXLE TURNINGS

Buffalo	16.50-17.00
Boston district	†12.50-13.00
Chicago, elec. fur.	20.50-21.00
East. Pa. elec. fur.	19.50-20.00
St. Louis	15.00-15.50
Toronto	7.25- 7.50

CAST IRON BORINGS

Birmingham	7.50
Boston dist. chem.	†10.25-10.75
Buffalo	13.50-14.00
Chicago	14.00-14.50
Cincinnati, dealers	9.75-10.25
Cleveland	14.50-15.00
Detroit	†12.00-12.50
E. Pa., chemical	15.50-16.00
New York	†11.50-12.00
St. Louis	11.00-11.50
Toronto, dealers	7.25- 7.50

RAILROAD SPECIALTIES

Chicago	24.00-24.50

ANGLE BARS—STEEL

Chicago	23.75-24.25
St. Louis	21.50-22.00

SPRINGS

Buffalo	25.00-25.50
Chicago, coil	25.00-25.50
Chicago, leaf	24.00-24.50
Eastern Pa.	26.00-26.50
Pittsburgh	26.50-27.00
St. Louis	23.50-24.00

STEEL, RAILS, SHORT

Birmingham	20.00
Buffalo	25.00-25.50
Chicago (3 ft.)	24.00-24.50
Chicago (2 ft.)	24.50-25.00
Cincinnati, dealers	25.50-26.00
Detroit	†22.50-23.00
Pitts., 2 ft. and less	26.00-26.50
St. L. 2 ft. & less	23.50-24.00

STEEL RAILS, SCRAP

Birmingham	18.00
Boston district	†15.75-16.00
Buffalo	22.00-22.50
Chicago	19.50-20.00
Cleveland	24.00-24.50
Pittsburgh	23.00-23.50
St. Louis	21.75-22.25
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.50-15.00
Cincinnati, dealers	13.25-13.75

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	14.25-14.75
Cincinnati, dealers	13.00-13.50
Eastern Pa.	19.00-19.50
New York	†13.00-13.50
St. Louis	14.25-14.75

RAILROAD WROUGHT

Birmingham	16.00
Boston district	†11.75-12.25
Eastern Pa., No. 1	20.50-21.00
St. Louis, No. 1	16.00-16.50
St. Louis, No. 2	17.00-17.50

FORGE FLASHINGS

Boston district	†14.00-14.25
Buffalo	19.00-19.50
Cleveland	19.00-19.50
Detroit	†17.25-17.75
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	25.00-25.50

LOW PHOSPHORUS

Buffalo, plates	26.50-27.00
Cleveland, crops	26.00-26.50
Eastern Pa., crops	25.00-25.50
Pitts., billet, bloom, slab crops	27.00-27.50

LOW PHOS. PUNCHINGS

Buffalo	25.50-26.00
Chicago	25.00-25.50
Cleveland	22.00-22.50
Detroit	†19.50-20.00
Eastern Pa.	25.00-25.50
Pittsburgh	26.00-26.50
Seattle	15.00

RAILS FOR ROLLING

3 feet and over

Birmingham	19.00
Boston	†18.50-19.00
Chicago	25.00-25.50
New York	†19.50-20.00
Eastern Pa.	26.00-26.50
St. Louis	23.50-24.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-21.00
Chicago, net	26.25-26.75
Eastern Pa.	27.50-28.00
St. Louis	26.00-26.50

LOCOMOTIVE TIRES

Chicago (cut)	24.50-25.00
St. Louis, No. 1	21.50-22.00

SHAFTING

Boston district	†19.50-19.75
New York	†21.00-21.50
Eastern Pa.	23.00-25.50
St. Louis, 1¼-3¾"	22.00-22.50

CAR WHEELS

Birmingham, iron	18.00
Boston dist., iron	†16.00-16.50
Buffalo, steel	25.00-25.50
Chicago, iron	21.50-22.00
Chicago, rolled steel	24.50-25.00
Cincin., iron deal.	20.00-20.50
Eastern Pa., iron	23.00-23.50
Eastern Pa., steel	26.00-26.50
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	26.50-27.00
St. Louis, iron	22.00-22.50
St. Louis, steel	23.50-24.00

NO. 1 CAST SCRAP

Birmingham	18.00
Boston, No. 1 mach.	†17.50-18.00
N. Eng., del. No. 2	18.25-18.75
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	19.00-19.50
Buffalo, mach.	20.50-21.00
Chicago, agri. net	16.50-17.00
Chicago, auto net	19.50-20.00
Chicago, railr'd net	18.00-18.50
Chicago, mach. net	19.50-20.00
Cincin., mach. deal.	21.50-22.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net	†17.50-18.00
Eastern Pa., cupola	24.00-24.50
E. Pa., No. 2	20.00
E. Pa., yard fdry.	20.00-20.50
Los Angeles	16.50-17.00
Pittsburgh, cupola	21.50-22.00
San Francisco	14.50-15.00
Seattle	14.00-15.00
St. L., agri. mach.	19.00-19.50
St. L., No. 1 mach.	20.00-20.50
Toronto, No. 1 mach., net dealers	18.00-18.50

HEAVY CAST

Boston dist. break.	†16.50-16.75
New England, del.	20.00-20.50
Buffalo, break.	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net	†18.00-18.50
Detroit, break.	†16.00-16.50
Eastern Pa.	22.00-22.50
Los Ang., auto, net.	13.00-14.00
New York break.	†17.00

STOVE PLATE

Birmingham	11.50
Boston district	†16.00-16.50
Buffalo	16.50-17.00
Chicago, net	14.00-14.50
Cincinnati, dealers	13.25-13.75
Detroit, net	†12.00-12.50
Eastern Pa.	19.00-19.50
New York fdry.	†14.00-14.50
St. Louis	15.25-15.75
Toronto dealers, net	12.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	23.00-23.50
Chicago, R. R.	24.50-25.00
Cincin. agri., deal.	18.00-18.50
Cleveland, rail	25.00-25.50
Eastern Pa., R. R.	22.50-23.00
Los Angeles	12.50
Pittsburgh, rail	25.50-26.00
St. Louis, R. R.	21.50-22.00

Ores

Lake Superior Iron Ore

Gross ton, 51½ %

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos	nom.
Spanish, No. African basic, 50 to 60%	nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c
F.O.B. Rio Janeiro.	
Scheelite, imp.	$25.00
Chrome ore, Indian, 48% gross ton, cif.	$28.00-30.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	.....
So. African, 50-52%	58.00-60.00
Indian, 49-50%	58.00-59.00
Brazilian, 46%	50.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 90, 91

Pittsburgh—Sheet production has gained slightly, but has not reached pre-holiday levels. Specifications are heavy and releases active. Some capacity is available on strip mills, with cold rolling mill schedules better than on hot mills. Galvanized sheet operations last week were up 1 point to 81 per cent of capacity.

Cleveland — Local producer reports making sales for fourth quarter at prices prevailing, meaning little except getting a place on rolling schedules. Sales volume is thoroughly maintained and often exceeds a month ago. Promises on deliveries are most deferred in alloy sheets, then galvanized sheets. In the latter, 20 weeks is a common delivery, government having ordered tremendous quantities for roofs and sidings of cantonments. Most sales generally are for second quarter.

Chicago—No let-up is seen in demand for sheets and strip, with orders increasing moderately, compared with the previous week. Bookings exceed orders and deliveries are extending. Current delivery schedules for hot-rolled sheets are May for 18-gage and heavier, late April for 20-gage and lighter; enameling iron and cold-rolled are in May delivery.

Boston—Most sheet orders now being placed are at open prices for second quarter delivery. Little tonnage is available for shipment this quarter with hot sheets ranging from 12 to 14 weeks. Demand is heavy and consumption is rising. Requirements for building are off slightly due materially to a slackening in buying for cantonments and defense camps.

New York—Increasingly extended deliveries, likelihood of more rigid priorities and renewed concern as to possibility of higher prices in second quarter give further stimulus to sheet demand. A number of buyers normally engaged in production of consumer goods have substantial government orders and believe that they will have no difficulty in obtaining steel for at least a portion of their operations.

Philadelphia — Sheet buyers are active in anticipating forward needs, adding further to heavy backlogs. Fear of rigid priorities is an important factor in future coverage though mills are not encouraging such buying. Shipments generally are accommodating current consumer needs. A large sheet tonnage is involved in railroad car work, headed by the Pennsylvania program.

Buffalo—Mills are unable to reduce order backlogs with solid bookings reported for the current quarter. Delivery extensions run anywhere from eight to twelve weeks. Production schedules are held as close to capacity as steel supplies permit. Demand is diversified.

St. Louis—Sheet and strip shipments are equal in volume to or somewhat larger than highest rate attained in the present movement. Buying, however, is less active, as consumers feel that placing of orders will not bring early delivery.

Cincinnati—First quarter demand for sheets has relaxed somewhat, following announcement by one district interest that delivery on further tonnage in this quarter cannot be assured on most items. Inquiries for second quarter have been correspondingly increased. Considerable tonnage tentatively accepted may be rolled in the next 60 days in absence of priorities for defense. So far, stainless steel, at 30 per cent of bookings, is in the forefront of defense needs.

Birmingham, Ala.—Sheet output remains consistently high, estimated at close to 90 per cent. Some restocking is evident and bookings are sufficient for continued steady output at least through this quarter. Only a small amount of strip is being turned out.

Toronto, Ont.—Plans are said to be underway whereby the Canadian automotive industry will concen-

trate more extensively on production of war vehicles, and under this new program demand for sheets will increase. It is reported that large sheet orders are pending for early closing on war vehicle production account. Household equipment makers show special interest and there have been large orders recently from electrical equipment makers and other consumers, most of whom are working on war contracts.

Plates

Plate Prices, Page 90

Pittsburgh—Buying is heavy and backlogs are high, with little change in the relative position. Deliveries are fair on plates under 6 inches but heavier material is tied up far in advance. Work is going forward on new forging presses to ease armor plate situation, with three 14,000-ton presses and one 6500-ton press now under construction in the district for installation in armor plate mills.

Cleveland—In view of the scarcity of wide plates many consumers are resorting to narrow plates, using two narrows in place of one wide. There is no easing in demand and supply is no easier. Small Pennsylvania mills which had been shipping into this district, giving four weeks' delivery, are about filled up now. Prospects of more defense shipbuilding on Great Lakes will give an additional outlet.

Boston—For delivery starting in March and continuing in equal lots at stated intervals to July, 1942, Todd-Bath Iron Shipbuilding Co., South Portland, Me., is placing a large tonnage for plates for 30 cargo ships to be built for the British at the Maine yard. This tonnage, the largest yet placed in this area in connection with the defense program, will be widely distributed. Floor plates are sharing in heavy demand for shipbuilding with deliveries at two to three weeks. Miscellaneous buying of light plates is also active.

New York—Federal Shipbuilding & Drydock Co., Kearny, N. J., has been awarded one C-2 type cargo ship, requiring approximately 4600 tons of hull and superstructure steel, by the maritime commission for Grace Line Inc.

Philadelphia—Plate bookings generally are even with shipments, with some mills reporting a further expansion in backlogs. Most business represents future requirements as buyers seek to cover needs into next quarter. Deliveries on heavier gages and wider sizes generally fall into April and beyond, at prices prevailing at time of delivery. Pennsylvania railroad has yet to order steel involved in equipment buying program announced recently. At least one mill with an unfavorable freight rate to this area is equalizing this disadvantage by quoting a proportionate increase over the usual 2.10c, Claymont, base.

Seattle — Heavy tonnages are pending for commercial and naval shipbuilding contracts placed with plants in Seattle, Tacoma and Portland. Richfield Oil Co. has begun construction on its Seattle terminal where 11 large storage tanks, capacity in excess of 500,000 barrels, will be erected. These tanks were awarded to Chicago Bridge & Iron Co., as previously announced, involving 1500 tons or more of plates.

San Francisco—Awards of plates are many times greater than they were for the first two weeks of 1940. Bookings aggregated 10,770 tons, bringing the total to date to 12,770 tons, compared with 380 tons a year ago. Moore Drydock Co. booked 7200 tons for two submarine tenders for the navy. Willamette Iron & Steel Works, took 3600 tons for two large mine layers and Chicago Bridge & Iron Works, 570 tons for four oil storage tanks in the Hawaiian Islands.

Toronto, Ont.— Placing of additional shipbuilding contracts with Canadian yards is creating new demand for ship plates and large tonnages now are pending for early closing. Tank builders are in the market for larger supplies, and other consumers are endeavoring to place large tonnages. It is reported that the Steel Co. of Canada Ltd., Hamilton, Ont., will put its new plate mill into production in March, which will take care of much of the country's needs.

Plate Contracts Placed

7200 tons, two submarine tenders, for navy, to Moore Drydock Co., Oakland, Calif.

3600 tons, two large mine layers, navy, to Willamette Iron & Steel Works, Portland, Oreg.

570 tons, oil storage tanks for Turner Construction Co., Honolulu, to Chicago Bridge & Iron Co., Chicago.

500 tons, plates and sheets, Watertown, Mass., arsenal, to Youngstown Sheet & Tube Co., Youngstown, O.; two contracts by lot.

Plate Contracts Pending

14,400 tons, six C-3 type cargo vessels for United States maritime commission; Moore Drydock Co., Oakland, Calif., low.

7992 tons, four C-2 type cargo vessels, United States maritime commission; Western Pipe & Steel Co., San Francisco, low.

1000 tons or more, 16 and 14-inch water line, McMinnville, Oreg.; Beall Tank & Pipe Co., Portland, low.

Unstated, five naval tankers; Albina Engine & Machine Works, Portland, Oreg., apparently low.

200 tons, 500,000-gallon tank and tower, United States engineer office, Tucson, Ariz.; bids soon.

Unstated, heating boilers for various units Alaska air bases; bids in to United States quartermaster, Seattle.

Bars

Bar Prices, Page 90

Pittsburgh—Bar backlogs are still fairly high. Buying is active. Alloy situation has not cleared, although deliveries on carbon steel bars are in fairly good shape.

Cleveland—Producers are selling largely into second quarter and sometimes third quarter at prices prevailing when shipped. Volume holds up well. Whereas a month ago orders were usually for needs in sight, business now is merely in anticipation of probable requirements ahead, with producers careful that customers don't overbuy.

Chicago—Bar orders are mounting with demand widespread. Alloy and high carbon grades are in tightest spot, with mills talking deliveries as far away as May or June. Heavy purchases have been made and more are pending for shell stock, but this volume is said to represent only a small portion of going business.

Boston—While some producers can ship carbon steel bars by late March, deliveries in general are more extended. Little capacity is open for the remainder of this quarter and on alloys, heat-treated and electric furnace steel deliveries are indefinite except on direct defense requirements. Demand for the latter are gaining momentum.

New York—Possibility of more rigid enforcement of priorities has further stimulated demand for bars. However, sellers are more cautious in acceptance of specifications and actual orders have not increased as much as inquiry. Deliveries on carbon bars average around 13 weeks, with business being accepted at prices ruling at time of delivery. Cold-drawn carbon bars are being offered around 14 to 15 weeks. Hot alloy bars range 25 to 30 weeks, special heat-treated being offered for shipment as late as fourth quarter in some cases.

Philadelphia — Bar mill backlogs in some instances have absorbed capacity through first quarter though deliveries vary somewhat according to specifications. While part of recent bookings represents forward buying, which tends to overestimate anticipated needs a general upturn in consumption makes it difficult to determine the extent of overbuying. Mills are scrutinizing orders carefully to distribute available tonnage as much as possible.

Buffalo—Bars appear in the most urgent demand of any product. Mills are completely booked on carbon bars for the current quarter

and alloy stock is practically sold out for second quarter.

Birmingham, Ala. — Bars are among the most active products. Producers are well sold for first quarter, and some pressure for deliveries is evident.

Toronto, Ont.—Despite the fact that mills are heavily booked on bars and deliveries are delayed two to three months, orders show no decline in volume. Inquiries indicate heavier purchases for the immediate future from building contractors and the manufacturing industry in general.

Rails, Cars

Track Material Prices, Page 91

Final returns indicate buying of 66,912 freight cars by domestic railroads in 1940. This is the largest total since 1929, when 106,105 cars were placed. The total for December is 7181, with indications that this figure might be surpassed in January, as more than 6600 have already been awarded, not including a heavy repair program for the Pacific Fruit Express calling for new bodies for 2000 freight cars, usually listed by railroad statisticians as new cars.

Following is a comparative statement on car awards over recent years:

	1940	1939	1938	1937
Jan	360	3	25	17,806
Feb.	1,147	2,259	109	4,972
March ...	3,104	800	680	8,155
April	2,077	3,095	15	9,772
May	2,010	2,051	6,014	4,732
June	7,475	1,324	1,178	548
July	5,846	110	0	1,030
Aug.	7,525	2,814	182	1,475
Sept.	9,735	23,000	1,750	1,216
Oct.	12,195	19,634	2,537	1,355
Nov.	8,234	2,650	1,232	275
Dec.	7,181	35	2,581	275
Total ..	66,912	57,775	16,303	51,611

Rail Orders Placed

St. Louis-San Francisco, 12,320 tons 122-pound rails, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Locomotives Pending

Missouri Pacific, two 4000-horsepower diesel-electric, for two streamlined trains; court permission granted.

Car Orders Placed

Pacific Fruit Express, subsidiary of Union Pacific and Southern Pacific, 1000 refrigerator cars, to Pacific Car & Foundry Co., Portland, Oreg.; Pacific Fruit Express also has a program, involving new bodies for 2000 cars, and repairs to 1000 others.

Union Pacific, 300 flats and 50 freight cars of another type, to Pullman Standard Car Mfg. Co., Chicago.

Car Orders Pending

Georgia Power Co., Atlanta, Ga., asks for 10 trolley buses.

Missouri Pacific, two streamlined trains, including two mail-baggage cars, two diner-lounge cars, four coaches, two storage mail cars; court permission granted.

South African Railways & Harbors, 1000 gondola cars, bids asked.

Tennessee Coal, Iron & Railroad Co., 116 freight cars, including ninety 70-ton ore cars, twenty 70-ton flat cars and six 70-ton slab side hot-hole cars, bids asked.

Buses Booked

A.c.f. Motors Co., New York: Ten 36-passenger for San Diego Electric Railway Co., San Diego, Calif.; eight 26-passenger for Montreal Tramways Co., Montreal, Que.; six 28-passenger for Conestoga Transportation Co., Lancaster, Pa.; five 36-passenger for United Electric Railways Co., Providence, R. I.; four 35-passenger and two 37-passenger for Eastern Massachusetts Street Railway Co., Boston; five 37-passenger for Interurban Transportation Co. Inc., Alexandria, La.; four 37-passenger for Gray Coach Lines Ltd., Toronto, Ont.; three 31-passenger for Pittsburgh Motor Coach Co., Pittsburgh; two 29-passenger for St. Joseph Railway, Light & Power Co., St. Joseph, Mo.; two 34-passenger for Penobscot Transportation Co., Bangor, Me.

Twin Coach Co., Kent, O.: Forty-two 31-passenger for Syracuse Transit Corp., Syracuse, N. Y.; fifteen 40-passenger for North Shore Bus Co., Flushing, L. I.; four 27-passenger for Grand Rapids Motor Coach Co., Grand Rapids, Mich.; two 33-passenger for Schuylkill Valley Line, Norristown, Pa.; two 31-passenger for Savannah Electric & Power Co., Savannah, Ga.; two 27-

Behind the Scenes with STEEL

Water Bottlenecks

■ Our roving reporter, sniffing a bottleneck while visiting a big defense-industry plant recently, followed the long row of slowly moving men to the source of trouble: A decrepit drinking fountain. That inspired this rather too-complete survey of several outstanding types of drinking fountains (which you may want to skip):

1. *The Gooseneck.* Made of soft brass. Drinker must go through following steps for drink: (a) Open mouth real wide. (b) Approach cautiously, ready to shift to right or left. (c) Turn on water. (d) Move mouth in elliptical path to follow course of water.

2. *The Salamander.* Also called the "Dog Watch," because playful boys on night shift prepare it for the first shift. Nozzle is made of heavy-gage, chromium-plated steel, with one hole in it. Hole is set at 45 degree angle, and aimed directly at a toolmaker's bench about ten feet away. An effective field piece when plugged with chewing gum or paper wad.

3. *The Dooshee.* Looks like ordinary fountain with octagonal, porcelain base. Like the Salamander, the nozzle has been plugged, but in this case with solder. Drinker leans over—thirsty, expectantly. Turns on water, which backfires from handle and drenches shirt sleeve clear to elbow.

4. *The Sprinkler,* and/or *Molotov Bread Basket.* Drinking head, unquote, is straight piece, set at 135 degrees from the floor. When loosened it revolves viciously, scattering water in a wide arc, catching drinker about shoulder high.

5. *The Bubble.* Swankiest of them all. Base is of lovely terra cotta. Drinking head is very modern and very sanitary. Water converges in fine streams, then falls elusively down drain and into sewer. Trick is to lean 'way over, try like hell to catch bubble that floats in the center. When unsuccessful, usual practice is to get a bottle of coke from the nickel machine.

Union Trouble

■ All of which leaves the poor drinker in about as much of a quandary as union officials of a certain local were recently. The CIO had placarded the town with notices of an important meeting on Saturday afternoon to discuss "matters of great importance" (meaning the collection of dues and contributions to "remove the miserable conditions at Ford plants"). But by coincidence (?) the local and large manufacturer of sundry automotive products then invited the men to stay on that same Saturday afternoon, at time-and-a-half. This posed a curious problem: To collect time-and-a-half, or attend the meeting and dig into the billfold. And it seems that most of the workers, possibly having read a number of double-page ads about Ford wages, decided to collect the time-and-a-half, and maybe some day apply for a job at Ford.

Nothing New

■ Back a few years ago when we were spending our days in the core-room of Buckeye Steel Castings, trying to get a little cash to start college, it seemed a long cry to the time our big boss and superintendent would some day be arguing with us over a can of beans. But it has come to pass, and this week C. F. Dierker took a minute off from turning out railroad couplings to "explode" our "new" can within a can which we mentioned here a couple of weeks ago. Mr. Dierker says he ate sausages out of just such a self-heating can 'way back in 1913, while fishing on Sandusky Bay with a couple of cronies. And, although we might get away with it now, we don't think we'll argue with the boss.

SHRDLU.

passenger for Bremerton-Charleston Transportation Co., Bremerton, Wash.; two 27-passenger for Peoples Transport Corp., Muskegon, Mich.

Pipe

Pipe Prices, Page 91

Pittsburgh—The pipe market offers no new development with prices strong in standard pipe and mechanical tubing. Shipments of standard pipe to consigned stocks are slightly lower. Oil country business shows little change.

Cleveland—Producers of line pipe learn that several important projects will reach inquiry stage in the spring. Just now line pipe and casings are only moderately active, though good for the season. Sales of merchant pipe hold at about the excellent December level, with buildings for defense the best outlet.

Boston—Pipe producers in some instances are advising regular distributors to replace stocks of galvanized liberally in view of short supply of zinc for coating. Demand for merchant steel pipe, while somewhat more spotty, is good for this period with the outlook for building requiremenuts encouraging.

Birmingham, Ala.—Cast iron pipe manufacturers continue generally on a five-day week, with miscellaneous bookings accounting for most of the tonnage. Not a great deal of larger sizes is being produced, but inquiries have developed which indicate substantial business for the next few weeks.

Steel Pipe Placed

6500 tons, steel pipe, Shasta dam, to Western Pipe & Steel Co. of California, San Francisco.

Cast Pipe Pending

2000 tons, 16 and 14-inch for McMinnville, Oreg.; Hugh G. Purcell, low for U. S. Pipe & Foundry Co., Burlington, N. J.

925 tons, 4 to 12-inch bell and spigot, Spokane, Wash.; Hughes & Co., Spokane, low, for Pacific States Cast Iron Pipe Co., Provo, Utah.

Wire

Wire Prices, Page 91

Pittsburgh—Bookings continue to exceed shipments, with merchant wire buying continuing to gain. Agricultural demand will be considerably heavier than last year, according to the tonnage now being taken by jobbers.

Boston—Wire buying continues heavy with incoming volume above shipments. Demand is widely diversified and backlogs are large, notably on specialties. Rod supplies are tight and some mills and departments are operating on a hand-to-mouth basis on some finishes.

Shapes

Structural Shape Prices, Page 90

Pittsburgh—Shape inquiries continue fairly active, although less than during the fourth quarter. Delivery situation is still bad in wide flange beams and other large sections. Standard shapes are relatively good.

Cleveland — Current business is quieter, but fabricators are in touch with many pending projects. Livest is load line buildings for the ordnance plant at Ravenna, O., estimated at 2500 tons or more. Some find, however, that potential business is larger than month ago.

Boston — Delivery of fabricated material, rather than price, is a growing factor in the award of more defense construction contracts. Low bidder on a navy yard building, first awarded the contract, later lost the tonnage to another shop promising earlier shipment. Inquiry is substantial, extension of shipbuilding facilities being enhanced by several industrial expansions of size in connection with defense needs.

Philadelphia—Structural mills are unable to better deliveries despite reduced inquiries. Orders remain heavy, but volume of pending work is less with closing on most defense projects the past 90 days. No general move to advance prices on plain material is indicated, despite such action by one producer.

Seattle—Largest tonnages pending are involved in naval and maritime commission shipbuilding contracts held by Seattle, Tacoma and Portland yards, expected to be placed soon. Willamette Iron & Steel Works, Portland, will furnish about 700 tons for a storehouse at Puget Sound navy yard.

Toronto, Ont.—Awards for war construction last week were upward of 15,000 tons, and 8000 tons were placed for ordinary construction. Approximately 20,000 tons are pending for closing within the next two or three weeks.

Shape Contracts Placed

7200 tons, naval ordnance plant, Canton, O., sponsored by Westinghouse Electric & Mfg. Co., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.

6700 tons, general assembly shops, Westinghouse Electric & Mfg. Co., Louisville, Ky., to American Bridge Co., Pittsburgh.

4800 tons, two submarine tenders for navy, to Moore Drydock Co., Oakland, Calif.

4300 tons, contract B-16, elevated parkway, Brooklyn, N. Y., Triboro Bridge authority, to American Bridge Co., Pittsburgh.

4000 tons, extension to shell loading plants, war department, Elwood, Ill., Sanderson & Porter, Chicago, engineers, to Wisconsin Bridge & Iron Co., Milwaukee.

2700 tons, transmission towers, between Bonneville dam and Oregon City, Oreg., to Bethlehem Steel Co., San Francisco.

2400 tons, two large mine layers for navy, to Willamette Iron & Steel Works, Portland, Oreg.

2000 tons, shell loading plant, war department, Burlington, Iowa, to Vierling Steel Works, Chicago; A. Guthrie & Co., St. Paul, and Al Johnson Construction Co., Minneapolis, joint contractors.

1500 tons, repairs and new shell for blast furnace, Great Lakes Steel Corporation, Detroit, to the Lackawanna Steel Construction Co., Buffalo.

1300 tons, Martin Point bridge, Falmouth-Portland, Me., bascule to Phoenix Bridge Co., Phoenixville, Pa., approach spans to Bethlehem Steel Co., Bethlehem, Pa.; Wyman & Simpson Inc., Augusta, Me., contractor.

1250 tons, shop buildings, naval base, Quonset Point, R. I., to Ingalls Iron Works, Birmingham, Ala.

Shape Awards Compared

	Tons
Week ended Jan. 18.....	53,548
Week ended Jan. 11.....	24,480
Week ended Jan. 4.....	55,382
This week, 1940	10,838
Weekly average, 1941.....	44,470
Weekly average, 1940.....	28,414
Weekly average, Dec.	31,516
Total to date, 1940.....	39,872
Total to date, 1941.....	133,410

Includes awards of 100 tons or more.

1200 tons, air corps hangars, various locations, for war department, to American Bridge Co., Pittsburgh.

1200 tons, 17 storage buildings, for government, La Porte, Ind., Bates & Rogers Construction Corp., contractor, to Mississippi Valley Structural Steel Co., Decatur, Ill.

812 tons, high school, addition, Berkeley, Calif., to Bethlehem Steel Co., San Francisco.

770 tons, west track stringer replacements, Manhattan bridge, New York, to American Bridge Co., Pittsburgh; John Roman Inc., New York, contractor.

700 tons, storehouse, Puget Sound navy yard, to Willamette Iron & Steel Corp., Portland, Oreg.; H. R. Olsen, Tacoma, Wash., general contractor.

650 tons, extension South Meadow station, Hartford Lighting Co., Hartford, Conn., to Bethlehem Fabricators, Inc., Bethlehem, Pa.

600 tons, sheet piling, pier, navy yard, Bremerton, Wash., to Bethlehem Steel Co., San Francisco.

550 tons, steel storage runway, Cramp Shipbuilding Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, repairs, elevated lines, Chicago Rapid Transit Co., to Hansell-Elcock Co., Chicago.

475 tons, marine railway cradle, Key West, Fla., for government, to American Bridge Co., Pittsburgh.

475 tons, power plant, Central Maine Power Co., to Lyons Iron Works, Manchester, N. H.

450 tons, curb angles, Manhattan and Brooklyn, N. Y., to Phoenix Bridge Co., Phoenixville, Pa., through procurement division, treasury department, New York.

417 tons, boiler house, Curtiss-Wright Corporation, Buffalo, to Bethlehem Steel Co., Buffalo.

417 tons, boiler house, Curtiss-Wright Corporation, St. Louis, to Stupp Brothers Bridge & Iron Co., St. Louis.

417 tons, boiler house, Curtiss-Wright Corporation, Columbus, to American Bridge Co., Pittsburgh.

410 tons, building, Walter Kidde & Co., Belleville, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, Farmers-Mechanics bank, Minneapolis, Madsen Construction Co., Minneapolis, contractor, to Crown Iron Works Co., Minneapolis; bids Dec. 14.

400 tons, yard facilities, Todd-Bath Iron Shipbuilding Co., South Portland, Me., to Lyons Iron Works, Manchester, N. H., Charles T. Main Inc., Boston, engineers. This, in addition to 4000 tons to American Bridge Co., Pittsburgh.

375 tons, Bancroft hall addition, naval academy, Annapolis, Md.; 200 tons for roof framing to Ingalls Iron Works, Birmingham, Ala.; 175 tons for main structure to Bethlehem Steel Co., Bethlehem, Pa.

357 tons, steel piling, Lindberg boulevard bridge, St. Louis, to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, highway bridge, Livingston County, N. Y., to American Bridge Co., Pittsburgh.

300 tons, plant, General Electric Co. at Canneaut, O., to Erie Concrete & Steel Co., Erie, Pa.

300 tons, two gate frames, Minidoka power plant, Acequia, Utah, to American Bridge Co., Pittsburgh.

300 tons, hangar, Middletown, Pa., for war department, to American Bridge Co., Pittsburgh.

260 tons, state highway bridge 2094, Marion, Ind., Gradle Bros., Indianapolis, contractor, to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, Lake Forest hospital, Lake Forest, Ill., Nielsen-Thorvald Co., Chicago, to New City Iron Works, Chicago; bids Nov. 25.

250 tons, addition, Doehler Die Castings Co., Batavia, N. Y., to F. L. Heughes Co., Rochester, N. Y., through Gleason Corp., Rochester, contractor.

230 tons, bridge, Ft. Loudoun dam, near Lenoir City, Tenn., Tennessee Valley authority, to Anthracite Bridge Co., Scranton, Pa.; bids Jan. 7, Knoxville.

215 tons, telephone building, Bellevue, Pa., for Bell Telephone Co. of Pennsylvania, to American Bridge Co., Pittsburgh.

200 tons, miscellaneous reinforcing of crane runway, Cramp Shipbuilding Co., Philadelphia, to Belmont Iron Works, Philadelphia.

200 tons, chemistry building, University of Nevada, Reno, Nev., to Schrader Iron Works, San Francisco.

187 tons, state highway project route, 29, section 2E, Mountainside, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; Franklin Contracting Co., Newark, contractor.

185 tons, navy building, South Boston, Mass., to Bethlehem Fabricators Inc., previously reported as to American Bridge Co., Pittsburgh.

180 tons, steel piling, Lindbergh boulevard bridge, St. Louis, Massman Construction Co., contractor, to Truscon Steel Co., Youngstown, O.

165 tons, ordnance shop, Camp Edwards, Falmouth, Mass., to Belmont Iron Works, Philadelphia.

130 tons, state bridge W1-6-35, Edgerton, O., to American Bridge Co., Pittsburgh.

103 tons, sheet piling, 12th naval district, San Francisco, to Bethlehem Steel Co., San Francisco.

100 tons, naval armory buildings, South Portland and Saco, Me., to Phoenix Bridge Co., Phoenixville, Pa.

Shape Contracts Pending

9600 tons, six C-3 type cargo vessels, United States Maritime Commission, Moore Drydock Co., Oakland, Calif., low.

5328 tons, four C-2 type cargo vessels, United States Maritime Commission; Western Pipe & Steel Co., San Francisco, low.

3250 tons, 13 hangars for United States Army quartermaster, San Francisco; bids in.

2500 tons, load line buildings, Nos. 1, 2 and 3, ordnance plant, Ravenna, O.; bids Jan. 17.

1650 tons, No. 2 armor tempering plant, Midvale Co., Philadelphia.

1000 tons, steel for crane builders at Seattle, Wash.; bids in.

1000 tons, three warehouses, McClelan field, Sacramento, Calif.; bids opened.

1000 tons, power house extension, Appalachian Electric Power Co., Cabin Creek, W. Va.

1000 tons, 300 transmission towers for Bonneville project; Bethlehem Steel Co., San Francisco, low.

700 tons, apartment house, Arthur Diamond, New York.

600 tons, inert storage buildings, type 9, Ravenna, O., for government.

595 tons, Pennsylvania state highway bridges, including 230 tons, bridges Bradford county, 140 tons bridge, Indiana county, 125 tons, pony truss bridge, Warren county and 100 tons, I-beam bridge, Bedford county; bids to state highway department, Harrisburg, Pa., Jan. 24.

526 tons, under-crossing, Azusa, Calif., for state; J. E. Haddock, Ltd., 357 N.

Chester avenue, Pasadena, Calif., low on general contract at $192,392.

525 tons, state highway bridge, Rockbridge, Ill.

500 tons, power house, Campbell Soup Co., Camden, N. J.; bids Jan. 17.

500 tons, state bridge RC-41-1, Thurman Station, N. Y.

500 tons, buildings, navy station, Keyport, Wash.; bids Jan. 15.

440 tons, manufacturing building, Defense Plant Corp., Belleville, N. J.

438 tons, two railroad under passes, Adams county, Colo., for state; bids Jan. 23.

425 tons, Mokelumna River bridge, San Joaquin county, Calif., for state; bids in.

400 tons, foundry, Sunnyvale, Calif.; bids in.

350 tons, storage building, Winslow Bros. & Smith Co., Norwood, Mass.

315 tons, state highway bridge PSC-6582, Depew, N. Y.

300 tons, Makalapa housing project, Honolulu, T. H.; bids opened.

250 tons, manufacturing building, I. B. Kleinert Rubber Co., College Point, N. Y.

225 tons, office and laboratory building, General Electric Co., Pittsfield, Mass.

210 tons, factory building, Beech-Nut Packing Co., Canajaharie, N. Y.

175 tons, storage building extension, Russell-Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

160 tons, highway bridge, Scranton, Pa., for city.

157 tons, two bridges, Bakersfield, Calif., for state; bids Feb. 5.

150 tons, state bridge 5959, Mapleton, Minn.

120 tons, pipe welding shop, New York Shipbuilding Corp., Camden, N. J.

120 tons, Indian river bridge, Alaska; Omaha Steel Works, Omaha, apparently low to Alaska Railroad.

110 tons, still building addition, Jos. E. Seagram & Sons, Lawrenceburg, Ind.

100 tons, addition to utility shop, Pearl Harbor, T. H.; bids in.

Unstated, light and trolley poles for Seattle Transportation Commission; Standard Steel Fabricating Co., Seattle, low.

Unstated, cranes and hoists for naval air base, Kodiak, Alaska; Siems, Drake, Puget Sound, Seattle, general contractor.

Reinforcing

Reinforcing Bar Prices, Page 91

Pittsburgh—Concrete bar production shows little change. New projects are active. Tonnages on books are heavy, although deliveries are being made on schedule in almost every case. However, it is difficult to buy now for delivery in less than three months, particularly if a large tonnage is involved.

Cleveland — Inquiries and sales have lessened, yet large amount of prospects on drawing boards are noted. Difficulty of getting old rails, hinders manufacture.

Chicago — Few reinforcing steel awards have been made here the past week, but a considerable number are pending. Some projects involve substantial tonnages, but most are small, ranging up to 100 tons. Only because most suppliers had built up ample stocks, are shipments reasonably prompt.

Philadelphia—Pending and prospective business is lighter, with mill backlogs still fairly heavy and shipments substantial. Need for raw steel supplies in other directions is making business in concrete bars unattractive at anything below the full price.

Seattle—New projects are developing rapidly, many small jobs calling for less than 100 tons each adding to the total. Largest award of the week, 2500 tons for a fitting-out pier at Puget Sound navy yard, went to Bethlehem Steel Co., which will also furnish 100 tons for a concrete wall at Richfield Oil Co.'s Seattle terminal.

San Francisco — While Pacific Coast rolling mills are extremely active filling small orders, few new ones of size have developed lately. Awards to date total 2295 tons, compared with 5062 tons for the same period last year.

Concrete Bars Compared

	Tons
Week ended Jan. 18.....	9,054
Week ended Jan. 11.....	17,400
Week ended Jan. 4.....	5,406
This week, 1940	6,036
Weekly average, 1941.....	10,620
Weekly average, 1940.....	9,661
Weekly average, Dec.....	7,204
Total to date, 1940.....	26,310
Total to date, 1941.....	31,860

Includes awards of 100 tons or more.

Reinforcing Steel Awards

2500 tons, Puget Sound navy yard pier, to Bethlehem Steel Co., Seattle; Rumsey & Co. and Puget Sound Bridge & Dredging Co., joint contractors.

1200 tons, housing project, Mitchell field, New York, to Carroll-McCreary Co. Inc., Brooklyn, N. Y.; H. R. H. Construction Co., New York, contractor.

1200 tons, nylon plant, duPont Co., at Martinsville, Va., to Bethlehem Steel Co., through Virginia Steel Co.

1108 tons, elevated highway section, contract B-15, Brooklyn, N. Y., Triborough Bridge Authority, to Bethlehem Steel Co., Bethlehem, Pa.; P. T. Cox Construction Co., New York, contractor.

600 tons factory, Owens-Illinois Can Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; Hughes-Foulkrod, contractor.

300 tons, unit No. 3, Delaware hospital, Wilmington, Del., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Philadelphia, contractor.

300 tons, highway project, route 29, section 2E, Mountainside, N. J., to Joseph T. Ryerson & Son Inc., Jersey City, N. J.; Franklin Contracting Co., Newark, contractor.

250 tons, retaining walls and sewers,

Peoria, Ill., to Calumet Steel Co., Chicago; States Improvement Co., contractor.

211 tons, highway bridge 2093, Marion county, Ind., Smith & Johnson, Indianapolis, contractor, to W. J. Holliday & Co., Indianapolis.

180 tons, postoffice, Burlingame, Calif., to W. C. Hauck Co., San Francisco.

178 tons, elevated highway section, contract B-13, Brooklyn, N. Y., Triborough Bridge Authority project, to Joseph T. Ryerson & Son Inc., Jersey City; P. T. Cox Construction Co., New York, contractor.

172 tons, warehouse, Sears, Roebuck & Co., Cleveland, to Republic Structural Iron Works, Cleveland, through Hadlock, Krill Co., Cleveland.

170 tons, bureau of reclamation, Corbett, Wyo., to Laclede Steel Co., St. Louis.

170 tons, Yakima, Wash., courthouse, to Northwest Steel Rolling Mills, Seattle; William Yeaman, Yakima, contractor.

150 tons, store, Sears Roebuck & Co., St. Louis, to Sheffield Steel Corp., Kansas City, Mo.

137 tons, two state highway bridges, contract 2067, Greenwood, Ind., 74 tons to Hugh J. Baker Co., Indianapolis, and 63 tons to Bethlehem Steel Co., Bethlehem, Pa.

128 tons, utility buildings, Fort Clayton, Calif., to Soule Steel Co., San Francisco.

100 tons, firewall, Richfield Oil Co. Seattle terminal plant, to Bethlehem Steel Co., Seattle; Puget Sound Bridge & Dredging Co., Seattle, contractor.

Reinforcing Steel Pending

15,000 tons, proving ground, U. S. army, Madison, Ind.; J. L. Simmons Co., contractor.

15,000 tons, air base, Bourinquen field, Puerto Rico; McCloskey & Co., contractor.

1500 tons, bars, and 115 tons, wire mesh, underground powder magazines, shell loading plant, war department, Elwood, Ill., Sanderson & Porter, Chicago, engineers.

1000 tons, chemical plant, Monsanto, Ill.

850 tons, two new plants and garages, Coca Cola Bottling Co. of Chicago Inc., Chicago, and 30 tons of wire mesh.

750 tons, supercharger building, General Electric Co., Everett, Mass.

700 tons, unit No. 2, William Penn Homes housing, Chester, Pa.; Stofflet & Tillotson, contractors.

600 tons, contract No. 10, River Front boulevard, Pittsburgh; bids due Jan. 28.

500 tons, cantonment, Front Leonard Wood, near Rolla, Mo.; Seventh corps area, contractors.

300 tons, Kingsley dam, Ogallala, Nebr.

297 tons, two railroad under-passes, Adams county, Colo., for state; bids Jan. 23.

243 tons, factory, Johnson Wax Co., Racine, Wis., Lockwood-Greene & Co., New York, engineers.

225 tons, factory building, Chicago Flexible Shaft Co., Chicago, Campbell-Lowrie-Lautermilch Corp., Chicago, contractors.

200 tons, plant, Rheem Mfg. Co., Chicago.

200 tons, garage building, Van Buren & Sherman, Chicago; bids Jan. 15.

185 tons, building, Gulf Oil Co., Boston.

163 tons, highway bridge 2070, Pulaski county, Indiana, Stuntz-Yeoman Co., Frankfort, Ind., low.

146 tons, two bridges, Bakersfield, Calif., for state; bids Feb. 5.

136 tons, highway bridge 2091, Putnam county, Indiana, R. McCalman Inc., Danville, Ill., low.

100 tons, store, Letter estate, Chicago.

100 tons, library, St. Olaf's college, Northfield, Minn.

100 tons, airplane motor test plant, Cleveland airport, Cleveland; R. P. Carbone, low on general contract.

Unstated, concrete bridge, Jackson county, and concrete siphons, Morrow county, Oreg.; bids to state highway commission, Portland, Jan. 21 and 22.

Tin Plate

Tin Plate Prices, Page 90

Pittsburgh—Mills are beginning to increase output slightly, with production estimated at 52 per cent. Cold mill activity has moved up somewhat, and shipments over the past week have been slightly better. Much of this is increased tonnage on general line and miscellaneous business. Buying for packers' needs during the coming season has not appeared in any appreciable volume.

Pig Iron

Pig Iron Prices, Page 92

Pittsburgh — Production is unchanged, with the supply situation easing somewhat. Coke supplies are more ample as each passing week brings additional beehive ovens into production. Work is progressing at a rapid rate on new by-product installations, many of which are expected to go into production before the end of the year.

Cleveland—Sales over the country as a whole at the higher price which went into effect several weeks ago run into six figures, it is learned here. Many producers still refuse to name a price, though several sell at price in effect at delivery. January shipments hold to the December level and in some cases pass it.

Chicago—Sales of pig iron continue at capacity and at the recently established price of $24 for No. 2 foundry. Some sellers are still booking small fill-in tonnages to regular customers at the former price of $1 a ton less; other sellers are booked up and out of the market. Practically no southern iron is coming into this area. As yet, price of northern charcoal iron has not been advanced, but a move in this direction would not be unexpected.

Boston—Pig iron sellers in many instances are rationing consumers on first quarter orders and shipments, keeping all foundries supplied. Load on merchant furnaces is heavier with foundry melt maintained. Numerous consumers, including those working on defense work, seek to get in supplies for two to three months, holding that inventory as a reserve. The Everett, Mass., furnace will remain in blast at least five weeks. It was originally scheduled to go out around Jan. 1.

New York—Pig iron specifications point to a more active month than December, which for most sellers was the best last year. Inventory has had little restrictive influence. In fact, one large seller reports that he has not had one request for deferred shipment for this reason. With the market generally $1 higher than at the close of last year and with sellers discouraging efforts of buyers to order second quarter tonnage even at prices ruling at time of delivery, the volume

of new business is relatively light.

Philadelphia—Pig iron inquiries are coming principally from small consumers seeking to supplement previous coverage or from buyers concerned over protection beyond this quarter. Sellers already are heavily booked for the ensuing three months and are not disposed to accept second quarter business. Shipments are at capacity and in some instances heavier than a month ago. The initial shipment of British coke received recently is reported satisfactory as to quality.

Buffalo—Covering by regular customers has taken practically all merchant iron available. While this coverage was at old prices, $1 a ton more is asked on what tonnage remains. Releases are pouring in against record backlogs but there are no delays in shipments.

Cincinnati—Shipments of pig iron are heavier than last month, in the eagerness of melters to get out all tonnage on contracts. This condition will level off next month, but stocks will likely carry through until next quarter when northern iron supplies, at least, will be freer by shifting of an Armco furnace to merchant output.

St. Louis—The pig iron price situation has not been entirely clarified, but some scattering sales are reported at the advance of $1. Heavy bookings in fourth quarter presumably provided for immediate requirements of most melters, and recent purchases have been to fill in. Shipments continue on a large scale, the movement so far this month being about equal to the similar period in December.

Scrap

Scrap Prices, Page 94

Pittsburgh—At the close of last week the scrap market was practically back to normal, with the key grade, No. 1 heavy melting steel, quotable at $21.50 to $22. There has been considerable buying by brokers to cover short sales and also mill interests, with several sources indicating willingness to makes sales at $22. Other grades, including blast furnace material, railroad specialties and cast iron, are being realigned on the same basis. The entire list shows a decline of approximately $1 on the average. It is expected that during this week normal conditions will again prevail at the new levels.

Cleveland—Continuing readjustments are being made in scrap to bring various grades in line with Washington stability requirements. Neither mills nor foundries appear interested but it is understood some consumers are approaching the day when new purchases will be imperative. Some foundries are said to be discussing plans for hand charging railroad material other than rails, due to diversion of rails to rerolling mills exclusively for the time being.

Chicago—Confused situation in the iron and steel scrap market here, following the government's efforts to reduce prices, has been partially cleared up with mill sales at $20 for No. 1 heavy melting steel. This is $1 a ton below the $21 top reached recently. All other steelmaking grades have been reduced proportionately. Trading still is practically at a standstill, pending further clarification, although brokers are paying $19.50 top for material from dealers. In the absence of sales information, prices on foundry scrap and specialties are not re-established on a new level and several days may pass before the air clears.

Boston—Borings and turnings and several other grades are off $1, but absence of trading offers little test of prices. Efforts to lower cast grades are meeting resistance. All active grades for export are lower but buying is light. Lower prices being quoted on steelmaking grades are still above the $20, Pittsburgh, level for No. 1 heavy melting steel.

New York—While prices have been lowered on numerous grades $1 to $1.50 per ton, the situation is far from clarified and consumers covered for immediate needs are generally marking time. Based on the government proposal for a Pittsburgh delivered price of $20 per ton for No. 1 heavy melting steel further reductions would appear likely. Some buying by consumers for delivery in the East have been done at that figure. Cast grades for nearby delivery are off $1, and machine shop turnings, stove plate and machinery cast are lower.

Philadelphia—The scrap market is still unsettled, with some prices nominal as buyers await clarification of the move to scale down quotations. Brokers have made a further 50-cent cut in the principal steelmaking grades, lowering No. 1 heavy melting steel to $20 to $20.50.

Buffalo—While leading mill consumers remain on the sidelines, dealers have cut scrap prices $2 to $2.50 a ton from recent levels. With the result of government pressure for lower prices obviously reflected, dealers are paying $21 to $21.50 a ton for No. 1 heavy melting at their yards. Regardless of present prices dealers announce contracts were being completed on the basis drawn up.

Detroit—Most scrap grades, with the exception of cast varieties, have receded from 25 cents to $1 per ton in the face of government pressure and the arbitrary lowering of buy-

ing prices by $2 per ton on the part of a leading consumer here. Heavy melting steel is off 50 cents, as are compressed sheets, loose clippings, borings and turnings, short steel rails and forge flashings. Busheling and low-phosphorus punchings are lower by $1 per ton. Lower priced items such as machine shop turnings are quoted only 25 cents a ton lower.

Cincinnati — Prices on iron and steel scrap have been arbitrarily reduced $1 a ton. Strong influences were exerted in the district to clear the tangled situation. Material was offered to mills at the new prices, and considerable dealer material released. Trading is less active.

St. Louis — Trading, other than covering by dealers on contracts, is virtually at a standstill. Consumers are purchasing virtually nothing and will probably not make commitments until able to determine the course of events.

Birmingham, Ala.—While still in an uncertain position, the scrap market has clarified to the point where heavy melting steel has been sold at $18, delivered.

Warehouse

Warehouse Prices, Page 93

Pittsburgh—Warehouse buying is heavy, with sellers a little more wary since mill supplies have been cut down. Stocks at the close of December were about the same as at the end of November, but it appears that the total will be somewhat lower by the end of this month.

Cleveland—Jobbers still sell at a faster rate than they take in steel from mills. They give credit to mills for fulfilling promises as to quantities and shipment dates, but wish they had ordered larger quantities originally. Holes in stocks are becoming wider. Cleveland jobbers have followed other districts in raising hot and cold-rolled sheets and strips $4 per ton, a belated adjustment to higher mill prices of last spring.

Chicago—Warehouse orders last week exceeded those for the first week, indicating that business is definitely on the upgrade after the year-end easing and inventory taking. Warehouses have not yet suffered from extended mill deliveries, but are covering requirements farther ahead to be assured of adequate stocks.

Philadelphia — Warehouse buying continues to tax distributors, with some departments working overtime. While some delays are encountered in mill shipments, stocks are in fairly good condition as a result of previous anticipatory buying. Prices are unchanged.

Buffalo—Warehouses have raised prices on hot-rolled sheets $4 a ton to 3.25c and hot-rolled strip, hoops and bands the same amount to 3.82c. Brisk buying holds at the peak.

Cincinnati — Warehouse tonnage, in consideration of present sales activity, may be greater this month than in December. Prices on sheets are slated for a $4 a ton increase, in reflection of a delayed adjustment to mill action last spring.

Detroit—Warehouse sales hold to the high level set during the last quarter of 1940 and the outlook is for maintenance of this pace. Stocks are reasonably good. Study is being given to the possible effect of priorities on steel purchases. Unconfirmed report is heard that one mill announced no promises can be made on shipments after Jan. 25, because of possible incidence of priorities at that time.

Iron Ore

Iron Ore Prices, Page 94

Cleveland—Weather being favorable, it is indicated that iron ore shipments down the Great Lakes will start out with a rush at the opening of the 1941 season in the interest of the national defense program. Ore is to have full right of way over other commodities. Predictions are made that 70,000,000 to 75,000,000 gross tons will have been shipped for the entire season, which would exceed the 1929 record by 5,000,000 to 10,000,000 tons. The industry expects only 11,000,000 tons at lower lake docks and furnace yards May 1.

A break-down of 1940 shipments of Lake Superior iron ore by grades, cargo bill-of-lading weights, has been compiled by the Lake Superior Iron Ore association, Cleveland. For United States ranges total non-bessemer ore shipped was 47,428,154 tons, out of the total of 62,719,309 tons; from Canadian ranges 356,613 tons of bessemer were shipped, the second successive season for Canadian listings after several years absence; the grand total was therefore 63,075,922 tons.

A study by ranges reveals that from the United States Mesaba led preponderantly with 44,829,933 tons out of the total of 62,719,309 tons.

LAKE SUPERIOR IRON ORE SHIPMENTS, 1940

By Ranges

U. S. Ranges	Gross Tons
Mesaba	44,829,988
Vermilion	1,452,303
Cuyuna	1,707,908
Gogebic	5,908,538
Marquette	5,690,288
Menominee	3,130,284
Total U. S. ranges	62,719,309
Canadian	
Michipicoten	356,613
Grand total	63,075,922

By Grades

U. S. Ranges	Gross Tons
Non-Bessemer	47,428,154
Bessemer	12,885,181
Manganiferous	1,797,342
Siliceous	608,632
Total U. S. ranges	62,719,309
Canadian	
Bessemer	356,613
Grand total	63,075,922

Iron ore output in the United States in 1940 was 73,806,000 gross tons, an increase of 43 per cent over 1939, according to a preliminary estimate of the bureau of mines. Except for 1916 and 1917 the output in 1940 was largest on record. Shipped from mines was 74,969,000

tons, valued at $191,734,000, a gain of 37 per cent in quantity and 21 per cent in value over 1939. By districts, ore mined last year was as follows: Lake Superior, 61,808,000 tons; southeastern states, 7,239,000 tons; northeastern states, 3,547,000 tons; western states, 1,212,000 tons.

Steel in Europe

Foreign Steel Prices, Page 93

London—(*By Cable*)—The pig iron situation in Great Britain is satisfactory except for tightness in supplies of hematite. Steelworks order books are filled for three months, government departments taking most steel supplies, especially sheets and light structurals. Shipbuilding requirements are increasing further. Special steel is in heavy demand. Light castings makers are busier. Tin plate exports are being maintained.

Mirrors of Motordom

(*Concluded from Page 38*)

over 1939, and in five months of the 1941 model season the company has shipped to distributors a volume of cars amounting to 53 per cent of the entire 1940 model production.

Willys-Overland in Toledo, O., now has better than $18,000,000 worth of defense orders on books and during this month and next is installing $2,000,000 worth of manufacturing equipment. List of orders included $6,000,000 in shells and shell hoists for the navy, $9,000,000 in shells for artillery divisions, $2,000,000 in machine gun parts for the navy, $1,500,000 in small reconnaissance cars and $75,000 in forgings for British trucks. Active production will not start until March.

By March 1, army trailers will be coming from production lines at the Racine, Wis., plant of the Nash-Kelvinator Corp. Three million dollar order has been placed. Chrysler has received a new order for 10,419 trucks for the army, bringing to 57,700 the number of units ordered in the past year from United States and Canadian plants of Chrysler.

Nonferrous Metals

New York — More direct control over nonferrous metals is being exercised by the government and further extension of the control appears likely. The government has practiced indirect control over the domestic copper price since last September, holding the producers' price at 12.00c, and has required licenses for the exportation of copper, brass, bronze, zinc and aluminum. Secondary ingot producers, metal scrap dealers and national defense officials are considering means now of bringing scrap prices into line with the virgin markets, especially zinc and aluminum. The probability of official priorities on zinc and copper sales is increasing.

Copper—Amount of copper which can be produced at the present 12-cent level apparently is inadequate

Nonferrous Metal Prices

Jan.	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
11	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
13	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
14	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
15	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
16	12.00	12.00	12.12½	50.10	50.10	5.50	5.35	7.25	17.00	14.00	35.00
17	12.00	12.00	12.12½	50.15	50.10	5.50	5.35	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	8.75
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	8.00-8.25
Cleveland	9.50-9.75
Chicago	8.62½-8.87½
St. Louis	8.37½-8.50

Heavy Copper and Wire

New York, No. 1	9.62½-9.87½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	9.75-10.00
St. Louis	9.62½-9.75

Composition Brass Turnings

New York	7.62½-7.87½

Light Copper

New York	7.62½-7.87½
Cleveland	8.00-8.25
Chicago	7.75-8.00
St. Louis	7.62½-7.75

Light Brass

Cleveland	5.00-5.50
Chicago	5.87½-6.12½
St. Louis	5.00-5.25

Lead

New York	4.60-4.70
Cleveland	4.50-4.75
Chicago	4.50-5.00
St. Louis	4.25-4.50

Zinc

New York	5.50-5.75
Cleveland	5.00
St. Louis	4.50-4.75

Aluminum

Mis., cast, Cleveland	11.00-12.00
Borings, Cleveland	8.00
Clips, soft, Cleveland	14.75-15.00
Misc. cast, St. Louis	11.00-11.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.25
Standard No. 12 aluminum	16.50-17.00

to meet anticipated defense and normal needs over the next several months. At least part of this deficiency will be met by importing larger tonnages of foreign copper, as indicated by the fact that the navy department stated in its inquiry for metal on which bids will be opened Jan. 22 that "if you cannot furnish this material of domestic origin, bids will be considered on copper from foreign sources."

Lead—Producers welcomed an opportunity last week to accumulate some reserves, although sales for the period were moderate and larger than expected. The market tone firmed due to a rise in the Mexican refined lead price. Approximately 30,000 tons of Mexican lead is available to users here monthly but imports have averaged only about 10,000 tons.

Zinc—Stocks have been reduced to a minimum and, therefore, sales and output soon must balance. Shortage of available stocks continues and likely will force a readjustment in scrap zinc prices and bring about official priorities.

Tin—Straits spot advanced on Friday to 50.15c following a prolonged period of steadiness at 50.10c. Reserves in this country are being accumulated steadily as imports exceed consumption.

Construction and Enterprise

Ohio

ASHLAND, O.—Ashland Malleable Co., W. Firestone, manager, has taken temporary quarters for foundry core room operations, pending rebuilding of burned core building.

CLEVELAND—Cleveland Sheet Metal & Engineering Co., 1928 West Seventy-fourth street, will build a one-story plant addition 20 x 120 feet, costing about $6000. Frank T. Kovar is president.

■ **Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 100 and Reinforcing Bars Pending on page 102 of this issue.**

CLEVELAND—Forest City Foundry Co., 2500 West Twenty-seventh street, will build storage building 2½ stories, 44 x 75 feet, which will release additional production space in main plant.

CLEVELAND — Chesapeake & Ohio railroad, G. O. Beale, chief purchasing officer, Midland building, asks bids, due Jan. 29, for an allsteel car float 370 feet long, 50 feet wide.

CLEVELAND—Thompson Products Co., 2196 Clarkwood road, Frederick C. Crawford, president, will treble or quadruple its manufacturing facilities for production of aircraft engine valves, fuel pumps and automotive parts. Site of about 100 acres is being purchased in Euclid, O., and plant costing $15,000,000 to $20,000,000 will be erected, financed through Defense Plant Corp.

CLEVELAND — Cleveland Pneumatic Tool Co., 3734 East Seventy-eighth street, will add two plant buildings with 80,000 square feet floor space, part of building program to cost $500,000. Louis W. Greve is president.

CLEVELAND—Aircraft Fittings Co., has bought plant and equipment of Star Products Co., 15105 Darwin avenue, manufacturer of valves, valve springs, tappets, cotter pins and other automotive products. No new construction will be undertaken at present.

CLEVELAND—Parker Appliance Co., Arthur L. Parker, president, has ordered new equipment for addition to Euclon building, 17325 Euclid avenue. Addition will cover about 18,400 square feet and cost about $30,000.

CLEVELAND — Metal Concentrating Co., Louis Feldman, president, has perfected method of concentrating metals from their compounds and has obtained plant location at 4832 Ridge avenue for operations.

CLEVELAND—Steel Improvement & Forge Co., 960 Addison road, will build an office and laboratory building, following completion of boiler plant and manufacturing additions. Laboratory will be 80 x 140 feet and office building 41 x 94 feet. Charles H. Smith is president and treasurer. J. L. Hunting Co., Ninth-Chester building has general contract.

CLEVELAND—Steel & Tubes Inc., 224 East 131st street, division of Republic Steel Corp., will build crane runway after work of raising roof is completed. William C. Vogenberger of the company's engineering department is taking bids on remodeling work.

DAYTON, O.—Lear Avia Inc., W. P. Lear, president, will build a plant for manufacture of airplane navigation instruments, costing about $300,000.

MARSHALLTOWN, O.—Village, V. H. Potter, clerk, asks bids, due Jan. 24 on a 75,000-gallon water tank on steel tower. Paul W. Elwell, 5005 Euclid avenue, Cleveland, is consulting engineer.

TORONTO, O. — Ohio Edison Co., Youngstown, O., plans extension of its power plant here, including a 35,000-kw. generator and auxiliaries and extension of transmission lines.

YOUNGSTOWN, O.—United Engineering & Foundry Co., 219 South Phelps street, is building a machine shop addition to cost $100,000 or more.

Connecticut

BRIDGEPORT, CONN.—United Illuminating Co., 1115 Broad street, has let general contract to Gellatly Construction Co., 25 Housatonic avenue, for a brick and steel switch house on East Main street, at cost of about $100,000. Westcott & Mapes Inc., 139 Orange street, New Haven, Conn., are engineers. (Noted Dec. 9.)

SOUTH MERIDEN, CONN.—Chandler-Evans Co., Evansville avenue, manufacturer of aircraft parts, is building three one-story additions to increase capacity. Austin Co., Cleveland, is engineer.

Massachusetts

SOUTHBRIDGE, MASS.—American Optical Co., 14 Mechanic street, has let contract for a two-story plant addition 65 x 94 and 35 x 150 feet to F. X. Laliberte & Son Inc., Central street, to cost about $67,000.

Rhode Island

PROVIDENCE, R. I.—Builders' Iron Foundry Inc., 9 Codding street, is building an addition, one story, 45 x 61 feet, at cost of about $8000.

PROVIDENCE, R. I.—Textile Finishing Machinery Co., H. A. DuVillard, manager.

Sims avenue, has let a general contract for a one-story 100 x 200 and 20 x 40-foot manufacturing building and trimming shop to Brooks Skinner Co., 662 Adams street, Quincy, Mass. Cost estimated at $45,000.

WOONSOCKET, R. I.—Taft-Peirce Mfg. Co. will build a plant addition costing $400,000, war department amortizing in five years.

Vermont

SPRINGFIELD, VT.—Bryant Chucking Grinder Co. has letters of intent from war department authorizing a plant expansion to manufacture defense products.

New York

ELMIRA, N. Y.—Eclipse Machine division of Bendix Aviation Corp., Eighteenth street and Oakwood avenue, has let contract to Henry A. Streeter Corp., 608 William street, for a plant addition superstructure to cost $500,000.

FARMINGDALE, L. I.—Liberty Aircraft Products Corp., has let general contract to Brown & Matthews Inc., engineer and contractor, New York, for a one-story 202 x 297 foot manufacturing plant, including boiler plant, for production of airplane parts, including engine parts and tail and wing services.

JAMESTOWN, N. Y.—Crescent Tool Co., 200 Harrison street, M. Peterson in charge, has let general contract for a one-story addition 50 x 135 feet, for heat treating shop, to J. M. Benzinger, 121 West Fourth street, to cost about $40,000, with equipment. (Noted Jan. 6.)

NIAGARA FALLS, N. Y.—National Carbon Co. Inc., Highland avenue, has let general contract to DuHamel Construction Co., Citizens' building, Cleveland, for a one-story addition 70 x 400 feet, costing about $100,000.

New Jersey

ELIZABETH, N. J.—Elizabethtown Consolidated Gas Co., 16 West Jersey street, plans construction of a gas generating station to cost $100,000, including equipment.

Pennsylvania

JENKINTOWN, PA.—Standard Pressed Steel Co., Stewart avenue, has let general contract for 75 x 120 and 75 x 145-foot additions to Townsend, Schroeder & Wood Inc., 1700 Sansom street, Philadelphia, to cost about $60,000.

Michigan

BENTON HARBOR, MICH.—Benton Harbor Malleable Industries Inc., Graham avenue, will build a foundry unit 46 x 130 feet, allsteel construction.

DETROIT—Bohn Aluminum & Brass Corp., East Grand boulevard, has let general contract to Krieghoff Co., Detroit, for a plant addition. Buckheit & Stuchell, Detroit, are architects.

DETROIT—Accurate Foundry Co., 6401 Miller Road, has been incorporated with $10,000 capital to manufacture nonferrous metal castings, by Gerard A. Racine, 1351 East Grand boulevard, Detroit.

DETROIT—Briggs Mfg. Co., Vernor highway, has let contract for a $15,000 plant addition to Barton-Malow Co., Detroit.

DETROIT—Commonwealth Brass Corp. will build a one-story plant addition 90 x 135 feet. H. E. Beyster Corp., Detroit, is architect.

GRAND RAPIDS, MICH.—Blackmer Pump Co., N. J. Harkness, executive vice president, will build addition to plant and office building, part of general program of expansion. Addition will double space of engineering department and add to offices, testing and production departments.

JACKSON, MICH.—Michigan Metal Abrasives Co., recently organized by M. I. Lutz, Jackson, and associates, is building its first unit of an eventual three or four, for cleaning castings by a new process, developed by E. L. Beisel, Cleveland.

KALAMAZOO, MICH.—Hoover Tool & Mfg. Co., Edward Van Dalson, president, is building a two-story plant at Palmer avenue and Fulford street to house onlarged activities in filling defense contracts.

Illinois

CHICAGO—Rheem Mfg. Co., 3425 South Kedzie avenue, manufacturer of steel barrels, drums, boilers, pails and shipping containers, is preparing to build a second plant on 40 acres on Kedzie avenue between Seventy-fifth and Seventy-seventh street, two one-story buildings, each 150 x 500 feet, costing about $350,000 and equipment an additional $150,000.

CHICAGO—Armstrong, Bray & Co., 308 North Loomis street, has bought a site at North Menard avenue and Northwest highway and will build a one-story machine shop costing $45,000, with equipment.

CHICAGO—Curtis Lighting Inc., 1123 West Jackson boulevard, will build new plant at 6135 West Sixty-fifth street, costing about $275,000 with equipment. Plant will be one story, monitor line-production type, 100,000 square feet, increasing production 30 to 50 per cent. Product is commercial and industrial lighting equipment.

CHICAGO—Chicago Foundry Co., 2028 North Major avenue, manufacturer of light gray iron castings, is building a one-story foundry addition 17 x 100 feet.

CHICAGO—Passman Bros Inc., 705 West Washington street, dealer in transmissions, machinery and new and used factory equipment has bought new location at Lake and Aberdeen streets, six, two and one stories, more than doubling present facilities.

CHICAGO—Lion Mfg. Co., 2640 Belmont avenue, manufacturer of coin machines, plans an addition 100 x 100 feet and will install new equipment. Addition brings company's space to 70,000 square feet.

LA GRANGE, ILL.—Electro-Motive Corp., subsidiary of General Motors Corp., will build fifth addition of 90,000 square feet, one story, 250 x 350 feet, costing about $300,000.

ROCKFORD, ILL.—Woodward Governor Co., 216 Mill street, is building a one-story addition 90 x 390 and 220 x 226 feet, to cost about $200,000. Harza Engineering Co., 208 West Wacker drive, Chicago, is engineer. (Noted Jan. 6.)

ST. ELMO, ILL.—Council is considering construction of a municipal power plant with diesel engine-generator and auxiliaries. A survey is being made by Engineering Service Corp., Decatur, Ill.

Indiana

EAST CHICAGO, IND. — Standard Forgings Corp., manufacturer of railroad car axles and drop forgings, is remodeling an unused building and will install equipment for production of shells on $624,000 contract for government.

Maryland

AMCELLE, MD.—Celanese Corp. of America Inc., 180 Madison avenue, New York, manufacturer of rayon products is building a two-story addition costing $275,000.

Georgia

ATLANTA, GA.—Patent Scaffolding Co., P. J. Burns, president, 44 Haynes street, plans plant addition 170 x 200 feet.

Mississippi

HINTONVILLE, MISS.—Resor Tung Plantations, Chicago, has plans for tung oil extraction plant on 40-acre site, first unit to cost $75,000, capacity 40 to 50 tons tung nuts daily. H. L. Vickers is project superintendent.

Tennessee

COPPERHILL, TENN.—Tennessee Cop-

per Co., 61 Broadway, New York, will build sulphuric acid plant at Isabella, Tenn., with capacity of 250 tons daily of 100 per cent contact acid.

MILAN, TENN.—War department has awarded contract for ammunition loading plant in conjunction with Wolf Creek ordnance project on 21,000-acre site near here to Procter & Gamble Defense Corp., Gwynne building, Cincinnati, at $24,720,000.

West Virginia

WEIRTON, W. VA.—Weirton Steel Co., T. E. Millsop, president, is completing plans for $10,000,000 expansion, including blast furnace and 60 coke ovens.

Virginia

NEWPORT NEWS, VA.—Newport News Shipbuilding & Dry Dock Co. has organized North Carolina Shipbuilding Co. as a subsidiary and is negotiating for a shipyard site at Wilmington, N. C., for construction of 25 ships for the maritime commission, its share of 200 vessels awarded by the commission.

Missouri

ST. LOUIS—Atlas Tool & Mfg. Co., 5145 Natural Bridge avenue, has awarded general contract to Wm. H. & Nelson Cunliffe Co., 3320 Lindell boulevard, for a two-story plant addition 90 x 109 feet, costing about $40,000, from plans by George Neff, 2230 Lindell boulevard.

ST. LOUIS—Brass & Copper Sales Co., 2817 Laclede avenue, has given general contract to Wm. H. & Nelson Cunliffe Co., 3320 Lindell boulevard, for one-story brick plant addition, 39 x 83 feet, costing about $10,000.

Wisconsin

MILWAUKEE—Ampco Metal Inc., 1745 South Thirty-eighth street, has let general contract to Keierleber Construction Co. for a foundry addition 164 x 310 feet, partly double deck, containing 76,620 square feet floor space. Cost will be $140,000, exclusive of equipment.

California

LOS ANGELES—Seaboard Coil Spring Co., 435 East Washington boulevard, has awarded general contract for brick and concrete plant, 50 x 150 feet, to cost about $9000.

LOS ANGELES—Tool & Die Design Co., has been organized by Eugene E. James, 350 West Slauson avenue.

LOS ANGELES—United Aviation Inc. has been incorporated with $75,000 capital and is represented by Bertrand Rhine, Citizens National Bank building, Los Angeles.

LOS ANGELES—Technical Aircraft Corp. has been incorporated with 2500 shares no par value. Represented by Hansen & Sweeney, 433 South Spring street, Los Angeles.

Oregon

PENDLETON, OREG.—War department has allocated $1,594,000 for development of municipal airport into air corps station with facilities for housing 2300 men.

PORTLAND, OREG.—Albina Engine & Machine Works, which built 19 large ships in World war, apparently is low to maritime commission for five twin-screw navy tankers. New shipways and expansion of plant will follow award.

Washington

SEATTLE—General Construction Co. has been given general contract for additional units for Seattle-Tacoma Shipbuilding Co., including steel acetylene shop, addition to fabricating shop, etc.

SEATTLE—General Construction Co. has award for army air base in Snohomish county, Wash., including barracks, warehouses, magazines, storage tanks, utility and repair shops and water and sewer systems, at cost of about $1,280,000.

VANCOUVER, WASH.—General Chemical Co. of America has bought 12½-acre site and will build plant.

Canada

CALGARY, ALTA.—Calgary Power Co. has received permission to build dam and power plant at Lake Minnewanka and contracts will be let immediately. Will provide 23,000 horsepower and will be completed in fall of 1941.

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., Depew street, has given general contract to Canadian Engineering & Contracting Co. Ltd., 25 Hughson street, for a plant addition costing $150,000. Prack & Prack, 36 James street South, are architects.

LEASIDE, ONT.—Sangamo Electric Co. Ltd., 183 George street, Toronto, has let general contract to Anglin-Norcross Ontario Ltd., 57 Bloor street West, for a one-story addition 120 x 150 feet, to cost about $150,000.

LONDON, ONT.—Department of munitions and supply, Ottawa, Ont., Q. H. Turnbull, acting secretary, will erect three additional buildings at the central mechanical depot here, one 300 x 1000 feet and two 300 x 700 feet. Russell Construction Co. Ltd., Harbour Commissioners building, Toronto, general contractors.

OWEN SOUND, ONT.—William Kennedy & Sons Ltd., First avenue West, J. D. Kennedy manager, plans to build new factory near present plant, one story, 40 x 200 feet. Company manufactures castings, machinery and tools. Cost is estimated at about $75,000.

PORT ARTHUR, ONT.—Port Arthur Shipbuilding Co. Ltd., will rebuild immediately part of plant burned in December, at cost of about $50,000. G. McDougall is general manager.

ST. CATHARINES, ONT.—Engineering Tool & Forgings Ltd., 30 Woodburn street, has given general contract to J. R. Stork, P. O. Box 281, for one-story plant 48 x 72 feet, to cost about $75,000.

TORONTO, ONT.—Dufferin Shipbuilding Co. Ltd., Fleet and Bathurst streets, is taking bids for superstructure for $40,000 plant addition through C. G. Maclean, 9 Sultan street.

TORONTO, ONT.—Flexible Shaft Co., 321 Weston road, manufacturer of shafting and other steel products, will build $50,000 plant addition.

TORONTO, ONT.—Canadian Acme Screw & Gear Co., 207 Weston road, is planning further plant additions, including propane tank and other equipment, to cost about $26,000.

TORONTO, ONT.—Canadian Aircraft Instruments & Accessories Ltd. has leased premises at Bloor and Balmuto streets and will install equipment.

DARTMOUTH, N. S.—Department of munitions and supply, Ottawa, Ont., has given general contract to Atlantic Construction Co., Roy building, for erection of aircraft and overhauling base, to cost $150,000. Ross & MacDonald, 1010 St. Catharines street, Montreal, Que., are architects.

COTEAU LANDING, QUE.—Aluminum Co. of Canada Ltd., Sun Life building, 1153 Metcalfe street, Montreal, will build a new plant here, to cost about $250,000.

MONTREAL, QUE.—Robert Mitchell Co. Ltd., 750 Bellair avenue, machinery and tools, has given general contract to Anglin Norcross Corp. Ltd., 892 Sherbrooke street West, for a $30,000 plant addition.

MONTREAL, QUE.—Montreal Locomotive Works, Longue Pointe, has awarded reinforcing steel contract to Truscon Steel Co. of Canada Ltd., 3 Place Viger, for plant addition to cost about $5,000,000. T. Pringle & Son Ltd., 485 McGill street, are engineers.

QUEBEC, QUE.—Dominion department of defense, Ottawa, J. L. Ralston, minister, will spend $250,000 on erection of munitions plant here.

THREE RIVERS, QUE.—Canada Iron Foundries Ltd., St. Maurice street, will build a $25,000 plant addition, general contract to Joseph Renaud, 145 Laviolette street.

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MACHINE WORK

For the Following Tools:

2—42" Bullard Boring Mills
2—Super Radial Drills
4—Warner & Swasey and Gisholt Turret Lathes
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3—Monarch and American Engine Lathes
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1000 KW Westinghouse 250 v. DC 6 ph. pedestal type with DC Panel and Transformers for 22,000 v.—4000 v. 2300 v. 3 ph. 60 cy. Reconditioned. Prompt shipment.

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STEAM DROP HAMMER

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POST MILL, 6-1/2" bar Niles, R.P.T., M.D
DIE SINKERS, E-3 and E-4 Keller, M.D.
HAMMER, Bd. Drop, 2000 lb. Chambersburg
GEAR CUTTERS, (2) 84" Newark, M.D.
PRESS, Stoll 79-D, Bed 72"x26", M.D.
PLATE SHEAR, 10' x 3/8" United, M.D.

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MECHANICAL ENGINEER, NOW EMployed, wants executive position as Chief or Plant Engineer with industrial concern. College graduate, 25 years experience in steel and allied industries. Address Box 255, STEEL, Penton Bldg., Cleveland.

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MECHANICAL ENGINEER & EXECUTIVE seeks connection with Southwest steel and iron manufacturing concern. Experienced in casting production, with own designs of successful machines and presses, for use in general trade or ordnance uses. Address O. B. R., Box 836-A, Rt. 2, Escondido, Calif.

CHEMICAL AND METALLURGICAL POSItion wanted: Twenty years' Mill and Laboratory experience with Carbon and alloy steels. Married, now employed. Excellent references. Address Box 387, STEEL, Penton Bldg., Cleveland.

OPEN HEARTH OR STEEL PLANT EXecutive with actual melting experience in manufacture of basic and acid open hearth steels, killed and rimming grades, carbon and alloy, top cast and bottom cast, ordnance steels, particularly large ingots, foundry experience, valuable plant research, chemical and physical laboratories, varied steel plant training. Address Box 399, STEEL, Penton Bldg., Cleveland.

MANUFACTURING AND SALES EXECUtive; capable engineer, twenty-five years practical and executive experience in metals industry will negotiate with principals of reliable company for position as General Manager or Assistant to the President. Age; 45. Dependable and Aggressive. Address Box 400, STEEL, Penton Bldg., Cleveland.

POSITION WANTED

Attorney. Practical experience personnel, labor relations and compensation laws. Exclusive services available. Understanding labor relations essential in expanding industrial production. Pennsylvania area preferred. Highest references. Address Box 402, STEEL, Penton Bldg., Cleveland.

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MACHINE SHOP
FOR SALE OR LONG TERM LEASE

7 lathes, 3 milling machines, 2 planers, 1 radial drill, 2 drill presses, 1 shaper, 1 gear cutter, 1 power hammer and 2 cut off hack saws all belted to line shafts with 2 electric motors and ready to be operated. Many inquiries for product are on hand at the present time.

Shop is situated adjacent to a siding of the Rutland R. R. in a small Vermont town and can be seen by appointment only. No brokers considered. Sale price $15,000, one-third of which can be left on first mortgage and $10,000 in cash. Address replies to Ernest M. Wheatley, 16 Center St., Bristol, Conn.

FOR SALE

Large machine shop, foundry, forge shop, one thousand ton marine railway. Main building contains 24,000 square feet floor space. There is 735 feet water frontage on St. Mary's River in city limits of Sault Ste. Marie, Michigan. Present owners in business over fifty years and desire to retire. Address inquiries to Fred S. Case, First National Bank, Sault Ste. Marie.

Help Wanted

DESIGNERS & ENGINEERS

Squad leaders, checkers, designers, computers for design of 350,000 ton annual capacity steel plant.

PLANT LAYOUT:

Experienced in any one or more of the following: boiler or power house; blast furnace blowing equipment; steel plant pumping stations; rolling mill equipment such as motor rooms, storage yards; rolling mill auxiliaries for blooming; hot strip, cold sheet, universal plate and tin mills; rail and structural accessories. General plant shops such as machine, electrical, pattern, forge, etc., also general steel mill buildings such as office, laboratories, etc., and transportation and sewer systems.

CONCRETE AND STRUCTURAL STEEL:

Experienced in any one or more of the following: general steel mill buildings, intricate reinforced concrete structures such as machinery and building foundations, steel and concrete trestles, etc.

MECHANICAL:

Experienced in any one or more of the following: general steel plant piping such as water, steam, air systems for rolling mills, power house, pumping stations, etc.

ELECTRICAL:

Experienced in any one or more of the following: general power plant such as overhead and underground distribution systems, switchboards, lighting, etc.

TECHNICAL ASSISTANTS:

Experienced in general computation such as calculating distribution of utilities and materials, determination of flow diagrams for power, fuel, water, compressed air, steam, etc. Preparation of specifications and economic study of steel plant equipment and operation.

IN REPLYING:

Give full particulars in first letter, qualifications, past experience in detail and date available. Write to ARTHUR G. MCKEE & COMPANY, CLEVELAND, OHIO. Attention: Stephen Derry, Employment Director.

Help Wanted

EXPERIENCED HEAVY FORGER AND blacksmith. Opening in large California Plant, best of climate and working conditions. Steady work. Good wages. Age under 45. Experience required in crankshaft, straight shaft and general light forgings, alloy and carbon steels. Address Box 389, STEEL, Penton Bldg., Cleveland.

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STRUCTURAL STEEL DESIGNER AND ENGINEER wanted by large fabricator. Must be thoroughly experienced and accurate. Give full information on training, experience and compensation received in first letter. Address Box 404, STEEL, Penton Bldg., Cleveland.

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Experienced in precision production work, consisting mostly of Warner & Swasey, hand screw, milling machines and drill presses; by company in Detroit vicinity established for 25 years. Address Box 403, STEEL, Penton Bldg., Cleveland.

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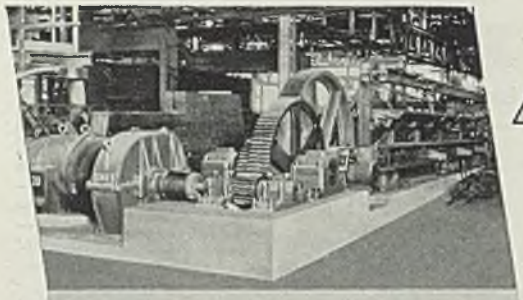
ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

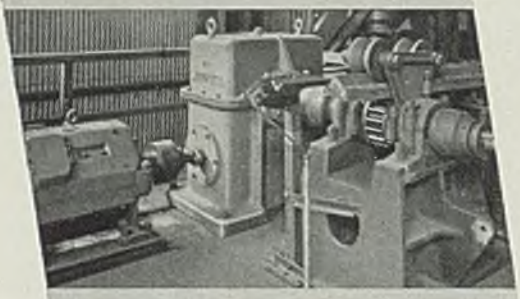
◆ ◆ ADVERTISING INDEX ◆ ◆

Where-to-Buy Products Index carried in first issue of month.

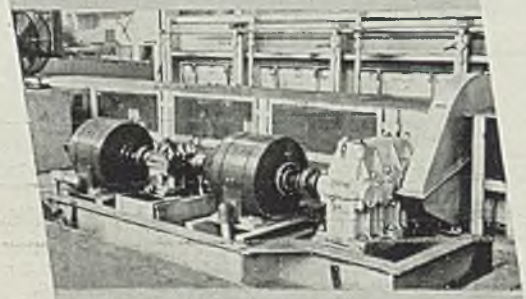
KEEP GOING with Jones



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



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



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

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

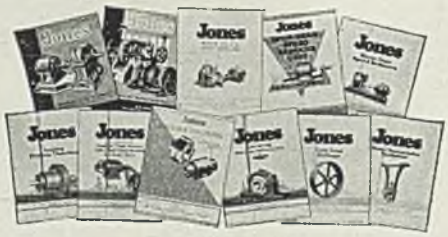
Jones Herringbone Reducer operating sheet mill tilting drive on feeder table.

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

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

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

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



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

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

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