STEEL

ESTABLISHED 1882

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Volume 107—No. 26 December 23, 1940

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PRODUCTION • PROCESSING • DISTRIBUTION • USE

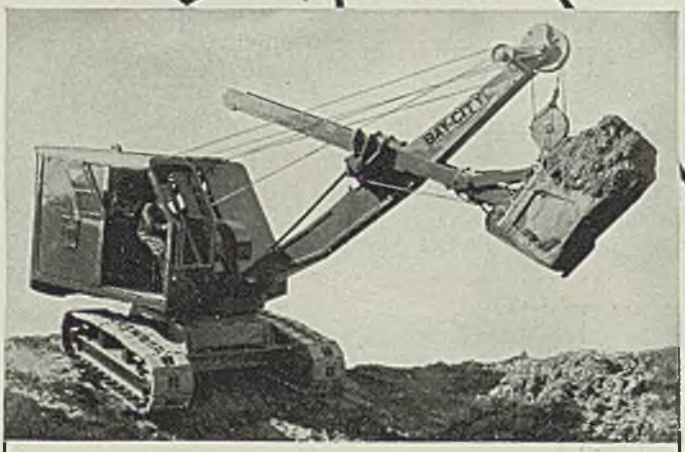
MORE STRENGTH TO MEET STRESS...

50 *places in a power shovel...*

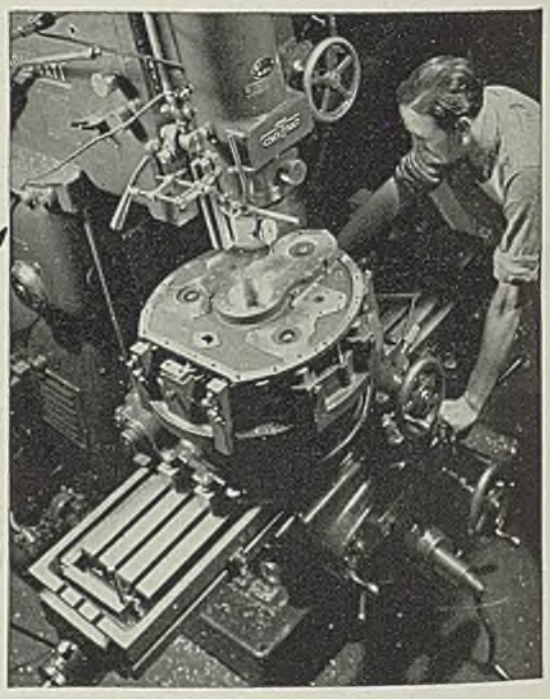
85 *places in a rock drill...*

275 *places in a milling machine*

NICKEL ALLOY STEELS



Measured by weight, nearly ⅓ of this Bay City power shovel is fabricated from long-wearing Nickel alloy steels. 50 vital parts which must withstand fatigue strains, shock stress and overloads are made of SAE 3135 oil quenched Nickel-chromium steel and other Nickel alloy steels. Frames and bases are Nickel cast steel. "Chabelco" crawler drive chains, Diamond crowd chain, Hercules gasoline and Caterpillar Diesel engines on Bay City shovels also employ high strength Nickel alloy steels for important stressed components.



More than 275 stressed parts in this dial type Cincinnati milling machine are Nickel alloy steels. Nearly 200 of these parts are made of a Nickel-chromium steel, heat treated to high strength yet readily machinable. Parts subject to wear are case-hardened.

Here are five Gardner-Denver rock drills mounted for tunnel driving. In each drill, 85 stressed parts are produced from Nickel alloy steels. The Gardner-Denver Co. writes, "Through increased use of Nickel alloy steels, remarkable improvements in performance and reduction in maintenance costs have been accomplished—without comparable increase in weight or bulk."

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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

HIGHLIGHTING THIS ISSUE

■ STEEL production last week (p. 19) again fell off half a point to 95 per cent of ingot capacity. This resulted from the need for repairing equipment. The industry continues to strain in order to get out as much steel as possible. Incoming orders are estimated (p. 77) as being at a rate equal to 140 per cent of production, so that deliveries continue to extend further into the future. Particularly where alloy steels are involved demand is increasing. . . . Steel's leaders continue to declare (pp. 16 and 27) that existing capacity is sufficient. Nevertheless, National Steel Corp. (p. 16) will expand its pig iron capacity.

• • •

Representatives of the steel industry last week warned the price stabilization division of the national defense advisory council (p. 16) that the industry cannot continue to sell steel at present prices if prices on scrap and other raw materials continue to go up. This subject is slated for further investigation. . . . First important application of the new policy of paying for British war requirements out of the United States treasury—Britain to repay "in kind" at a later date—is seen in an order for sixty 10,000-ton freighters (p. 19) to be built by Todd Shipyards Corp. in new yards to be constructed immediately. . . . Unusual market situation: Higher prices now are being paid for scrap (p. 77) than for pig iron.

Ships for Britain

• • •

President Roosevelt says that two or three cases that come under the "draft industry" provision of the selective service act now (p. 18) are being investigated. . . . Agitation for speedier execution of the defense program grew last week; William S. Knudsen (p. 18) urged the machine tool industry to do the "impossible" in hastening deliveries. Later the war department issued letters of intent as a result of which expansion programs will be started immediately by the Giddings & Lewis Machine Tool Co., the Bullard Co. and the Bryant Chucking Grinder Co. . . . Arthur G. McKee & Co. have the contract for building an integrated steel plant in Brazil (p. 27) with annual ingot capacity of 350,000 tons.

Asks Quicker Deliveries

• • •

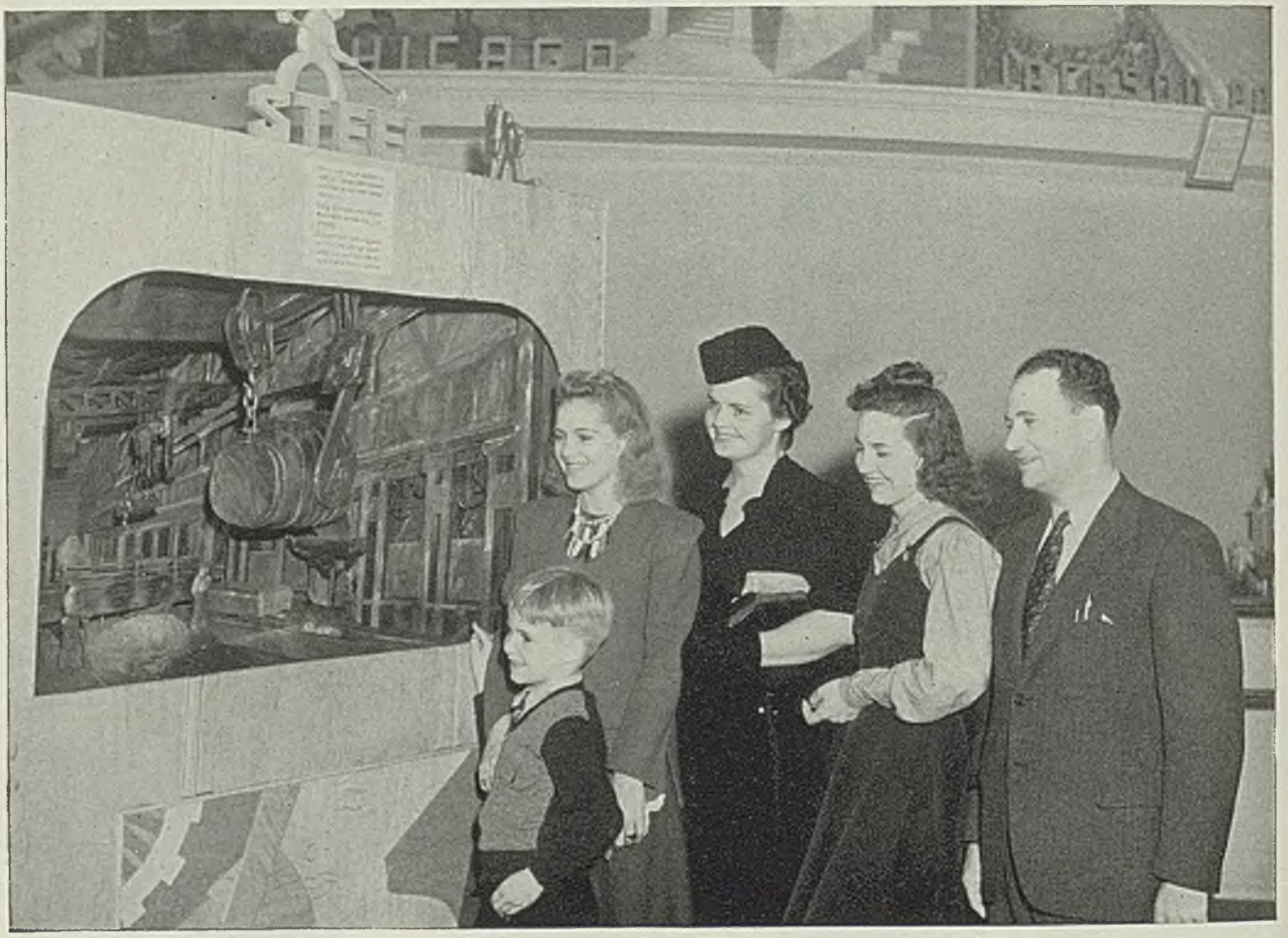
Use of the "arc torch," says Frank W. Scott (p. 42), makes it possible to weld perfectly many alloys that have been regarded as practically unweldable. It is necessary for the operator to become familiar with the physical properties of these alloys and to recognize when the metal is molten. He gives instructions covering specific applications. . . . Cast steel armor plate, says Frank G. Steinebach, (p. 46) is being used on army tanks. . . . New building just completed by Cummins Engine Co. is to be devoted (p. 47) to diesel engine research. . . . Concluding his article on getting the most from cylindrical grinding, Fred B. Jacobs (p. 52) tells how grinding time often can be saved by revising grinding allowances.

Cast Steel Armor Plate

• • •

Taking, etching and examining trepanned plugs get more attention, proportionally, than proper closure of the holes, says Harold Lawrence (p. 48). He describes the necessary procedure in order to obtain proper closure. . . . Reginald Trautschold (p. 56) describes the methods by which the Link-Belt Co. solved a problem of non-uniformity of pack-hardened parts. This company is using rotary retort furnaces with gratifying results. . . . American Society for Testing Materials (p. 66) has issued a new 153-page volume containing specifications for pipe and piping materials for high-temperature and high-pressure service. . . . STEEL begins the first of a notable series of articles (p. 72) on materials handling.

Materials Handling



Reading left to right are: Allen, Elaine, Mrs. Bollinger, Jean and Otto Bollinger, on a visit to the Inland Steel Diorama at the New York World's Fair.

Inland Family Chosen as Typical

Otto Bollinger and family were recently selected, in an extensive contest held at Chicago, as the typical Illinois family. Not only is the Bollinger family typical of Illinois, but it is typical of Inland families—Otto Bollinger is a machinist at the Inland mills.

There are thousands of family men at Inland, who, like Otto, use their ability and expert knowledge to help produce fine steel. They are steeped in the Inland tradition for unexcelled workmanship. Their primary interest lies in maintaining the high quality of Inland products.

The skill and teamwork of Inland men combine with modern mills to serve American Industry.

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THE TRIANGLE OF INDUSTRY AND THE PRODUCTION OF WEALTH

By F. C. CRAWFORD
President, Thompson Products Inc.

The average manufacturer of today realizes that the future of our country will be influenced profoundly by the extent to which our citizens understand the real meaning of what is termed "the American way of free enterprise". Many manufacturers have made notable contributions to this educational effort. Many more would like to contribute but do not know exactly how they can do it effectively.

In the accompanying article, F. C. Crawford, president, Thompson Products Inc., Cleveland, tells a story which has proved singularly convincing in advancing the thesis that there is no real basis for grouping "labor" and "capital" separately.

Analyzing the case of "Joe," a mythical worker in an umbrella factory, Mr. Crawford makes it clear that 130,000,000 Americans all constitute, at the same time, labor and capital and, as well, the great American market. This article originally was presented by Mr. Crawford as a paper before the Congress of American Industry, New York, Dec. 11-13, under sponsorship of National Association of Manufacturers.

I—Introduction

1—We all seek to preserve the American way of free enterprise.

2—To preserve free enterprise, the American people must understand it and its accomplishments.

3—The industrialist has an obligation to tell the story to his own workmen, and he must tell it in a simple and graphic manner.

4—All agree that everyone desires a higher material standard of living. This is a point of common agreement from which to start our story.

5—A higher material standard of living can come only from industry—industry in the broad sense, including the production, distribution and servicing of goods. The social and political worlds can contribute nothing to the material standard of living. Food, clothing and shelter come only from industry.

II—The Story of the Triangle of Industry

1—*Elements of Triangle*:

Picture in your mind, industry as a large triangle. At the top corner place the American MARKET—130,000,000 American people—all of us, everybody that has any requirements at all for food, clothing, shelter. This Market is inexhaustible. Any saturation point is inconceivable. The demands of Market upon industry are: More products, better products, lower prices—the natural human demands of any good buyer.

At the lower left-hand corner put CAPITAL—labor of the past that has been saved. To our amazement we find the same 130,000,000 people in this corner. Every person with a life insurance policy, or savings account, or who owns anything at all, is CAPITAL. The natural human demands of CAPITAL are: Reasonable security and greater return.

At the lower right-hand corner place LABOR—all of us—the same 130,000,000 Americans. The demands of LABOR are: Higher wages and shorter hours. These are natural human demands.

Now look at our triangle. The first thing we observe is that there is no force in it except ordinary, everyday human nature. The three forces are, apparently, irreconcilable. MARKET wants more for less money. LABOR wants more money for less work. CAPITAL wants security and more return.

In the industrial triangle there is a fourth element—MANAGEMENT. Imagine MANAGEMENT as a figure in the center of the triangle. Management finds itself in an awful spot. It must reconcile the conflicting but natural human demands of the three corners. Imagine a rope around the neck of Management and the end in the hands of Market. Whenever Market buys, it yanks the rope, demanding more for less money. Capital holds a rope attached to Management's left leg and pulls it as it demands security and return. Labor holds a rope attached to Management's right leg and pulls it constantly,

demanding more money for less work.

For self-preservation Management must find a way to reconcile the conflicting demands from the corners of the Triangle. To him the science of business is just the study of human reactions.

Many people follow my picture this far. Many think at this point that someone tosses in a fixed amount of money and the triangle becomes a poker game in which, if one shall win, another must lose. This is not true. The triangle of industry is a device for producing wealth—creating something that did not exist before.

2—*Umbrella Factory—First Day*

Let us take a simple example: An umbrella factory with one workman named "Joe." Joe can make one umbrella in one hour and receives a dollar's pay for his hour's work. The manager takes the umbrella to the great American market. He must sell it for at least one dollar in order to be able to pay Joe's wage. After some difficulty, because of this high price, he succeeds in selling the umbrella; returns and pays the dollar to Joe. There is nothing left for Capital. What are the reactions at the end of the first day?

Market is dissatisfied and cries: "The price is too high. No more orders unless you reduce the price." Joe is dissatisfied. He wants a raise. Capital is dissatisfied. It has had no return. It threatens to change management. Management is on the spot. Its job is at stake.

Management, to succeed, must find a way to satisfy the demands of the three corners. In seeking ways to accomplish this, Management studies production problems. It observes that Joe stands at his bench. He turns his lathe by hand, which tires him. Time is lost handling materials.

Management decides to improve the methods of production. It secures additional capital and installs a stool for Joe to sit on, a conveyor to bring the work to him, electric power to operate his machine. These are labor-saving devices that make Joe's work easier.

3—*Umbrella Factory—Second Day:—How Wealth Is Increased*

When Joe comes to work the second day, he is surprised at the improvements. Reluctantly he agrees to try them out. His work runs along much more easily and smoothly. To his amazement, at the end of an hour he has made *two* umbrellas with no more effort than it took to make *one* the day before. Management says, "Joe, I think we have discovered the great secret of how wealth is produced! You wait and I'll go to market with these two umbrellas."

Management meets the demand for lower prices and offers the two umbrellas to the great American Market at 75c each. Yesterday's disgruntled buyer appears and is pleased with the bargain price. He buys both umbrellas and goes away, a happier customer. His demand has been satisfied in the 25 per cent saving on his purchases.

Management returns to Joe and says, "Joe, we've discovered the great secret! We have $1.50 today where we had only $1 yesterday. We have produced an increase in wealth. I can give you a 25 per cent raise and pay you $1.25 per hour." Joe is happy—his demand has been satisfied.

Then Management reports to Capital that 25 cents remain in the cash drawer from which a dividend may be paid. Capital's demand is satisfied. All three apparently irreconcilable demands have been temporarily satisfied and successful Management has preserved its own job.

A dollar and a half has appeared where only one dollar existed before. Wealth has been created. The public can now use cheap umbrellas. Its standard of living has been raised by the amount of the saving in the purchase price. Joe goes home happy, his standard of living having risen by 25 per cent. Capital is happy and is ready to buy more tools to make more umbrellas at lower price with higher wages.

4—*Joe's Day*

At this point it is interesting to follow Joe through a complete day. From eight o'clock to three he makes umbrellas at his bench. He is aware that he belongs to the Labor group. He wants more money for less work. He wonders why the boss doesn't raise his selling prices and cut out dividends so that wages can go up again.

At three o'clock he goes home with his pay envelope. With his wife he goes to town shopping. He is now a part of the great American Market. He entirely forgets that he was Labor that morning. He wants to buy an umbrella. He demands lower prices.

At 4:30 he stops to pay his life insurance premium. He is now Capital and tough about it. Why don't they pay him bigger dividends on his insurance? Is his money safe? He forgets that he was Labor in the morning, Market in the afternoon and that he—the same Joe—is now Capital.

It should be noted that Joe profited at each corner of the triangle, because wealth was produced on our second factory day. As Labor he received a 25 cent raise. As Market he received a 25 per cent saving through reduced price. As Capital he received larger dividends because industry is now earning profits.

Joe is the American People. Each day the American people go around the Triangle of Industry. So long as the production of wealth increases, their reward is to be found at each corner—in rising wages, lower prices and in increasing dividends. Thus the standard of living rises.

III—Conclusions

1—*Capitalism—Not a System*:

First and most important: This industrial system —free enterprise—is not a system at all. It is simple everyday human nature expressing itself in a land of freedom. Observe the great American market demanding more pieces at lower prices. Observe labor demanding more money and less hours. Observe capital demanding security and return. All are natural human demands. Sweep free enterprise all away, let people alone, give them freedom, and the same thing will come back.

2—*The Driving Force of Industry*:

The persistency of these natural demands of human nature (selfishness) is the driving force of industry

prodding management to devise ways to increase the production of wealth.

3—*Industry Produces Wealth*:

Industry is not a poker game with a fixed amount of money where one player can profit for producing of Wealth. All may gain by it.

4—*Paradox of Industry:*

When new wealth is created, even though the customer pays less for goods per unit, there is more to divide between capital and labor. This is the seeming paradox of industry.

5—*Distributes Wealth:*

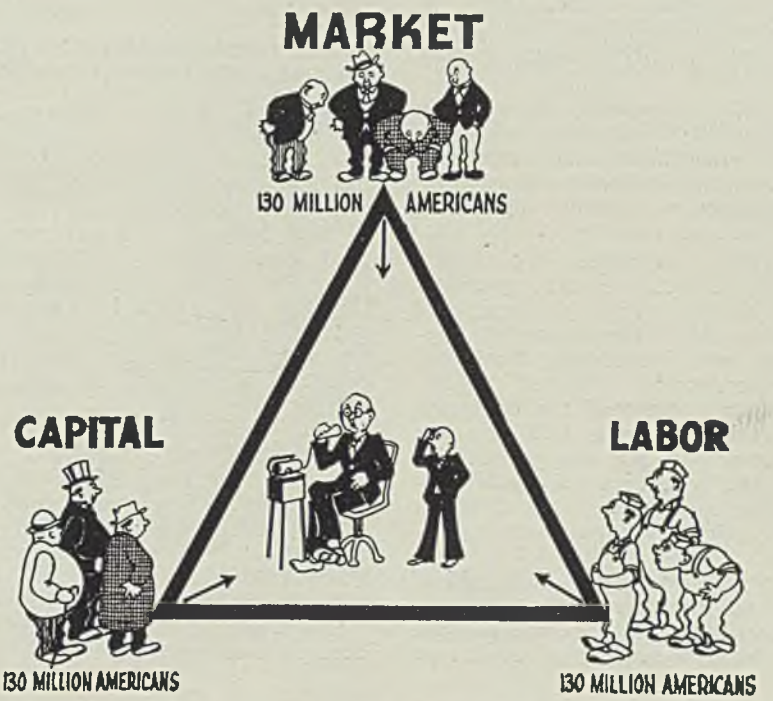
It is a device which tends to balance itself, thereby distributing wealth fairly. If one corner pulls too hard, the other corners will eventually pull their way and balance it up. Too-high wages mean too-high cost and no orders, etc. It always has and always will be this way.

6—*Not a Charity:*

Note that Industry's sole object is to produce the goods which are the basis of our standard of living. Industry is not a charitable institution or a Sunday School. It is a healthy tug-of-war right from the start.

7—*Increased Production Is Purchasing Power:*

High Wages are a result (not a cause) of increased Production of Wealth. The same is true of low prices and high return on Capital. Therefore, increased production is purchasing power.



■ **Illustrating its position in industry, as propounded by Mr. Crawford, is this sketch showing management to be the integrating force whose task it is to reconcile simultaneous but opposing demands of capital, market and labor. To produce greater wealth for all three, apparently entirely separate but in reality only one, increased production is necessary, says Mr. Crawford, in his defense of the free enterprise system.**

8—*It Works*:

Let us look at results. For over fifty years this simple device of production has turned out wealth as it never was turned out in the world before. The American standard of living has been raised to a point higher than ever before. American wage scales have reached a point higher than ever dreamed of. Capital accumulated while prices for goods reached new low levels.

9—*No Classes in America*:

There are no classes in the American system. All of us are Market. All of us are Capital. All of us are Labor.

10—*Flow of Capital Necessary*:

The increase in production depends upon improved machines and methods of production. A constant flow of new Capital into industry is necessary to provide these improved tools for production.

11—*Obstacles to Production of Wealth*:

There are only two real obstacles to the operation of the Industrial Triangle in producing a higher standard of living. Government imposes both.

1—Political control that curbs the natural demands of each element of our Triangle:

(a) Regulation and control affecting the demand of Market, such as price control;

(b) All manipulation of Capital which limits return or limits flow of new Capital;

(c) All regulation which affects labor wages, such as freezing or creating artificially high wages;

(d) All regulation that limits Management in its struggle to devise improved production methods.

2—Taxation which consumes the wealth produced before it can be distributed to Market, Labor and Capital:

(a) In our umbrella factory story, if taxes take a modest part of the 50-cent increase in wealth of the second factory day, then a substantial part of the increase is available for distribution and the standard of living rises;

(b) If taxes take the whole 50-cent increase, our Triangle is at a standstill;

(c) If taxes take more than the 50-cent increase, prices must rise, wages must fall and return to capital be reduced. Standard of living necessarily falls.

Steelmakers, Defense Officials Discuss Raw Material Prices

■ PRESENT steelmaking costs, as affected by recent price changes in iron and steel scrap, coke and pig iron, were explored in Washington last week by representatives of the steel producing industry and the price stabilization and raw materials sections of the national defense commission.

Complaints made by some of the nonintegrated companies were reported responsible for the conference being called to see whether disparities in steelmaking costs could be adjusted.

Further conferences, between commission officials and representatives of the scrap, pig iron, and possibly other raw materials suppliers, are considered likely in the near future.

It was understood the conferees were told there was little increase in scrap and pig iron prices for some weeks following a similar conference last October, but that recently prices have been moving upward.

The defense experts said following the conference that buyers, middle men and sellers all are opposed to increasing prices of raw materials as well as finished steel. However, some producers were reported to have said they cannot continue to sell steel at present prices if raw material prices continue to rise.

STEEL CAPACITY ADEQUATE FOR ALL NEEDS—E. T. WEIR

Ernest T. Weir, chairman, National Steel Corp., in Pittsburgh last week, said the steel industry has sufficient capacity for defense and other requirements.

"Next year we will have an annual ingot capacity of 85,000,000 tons," he stated. "Production over the past ten years has averaged 36,000,000 tons. On top of this we have demands for steel from countries at war and for our own defense programs.

"Our preparedness efforts will require only 3,000,000 tons next year and not more than 10,000,000 will be bought for the war abroad. I can't possibly see where we are confronted by a serious shortage. Everyone's getting all the steel he wants and will continue to do so.

"Naturally orders have piled up because most consumers are buying ahead right now in anticipation of their needs."

Mr. Weir, former president of the American Iron and Steel institute, is opposed to suggestions in government quarters that expansion in the steel industry will be necessary to forestall a shortage.

He said that were it not for defense and war demands the steel industry would be operating at 50 or 60 per cent of capacity instead of the current 97 per cent.

"The whole industry level is being sustained almost entirely by war preparations," he stated.

The steel leader said he was opposed to price increases in the industry but added if advances become necessary they will be due to higher costs for raw material and equipment. He said iron and steel scrap is the most important problem confronting the industry.

He blamed the government for the situation, calling attention to the fact the Steel institute warned a year ago that scrap exports were depleting supplies, though until recently nothing was done it.

Regarding the defense program, Mr. Weir expressed the opinion a commission should be established with complete authority and effective leadership.

NATIONAL STEEL CORP. TO REBUILD BLAST FURNACES

National Steel Corp. directors last week approved a program to tear down and rebuild two blast furnaces, one at Detroit and one at Buffalo, expanding pig iron capacity by 420,000 tons a year. The management also was instructed to prepare provisional estimates for the construction of an additional 360,000-ton blast furnace and 64 coke ovens at Weirton, W. Va.

No direct increase in steelmaking capacity will be undertaken, according to E. T. Weir, chairman of the board, but the added facilities will make possible an increase in production at existing steel mills.

Indian Steelworkers Seek Proof of Citizenship

■ These Indians, spokesmen for tribesmen of the Six Nations, went to court in Philadelphia recently to obtain proof they are citizens and therefor eligible to jobs on defense projects as steelworkers, at which many of them are skilled. They want the records in the Diabo case, in which in 1927 a federal court ruled they were "first citizens" and that they could wander at will across borders of North American countries. Now, they complain, members of the tribe who have been working in Canada are classed as aliens, and are not considered available for jobs in the United States. Acme photo

Domestic Use of Steel Scrap Off in November

■ Domestic consumption of iron and steel scrap in November decreased slightly because of the shorter month and Thanksgiving holiday, according to the Institute of Scrap Iron and Steel. November consumption was 3,922,000 gross tons against 4,233,000 tons in October. This brought the aggregate for 11 months to 37,737,000 tons.

Exports of scrap for the first 10 months were 2,651,774 tons, against 3,075,998 tons for the comparable 1939 period, according to the department of commerce. United Kingdom and Canada are now the only large foreign buyers.

Government May Extend Control Over Zinc, Brass, Copper Exports

WASHINGTON

■ EMBARGO on exports of zinc, copper and brass is being planned by the administration, according to unofficial sources here.

How far along the plans for more strict control of these commodities have gone is not known. It is known, however, that insofar as copper is concerned that all necessary information is now before the munitions control board of the state department for the drawing up of a final order.

Metals Reserve Co. has contracted to purchase 100,000 tons of Latin American copper, Jesse Jones, federal loan administrator, announced last week. Seventy-two thousand tons were purchased at 10 cents a pound, f.a.s., New York, as follows: From Anaconda Copper Mining Co., 57,000 tons; from American Metal Co. Ltd., 10,000 tons; from Phelps-Dodge Corp., 5000 tons. If freight and insurance costs exceed one-half cent a pound, the excess will be paid by the Metals Reserve Co.

The remaining 28,000 tons will be supplied by Kennecott Copper Corp. at 9½ cents a pound, f.a.s., Chilean ports, on condition that on such portion as the seller can provide transportation, the Metals Reserve Co. will allow a half cent a pound for freight and insurance. Metals Reserve Co. will make its own transportation arrangements for the remainder.

INCREASED ZINC CAPACITY TO RELIEVE SHORTAGE

Present shortage of zinc will be somewhat relieved in the first half of 1941 as more capacity is added. It is estimated that by the end of the second quarter actual production will be running about 33 per cent ahead of the average for the 12 months beginning September, 1939. Some additional capacity already has gone into operation.

In discussing the situation last week, C. Donald Dallas, president, Revere Copper & Brass Inc., New York, said: "The most optimistic estimates of production for zinc during 1941 are only slightly over 800,000 tons for all grades. These estimates take into consideration existing capacities, plus planned increases, most of which do not take effect until the last half of the year. With this picture before us, it is very evident that during the first half of the year we will face drastic curtailment of brass production on account of the shortage of zinc.

"In looking at anticipated requirements by the brass industry alone, to meet ordinary domestic, United States armament, and foreign armament programs, it is evident that any present anticipated increase in production can be absorbed by the brass industry without making any allowance for essential increases in other industries using zinc. It is believed that the curtailment in production during the first six months of 1941 in the brass industry on account of lack of zinc, even if we continue to get our share of total zinc production, will be at least one third of our projected capacity based on procurement of necessary zinc supplies."

Mr. Dallas last week announced a $10,000 award for the best suggestions for speeding up the national defense program, submitted by workmen in the nation's metalworking industry.

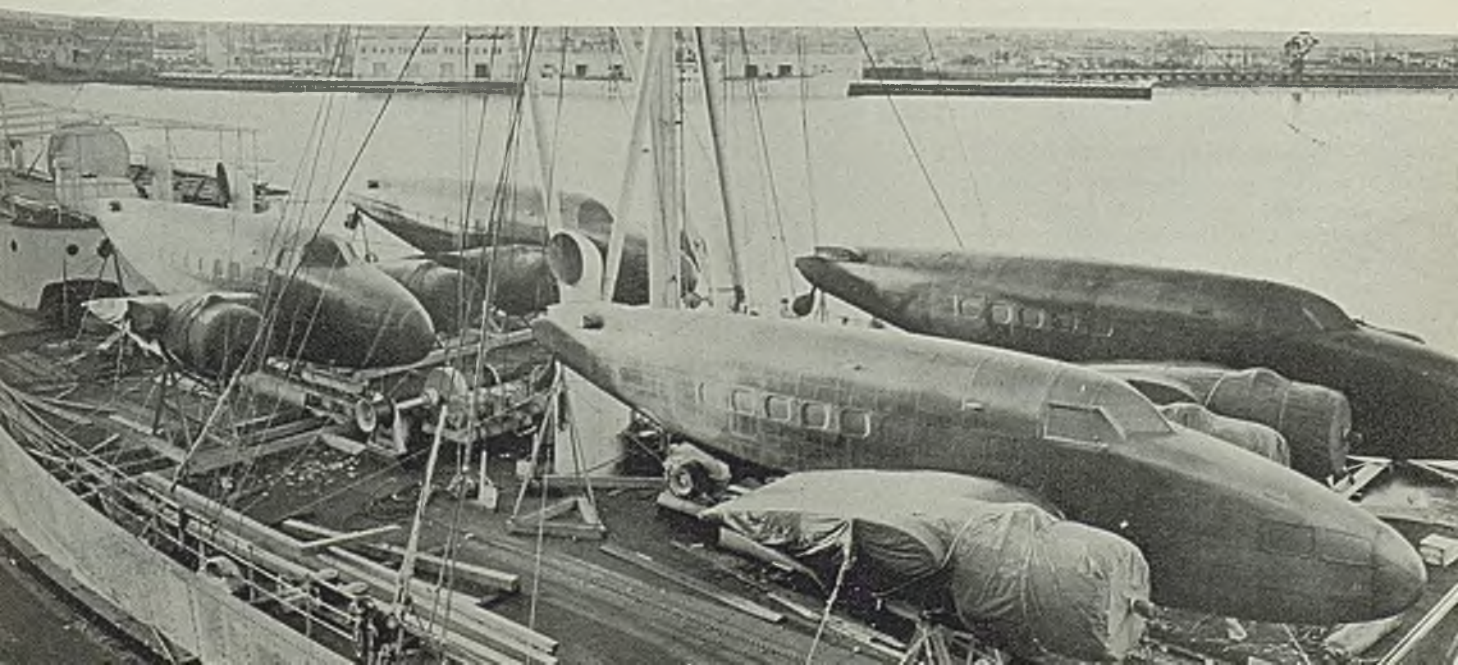
Farm Equipment Exports Increase 12 Per Cent

■ Farm equipment manufacturers' sales for export in first ten months of 1940 aggregated $67,030,229, according to commerce department's machinery division. This was 12 per cent more than total of $59,654,467 in the comparable period last year.

Exports of tillage implements in the period totaled $6,183,968, an increase of 21 per cent over $5,128,802 in first ten months of 1939. Harvesting machinery exports were up slightly, totaling $7,937,465 in the ten months this year as against $7,879,614 in the period last year. Shipments of tractors and parts were up 17 per cent, to $48,132,304 from $41,271,933.

Canada, Argentina, United Kingdom and Union of South Africa were principal purchasers of American farm implements. Other heavy buyers included Mexico, Turkey, Sweden, New Zealand, Australia and France, largest share of their purchases being tractors.

■ A more acute shortage of skilled mechanics next spring was forecast at Detroit by Frederick E. Searle, Ford Motor Co., in an address recently before the Detroit chapter, American Society of Tool Engineers.



■ Lockheed-Hudson bombers loaded aboard ship to be transported to England. Proposed financing of British purchasing, by the United States government—to be repaid "some way, some time"—is expected to greatly expedite deliveries of war supplies. NEA photo

"Do the Impossible Again," Knudsen Urges Tool Builders

■ WILLIAM S. KNUDSEN, production defense commissioner, last week asked American machine tool builders to do the "impossible" in increasing production and hastening deliveries. His plea was contained in a letter addressed to 150 manufacturers and was written in view of "the terrible urgency of the situation."

Mr. Knudsen also appealed to employes in machine tool plants to "put everything you have, without stint, into your job. Only by the co-operation of everybody in this national emergency can the defense task be done in time." The letter to employes was to be posted on bulletin boards in the shops.

In addressing the manufacturers, Mr. Knudsen said:

"It is not your fault that the army and navy requirements weren't known far enough in advance to prevent the dumping of millions of dollars' worth of orders on the industry in a very short time. The changes in the program week by week necessitated by changed conditions in Europe make it impossible to figure machine tool requirements very far in advance. But the fact remains that practically all of you are quoting from six to twelve months' delivery. The delivery must be speeded up.

"All of you have made large plant expansions, many of you are running three and two shifts, many are subcontracting some parts, subassemblies and whole machines. But not enough of you are doing this.

"I realize the difficulties of subcontracting such accurate tools as yours, but if some manufacturers of highly accurate tools can do this, more can. There are still many plants in the country capable of making machine tools or parts of machine tools that should be put to work by you.

"Others Do It, You Can Also"

"There are difficulties in adding additional shifts, of getting the skilled men necessary, but some of the builders of high quality tools are doing it, and I believe others can do so.

"I am not telling you how to do your job. But if you could see, as I do, from the inside, the terrible urgency of the situation, you would agree with me that I am not asking too much in requesting you to speed up delivery and increase production of machine tools during 1941. Let's forget everything except the welfare of the country.

"The industry as a whole has done practically the impossible in trebling its rate of output in the last two years. I am appealing to you to do the impossible again."

Following Mr. Knudsen's appeal, the war department announced it had issued letters of intent, assurances that contract would be awarded, and authorized immediate expansion at three machine tool plants. These were: Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; Bullard Co., Bridgeport, Conn.; and Bryant Chucking Grinder Co., Springfield, Vt.

The war department called these letters part of "an effort to break the machine tool bottleneck," and said similar letters would be sent to other companies.

No information on the cost of the expansions authorized was divulged, but the army has $20,000,000 available for such purposes.

Discussing at his press conference last week means of speeding production, the President said no action has yet been taken under the "draft industry" law voted by congress last summer, but added that two or three cases now are under investigation.

Wall Charts To Aid in Machine Shop Training

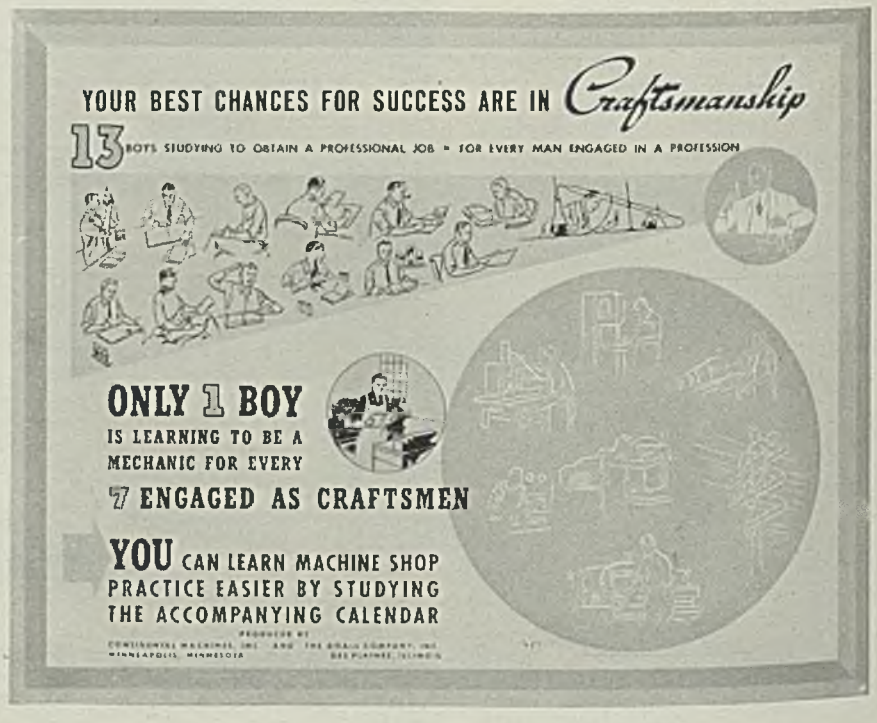
■ Sponsored by Leighton Wilke, president of the company, Continental Machines Inc., Minneapolis, has issued a series of 12 wall charts constituting a simplified exposition of basic principles of machine tools and production metalworking. Each sheet is 22 x 40 inches and carries a month's calendar.

These educational charts are, to quote the sponsor: "Dedicated to all metalworkers and apprentices, upon whom America is dependent to maintain first place among the nations of the world in progress and defense."

Subjects dealt with are as follows: Lathe; chip production common to all machine tools; the shaper; drill press; milling machine; contour sawing machine; band filing machine; broaching machine; vertical milling and duplicating; grinding machine; honing machine; and superfinishing machine.

In each case the machine is shown in action, with typical work and tools in place and with a "phantom" operator at controls so no mechanism is obscured by the man. Important details of machine and tooling are identified by arrowed captions. Auxiliary illustrations, with decks of brief text, cover origin of the machining process, its latest applications and how and in what form metal is removed. Microphotographs are employed to show cutting action, chip formation and resulting surface finish.

The series constitutes what is in effect a quick course in basic machine shop practice of real value not only to learners and apprentices but also to advanced machinists who want to review recent developments. Importance of training is emphasized by the accompanying illustration, reproduced from an exhibit accompanying the charts.



60 Ships for Britain To Take 180,000 Tons Steel

■ Sixty freighters, of 10,000 tons displacement each, were awarded last week by the British purchasing commission to the Todd Shipyards Corp., New York, reported to be largest order of its kind ever placed in the United States by any country at war. About 180,000 tons of steel, mainly plates, will be required for construction.

Two Todd subsidiaries have been organized for the project, Todd-California Corp., Richmond, Calif., and Todd-Bath Shipbuilding Corp., South Portland, Me.

New shipways will be completed within four months, the first keels to be laid in two and a half months and the first vessel scheduled to be completed in eight and a half months. Each yard will build 30 vessels.

The freighters will cost nearly $100,000,000, Britain already having appropriated $50,000,000 in cash for the purpose. The contract is expected to be the forerunner of additional large ship orders and is part of approximately three billions of new British war orders, financing of which is now being discussed in Washington.

Steel Stocks, Orders, Shipments Up in October

■ Index of the value of iron and steel manufacturers' inventories for October was 124.3, compared with 121.1 in September and 108.7 in October, 1939, according to the commerce department. Index is based on Dec. 31, 1938, as 100.

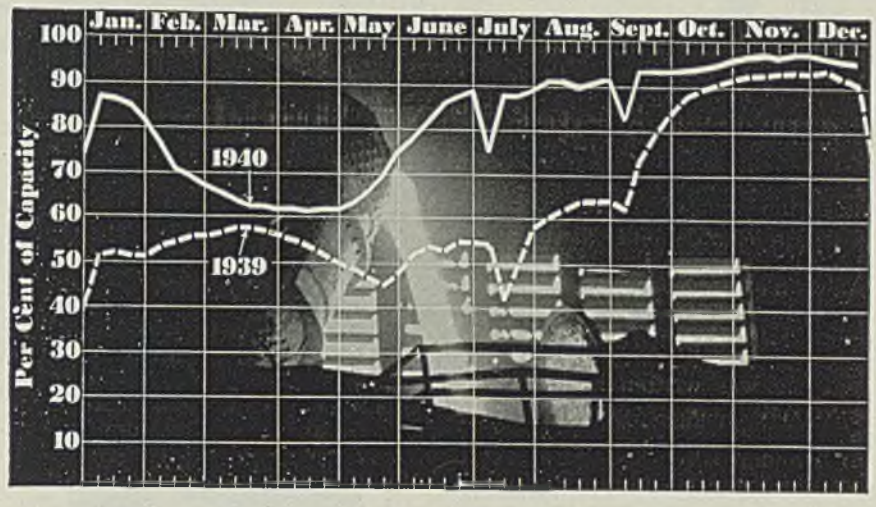
Index of the value of new orders received by iron and steel manufacturers in October was 213, compared with 199 in September and 231 in October, 1939, based on January, 1939, as 100.

Index of the value of shipments for October was 183, compared with 180 in September and 168 in October, 1939.

Institute Preparing Distribution Statistics

■ American Iron and Steel institute has mailed blanks and instructions to steelmakers covering statistics of steel distribution in 1940. Figures will be compiled and issued by the institute early in 1941.

This service was undertaken first by *Iron Trade Review*, predecessor of STEEL, in 1922, covering distribution of 1921 steel output, and has been continued each year since. The institute has taken over the task as part of its statistical work.



PRODUCTION . . . Down

■ STEELWORKS operations last week declined ½-point to 95 per cent as furnace repairs caused shutdowns. Losses were met in three important producing centers and a small gain in one. The remaining eight districts held unchanged. A year ago the rate was 90½ per cent; two years ago it was 52 per cent.

St. Louis — Holds at 87½ per cent for the fifth consecutive week, 23 open hearths being active.

Cincinnati — Steady at 87 per cent, slight shifts for repairs bringing no change in production.

New England — Advanced 10 points to 100 per cent, all open hearths in operation. Repairs will cause a drop this week.

Birmingham, Ala. — Production steady at 97 per cent.

Wheeling — Rate maintained at 98½ per cent, which has been in effect since the beginning of November.

Pittsburgh — Drop of 1 point to 95 per cent resulted from necessity for furnace repair.

Central Eastern seaboard — Steel making continues at 95 per cent for the third week, but the Christmas holiday shutdown is expected to decrease the rate 10 points this week.

Buffalo — Unchanged at 93 per cent. Necessity for repairs prevents steelworks adding more open hearths.

Detroit—Continues at 90 per cent for the third week.

Cleveland — In an effort to meet demand mills maintained production at 86½ per cent. Holiday shutdowns will lower rate this week.

Chicago — Down ½-point to 97½ per cent as heavy production brought necessity for repairs to open hearths.

Youngstown, O. — Loss of one open hearth cut production one point to 91 per cent, Republic Steel Corp. taking off a furnace at its Warren, O., plant, for repair, resuming Sunday night. Holiday interruption will cut production to about 78 per cent this week. Republic will blow out a blast furnace early in January for rebuilding.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 21	Change	Same week 1939	Same week 1938
Pittsburgh	95	— 1	91	40
Chicago	97.5	— 0.5	92	56.5
Eastern Pa.	95	None	85	32
Youngstown	91	— 1	91	45
Wheeling	98.5	None	85	59
Cleveland	86.5	None	87.5	50
Buffalo	93	None	79.5	44
Birmingham	97	None	94	82
New England	100	+10	89	70
Cincinnati	87	None	82	75
St. Louis	87.5	None	77	51.5
Detroit	90	None	90	90
Average	95	— 0.5	90.5	52

Pittsburgh Protests Cut In Southern Freights

■ Application of southern railroads for reduced freight rates on iron and steel from Birmingham and vicinity to Memphis, Vicksburg, Natchez and Baton Rouge has been opposed by the Pittsburgh Chamber of Commerce on the grounds that the reduced rates might shift Mississippi Valley steel business from Pittsburgh to Birmingham.

The diversion of steel business would not only harm northern steelmakers but also northern railroads. For every 50 tons of finished steel shipped by the railroads they also move 250 tons of raw materials for making the steel, the chamber maintains.

MEN of INDUSTRY

■ ADDISON F. VARS was elected president, Sterling Engine Co., Buffalo, and Edward H. Townsend, executive vice president and treasurer, at a directors' meeting Dec. 16.

Spencer H. Logan, president since 1939, was elected chairman of the board, succeeding Charles A. Criqui, who becomes vice chairman.

Mr. Vars had been executive vice president since August, 1939. His father, Harry Thorpe Vars, was one of the founders of the company nearly 40 years ago. Mr. Townsend formerly was a member of a New York firm of consulting engineers. His association with the Sterling company began early in 1939.

♦

Robert L. Glose, heretofore manager of welded fabric and construction products sales for Pittsburgh Steel Co., Pittsburgh, has been named sales manager of the company's newly established Construction Products division. Thomas C. Phillips has been made dealer sales manager of the new division. The past six years Mr. Phillips has been associated with Johns-Manville Corp., New York, in charge of sales of welded wire building fabric and Steeltex products manufactured by Pittsburgh Steel.

♦

Kurt R. Vogel has been made secretary, Crucible Steel Co. of America, New York. He formerly was assistant manager, Chicopee Falls, Mass., division of United States Rubber Co.

♦

Dr. George A. Moore has joined Battelle Memorial institute, Columbus, O. He will make an investigation of the faults and failures which occur in the commercial production and fabrication of metals.

♦

Clinton D. St. Clair has been appointed works manager of the Hancock Valve division plant in Boston of Manning, Maxwell & Moore Inc., Bridgeport, Conn. He formerly was associated with B. F. Goodrich Co., Ohio Match Co., Erie City Iron Works, and American Machine & Metals Inc.

♦

Leonard E. Best has been appointed assistant development manager in charge of new products, mechanical goods division, United States Rubber Co., with headquarters at Passaic, N. J.

♦

William C. Hogg has been named assistant to general superintendent, Homestead, Pa., works, Carnegie-Illinois Steel Corp. He previously was assistant superintendent of open-hearth departments, Homestead plant.

Addison F. Vars

Edward H. Townsend

Clinton D. St. Clair

♦

Mark V. Appleman, director of safety, Youngstown, O., division of Carnegie-Illinois Steel Corp., has been elected president, Mahoning Valley Foremen's association. T. F. Redick, assistant treasurer, Struthers Iron & Steel Co., has been chosen treasurer, and Al Getchey, industrial secretary, Y.M.C.A., executive secretary.

♦

Walter E. Rogers, heretofore western sales manager, Taft-Peirce Mfg. Co., Woonsocket, R. I., with headquarters at Indianapolis, has been transferred to Woonsocket as assistant secretary. He succeeds Chandler B. Gardiner, resigned.

♦

A. R. Engler has been placed in charge of the new southwestern district office established by Gisholt Machine Co., Madison, Wis., at Houston, Tex. He will be assisted by Starr Pitzer and Ray Dorow.

♦

Elmer Ghrist has been named metallurgist, Jessop Steel Co., Washington, Pa. He has been employed by Jessop since 1935, having served two years in the chemical department and three years in the metallurgical department.

♦

Reginald Rumwell has been promoted to advertising manager, International Business Machines Corp., New York. He succeeds Arch Davis, who recently was promoted to executive secretary. Mr. Rumwell was previously a member of the company's sales organization in San Francisco.

♦

Desmond McCall has been appointed assistant general superintendent, Torrance, Calif., plant of Columbia Steel Co., San Francisco. He joined the company as assistant works industrial engineer at the Pittsburg, Calif., plant; in 1938 was named works industrial engineer and two years later was transferred to the Torrance plant as assistant to general superintendent.

♦

R. J. Thompson, previously in charge of the Detroit office of Ampco Metal Inc., Milwaukee, has been promoted to manager of the eastern district, with headquarters at 30 Church street, New York. S. C. Lawson has been placed in charge of the central district, with offices at 600 South Michigan avenue, Chicago.

♦

Paul L. Gillan has joined the automotive and industrial engineering consultation staff of Aluminum Industries Inc., Cincinnati. He formerly was assistant chief engineer and automotive engineer, Lycoming Mfg. Co., Williamsport, Pa.; and held

engineering positions with American LaFrance Co., Elmira, N. Y., and H. H. Franklin Co., Syracuse, N. Y.

♦

T. I. Phillips, general works manager, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announced appointment of M. L. Fawcett as staff assistant. Mr. Fawcett will be transferred to Pittsburgh headquarters from Sharon, Pa., where he has been manager of the transformer division since 1935.

H. V. Putman, manager of engineering, Sharon, Pa., transformer works of Westinghouse Electric & Mfg. Co. since 1931, has been named manager of that division. He succeeds Mr. Fawcett.

♦

T. F. Barton, assistant New York district manager, General Electric Co., will become district manager, Jan. 1. H. H. Barnes Jr., commercial vice president, New York district, will continue in that capacity.

♦

Howard Stevens, employed in various sales department capacities with Wheeling Steel Corp., Wheeling, W. Va., will be transferred to the Columbus, O., district sales division, as sales representative, Jan. 1. George Spengler, at present employed in the tubular sales division at Wheeling, will be transferred to the Buffalo district sales office as a traveling representative Jan. 1.

♦

L. B. Keeler has joined the Wayne division of Bendix Aviation Corp., Wayne, Mich., in charge of production planning and material control. He formerly was associated with Hudson Motor Car Co.

♦

C. H. Black, heretofore general manager of sales, general line, American Can Co., has been appointed vice president in charge of sales. He has been associated with the company 32 years. K. S. Breckenridge, vice president, Chicago, will retire Dec. 31 and will be succeeded as vice president in charge of central district by G. H. Kellogg, vice president in charge of packer can sales.

Other appointments include: J. A. Stewart, formerly general manager of manufacture, packer cans, and R. C. Taylor, general manager of manufacture, general line, as vice presidents; A. C. Webb, who has served the past 22 years as district sales manager, with headquarters in San Francisco, as general manager, and D. A. MacArthur as sales manager, succeeding Mr. Webb.

Stay Is Granted in "Pittsburgh Plus" Case

■ United States circuit court of appeals at Philadelphia last week stayed until the first Monday in October, 1941, all proceedings in the appeal by the United States Steel Corp. and its subsidiaries for nullification of the cease and desist order issued against them by the federal trade commission in 1924.

The stay was made at request of counsel for the corporation and the FTC.

The original order, among other things, provided the corporation's subsidiaries discontinue the practice of charging Pittsburgh base prices for steel products, regardless of where manufactured, plus freight charges from Pittsburgh to destination. Subsequently, multiple basing points were established.

The commission made no effort to enforce the order for 14 years, or in 1938. The companies then asked the order be nullified.

Primary reason for holding the case in abeyance for another ten months is the expectation of a decision in the case of the cement institute involving parallel questions of price fixing which may govern the steel situation.

Republic Steel Officials Fly South for Week-End of Golf

■ REPUBLIC STEEL CORP. officials recently chartered a transport plane and flew to Pinehurst, N. C., arriving on the first tee at Pinehurst Country club at 10:15 Saturday morning, two hours and 15 minutes out of Cleveland. They played 36 holes and were back in Cleveland Sunday evening. Group included, left to right: R. J. Wysor, president; Barney Barbin, senior pilot; Arthur Jones, co-pilot; W. W. Hancock, treasurer; P. F. Boyer, comptroller; N. J. Clark, vice president in charge of sales; T. F. Patton, general counsel; C. A. Ilgenfritz, director of purchases; R. J. Morgan, manager of orders; and C. M. White, vice president in charge of operations. Newspaper Enterprise Association photo

Activities of Steel Users, Makers

■ NORTHWESTERN Steel & Wire Co., Sterling, Ill., has placed a contract for an additional 50-ton top charge electric furnace which will practically double its present capacity of electrically refined steel for manufacture of wire products.

♦

Lincoln Electric Co., Cleveland, has moved its Grand Rapids, Mich., office to new quarters at 44 Grandville avenue.

♦

Foote-Burt Co., Cleveland, has purchased Hammond Mfg. Co., Cleveland. Surface grinding machines and radial drilling machines will still be manufactured by Hammond and will retain the name of Hammond.

♦

Eaton Mfg. Co., Cleveland, J. O. Eaton, president, has sold its automobile bumper plant at Jackson, Mich., to Houdaille-Hershey Corp., Detroit, and will concentrate on production of automobile parts. The Jackson plant covers about 140,000 square feet.

♦

Crobalt Inc., manufacturer of nonferrous cutting alloy for machine cutting tools, has completed erection of a new plant at Ann Arbor, Mich., containing 6000 square feet of floor space. Located in Detroit since its organization in 1934, the company will begin operation in its new plant early in January.

♦

Foote Bros. Gear & Machine Corp., Chicago, has been awarded a $1,020,000 contract by the navy for construction of 125,000 square feet of additional floor space to be equipped for manufacture of airplane engine gears. Contract calls for acquisition of additional land and buildings, machinery and plant equipment.

♦

Cramp Shipbuilding Co. has acquired property until recently owned by the Lehigh Coal & Navigation Co. along the Delaware river at Philadelphia. The property, including piers 75 and 76, adjoins Cramp's and is to be used in extension of the shipyard's facilities. It has been owned for 100 years by the Lehigh company. Price paid was $350,000.

♦

Harris Products Co., Detroit, has moved the major portion of its production of Torflex rubber and Neoprene backed bushings to a new plant in Cleveland, and has also established a branch sales office there. Some manufacturing facilities will still be maintained at Detroit, and engineering design, development and testing capacities are being enlarged there. The new plant, located at 5105 Cowan avenue, has capacity at present time of 30,000 Torflex bushings per day which can be increased to 100,000 per day without extensive additions or equipment.

♦

American Screw Co., Providence, R. I., licensor, announces that the number of firms manufacturing Phillips recessed head screws totals 18.

♦

Weltronic Corp., Detroit, manufacturer of resistance welding controllers and general purpose timers, is moving into a new plant nearing completion on East Outer drive. The building, of modern design with approximately 8700 square feet of floor space, has provisions for enlargement to accommodate added manufacturing facilities as needed.

♦

George Birkenstein Corp., Chicago, nonferrous metal interest, has moved its offices from suite 642 at 332 South Michigan avenue to larger quarters in suite 555, same building. Transferred also is the Chicago headquarters of Anker-Holth Mfg. Co., Port Huron, Mich., and its Air-grip Chuck division, both of which were acquired recently by Mr. Birkenstein.

♦

Metal & Thermit Corp., New York, has appointed Industrial Equipment Co., Birmingham, Ala.; Morgans Inc., Savannah, Ga.; D. J. Murray Mfg. Co., Wausau, Wis.; and George Rumble, Toronto, Ont., Canada, distributors of Murex heavy coated electrodes.

The company completed a new manufacturing plant at East Chicago, Ind., 90 x 320 feet, for the manufacture of Murex electrodes. All steel work for the building was fabricated and erected by arc welding.

MEETINGS

GEAR MANUFACTURERS TO MEET IN HOT SPRINGS

■ AMERICAN Gear Manufacturers association will hold its twenty-fifth annual convention at The Homestead, Hot Springs, Va., May 5-7. J. C. McQuiston, 602 Shields building, Wilkinsburg, Pa., is manager-secretary.

MIDWEST FOUNDRYMEN IN MILWAUKEE, FEB. 20-21

Fourth annual foundry conference under the joint auspices of the Wisconsin chapter of the American Foundrymen's association and the department of mining and metallurgical engineering, University of Wisconsin will be held at the Schroeder hotel, Milwaukee, Feb. 20-21.

OPEN-HEARTH COMMITTEE AT PALMER HOUSE, CHICAGO

Twenty-fourth national convention of the Open-Hearth committee of the American Institute of Mining and Metallurgical Engineers, will be held at the Palmer House, Chicago, April 23-25.

UTLEY TO ADDRESS MEMBERS OF SCRAP INSTITUTE

S. W. Utley, president, Detroit Steel Casting Co., Detroit, will speak on "What Industry Means to Civilization" at the Jan. 8 business session in the annual convention of the Institute of Scrap Iron and Steel Inc., Lord Baltimore hotel, Baltimore.

Convention Calendar

Jan. 6-10—Society of Automotive Engineers. Annual meeting, Book-Cadillac hotel, Detroit. John A. C. Warner, 29 West 39th street, New York, is secretary.

Jan. 7-9—Institute of Scrap Iron & Steel, Inc. Annual meeting, Baltimore. E. C. Barringer, Salmon Tower building, 11 West 42nd street, New York, is secretary.

Jan. 8.—American Washer & Ironer Manufacturers association. Annual meeting, Morrison hotel, Chicago. J. R. Bohnen, 80 East Jackson boulevard, Chicago, is secretary.

Jan. 17-18—National Slag association. Annual meeting, Tutweiler hotel, Birmingham, Ala. T. E. Shaefer, 644 Earle building, Washington, is secretary.

Jan. 27-30—American Road Builders association. 38th annual convention and show, Hotel Pennsylvania, New York. Charles M. Upham, 914 National Press building, Washington, is national director.

Jan. 27-31—Electrical Engineering Exposition. Convention hall, Philadelphia. Charles F. Roth, Grand Central Palace, New York, is manager.

Jan. 27-31—American Institute of Electrical Engineers. Winter convention, Convention hall, Philadelphia. H. H. Henlein, 33 West 39th street, New York, is secretary.

Republic Steel Corp. Pays Vacation Checks

■ Republic Steel Corp. last week made distributions of cash payments to employes under a plan inaugurated in 1936 whereby employes had the option of taking vacations or staying at work and receiving cash. Of 50,000 employes 36,000 participated in payments for 1940. In addition, checks were given out for the years 1938 and 1939, which had been held up pending court decision as to whether striking employes had forfeited their standings and eligibility to the vacation payments.

Pratt & Whitney Join Connecticut In Training for Aircraft Skills

■ TO HELP supply the demand for trained machine tool workers and other similarly skilled labor the Pratt & Whitney aircraft division of United Aircraft Corp. and the state of Connecticut have co-operatively entered upon an extensive job-training program.

Pratt & Whitney aircraft is vitally concerned because its force of skilled workers, 2700 early in 1939, must soon be increased to over seven times the 1939 figure, nearly 20,000 men and women. Within three months Pratt & Whitney aircraft must have 3000 new, trained workers.

Today there is a completely-equipped school in full swing in Hartford, known as the "Hartford State Trade School, Defense Training Center," with floor space of 30,000 square feet. Approximately 50 machine tools, including millers, lathes, drills, grinders, and gear shapers, have been provided by Pratt & Whitney aircraft, as well as classrooms, shop instructors, materials, jigs and fixtures. The state of Connecticut has supplied classroom instructors, clerical staff, light, and electric power.

Will Increase Enrollment

These facilities were expanded recently, with approximately 350 persons now being trained, while provisions are being made to increase the enrollment to 1500. The school has been in operation only a short time, but already over 400 have graduated and entered the aircraft engine plant. H. C. O'Sullivan, director of training for Pratt & Whitney, co-ordinates enrollment and curriculum of the school with Pratt & Whitney's requirements.

To be eligible for the school, the applicant for training must be an American citizen, over 18, have a high school education or its equivalent, and be physically fit. No previous experience with machine tools is necessary. To enter he applies to the Connecticut state employment commission in Hartford. Here he gets an adaptability test and preliminary examination, is then sent to Pratt & Whitney employment officer for further check.

On entering the school, the student finds 320 hours of training are available. About 180 hours are required to assimilate instruction given in shop and classrooms. He works an eight-hour shift each day, six days a week, and receives a regular wage while in school. Three shifts are working at the school each day.

The student is taught the ways of a craftsman, is trained on one particular type of machine tool and becomes a specialist, and is trained in fabrication and machining of actual aircraft parts. An integral part of his training is on speeds, feeds, jigs and fixtures of the type used in the shop. Instructors are skilled shop men directly from production department at Pratt & Whitney aircraft. The students also attend classroom sessions in mathematics, blueprint reading, and technical knowledge of fixtures, accessories, and materials. They learn the use of precision instruments such as inside and outside micrometers, vernier calipers, height and depth gages, and all types of inspection gages.

Air Lines Passenger, Mail Volume Increases

■ Approximately 3,000,000 passengers made trips in 1940 over the 37,000 miles of regularly scheduled airlanes in United States and 45,000 route miles operated internationally by American airlines, according to Air Transport Association of America, Chicago. This is an increase in number of passengers of nearly 46 per cent over 1939. Increase in air mail carried is 20 per cent and in air express, 15 per cent.

Passenger-miles increased 62 per cent over the preceding year.

Air transport industry in United States, 14 years old, does a gross business of $75,000,000 annually, according to the association. It employs 20,000 and pays $30,000,000 annually in wages and salaries. Air liners in service, June 30, 1940, totaled 398, with a total seating capacity of 8968 passengers or more than 10,000 for emergency purposes.

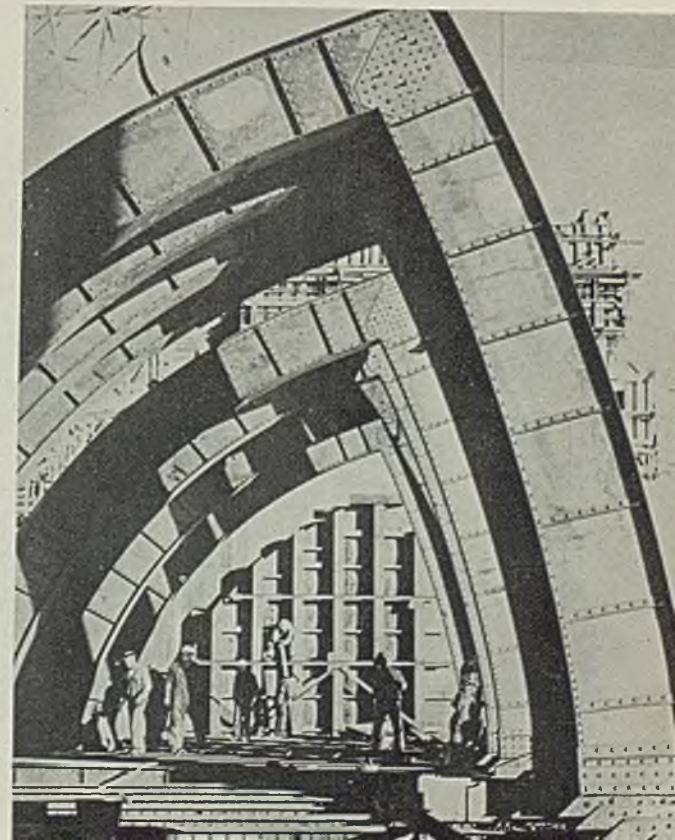
As an industry, air transport since 1926 has carried 49,618,000 pounds of express and freight and 165,300,000 pounds of mail.

Labor Force Unbalanced As to Areas and Crafts

■ An increase in employment by 6,000,000 by the fall of 1942 is suggested in a report by the research staff of the Twentieth Century Fund, New York, headed by Prof. Lloyd G. Reynolds, Johns Hopkins university. However, labor shortages can exist in some localities, with unemployment in others.

The most serious current shortages are said to be in certain shipyard crafts such as coppersmiths, loftsmen and shipfitters. There may be unemployment of 2,000,000 or more even at peak defense production. For defense it is estimated that 35 per cent of the number needed will be skilled workers, 40 per cent unskilled, and 25 per cent semi-skilled. One expedient will be to break down production processes into simpler elements which can be performed by workers with only few months training.

Drum Gate for Grand Coulee



■ First drum gate for the Grand Coulee dam being assembled above a compartment in the spillway crest into which it will disappear whenever the water level in the storage reservoir is to be lowered. When in use the gate floats on water in the compartment. Gate is 135 feet long and operates in a range of 28 feet vertically. Eleven of these have been shipped to the dam site. Wide World photo

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Amortization Certificate Application Deadline Nears.

Defense Manufacturers Reminded of Law's Provisions.

Report on Railroad Equipment Manufacturers Issued.

Seek Domestic Sources of Strategic Minerals.

WASHINGTON

■ NATIONAL defense advisory commission and the war and navy departments are reminding manufacturers the internal revenue code of 1940 imposes a statutory "deadline" for the issuance of certain certificates required under the amortization deduction provisions.

The provisions permit manufacturers to amortize for tax purposes over a five-year period any facilities constructed or acquired to meet the present emergency, provided the required certificates are issued by the secretary of war or navy and the national defense advisory commission.

Consideration of applications for certificates will require much time. Defense officials have announced that unless applications are received before Jan. 7, or 30 days before the "deadline," no assurance can be given that they will be acted upon in time to meet the law's requirements.

Statement by the departments and the defense commission:

"Sections 23 and 124 of the internal revenue code allows a deduction for income and excess-profits tax purposes for amortization, over a 60-month period, with respect to any emergency facility, the construction of which was completed, or which was acquired, after June 10, 1940, upon the issuance of the certificate or certificates, required by the statute. Such certificates are to be issued to the commissioner of internal revenue by the secretary of war or the secretary of the navy, and the advisory commission to the council of national defense.

"Section 124 of the internal revenue code provides that the 'necessity certificate' must be made before Feb. 5, 1941, or before the beginning of the construction or the date of acquisition of the emergency facility, whichever is later, and that the 'certificate of government protection' and 'certificate of non-reimbursement' be made before Feb. 6, 1941, or within 90 days after contract's execution, whichever is later.

"It is apparent then that in order to satisfy the requirements of the statute an application for a 'necessity certificate' with respect to facilities, the construction of which has been begun or which have been acquired, must be acted upon, and a certificate issued, before Feb. 5, 1941. For the same reason an application for a 'certificate of government protection' and 'certificate of non-reimbursement' with respect to a contract which has already been executed must be acted upon, and a certificate issued, within 90 days after execution of contract or before Feb. 6, 1941, whichever is later.

"The notice of procedure for certification issued by the treasury, war and navy departments and the advisory commission states: 'In order that the applications may be acted upon and certificates made within the prescribed time, applications for such certificates should be filed at the earliest possible date. Unless filed in sufficient time, it will not be possible to act upon the applications within the statutory periods, referred to above.' In spite of this warning, applications have not been filed promptly as expected.

"The departments and the advisory commission are aware of the fact that many applications which must meet the statutory 'deadline'—Feb. 5 or Feb. 6, 1941, have not yet been filed. For this reason the departments and the advisory commission feel it necessary to state that, unless such applications are received before Jan. 7, 1941, no assurance can be given that they will be acted upon in time to meet the statutory requirements. Applications will be received after Jan. 7, 1941, however, and will be acted upon as promptly as possible. Such applications, it must be repeated, should be filed at the earliest possible date."

Defense orders already placed with manufacturers will be given adequate consideration when additional orders are being allocated, according to Donald M. Nelson, coordinator of defense purchases.

Mr. Nelson explained the war department for some 20 years has been making a plant to plant survey. Selected firms have been earmarked to insure their effective utilization.

The co-ordinator's office has received inquiries from manufacturers whose plants have been surveyed and allocated in the past by the war department. Some have recently signed "accepted schedules of production" in connection with the army's advanced procurement planning activities. They have indicated reluctance to accept orders not in agreement with these schedules.

Assistant secretary of war states the planned schedules are regarded as evidence of willingness and ability to co-operate and are not to interfere with orders being placed under the present program.

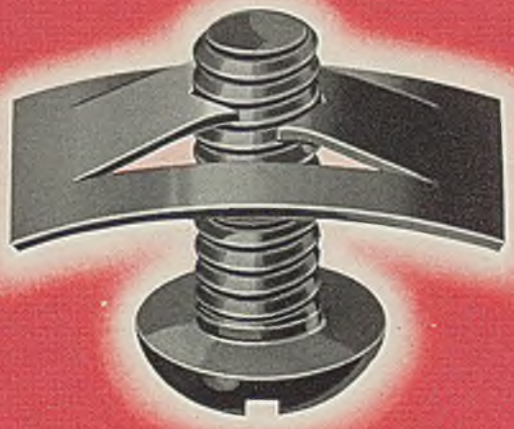
STATISTICAL DIVISION ORGANIZED BY NAVY

Central statistical division has been established in the office of the secretary of the navy, under the direction of A. H. Richardson, whose services have been made available by the American Telegraph & Telephone Co. Mr. Richardson has reported for duty.

The new unit is charged with the compilation of statistical data relative to the naval national defense program and to programs of pro-

Speed Nuts

THE ONLY ONE PIECE FASTENING DEVICES THAT AFFORD A DOUBLE LOCK



ELIMINATE THREADED NUTS AND LOCK WASHERS

The SPEED NUT is the only one piece fastening device ever developed that actually affords a double lock. Note how the arched prongs fit into the threads while the main base of the SPEED NUT is also well arched. As the bolt is turned and tightened, the main arch of the SPEED NUT is brought down and the prongs are forced deeper into the roots of the threads to double-locked position. This gives an arched spring lock and an inward thread lock at the same time.

Vibration tests have shown that the SPEED NUT will stand from 3 to 6 times more vibration than conventional nuts, without loosening. That is why we say, SPEED NUTS definitely prevent loosening from vibration and hold assembled parts together under firm spring tension for the life of the product.

Are you taking full advantage of SPEED NUTS as time and cost savers in the assembly of your *entire* product? Check every assembly location and switch to standard SPEED NUTS wherever possible. Write for samples today, explaining nature of assembly.

SEE US AT S.A.E. CONVENTION, Book-Cadillac Hotel, Parlor C-2, JANUARY 6TH-10TH INCLUSIVE

TINNERMAN PRODUCTS, INC. 2039 FULTON ROAD CLEVELAND, OHIO

MANUFACTURERS OF PATENTED SPEED NUTS

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario. IN ENGLAND: Simmonds Aerocessories, Ltd., London. IN FRANCE: Aerocessoires Simmonds, S. A., Paris.

OVER 900 MILLION ALREADY USED—OVER 700 SHAPES AND SIZES

curement and construction in connection with current and future expansion of the naval establishment. It will also function to eliminate duplication of statistical effort.

In addition to operating in immediate co-operation with factual units of each naval office and bureau, the new statistical division will furnish information and data requested by the national defense advisory commission in accordance with the increasing scope of the requirements of that group.

MEASURES INTRINSIC MAGNETIZATION OF IRON

Limit of intrinsic magnetization of which iron is capable has been determined as a result of experiments recently concluded at the bureau of standards, department of commerce.

Success of the experiments, it is said, at the bureau, was made possible because there was available for the first time the ingots of practically pure iron on which the requisite measurements could be made.

The iron was prepared in the bureau's division of metallurgy and analyses by the best available methods showed impurities of not over 0.01 per cent.

Magnetic measurements were made on several specimens taken from these ingots, the experts state, and every precaution was used to insure high accuracy. The value for magnetic saturation induction of pure iron at 25 degrees Cent. (77 degrees Fahr.) is 21.58 kilogauss, with an uncertainty of 0.01. The gauss is the unit of magnetic induction.

FTC REPORTS ON RAILROAD EQUIPMENT MANUFACTURERS

Report was issued last week by the federal trade commission on "Railroad Equipment Manufacturing Corporations," in its project for the collection of annual financial reports from a large number of industrial corporations.

Eleven corporations' financial reports are included. These represent the more important concerns in the industry from the standpoint of investment and value of goods sold in 1939.

Combined net income, before deduction of interest on long-term borrowings and income taxes, on the average total capital of $439,131,334 employed by the corporations was $9,987,307, or a rate of return of 2.3 per cent. This average rate of return represented individual rates for the corporations ranging from a loss of 3.1 per cent to a profit of 7.1 per cent. Five corporations had rates of return higher than the average, and these rates ranged from 2.4 per cent to 7.1 per cent. Three had rates of return ranging from a profit of 0.3 per cent to 1.1 per cent, and three had a loss.

Net income in 1939 on the average corporate net worth investment, or stockholders' equity, after provisions for income taxes, amounted to $6,146,725. This was a return slightly under 1.6 per cent on the stockholders' investment. Range in rates of return for individual corporations on this base was from a loss of 7.7 per cent to a profit of 5.9 per cent. Five corporations had rates of return higher than the average, ranging from 2.1 per cent to 5.9 per cent. Two had a profit of 0.1 per cent and 0.7 per cent; the other four corporations had a loss.

The eleven corporations realized a net income, after provisions for the payment of income taxes and deduction of profits accruing to minority interests, amounting to $6,152,297. Combined cash dividends paid, or accrued, on preferred shares amounted to $422,190, and on the common shares, $5,015,928. Cash dividends paid during the year 1939 represented a return of approximately 1.4 per cent to the stockholders on the average ledger value (not market value) of their equity of $397,066,301.

Total combined inventories of the 11 corporations amounted to $31,281,121 at the beginning of 1939, as compared with $53,894,740 at the end of 1939, or an increase of approximately 72.3 per cent. Of the total combined inventories, finished goods inventory increased 7.0 per cent; work in process increased from $8,455,168 at the beginning of 1939 to $26,735,892 at the end of 1939, or approximately 216.2 per cent; inventory of raw materials increased from $13,322,737 at the beginning of 1939 to $16,973,738 at the end of 1939, or approximately 27.4 per cent; and inventory of supplies increased 8.2 per cent.

BUREAU OF MINES SEEKS STRATEGIC MINERALS

Exploration of various ore deposits in the United States to determine which might be sources for strategic minerals in an emergency, the development and improvement of methods for producing high-purity electrolytic manganese and chromium, and for recovering nickel, copper, and platinum metal from some complex domestic ores, and the acquisition of special economic data on minerals of importance to the national defense program were among the outstanding accomplishments of the bureau of mines for the fiscal year 1940, according to the annual report of Dr. R. R. Sayers, director of the bureau.

Among the bureau's other national defense activities were: Metallurgical investigations of the production of electrolytic manganese and magnesium metal; and the collection of economic and statistical data on scrap metals. The strategic minerals act authorized the bureau to examine deposits that might be a source of strategic minerals, such as antimony, chromite, nickel, tin, tungsten, mercury, and manganese, in a war emergency. Ten such deposits were tested by surface trenching, pitting, and diamond drilling, and 163 others inspected more briefly. Results indicate significant quantities of strategic minerals in three of the deposits and the possibility that in an emergency the country could be self-sufficient as regards antimony and mercury. Bureau of mines metallurgical laboratories completed 11,718 analyses and other tests of samples shipped from the field.

GERMAN-BELGIAN STEEL EXPORT FIRM FOUNDED

German firm of Otto Wolff, Cologne, Germany, and the Belgian Societe Commerciale d'Ougree S. A., Ougree, Belgium, organized a German-Belgian steel export company under the name of *"Eisenausfuhr Otto Wolff-Ougree G.m.b.H."* with headquarters at Cologne, according to the American consulate general, Cologne. The German participant, while an important steel producer in its own right, was pre-war Germany's outstanding exporter of iron and steel to, particularly, the Near and Far East, and often operating in conjunction with such leading steel producers as Friedrich Krupp A. G. The Belgium firm was also a major steel producer having an annual capacity of (it is reported) 1,000,000 tons and employing 12,000 workmen.

CENSUS BUREAU REPORTS ON STEEL INDUSTRY

Moderate decreases in employment, wages and production in steelworks and rolling mills were shown for 1939, compared with 1937, in the 1939 census of manufacturers, just reported by the bureau of census.

Wage earners primarily engaged in manufacturing employed in the industry in 1939 numbered 368,904, a decrease of 15.8 per cent compared with 437,962 reported for 1937. Their wages, $569,724,280, were 20.6 per cent less than the 1937 figure, $717,425,113.

The decreases, the bureau states, may be partially accounted for by the fact that the 1939 census of manufacturers' questionnaire, for the first time, called for personnel employed in distribution, construction, etc., separately from the manufacturing employes of the plants.

Value of products of the industry for 1939 amounted to $2,720,019,564, a decrease of 13.5 per cent, compared with $3,146,263,400 reported for 1937.

McKee To Build Steel Plant in Brazil

■ Contract for construction of a complete steel plant near Rio de Janeiro, Brazil, has been awarded to Arthur G. McKee & Co., engineers and contractors, Cleveland, by the Commissao Executiva do Plano Siderurgico Nacional.

The plant will be built upon general plans previously prepared by this Brazilian commission. It will consist of coke ovens, a 1000-ton blast furnace, open-hearth steel furnaces with an annual capacity of about 350,000 tons, and rolling mills for producing a complete range of rolled steel products from heavy semifinished steel, rails and structural materials, to finished sheets and tin plate.

Iron ore of very high quality is available within 300 miles of the plant site. Coal will come from mines in the state of Santa Catherina, supplemented by coking coal from the United States.

The cost of the plant will be about $36,000,000, of which $20,000,000 has been made available by a loan from the United States Export-Import bank. Total capitalization of the operating company will be about $45,000,000. Materials and equipment will come largely from the United States. It is estimated that two and one-half to three years will be required for completion.

Other foreign contracts of the McKee company include provision for increase in capacity and improvements in the plants of the three principal iron and steel manufacturing companies in Canada, and extensions to oil refineries in Trinidad, British West Indies.

Girdler Calls Defense Needs 8,000,000 Tons

■ T. M. Girdler, chairman, Republic Steel Corp., has added his statement to that of other steel leaders that steelmaking capacity is sufficient for national defense. In his company's publication, "Republic Reports," he states that capacity is 83,000,000 net tons yearly, an increase of 22,000,000 tons since 1920. Defense requirements will not exceed 8,000,000 tons yearly. Experience indicates that steelmakers of their own volition expand capacity when necessary, even when others accuse them of overexpanding. Mr. Girdler reviewed expansions of his company, as announced last month, including a 4-stand, 4-high, 54-inch cold mill in Cleveland, enlargement of No. 4 blast furnace at Youngstown, a fifth 50-ton electric furnace at Canton, O., a new 4-high, single-stand, skin-pass mill at Monroe and the remodeling of soaking pits at Gadsden.

1,760,000,000 Tons Steel Used in U.S. Since 1854

■ More than 1,760,000,000 net tons of rolled or cast iron and steel have gone into consumption in the United States since 1854, according to the American Iron and Steel institute.

Nearly one-third of this has been repurchased by steel mills and foundries as scrap to be reprocessed into new iron or steel.

Of the remaining 1,210,000,000 tons, the greater part is believed to be still in service in this country in the form of buildings, bridges, railroad equipment, ships, automobiles, tools, machinery, pipes, bathtubs and many other articles.

An indeterminable part has been exported in the form of manufactured articles, such as automobiles, machinery, utensile, or as scrap.

249 Electric Trucks Booked in November

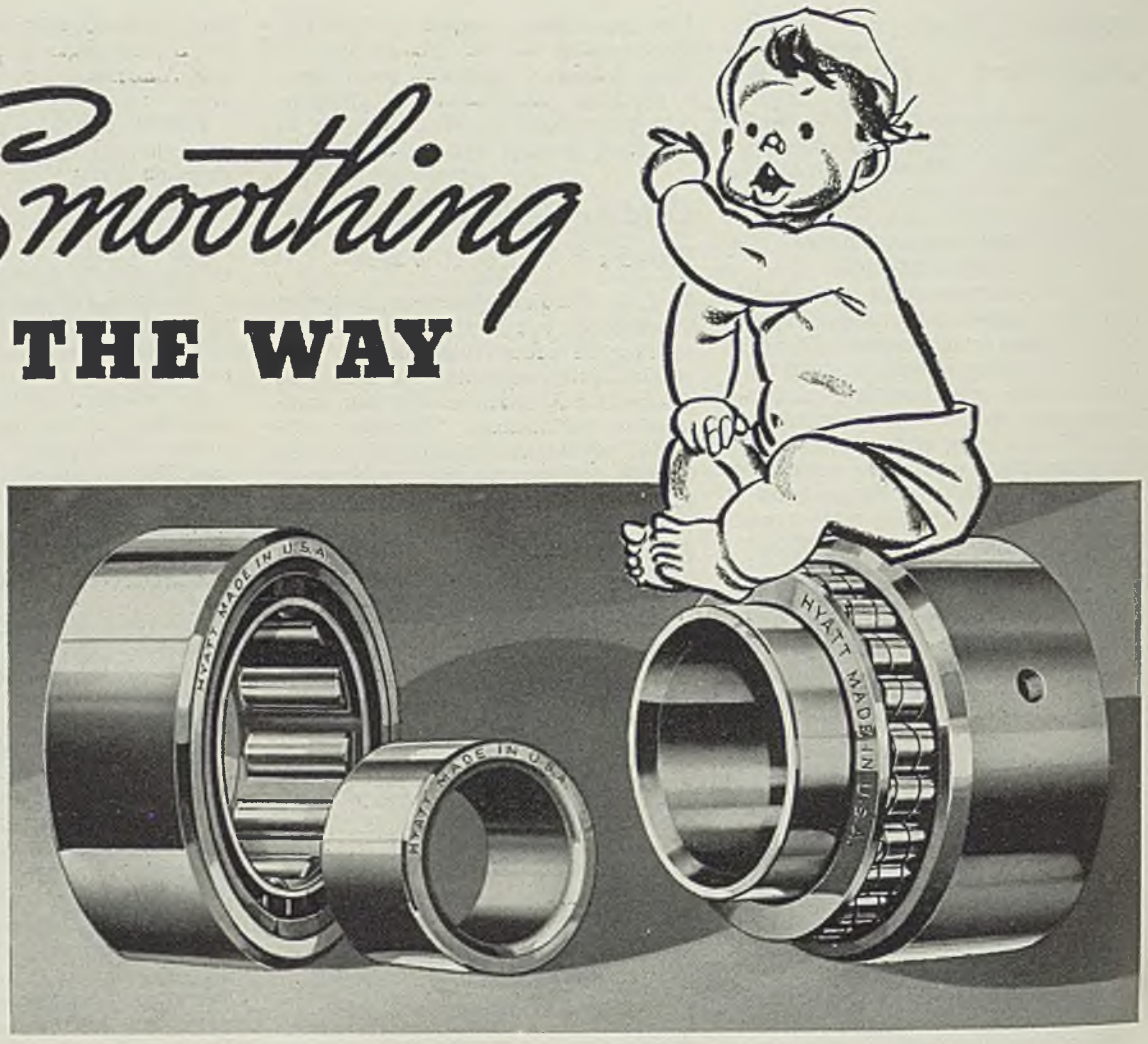
■ Domestic bookings of electric industrial trucks and tractors in November totaled 249 units, highest in several years. This compared with aggregate of 193 units in October, according to report of the Industrial Truck Statistical association, 208 South LaSalle street, Chicago. Total net value of bookings for chassis only was $827,003.73 in November, against $653,682.20 in the preceding month.

Units booked included: 193 cantilever type trucks, 17 nonelevating platform trucks, 17 crane trucks, 16 tractors, five special non-load carriers and one paper roll handler. Further details of the report may be obtained from the association.

Lights Help Stop Saboteurs

■ Designed to forestall sabotage of manufacturing plants, protective night illumination has been advanced to a high degree. These pictures, taken at a large eastern industrial plant, show this type of lighting designed by General Electric engineers. At left is illustrated lighting at plant's main entrance, as an aid in identifying persons entering at this point. At right is shown protective lighting of railroad tracks and the area extending from factory to beyond the plant fence

Smoothing
THE WAY



KEEP THEM YOUNG WITH HYATTS

HYATTS ROLL MERRILY ALONG carrying heavy loads . . . eliminating bearing wear and care, keeping shafts, gears and wheels in perfect alignment . . . and making life easy, smooth, *and long,* for all mechanical equipment. Design them into the machines you build; look for them in the equipment you buy. Ask for further details. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit and San Francisco.

HYATT
ROLLER BEARINGS
QUIET

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Kettering Cites Cost Factor as Generator of Progress. 1,000,000 Cars in 1941 Model Year—Chrysler Program. Use of Auto Industry's "Surplus Capacity" Advocated. Seen as Means for Increasing Aircraft Production.

DETROIT

■ CHARLES F. KETTERING, genial head of General Motors research laboratories, is always "good copy" and his appearance as featured speaker before the Detroit branch of the American Electroplaters society here recently was no exception. He is one of those rare individuals who can speak humorously yet with perfect logic on almost any given subject. He never reads a prepared speech and, when he does prepare his comments in advance, usually memorizes them.

In his recent address he touched on everything from plating generators to the reasons for wars but his main theme was a plea for engineers to have faith in today's job and at the same time to keep an eye on the future and to be alert for new ideas.

Kettering maintained that the explanation for unemployment today and the need for government work projects was simply the exceedingly low ebb of technological development. If scientists, engineers and business men could determine new projects to study and investigate, they could absorb millions of men now forced to seek refuge in nonproductive government jobs.

In fitting new ideas to manufacturing, engineers often bump into disconcerting things which they did not anticipate encountering. As an example, Kettering cited the new type of clutch spring developed for Chevrolet several years ago. It comprises a steel disk with a series of radial fingers pointing inwardly toward a hole in the center, the fingers supplying the spring action in the clutch. When this device was first proposed, engineers shook their heads and said it would not work, that the continual movement of the steel fingers would break them off through fatigue failure.

Someone suggested that the steel be shot blasted before installation in the clutch and this proved to be the factor which upset all the preconceived theories of engineers about fatigue failure of the member.

"Keep Sight of the Future"

From this practical example, Kettering drew the suggestion that engineers keep their vision on things to come and not lose sight of the future in the hard and fast realities of today. "Give me a sliderule," he said, "and I'll stop the universe."

He had some interesting remarks on the subject of costs which he characterized as the "fourth dimension" of a part. Particularly in the motor industry, the pressure of cost is one of the surest generators of progress, and where cost is no factor, such as in the current defense program, a "superdeluxe complication" is introduced which stymies improvement and progress. Kettering cited the study made by his engineers of a certain part designed for military use, which proved to be so complicated that it was possible to leave off 80 per cent of the device and end up with a better product than the original.

Progressive improvement made in piston rings for diesel engines in railroad service was mentionel by Kettering as another example of what engineers can accomplish when they do not set any definite goal but keep looking ahead. At one time it was necessary to replace rings every 80,000 miles of travel.

Improvements in design, steel and manufacturing raised this to 120,000 miles and finally to the present 400,000 miles. Likewise, cylinder liners for these large power plants once had to be ground after 150,000 miles of service; now they stand up for 1,000,000 miles.

Another product of research was the determination of what caused deterioration of body finishes on automobiles. Volumes have been written on this subject, with the thesis that paint deterioration was caused by ultraviolet rays of sunlight. Unconvinced, General Motors engineers racked up some panels along the Florida coast and left them exposed to the elements for months. Investigation showed that those panels exposed at night deteriorated faster than those exposed during the day, which was a mild shock to preconceived theories about ultraviolet light.

Ultimately it was discovered that the cause of corrosion was dew which, being a vapor, could penetrate minute discontinuities in the painted surface, condense and then corrode the panel. And the strange part of it was that such deterioration could not be detected by salt spray tests, the accepted method of accelerated testing for corrosion, because the salt spray was not a vapor like dew and hence could not penetrate the surface as easily.

Commenting upon the "war of the airplane" which we are now witnessing in Europe, Kettering pointed out that wars always result from the creation of new weapons and that the airplane is a comparatively new mechanism. In fact, the 37th anniversary of the first flight of the Wright brothers was celebrated Dec. 17. On this day in 1903 the Wrights flew their first plane a distance of 112 feet.

In their elation, the brothers sent their sister a telegram stating in substance: "We have just flown our airplane a distance of 112 feet. Will

be home for Christmas." Realizing the epoch-making significance of the event, the sister called up the local newspaper office and read the wire to the city editor. Apparently unimpressed, the editor replied, "Well it's nice to know the boys will be home for the holidays."

■ AMPLE evidence exists that Packard is launching a new model program—not a 1942 program—leading to possible introduction of an additional model priced somewhere between the present six and lowest-priced eight. Inquiries are out for a large number of items, including hardware, trim and other body accessories which appear to be completely restyled from anything Packard now has going through the mill. One inquiry involves parts for 10,000 cars.

While the development is in its early stages and naturally no announcement has been made by the company, the possibility is seen that Packard may have decided to test the public's reaction to a radically-styled model with latest ideas in appointments and trim. The move ties in with previously reported activity on the part of Briggs Mfg. Co. in figuring on building 50,000 Packard bodies. Observers are not inclined to believe the present project is a 1942 program, inasmuch as it would seem premature to start this work.

Chrysler is planning to build close to 1,000,000 of its 1941 models and has released steel already for 850,000 jobs, which will carry through to April 1. Projection of production to the million-car level for the model year would indicate an 18 per cent gain over the 847,000 total for the 1940 model year.

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
10 mos.	1,857,806	2,895,059	3,674,434
Nov.	390,405	368,541	.....
Dec.	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

Estimated by Ward's Reports

Week ended:	1940	1939†
Nov. 23	102,340	72,520
Nov. 30	128,783	93,638
Dec. 7	125,690	115,488
Dec. 14	125,625	118,405
Dec. 21	125,350	117,705

†Comparable week.

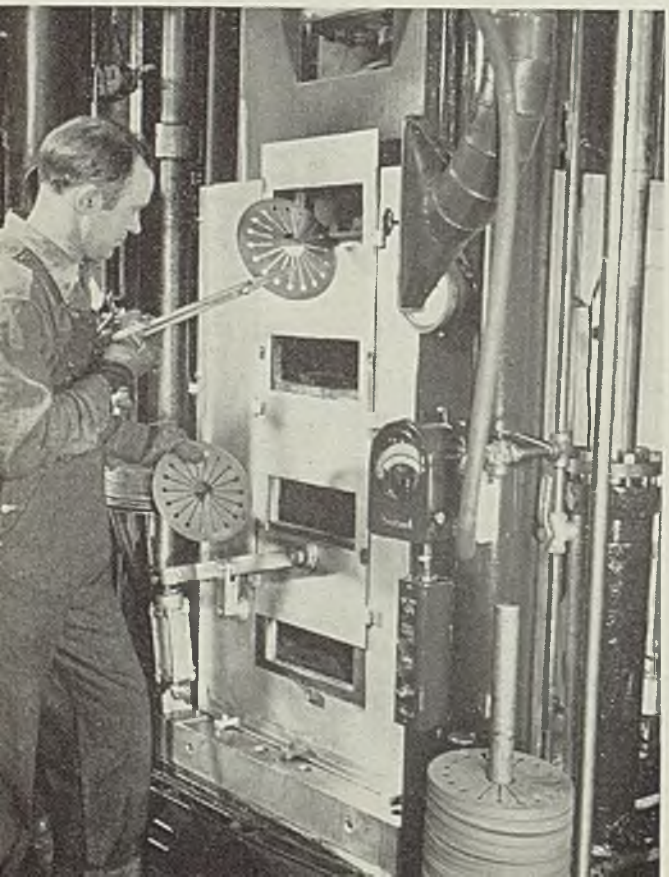
■ ON THE refrigerator front, some interesting advance plans were disclosed at a sales meeting of the Kelvinator organization here last week. Two new models will be added to the Kelvinator line for 1941 and they embody a number of innovations, one being the use of solid plexiglass shelves trimmed in metal, instead of the conventional stainless steel or tinned steel wire shelves. Another is the installation of cooling coils in the back wall of the cabinet, in addition to the conventional stainless steel evaporator; another is the perfection of a new type of stainless steel interior trim eliminating a number of screws and fasteners.

Introduction of the two spectacular new models is calculated to obsolete many electric refrigerators now in use and to step up sales of new boxes accordingly. This is a page in sales psychology taken directly from the automotive industry and its effect will be watched closely. One of the big talking points on the new line will be the close control of humidity and temperature possible. Use of the solid plexiglass shelves was not dictated by any inferiority of steel, but by the desire deliberately to reduce circulation inside the cabinet and prevent dehydration of foods.

■ AN AMUSING incident relative to the defense program is being told around town. When an eastern manufacturer was forced to suspend airplane production because of lack of engines, an energetic purchasing agent decided to investigate. He went to the engine builder and asked why no engines could be supplied to the aircraft plant. He was told that no engines could be had because magnetos were lacking.

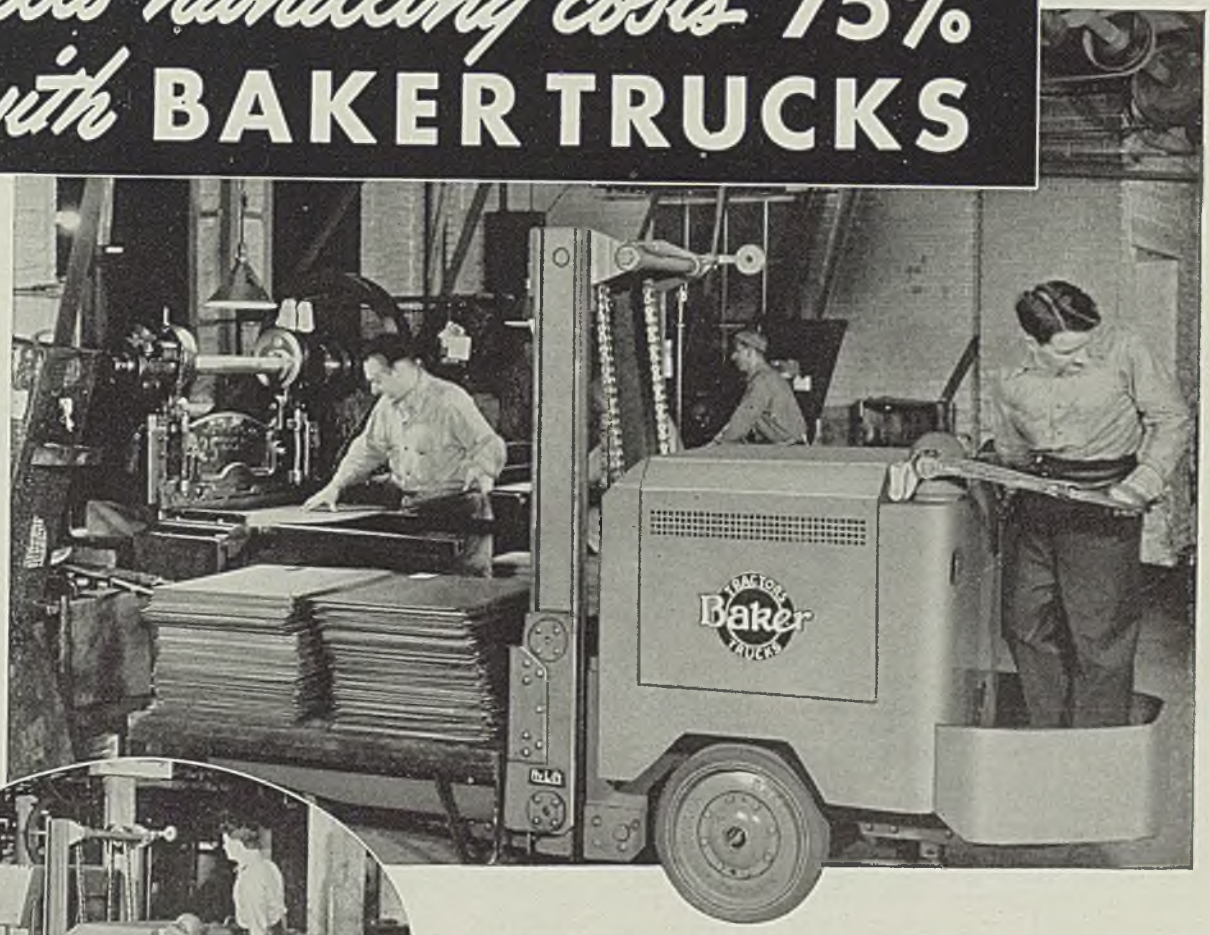
Going to the magneto manufacturer, he was told that no magnetos were available because no magnets could be obtained. Following the trail to the magnet supplier, he was told it was impossible to obtain magnet steel. Keeping at it, the investigator went to the steel source and inquired why magnet steel was so short. He was told that no magnet steel could be supplied because the plant had been told by the government to devote all its facilities to the production of armor plate! At this point, the investigator gave up.

A plan for utilizing "surplus capacity" of the automobile industry to the end that 500 single-motor pursuit planes could be built daily by the motor car industry without requiring any new plants, is reported in process of submission to Washington authorities by Walter Reuther, official of the UAW-CIO. He has been in process of compiling a secret survey of motor plants, receiving his data from union members in the plants. His plan is understood to involve borrowing a part of the facilities of various car builders for various phases of plane and airplane engine production, assembling planes at airports and assembling motors at idle auto plants.



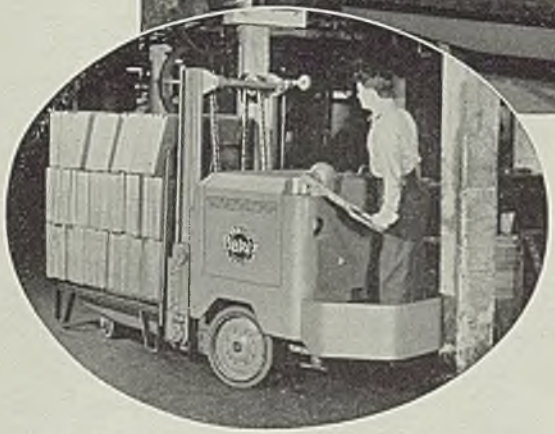
■ Engineers first said these clutch spring disks for Chevrolet wouldn't work, that they would fail by fatigue. Then they found that by shotblasting the surface of the steel, fatigue life was prolonged immeasurably, upsetting previous theories. The springs now are standard in Chevrolet cars

AMERICAN STOVE COMPANY *cuts handling costs 75% with* BAKER TRUCKS



(Left) Baker Truck carrying a bulky load of pressed forms to the spot-welding department—increasing by three times the load formerly handled.

(Above) Baker Truck carrying 2½ tons of sheet steel from shearing department to press room—cutting the cost of this operation from 35c to 4c per load.



(Below) Baker Truck with die-pulling winch handling a 2-ton die on a large press. Baker Trucks also move machines, heavy machine parts, and are a great help in general millwright work.

The world's largest manufacturer of domestic ranges uses 8 Baker Trucks. The extent to which these trucks contribute to the company's earnings is demonstrated by the record of the Cleveland plant. According to Mr. T. P. Muelhauser, superintendent, three Baker Trucks cut handling costs upwards of 75%, besides speeding up production and increasing plant capacity without adding to overhead.

Let the Baker representative show you how similar savings can be gained in your plant.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Co.
2167 WEST 25TH STREET • • CLEVELAND, OHIO
In Canada: Railway & Power Engineering Corporation, Ltd.

Trade mark Registered U. S. Pat. Off.
Baker INDUSTRIAL TRUCKS

War, Navy Departments Award $258,877,037 Defense Contracts

■ DEFENSE contracts last week reported awarded by the war and navy departments aggregated $258,877,037.27, war department awards totaling many times the aggregate of navy contracts. Ordnance and quartermaster corps awards were heavy, war department making further provisions for ordnance plant expansion. Two contracts, totaling $105,887,790, for the equipping and operating of a small arms ammunition plant at St. Louis, were outstanding.

Western Cartridge Co., East Alton, Ill., was awarded an $18,600,000 cost plus fixed fee contract for supervising layout, engineering and production of the plant, and for procuring equipment, supervising its installation and supplying management services. United States Cartridge Co., Baltimore, received an $87,279,790 award, on a cost plus fixed fee basis, for production of small arms ammunition at the new plant. Federal government will retain title to the plant. Manufacturing operations, it is estimated, will provide employment for 10,000 to 12,000.

Construction of temporary buildings and other facilities to house reserve officers and enlisted men at the Walter Reed general hospital, army medical center, Washington, was authorized last week by the war department. Allocated for that purpose was $584,056. Additional buildings and utilities at Edgewood arsenal, Maryland, to cost $148,140 were also authorized, construction to start as soon as practicable.

James Forrestal, acting secretary of the navy, announced sites for four additional naval ordnance plants had been selected as follows: Detroit, approximate cost to be $12,000,000, estimated personnel, 3600; Canton, O., $16,000,000, personnel, 2000; Indianapolis, $6,000,000, personnel, 2500; and Macon, Ga., to cost about $800,000, with estimates of needed personnel about 250.

War department announced the following:

Signal Corps Awards

Camillus Cutlery Co., New York, knives, $22,327.37.

Connecticut Telephone & Electric Co., Meriden, Conn., headsets, $527,533.40.

Frolland Mfg. Co., Springfield, Mass., mast parts for vehicular and ground radio sets, $61,527.24.

Hammarlund Mfg. Co. Inc., New York, radio receivers, $23,729.80.

Holtzer-Cabot Electric Co., Boston, headsets, telephones, $239,056.25.

Horton Mfg. Co., Bristol, Conn., mast sections for vehicular and ground radio sets, $159,251.52.

Kellogg Switchboard & Supply Co., Chicago, microphones, $48,973.50.

Leich Electric Co., Genoa, Ill., switchboards, $367,729.75.

Pollak, Joseph, Corp., Boston, holders, $9562.80.

R. C. A. Mfg. Co. Inc., Camden, N. J., radio receivers, $268,341.80.

Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., switchboards, $448,422.

Utica Drop Forge & Tool Corp., Utica, N. Y., pliers, $75,215.

Veeder-Root Inc., Hartford, Conn., machinery, $22,399.

Vernon Co., New York, clips, $14,868.34.

Corps of Engineers Awards

Addressograph-Multigraph Corp., Cleveland, reproduction equipment, $40,209.

Dietzgen, Eugene, Co. Inc., Chicago, level and stadia rods, $22,742.50.

Ingersoll-Rand Co., Athens, Pa., nail driyers, $109,950.

Pullman Co., Chicago, railroad hospital cars, $57,312.

Star Drilling Machine Co., Akron, O., well drilling machines, $26,231.82.

Chemical Warfare Service Awards

Arcway Equipment Co., Philadelphia, welding wire, $1926.

Artos Engineering Co., Milwaukee, cutting machines, $8008.13.

Baltimore Cooperage Tank & Tower Co., Baltimore, vacuum filters, $3750.

Benson Co., L. A., Inc., Baltimore, can opening machine, $1540.

Bliss, E. W., Co., Brooklyn, N. Y., parts for presses, thread machines, $2399.60.

Dahlquist Mfg. Co. Inc., Boston, slurriflers and reactors, $9830.

Draper Mfg. Co., Cleveland, rotating discs, $27,146.82.

Fischer, Charles, Spring Co., Brooklyn, N. Y., springs, $9372.

Gries Reproducer Corp., New York, loop forming machines, $5900.

Kearney & Trecker Corp., Milwaukee, milling machines, $4879.

Mack Molding Co., Wayne, N. J., outlet valve guard, $16,220.63.

McCauley Engineering Co., Washington, oil burners, $4936.

Pennsylvania Pump & Compressor Co., Easton, Pa., air compressor unit, $1602.

Quaker City Iron Works, Philadelphia, storage tanks, $3078.

Singer Sewing Machine Co., New York, sewing machines, $4243.

Toledo Scale Co., Toledo, O., scales, $1335.12.

Tomkins-Johnson Co., Jackson, Mich., riveting machines, $988.44.

United Carr Fastener Corp., Cambridge, Mass., tip clinching machine, $6000.

Western Auto Machine Screw Co., Elyria, O., striker nuts, $7429.66.

Wolverine Supply & Mfg. Co., Pittsburgh, hose guards, $6304.34.

Zallea Bros. & Johnson, Wilmington, Del., storage tank, $2968.

Air Corps Awards

Armstrong Bros. Tool Co., Chicago, socket wrenches and parts, $167,485.19.

Barnard Aviation Equipment Co. Inc., Ashley, Pa., hoists, $429,400.

Crescent Tool Co., Jamestown, N. Y., pliers, $27,263.36.

Kidde, Walter, & Co. Inc., New York, fire extinguishers, $258,636.30.

Kinsey, E. A., Co., Cincinnati, socket wrenches and parts, $3972.

Lawrence, A. C., Leather Co., Peabody, Mass., shearling, $82,287.50.

Plomb Tool Co., Los Angeles, socket wrenches and parts, $81,330.09.

Trailer Co. of America, Cincinnati, trailers, $82,416.

Weston Electrical Instrument Co., Newark, N. J., ammeter and voltmeter assemblies, indicator and generator tachometers, $474,693.65.

Williams, J. H., & Co., New York, socket wrenches and parts, $11,082.75.

Wright Tool & Forge Co., Barberton, O., socket wrenches and parts, $285.

Yale & Towne Mfg. Co., Stamford, Conn., fuel pumps, $45,410.34.

Ordnance Department Awards

Ahlberg Bearing Co., Detroit, bearings, $1527.68.

Albany Hardware & Iron Co., Albany, N. Y., surface plates, $4398.50.

American Hollow Boring Co., Erie, Pa., artillery materiel, $1067.04.

American Type Founders Corp., Philadelphia, stitchers, $1024.34.

Ampco Metal Inc., Milwaukee, small arms materiel, $2291.

Armstrong-Blum Mfg. Co., Chicago, hack saw machines, $13,781.99.

Arrow Tool & Reamer Co., Detroit, cutting tools, $1456.25.

Atlas Mfg. Co., New York, projector for ground signals, $1790.75.

Barber-Colman Co., Machine & Small Tool division, Rockford, Ill., cutters, $1462.86.

Barker Tool Die & Gauge Co., Detroit, gages, $12,232.50.

Barnard Aviation Equipment Co. Inc., Ashley, Pa., sight assemblies, $163,864.

Barwood & Co., Philadelphia, gages, $19,507.

Bees Mfg. Co., Boston, small arms materiel, $6651.04.

Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., automotive equipment, $271,308.80.

Blaw-Knox Co., Union Steel Castings division, Pittsburgh, castings, $2500.

Bridgeport Brass Co., Bridgeport, Conn., artillery ammunition components, $229,500.

Brown Instrument Co., Philadelphia, recording and controlling instruments, $2048.

C. & B. Machine Co., New Haven, Conn., gages $1400.

Canister Co., Phillipsburg, N. J., artillery ammunition components, $1093.

Carboloy Co. Inc., Detroit, lathes, $2750.

Chase Brass & Copper Co., Waterbury, Conn., small arms ammunition, brass, $117,992.79.

Chelsea Clock Co., Chelsea, Mass., clocks, $1735.50.

Clark Equipment Co., Clark Tructractor division, Battle Creek, Mich., tractors, $1110.

Colonial Broach Co., Detroit, broach sections, $3971.15.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, components for Colt's automatic pistol, $5305.50.

Comtor Co., Waltham, Mass., gages, $3324.60.

Continental Machines Inc., Minneapolis, shaping and sewing machines, $6991.95.

Crescent Truck Co., Lebanon, Pa., electric lift truck, $2120.

Crucible Steel Co. of America, New York, small arms materiel, nickel-chromium steel, $17,033.12.

Cunningham, James, Sons & Co., Rochester, N. Y., accessories for scout cars, $1,993,620.

Detroit Broach Co. Inc., Detroit, broach sections, $1548.30.

Du Pont, E. I., de Nemours & Co., Carney's Point, N. J., small arms ammunition, $14,870.40.

Essley, E. L., Machinery Co., Chicago, riveting machines, $1113.50.

Ex-Cell-O Corp., Continental Tool Works division, Detroit, hobs, $1313.25.

Finkl, A., & Sons Co., Chicago, artillery materiel, $15,600.

Firth-Sterling Steel Co., Philadelphia, dies, tools for small arms, $6598.80.

General Motors Corp., Delco Appliance division, Rochester, N. Y., fire control equipment, $2,589,809.25.

Goodman Mfg. Co., Chicago, artillery materiel, $428,715.

Greenfield Tap & Die Corp., Greenfield, Mass., gages, $1193.

Guiberson Diesel Engine Co., Chicago, and Breeze Corp. Inc., Newark, N. J., automotive equipment, $195,030.

Hadley Special Tool Co. Inc., Boston, assemblies for machine guns, $2041.80.

Halpin Mfg. Co. Inc., Long Island City, N. Y., gages, $1193.50.

Hanson-Van Winkle-Munning Co., Matawan, N. J., motor generators, $4171.

Hanson-Whitney Machine Co., Hartford, Conn., sub acme tap, $1080.

Hardinge Brothers Inc., Elmira, N. Y., lathes, $1426.50.

Hercules Machine Tool & Die Co., Detroit, gages, $2936.

Hercules Powder Co., Kenvil, N. J., artillery ammunition components, $2820.

Jahn, B., Mfg. Co., New Britain, Conn., dies, $1676

Knight Screw Products Co., Detroit, small arms materiel, $1360.44.

Lamson Co., Syracuse, N. Y., small arms ammunition, $441,000.

Lawson, E. P., Co. Inc., Philadelphia, machines, $1265.

McCulloch Mfg. Co., South Boston, Mass., small arms materiel, $20,033.84.

McGill Mfg Co., Valparaiso, Ind., bearings, $5974.50.

McKinney Mfg. Co., Pittsburgh, artillery ammunition components, $10,997.19.

Milwaukee Saddlery Co., Milwaukee, accessories for mortars, $34,388.

Moore, J. W., Machine Co., Everett, Mass., gages, $4964.

Moto-Scoot Mfg. Co., Chicago, rails, $80,-119.04.

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., blades for cutter heads, gages, $23,768.99.

Oliver Iron & Steel Corp., Pittsburgh, artillery materiel, $1947.

Otis Elevator Co., Buffalo, steel castings, $6096.

Pipe Machinery Co., Cleveland, gages, $2323.23.

Poor & Co., Canton Forge & Axle Works, Canton, O., artillery materiel, $2649.

Pratt & Whitney Co., Philadelphia, gages, $6850.50.

Precise Tool & Mfg. Co., Farmington, Mich., gages, $38,021.30.

Prentiss, Henry, & Co. Inc., New York, grinders, $49,620.

Rettew, R. L., & Co., Lebanon, Pa., ammunition components, $6700.

Revere Copper & Brass Inc., Baltimore, small arms ammunition, $8868.

S. & S. Tool & Mfg. Co., Detroit, artillery materiel, $1008.

Savage Arms Corp., J. Stevens Arms Co. division, Chicopee Falls, Mass., small arms materiel, $42,100.

Schlosser Mfg. Co., Philadelphia, gages, $27,319.

Scovill Mfg. Co., Waterbury, Conn., small arms ammunition, artillery ammunition components, $183,904.

Size Control Co., Chicago, gages $1181.25.

Stow Mfg. Co. Inc., Binghamton, N. Y., small arms materiel, $36,860.

Struthers Wells-Titusville Corp., Titusville, Pa., artillery materiel, $238,306.

Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $11,808.35.

Threadwell Tap & Die Co., Greenfield, Mass., cutters, $2800.

Thurston Mfg. Co., Providence, R. I., cutting tools, $4988.40.

Union Twist Drill Co., Athol, Mass., cutters, $1456.

United Shoe Machinery Corp., Beverly, Mass., forging dies, $1212.

Universal Metal Products Co., New York, small arms materiel, $7501.32.

Veit & Young, Philadelphia, tools for small arms, $63,841.

Vinco Corp., Detroit, gages, $10,116.75.

Vulcan Mold & Iron Co., Latrobe, Pa., molds, $25,561.55.

Western Cartridge Co., East Alton, Ill., small arms ammunition, $10,286.

Williams, J. H., & Co., Drop Forgings division, Buffalo, wrenches for automotive equipment, $18,810.61.

Quartermaster Corps Awards

Alco Construction Co. Inc., Los Angeles, warehouse, Mines field, California, $121,385.

Aluminum Cooking Utensil Co., New Kensington, Pa., component parts for field ranges, $1,023,570.

Atlas Electric & Engineering Co., San Francisco, underground extension to electric distribution system, Hamilton field, California, $6701.

Beck, A. H., Foundation Co., San Antonio, Tex., excavation and pier footing for supply building, and engine repair building, Duncan field, Texas, $8580.

Bootz, Wm. R., Evansville, Ind., fire units for field ranges, $226,200.

Brockmeyer Construction Co., St. Louis, boiler house for mess, Scott field, Illinois, $39,128.

Carr, Meryl, Lawton, Okla., pump station with accessories, Ft. Sill, Oklahoma, $7250.

Chatillon, John, & Sons, Fulton, N. Y., butchers' cleavers, $30,896.

Cooperage Corp., Chicago, flour sieves, $6240.

Crosley Corp., Cincinnati, fire units and cabinets for field ranges, $765,885.

Dickie Construction Co., St. Louis, radio school building, Scott field, Illinois, $127,532.

Equitable Equipment Co., New Orleans, single-screw, all steel tug, $140,000.

Fisher Electric Co., New York, electrical systems, Ft. Hancock, New Jersey, $10,277.37.

Foley, Howard P., Co. Inc., Harrisburg, Pa., electrical distribution system, New Cumberland general depot, Pennsylvania, $4475.

G. & J. Mfg. Co., Dallas, Tex., cabinets, complete with cradles, for field ranges, $299,750.

Green, Mont J., Manhattan, Kans., operations building, Marshall field, Kansas, $46,808.

Hill & Combs, San Antonio, Tex., depot supply building, Duncan field, Texas, $571,700.

Honneycut & Co., Birmingham, Ala., temporary housing, Drew field, Tampa, Florida, $235,400.

Jones, J. A., Construction Co., Charlotte, N. C., temporary buildings and facilities, Ft. Jackson, South Carolina, $4,-081,546.

Lewis & Trifinger, Ann Arbor, Mich., rifle range, Ft. Custer, Michigan, $33,-500.

Light, Joseph, Construction Co., Washington, dock at ordnance depot, Curtis bay, Baltimore, $243,041.

Loranger, Theodore, & Sons, New Bedford, Mass., rehabilitation of miscellaneous buildings, Ft. Rodman, Massachusetts, $13,705.

Louisville Tin & Stove Co., Louisville, Ky., tin dippers, $24,000.

MacDonald & Kahn Inc., San Francisco, construction of cantonment, Ft. Lewis, Washington, $1,550,000.

Metropolitan Wire Goods Co., Brooklyn, N. Y., wire egg whips, $2464.

Mondelci & Benvenuti, New London, Conn., warehouse, Ft. Terry, New York, $34,990.

Montgomery, P. O. B., Dallas, Tex., temporary construction, Ft. Sam Houston, Texas, $1,903,370.

Muskegon Construction Co., Muskegon, Mich., laundry and adjacent boiler house, Ft. Custer, Michigan, $229,586.

Page, Holland, Austin, Tex., temporary housing, Ft. D. A. Russell, Texas, $79,-400.

Presto Gas Mfg. Co., Chicago, component parts for field ranges, $51,273.20.

Reeves Steel & Mfg. Co., Dover, O., accessories for field ranges, $43,010.

Scheu Products Co., Upland, Calif., component parts for tent stoves, $24,200.

Severin, N. P., Co., Chicago, miscellaneous buildings, Albrook field, Canal Zone, $1,128,200.

Stortz, John, & Son Inc., Philadelphia, accessories for field ranges, $2074.

Sullivan Foster Inc., New Bedford, Mass., construction and completion of temporary housing, harbor defense, New Bedford, Mass., $289,898.

Trask Heating Co., Boston, heating system, Ft. Warren, Boston harbor, Massachusetts, $3430.

Wallace, R., & Sons Mfg. Co., Wallingford, Conn., 200,000 forks and 200,000 spoons, $13,500 and $14,500, respectively.

Walsh Bros., Cambridge, Mass.; Samuel Glazier, Everett, Mass.; and Walter L. Ritchie, Somerville, Mass., construction and completion of temporary housing, harbor defense, Boston, $402,-000; $39,882; and $73,809, respectively. Walsh Bros., Cambridge, Mass. and Joseph E. Bennett Co., Boston, construction and completion of temporary housing, harbor defense, Portland, Me., $246,000 and $193,790, respectively.

Wark & Co., Philadelphia, warehouse, factory and other buildings and utilities, Philadelphia quartermaster's depot, $9,035,000.

Watz, Oscar C., Modern Electric Co., Mt. Clemens, Mich., electrical distribution system, Selfridge field, Michigan, $19,-400.

Williams Lumber Co., Columbus, Ga., miscellaneous buildings, Ft. Benning, Georgia, $469,240.

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Navy department announced the following:

Bureau of Supplies and Accounts Awards

Aldrich Pump Co., Allentown, Pa., centrifugal pumps, $5556.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., corrosion-resisting steel, $310,915.50.

Allis-Chalmers Mfg. Co., Milwaukee, gas turbine test equipment, $182,000.

American Brass Co., Waterbury, Conn., copper-nickel alloy tubing, $40,441.99.

American Car & Foundry Co., New York, burster links, shear pins, round pin shackles, $10,806.90.

American Smelting & Refining Co., New York, ingot copper, $109,060.

American Tool Works Co., Cincinnati, engine lathes, $19,960.

Anaconda Wire & Cable Co., New York, electric cable, $7277.50.

Bridgeport Brass Co., Bridgeport, Conn. brass tubes, $31,507.

Brown & Sharpe Mfg. Co., Providence, R. I., automatic screw machines, $17,-232.01.

Calumet & Hecla Consolidated Copper Co., New York, ingot copper, $48,200.

Carnegie-Illinois Steel Corp., Pittsburgh, corrosion-resisting steel, $37,415.40.

Carrier Corp., New York, refrigerating equipment, $16,233.

Chase Brass & Copper Co. Inc., Waterbury, Conn., brass, copper pipe and tubing, $273,013.93.

Conver Insulated Wire Co., Pawtucket, R. I., copper wire, $200,500.

Compressed Steel Shafting Co., Readville, Mass., cold-rolled steel, $7149.45.

Crane Co., Chicago, valves, $64,327.48.

Crucible Steel Co. of America, New York, steel welding electrodes, $7899.
Electric Storage Battery Co., Philadelphia, storage battery elements, $9174.15.
Erie Foundry Co., Erie, Pa., drop forge hammer, $9270.
Farrel-Birmingham Co. Inc., Buffalo, engine stub shafts, and engine couplings, $20,090.40.
General Cable Corp., New York, copper wire, $304,962.50.
Hard Mfg. Co., Buffalo, hospital beds, $47,960.
Harrisburg Steel Corp., Harrisburg, Pa., shatter-proof compressed gas cylinders, $54,070.
Heald Machine Co., Worcester, Mass., internal grinders, $19,153.
Indian Motorcycle Co., Springfield, Mass., motorcycles with package trucks, $29,-035.53.
International Nickel Co. Inc., New York, nickel-copper-aluminum alloy, nickel-copper alloy, $57,402.79.
Kennecott Sales Corp., New York, ingot copper, $225,439.52.
Lyon Metal Products Inc., Aurora, Ill., shelving for engine overhaul and aircraft maintenance shop, $7648.64.
Mine Safety Appliances Co., Pittsburgh, hydrogen gas indicators, $7936.15.
Monarch Machine Tool Co., Sidney, O., precision lathes, $11,866.
Motley, James M., & Co. Inc., New York, lathe, $9135.
National Cylinder Gas Co., Chicago, acetylene cylinders, $6750.
National Steel Construction Co., Seattle, tank baulks, $892,154.
Noland Co. Inc., Washington, plumbing fixtures, $17,915.10.
Norton Co., Worcester, Mass., grinding machine, $6175.
Orton Crane & Shovel Co., Chicago, locomotive crane, $13,087.
Peters, Orville S., Washington, oscillograph unit, $8842.
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire division, New York, copper wire, electric cable, $260,-749.30.
Roberts Numbering Machine Co., Brooklyn, N. Y., automatic numbering machines, $8250.
Rockford Machine Tool Co., Rockford, Ill., double housing planer, $30,521.60.
Scovill Mfg. Co., Waterbury, Conn., copper-nickel alloy tubing, $10,778.25.
Spengler-Loomis Mfg. Co., Automatic Pencil Sharpener Co. division, Chicago, pencil sharpeners, $12,618.75.

Bureau of Yards and Docks Awards

Dally & Quist, Seattle, replacement of pier at naval ammunition depot, Puget sound, Washington, $179,397.
Eckert Etinne Engineering Corp., San Francisco, refrigeration and ice-making plant at receiving ship, Yerba Buena island, San Francisco, $6400.
Guest, C. M., & Sons, Anderson, S. C., naval ammunition depot at Charleston, S. C., $1,000,000.
Harnischfeger Corp., Milwaukee, bridge cranes at following navy yards: Pearl Harbor, Honolulu, T. H.; Norfolk, Va.; Portsmouth, N. H.; Charleston, S. C.; and Puget sound, Washington, $317,780.
Meyerstein, Anthony M., Inc., dry dock cranes at Brooklyn, N. Y., navy yard and at navy yard, Boston, $319,280.
Shepherd Niles Crane & Hoist Co., Montour Falls, N. Y., wall cranes at following navy yards: Pearl Harbor, Honolulu, T. H.; Charleston, S. C.; and Puget sound, Washington, $138,674.
Star Iron & Steel Co., Tacoma, Wash., dry dock crane at naval dry docks, Hunters Point, Calif., $238,500.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., turbo-alternator for Norfolk navy yard, Portsmouth, Va., $177,300.
Wheeler, C. H., Mfg. Co., Philadelphia, condenser and auxiliaries for Norfolk navy yard, Portsmouth, Va., $23,750.

Purchases Under Walsh-Healey Act

(In Week Ended Dec. 7)

Iron and Steel Products

	Commodity	Amount
Air Cruisers Inc., Clifton, N. J.	Oxygen cylinders	$252,797.02
Akron-Selle Co., Akron, O.	Steel supports	10,352.00
Baldt Anchor, Chain & Forge Corp., Chester, Pa.	Chain	14,977.93
Berkley Machine Works & Foundry Co. Inc., Norfolk, Va.	Steel tubes	20,600.00
Bethlehem Steel Co., Bethlehem, Pa.	Steel towers	35,800.00
Boyle Mfg. Co., Los Angeles	Steel drums	54,088.32
Braeburn Alloy Steel Corp., Braeburn, Pa.	Steel	20,499.36
Budd, Edward G., Mfg. Co., Philadelphia	Metal parts, body assemblies	865,601.09
Burns, Jabez, & Sons Inc., New York	Coffee roasters	17,700.00
Camden Forge Co., Camden, N. J.	Racks and pinions	240,860.00
Camillus Cutlery Co., New York	Jack knives	24,068.00
Chicago Flexible Shaft Co., Chicago	Blades	23,154.95
Commercial Shearing & Stamping Co., Youngstown, O.	Superstructure hoist	49,189.06
Copperweld Steel Co., Glassport, Pa.	Copper wire	18,630.00
C-O-Two Fire Equipment Co., Newark, N. J.	Gas cylinders	21,072.80
Crane Co., Chicago	Valves, cocks	86,082.50
Crown Iron Works Co., Minneapolis	Screw posts	20,894.00
Crucible Steel Co. of America, New York	Forgings	26,875.00
Cyclone Fence Co., Waukegan, Ill.	Fence	29,830.00
Dayton Wheel Co., Dayton, O.	Reel carts	31,093.00
Dicke Tool Co. Inc., Downers Grove, Ill.	Reel units	146,646.50
Eastern Tool & Mfg. Co., Bloomfield, N. J.	Wire assemblies	43,500.00
Edgcomb Steel Co., Philadelphia	Drawn steel	99,384.51
Enterprise Foundry Co., San Francisco	Stretcher weights	13,800.00
Estate Stove Co., Hamilton, O.	Ranges	87,950.00
Ever-Tite Mfg. Co., Davenport, Iowa	Radio cabinets	32,200.00
Fairmount Tool & Forging Co., Cleveland	Motor maintenance equipment	11,731.88
Farquhar, A. B., Co. Ltd., York, Pa.	Buoys	29,775.00
Federal Equipment Co., Carlisle, Pa.	Lock boxes	19,791.00
Fischer, Charles, Spring Co., Brooklyn, N. Y.	Rifle parts	55,929.20
Froiland Mfg. Co., Springfield, Mass.	Mast bases	61,527.24
General Drop Forge Co. Inc., Buffalo	Forgings	10,065.00
Gorsuch, James, Jr., Jeffersonville, Ind.	Grates	73,500.00
Graver Tank & Mfg. Co. Inc., East Chicago, Ind.	Mooring buoys	61,400.00
Graybar Electric Co., Knoxville, Tenn.	Steel conduit	11,781.64
Grove Regulator Co., Oakland, Calif.	Valves	10,360.00
Hanssen's, Louis, Sons, Davenport, Iowa	Hardware	11,103.14
Hart Mfg. Co., Louisville, Ky.	Ranges	171,580.00
Heller Bros. Co., Newark, N. J.	Files	20,114.88
Hemp & Co. Inc., Macomb, Ill.	Finished assemblies	76,959.14
Horton Mfg. Co., Bristol, Conn.	Mast sections	159,251.52
Independent Engineering Co. Inc., O'Fallon, Ill.	Oxygen cylinders	145,800.00
Ingersoll-Rand Co., New York	Drills, hammers	54,637.04
International Silver Co., New York	Knives	37,200.00
Karp Metal Products Co. Inc., Brooklyn, N. Y.	Radio cabinets	21,704.00
Keckley, O. C., Co., Chicago	Valves	11,490.00
Kidde, Walter, & Co. Inc., New York	Cylinder assemblies	127,907.36
Klaine, F. A., Co., Cincinnati	Ranges	47,982.00
Lakeside Bridge & Steel Co., Milwaukee	Gantry crane	198,750.00
Lalance & Grosjean Mfg. Co., Woodhaven, Long Island, N. Y.	Kitchen utensils	11,699.25
Larson Tool & Stamping Co., Attleboro, Mass.	Angletube assemblies	116,024.44
La Salle Steel Co., Chicago	Cold drawn steel	*189,752.32
Louisville Tin & Stove Co., Louisville, Ky.	Spark arrestors	34,000.00
Lufkin Rule Co., Saginaw, Mich.	Calipers	14,070.72
Lukens Steel Co., Coatesville, Pa.	Trunnion blocks	64,314.96
Mann Edge Tool Co., Lewistown, Pa.	Axes	22,537.78
Midvale Co., Philadelphia	Racks and pinions	239,600.00
Midway Electric Supply Co. Inc., New York	Conduit pipe	114,189.50
Mosler Safe Co., Hamilton, O.	Safes	30,817.50
National Can Corp., Boston	Hose guards	10,908.87
National Enameling & Stamping Co., Granite City, Ill.	Steel drums	88,720.00
National Forge & Ordnance Co., Irvine, Pa.	Forgings	139,633.23
National Malleable & Steel Castings Co., Cleveland	Cast chain	131,939.00
National Pneumatic Co. Inc., New York	Shell parts	154,020.00
Oil Well Supply Co., Oil City, Pa.	Metal parts	246,262.50
Phillips & Butterff Mfg. Co., Nashville, Tenn.	Stoves	90,382.00
Phillips Pump & Tank Co., Cincinnati	Portable tanks	15,841.00
Phoenix Mfg. Co., Joliet, Ill.	Horse shoes	19,673.71
Pittsburgh Valve & Fittings Corp., Barberton, O.	Bronze valves	48,794.10
Pratt Industries Inc., Frankfort, N. Y.	Tubes	263,241.75
Prentice, G. E., Mfg. Co., New Britain, Conn.	Clasps	28,080.40
Robertshaw Thermostat Co., Youngwood, Pa.	Booster parts	79,719.78
Ryerson, Joseph T., & Son Inc., Chicago	Reinforcement bars	12,743.38
Scheu Products Co., Upland, Calif.	Grate bases	25,375.00
Schmitt Steel Co., Portland, Oreg.	Anchor jacks	31,450.00
Southwest Welding & Mfg. Co., Alhambra, Calif.	Mooring buoys	183,200.00
Star Drilling Machine Co., Akron, O.	Drawbars	21,402.00
Starrett, L. S., Co., Athol, Mass.	Calipers	20,943.50
Steel Improvement & Forge Co., Cleveland	Forgings	46,806.00
Surface Combustion Corp., Toledo, O.	Heat units	68,000.00
Tredegar Co., Richmond, Va.	Projectiles	42,224.00
United-Carr Fastener Corp., Cambridge, Mass.	Clips	11,337.10
United States Expansion Joint Co., Nashville, Tenn.	Steel stakes	50,438.02
Universal Highway Products Co., Chicago	Tie bars	88,179.25
Valley Iron Works Inc., Yakima, Wash.	Gate frames	41,990.00
Walworth Co., New York	Valves	126,057.04
Wheeling Corrugating Co., Philadelphia	Cans	11,340.00
Willamette Iron & Steel Corp., Portland, Oreg.	Gate rollers	315,326.00

*Estimated.

Purchases Under Walsh-Healey Act (Cont.)

	Commodity	Amount
Nonferrous Metals and Alloys		
American Brass Co., Waterbury, Conn.	Jacket cups, steam hose	$277,580.00
Atlantic Metal Hose Co. Inc., New York	Steam hose	16,575.00
Blackstone Silver Co., Stratford, Conn.	Forks	30,000.00
Chase Brass & Copper Co. Inc., Waterbury, Conn.	Brass	48,426.00
Hudson Motor Car Co., Detroit	Booster parts	143,824.00
International Nickel Co. Inc., New York	Alloy rods, bars and sheets	47,681.26
National Boston Lead Co., Boston	Solder	18,554.33
Phelps Dodge Copper Products Corp., British American Tube division, New York	Brass pipe	51,364.80
Follak Mfg. Co., Arlington, N. J.	Fuse parts	955,350.00
Revere Copper & Brass Inc., Baltimore	Copper tubing, brass strip	119,253.78
Risdon Mfg. Co., Naugatuck, Conn.	Grommets	52,000.00
Robertshaw Thermostat Co., Youngwood, Pa.	Booster parts	352,100.00
Scovill Mfg. Co., Waterbury, Conn.	Sockets, fuse parts	387,500.00
Stewart-Warner Corp., Chicago	Fuse parts	742,930.80
Thorrez & Maes Mfg. Co., Jackson, Mich.	Liner assemblies	161,250.00
United Metal Hose Co. Inc., Long Island City, N. Y.	Steam hose	23,410.00
Wallace, R., & Sons Mfg. Co., Wallingford, Conn.	Spoons	49,800.00
Machinery and Other Equipment		
Alliance Machine Co., Alliance, O.	Hydroseparators	21,495.00
American Bosch Corp., Springfield, Mass.	Engine parts	13,175.00
Arter Grinding Machine Co., Worcester, Mass.	Grinding machines	18,381.00
Barnard Aviation Equipment Co. Inc., Ashley, Pa.	Hoists	59,000.00
Bertsch & Co. Inc., Cambridge City, Ind.	Roll machines	17,097.00
Borg-Warner Corp., Marvel-Schebler Carburetor division, Flint, Mich.	Controls	226,237.70
Brown & Sharpe Mfg. Co., Providence, R. I.	Grinding machines	36,975.00
Buda Co., Harvey, Ill.	Engine parts	14,785.60
Buffalo Forge Co., Buffalo	Blowers	14,995.00
Builders Iron Foundry, Providence, R. I.	Lathes	62,000.00
Bullard Co., Bridgeport, Conn.	Turret lathe	12,421.00
Busch-Sulzer Bros., Diesel Engine Co., St. Louis	Engine parts	26,517.38
Caterpillar Tractor Co., Peoria, Ill.	Tractors	14,929.32
Cincinnati Bickford Tool Co., Cincinnati	Drills	26,424.20
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Broaching machines	23,250.00
Cleveland Worm & Gear Co., Cleveland	Worm wheels	17,856.00
Continental Motors Corp., Muskegon, Mich.	Overhauling engines	12,211.46
Cuno Engineering Corp., New York	Oil filters	42,480.00
Davidson, M. T., Co., Brooklyn, N. Y.	Pumps	20,588.40
Detroit Aluminum & Brass Corp., Detroit	Bearings	16,350.50
Dorr Co. Inc., New York	Cranes	57,500.00
Edwards, John, Inc., Brooklyn, N. Y.	Motor parts	10,953.00
Ex-Cell-O-Corp., Detroit	Engine parts	22,216.20
Frick Co. Inc., Waynesboro, Pa.	Refrigeration unit	13,140.00
Gammons-Holman Co., Manchester, Conn.	Reamers	10,990.65
General Motors Corp., Diesel Engine division, Cleveland	Engine spares	32,784.00
General Tool & Mfg. Co., Irvington, N. J.	Draw Ties	28,500.00
Given Machinery Co., Los Angeles	Lathes	10,195.00
Gould & Eberhardt, Newark, N. J.	Cutting machines	23,568.00
Hardie Tynes Mfg. Co., Birmingham, Ala.	Air compressors	505,542.00
Harnischfeger Corp., Milwaukee	Excavators	35,300.00
International Harvester Co., Chicago	Tractors	13,888.80
Kinsey, E. A., Co., Cincinnati	Grinders	128,142.50
Koehring Co., Milwaukee	Dumptors	20,220.00
Landis Tool Co., Waynesboro, Pa.	Grinding machines	10,064.00
Leece-Neville Co., Cleveland	Engine parts	11,666.50
Linkbelt Speeder Corp., Chicago	Shovels	248,320.00
Lloyd & Arms Inc., Philadelphia	Lathes, drilling machines	28,702.00
Lodge & Shipley Machine Tool Co., Cincinnati	Lathes	14,141.00
Lynch, Edward A., Machine Co., Philadelphia	Drilling machines	17,065.20
Miller Printing Machinery Co., Pittsburgh	Gun mounts	2,306,376.40
Mine Safety Appliances Co., Pittsburgh	Manifold systems	67,500.00
Monarch Machine Tool Co., Sidney, O.	Lathes	86,613.04
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn.	Boring machine, mills, cutting machine, gage block	71,105.55
Perine Machine & Supply Co. Inc., Seattle	Presses	10,534.00
Philadelphia Metal Stamping Co. of Pennsylvania, Philadelphia	Machine service	21,063.85
Prentiss, Henry, & Co. Inc., New York	Boring machines, shapers	53,270.00
Prosperity Co. Inc., East Syracuse, N. Y.	Laundry equipment	812,341.30
Pump Engineering Service Corp., Cleveland	Test units	17,860.00
Reed-Prentice Corp., Worcester, Mass.	Lathes	62,970.00
Rockford Machine Tool Co., Rockford, Ill.	Metal shapers	18,332.25
Schutte & Koerting Co., Philadelphia	Oil systems	41,470.00
Sebastian Lathe Co., Cincinnati	Lathes	51,064.00
Sellers, Wm., & Co. Inc., Philadelphia	Boring machines	75,752.00
Sharples Corp., Philadelphia	Purifiers	45,052.56
Star Machinery Co., Seattle	Boring machines	25,715.74
Stewart-Warner Corp., Chicago	Engine parts	33,451.35
Swind Machinery Co., Philadelphia	Machine	11,704.00
Tool & Equipment Supply Co., New York	Reamers	10,248.50
Tycoon Tackle Inc., Miami, Fla.	Machine service	19,950.00
Van Norman Machine Tool Co., Springfield, Mass.	Boring machines	21,000.00
Vickers Inc., Waterbury Tool division, Waterbury, Conn.	Pumps	122,203.75
Wagner, Charles P., & Bros., New Orleans	Bakery equipment	19,628.37
Warner & Swasey Co., Cleveland	Lathes	18,872.00
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.	Loading machines	15,000.00
Waukesha Motor Co., Waukesha, Wis.	Engine assemblies	12,388.00
Weber & Co., San Francisco	Cranes	14,728.00

80% of Canada's Steel Booked for War Needs

TORONTO, ONT.

■ Nearly 80 per cent of Canadian steel business booked or coming into market in past six months has been on war account. Heavier tonnages are being placed with steelmakers in United States.

To provide war materials producers' requirements, steel capacity in Canada will be further expanded. Steel Co. of Canada Ltd., Hamilton, Ont., reports additions to cost about $6,000,000 are planned. Enlargement includes a new blast furnace, coking ovens, soaking pits and a plant addition, 100 x 400 feet.

Contracts totaling $11,919,400 were reported last week. Awards included $2,737,216 placed in United States. Chrysler Motor Corp. of Canada Ltd., Windsor, Ont., received a $3,000,000 order for military vehicles. Awards included:

Shipbuilding: Pictou Foundry & Machine Co. Ltd., Pictou, N. S., $60,000; MacDonald Bros. Aircraft Ltd., Ottawa, Ont. $5080; Armstrong Bros., Victoria, B. C., $22,190.

Dockyard supplies: Canadian Vickers Ltd., Montreal, Que., $8775; R.C.A. Victor Co. Ltd., Ottawa, $5534.

Instruments: Air Ministry, England, $11,000; Accessories Manufacturers Ltd., Montreal, $14,407; Instruments Ltd., Ottawa, $9472; Stanley Mfg. Co. Ltd., Toronto, $13,500.

Mechanical transport: International Harvester Co. of Canada Ltd., Ottawa, $53,968; J. S. Innes Ltd., Toronto, $232,875; Ford Motor Co. of Canada Ltd., Windsor, Ont., $5903.

Aircraft: Air Ministry, England, $35,334; Canadian Vickers Ltd., Montreal, $6213; Canadian Wright Ltd., Montreal, $15,638; C. O. Monat & Co. Ltd., Montreal, $17,616; Switlik Canadian Parachute Ltd., Montreal, $32,992; Irvin Air Chute Ltd., Ottawa, $33,000; Coates Ltd., Eburne, B. C., $9742.

Electrical equipment: Canadian General Electric Co. Ltd., Halifax, N. S., $10,049; Northern Electric Co. Ltd., Halifax, $17,913; Canada Wire & Cable Co. Ltd., Montreal, $17,172; Gardner Engines Ltd., Montreal, $129,780; Canadian General Electric Co. Ltd., Ottawa, $7948; Canadian Westinghouse Co. Ltd., Ottawa, $26,434; Northern Electric Co. Ltd., $34,943; Canadian Telephones & Supplies Ltd., Toronto, $17,172; Small Electric Motors Ltd., Toronto, $255,000.

Machinery: Lincoln Electric Co. of Canada Ltd., Toronto, $5272; Dominion Chain Co. Ltd., Niagara Falls, Ont., $26,065.

Ordnance: Hall Machinery Co., Sherbrooke, Que., $46,675.

Munitions: Defence Industries Ltd., Montreal, $36,180.

Miscellaneous: Metal Craft Co. Ltd., Grimsby, Ont., $10,290; Canadian Comstock Co. Ltd., Toronto, $25,700; Howard Furnace Co., Toronto, $58,395; Canadian Kodak Co., Ltd., Toronto, $9720; Geo. R. Prowse Range Co. Ltd., Ottawa, $11,904; Stanley A. Grant, Toronto, $24,995; Gillette Safety Razor Co. of Canada Ltd., Montreal, $6000; Waterous Ltd., Brantford, $19,000; MacLean Plumbing Service, Noranda, Que., $23,000.

War Construction projects: Bennett & White Construction Co., Calgary, Alta., $839,723; Fundy Construction Co., Halifax, $400,000; Rayner Construction Co., Leaside, Ont., $83,478; Storms Contracting Co. Ltd., Toronto, $123,420; Pigott Construction Co., Hamilton, Ont., $89,700; G. A. Beert, St. Boniface, Man., $193,075; Bird Construction Co. Ltd., Winnipeg, $90,345; General Construction Co. Ltd., Vancouver, B. C., $271,982.

Manufacturers Adopt Plan To Protect America's Future

Defense should be made strong but neither government nor industry should over-mortgage the future. Upward spirals must be prevented, public purchasing power sustained equitably, private enterprise encouraged

■ A FORMULA for preparing for the future of America was adopted by the Congress of American Industry, held in New York, Dec. 11-13, under the sponsorship of the National Association of Manufacturers.

"The task before us," the platform stated, "is twofold: First, to safeguard our freedom by providing military defenses, by strengthening our economic defenses, by fortifying our moral and spiritual defenses; second, to prepare for the future, in both its immediate and long-range aspects."

"The strength to defend America," document went on, "is the first concern of this nation. Three major problems are involved:

"1—To determine the vital interests to be defended and how far beyond our continental borders these interests extend. This is the responsibility of government.

"2—To determine the nature and size of the military establishment and the equipment and supplies required. This also is the responsibility of government.

"3—To produce the required equipment and supplies. This is the task of industry."

"National defense is national insurance. The American people can secure this without experiencing reduction in standard of living to the extent suffered abroad. But the effort to maintain our living standard at its present level can hold hope of success only if labor, capital and management work together with a united purpose for production, more production and still more production.

Equitable Prices Necessary

"Among the fundamental conditions necessary to this end are the following:

"1—An equitable relationship between the prices of agricultural products and the prices of other commodities;

"2—Opportunity for industrial management and labor to operate efficiently and effectively in the processes of production and distribution;

"3—Taxation carefully and intelligently adjusted to meet at least non-defense expenditures, and designed to facilitate the flow of private capital and remove uneconomic barriers to the production and distribution of needed goods and services;

"4—Avoidance of production by government of goods which private enterprise can furnish;

"5—Recognition of the value of the profit motive as a powerful incentive to productive effort, and of the economic need for profits in industry sufficient to maintain and expand productive enterprise;

"6—Maintenance of such equitable wage rates and conditions of employment as will promote increased production and employment and a higher actual income to workers;

"7—Encouragement of the investment of private capital in production, research, and continued economic venture;

"8—Preservation of competition as the best assurance to the consumer of reasonable prices and high and improving quality of product;

"9—Maintenance of the buying power of consumers by all possible improvements and economies which will reduce costs of production and distribution.

"Essential to America's defense effort is the moral and spiritual strength of the people. There must be a resurgence of faith in God and country, of confidence in each other and in ourselves; there must be self-reliance and a willingness to sacrifice immediate self-interest for the common welfare."

With respect to the future the platform went as follows:

"The time will come when millions of workers engaged in producing goods for national defense will be released from that employment; when a large army of young men will have completed their military training; when the support provided by the defense program to employment in non-defense occupation will cease. In other countries similar conditions will exist, the effects of which upon this nation's domestic and foreign markets should be anticipated.

"Consistent with the maximum defense effort itself, the policies and practices followed during the existing emergency by business, labor, agriculture, and government should be such as to lessen the dangers of a post-war depression or cushion the effects if one should occur.

"Among such fundamental considerations are protection of government credit, by keeping reserves of borrowing power for future use if needed, and by encouraging the use of private funds for productive defense facilities; prevention of an inflationary spiral of runaway prices and wages; curtailment by industry of any tendency to over-mortgage the future or to build up inventories unnecessarily, by unwise expansion of credit through installment selling or otherwise; efficient expenditure of defense funds; rigid economy in non-defense expenditures of federal, state, and local governments.

"Such measures would not delay or obstruct armament production; yet they would contribute much to preventing a subsequent economic depression.

"America has been built to its present stature by the free enterprise and individual initiative of its people.

"Fifty years ago our geographic frontiers had disappeared. We found that new industrial frontiers offered opportunity for even greater expansion. There are other industrial frontiers before us today still more extensive, still more promising.

"Here in America we have an abundance of natural resources, of manpower, of machines, of capital, of organizing and technical skill.

"Inventors' workshops and research laboratories are constantly supplying new things that create new jobs and contribute to a higher standard of living as they are developed into commercial products.

Platform Pledges Aid

"The main assurance of the future welfare of America lies in the present and potential wants of the people and in the ability of free enterprise to provide the goods and services the people desire."

The platform closed with this pledge:

1—To continue to defend against attack from any source the American concept of freedom—constitutional representative democracy; private enterprise; and civil and religious liberty, including freedom of speech and freedom of the press;

2—To exert its utmost effort in co-operation with the government to carry out the program of national defense with all possible speed and efficiency;

3—To maintain at the same time, as far as possible, production of

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■ **For proceedings at earlier sessions of the Congress of American Industry held in New York, Dec. 11-13, under the sponsorship of the National Association of Manufacturers, please see STEEL of Dec. 16, p. 21**

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goods and services to meet normal needs;

4—To do its full part to prevent or cushion a threatened post-war economic depression, by supporting and following practices which will contribute to the maintenance of a healthy economic life; and

5—To continue to promote, within industry, recognition and fulfillment of the economic and social responsibilities which industrial management shares with other groups for the improvement and advancement of the general welfare.

The Congress of American Industry pledges itself to work for the preservation of America's institutions and the protection of America's future.

What Other Speakers Said

The trend toward dictatorship here was the subject of an address by J. Howard Pew, president, Sun Oil Co., Philadelphia, and vice president of the National Association of Manufacturers. To show how far we have gone he cited a recent analysis which revealed the federal government as a maze of 10 departments, 133 bureaus, divisions, authorities and agencies, and 68 independent establishments, altogether employing more than a million persons.

Dr. Carl Snyder, well-known writer on economics, also examined the path toward totalitarianism on which this nation has been traveling. He said our chief trouble is that the United States is a nation of economic illiterates. We have a lot of well-intentioned people but they do not think straight. He recommended country-wide education of our people as to the significance of economic facts.

The thorough campaign which the association is conducting toward this objective was described in a report by C. M. Chester, chairman, General Foods Corp., New York, who told of the ramified activities of the work that is conducted under the guidance of an advisory group of 36 public relations experts headed by Paul Garrett, General Motors Corp. The work has borne much fruit.

"Who would have thought seven years ago," asked Mr. Chester, "when businessmen were about as popular as a skunk at a lawn party, that in 1940 a businessman would be running for President? And, what is even more encouraging, that the same businessman would be running as an avowed champion of the private enterprise system? And, what is even more significant, that the candidates of both parties would be proclaiming their faith in American business?"

Philip D. Reed, chairman, General Electric Co., New York, spoke rather optimistically with respect to present relations between industry and government. "There is increasing evidence of better understanding and of a closer working relationship between government and business," he said. "Nothing, as one views the future and the dimensions of the job that industry is asked to discharge, is more important than a close, a cordial relationship between industry and government. May we all foster it in every way at our command lest 'national unity' become indeed a hollow phrase."

Mr. Reed also was one of numerous industrialists who declared that prices must be held down and that the armament program must not be utilized by industry or any part of industry to make unreasonable profits.

Recalling the aftermath of upward price spirals in the first World war period, he declared that inflationary profits are not real profits and eventually vanish.

In this connection Charles R. Hook, American Rolling Mill Co. described profits of the World war period as "fool's gold."

Commenting on the great success which has characterized the work of the United States conciliation service in preventing or mending labor trouble, John R. Steelman, director of that service, made some suggestions as to how best to utilize it.

"Call on us in the early stages," he said. "Help us to help you *before* and not *after* a stoppage of operations."

Col. Philip B. Fleming, administrator, wage and hour division, department of labor, said that the 40-hour week definitely is a good thing because it is forcing the employment of more men. More important, it is enforcing widespread training of Americans in productive skills. The 40-hour week, he said, is working.

"Some employers have asked our inspectors," he said, "if we would rather have them hire more men than pay overtime. So let me answer that question right here. Yes, hire more men. That's the primary reason for the 40-hour week today. Put on that extra shift even though it means hard work for you to organize it . . .

"Nobody likes to train men. Training costs money. It would help a lot to be able to hire them already trained. But you will not help your country by returning from Washington with a contract in your pocket and hiring 300 skilled workers away from other factories . . .

"One of your most difficult tasks will be to increase your supervisory personnel. You will have to make foremen out of your best inspectors. Pick the men who seem to be born leaders. Make inspectors of your own toolmakers, toolmakers of your machinists, machinists of your machine operators. Promote them from

(*Please turn to Page* 71)

■ Germany, forsaking production of most peace-time goods, continues to build a mighty armada of Blitzkrieg material. Pictured is a heavy tank assembly line "somewhere in Germany". These mobile fortresses contributed largely to the Nazis' conquest in western Europe. NEA photo

Broad Horizons for Industrialists

■ IN MAN'S pursuit of knowledge and experience, he sometimes concentrates in his chosen field to the point of developing a dangerously narrow outlook on life.

We once knew a young engineer who was so intent upon acquiring the so-called "engineering type of mind" that he shunned all literature except that pertaining to science and technology. He actually bragged to his friends that in his entire life he had read less than a half dozen books on history, biography, fiction and the arts. Not until years later did he discover his mistake. His narrow viewpoint had interfered with his development as an engineer.

Many business and industrial executives have encountered a similar difficulty. At times they have become so wrapped up in the routine of the immediate job that they have lost touch with the world beyond their office or factory doors. In time, most of them learned their mistake. Like the engineering student, they realized that the broader viewpoint is a valuable adjunct to one's specialized knowledge and experience.

* * *

The urge to develop a broader background—to know more intimately the forces which rule the world—has been intensified tremendously during the past decade. In business, as in other pursuits, men have been forced to realize that they should understand something of the social, political and economic forces which impinge upon their own activities.

This new interest in a wider horizon was reflected clearly in the splendid program of the recent annual meeting of the National Association of Manufacturers. Those hundreds of executives who attended the sessions at the Waldorf-Astoria did not listen solely to speeches by their contemporaries. They heard also the pulse beats of the world from the lips of eminent authorities who do not profess to know much about manufacturing.

* * *

They heard the lesson of poor France from an observer competent to teach it—the well known French author, Andre Maurois. They listened attentively while a noted philosopher, Will Durant, outlined a drastic program which he believes will insure a self-disciplined freedom for America. They heard Wythe Williams, noted commentator, discuss the probable conditions of the peace which will follow the present world conflict.

They heard Mrs. Harold V. Milligan, Emily Post, Lily Pons, Margaret Culkin Banning and a typical American housewife —Mrs. Irvin Bussing—express the views of American women on questions of national defense. They heard W. B. Weisenburger, of the Roper survey organization, analyze the opinion of the American public on questions pertinent to industry.

The N. A. M. program was heavily weighted with the "outside viewpoint." This is a favorable sign. The better manufacturers understand the lay mind, the greater will be their chance of avoiding the fate that has befallen private enterprise in Germany, Italy, Russia and Japan.

E. L. Ohaner

The *BUSINESS TREND*

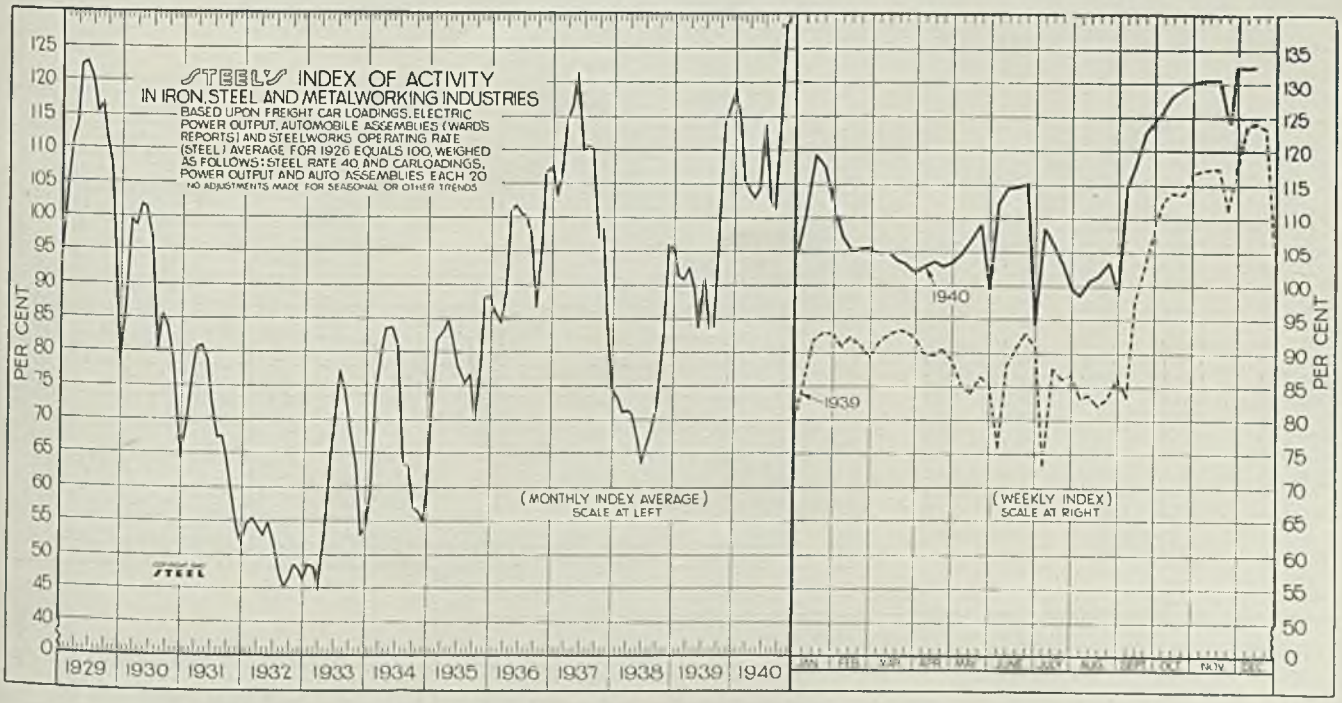
Business Pace Resists Year-End Influences

■ BUSINESS has reached the mid-way point of December without experiencing the normal seasonal decline in new demand nor the usual year-end recession in industrial activity. Incoming orders are well sustained despite the near record pace of October and November. Steady volume of incoming business and the large backlog of orders assure a high level of activity in the capital goods industries at least through the first quarter.

In the week ended Dec. 14, STEEL's index of activity gained 0.1 point to 132.6. This compares with 124.2 level at this time a year ago while in the corresponding weeks of 1938 and 1937 the index stood at 99.8 and 79.4 respectively.

The national steel rate declined one point to 95.5 per cent during the week ended Dec. 14. Steelmaking operations in the weeks immediately ahead are expected to fluctuate within a narrow range at the present near-capacity level.

Revenue freight traffic declined less than seasonally during the latest period, while electric power consumption again climbed to a new peak. Automobile assemblies during the week of Dec. 14, totaled 125,625 units.



STEEL'S index of activity gained 0.1 *point to* 132.6 *in the week ended Dec.* 14:

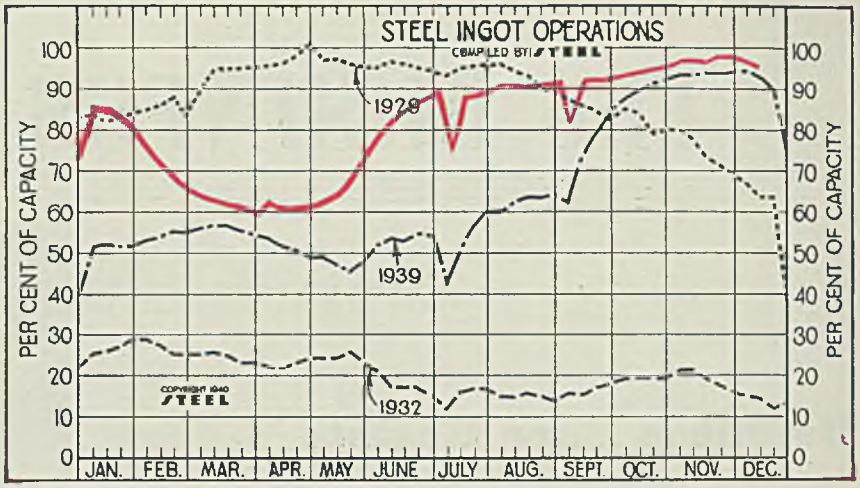
Week Ended	1940	1939
Sept. 28	122.8	107.9
Oct. 5	124.4	112.5
Oct. 12	126.0	113.9
Oct. 19	128.3	113.6
Oct. 26	129.9	116.2
Nov. 2	130.2	117.1
Nov. 9	130.3	117.2
Nov. 16	130.3	117.3
Nov. 23	124.7	111.4
Nov. 30	132.6	117.9
Dec. 7	132.5	123.9
Dec. 14	132.6	124.2

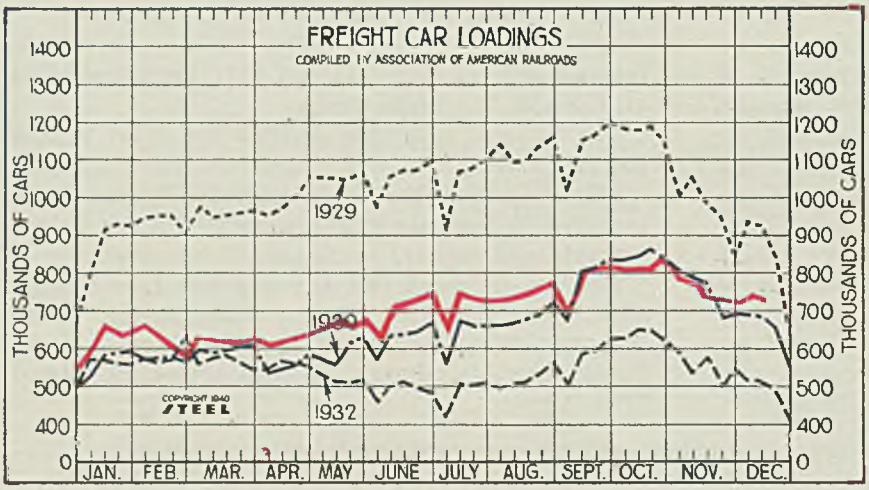
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	102.7	89.8	70.8	116.6	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.	.....	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
Aug. 31....	91.5	64.0	44.5	83.0
Sept. 7....	82.0	62.0	41.5	72.0
Sept. 14....	93.0	74.0	46.0	80.0
Sept. 21....	93.0	79.5	48.0	76.0
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





Freight Car Loadings

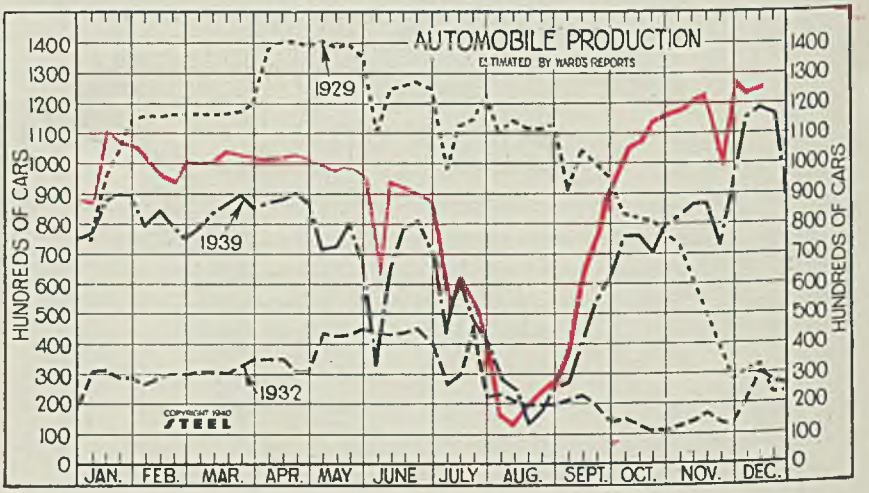
(1000 Cars)

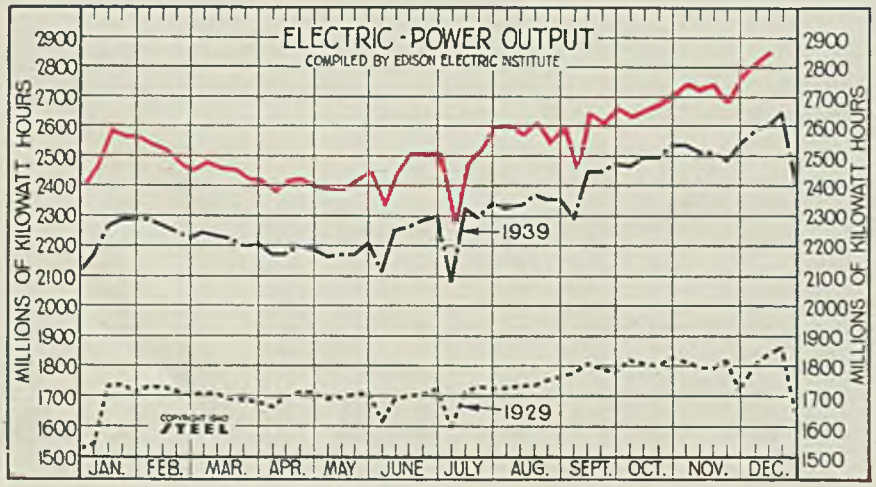
Week ended	1940	1939	1938	1937
Sept. 7.....	695	667	569	711
Sept. 14.....	804	806	660	827
Sept. 21.....	813	815	676	840
Sept. 28.....	822	835	698	847
Oct. 5.....	806	835	703	815
Oct. 12.....	812	845	727	810
Oct. 19.....	814	861	706	773
Oct. 26.....	838	834	709	772
Nov. 2.....	795	806	673	732
Nov. 9.....	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

Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Sept. 7....	39.7	26.9	17.5	59.0
Sept. 14....	66.6	41.2	16.1	30.1
Sept. 21....	78.8	53.9	20.4	28.0
Sept. 28....	95.9	62.8	25.4	45.8
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





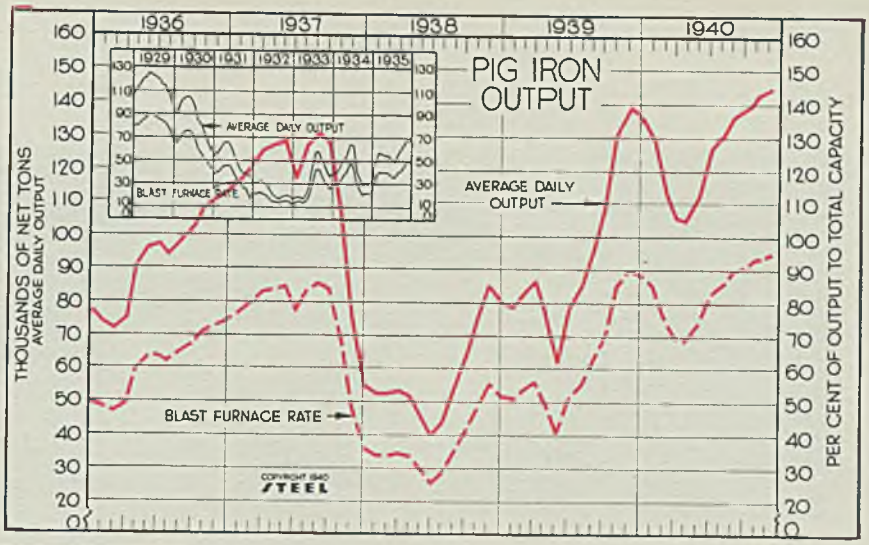
Electric Power Output

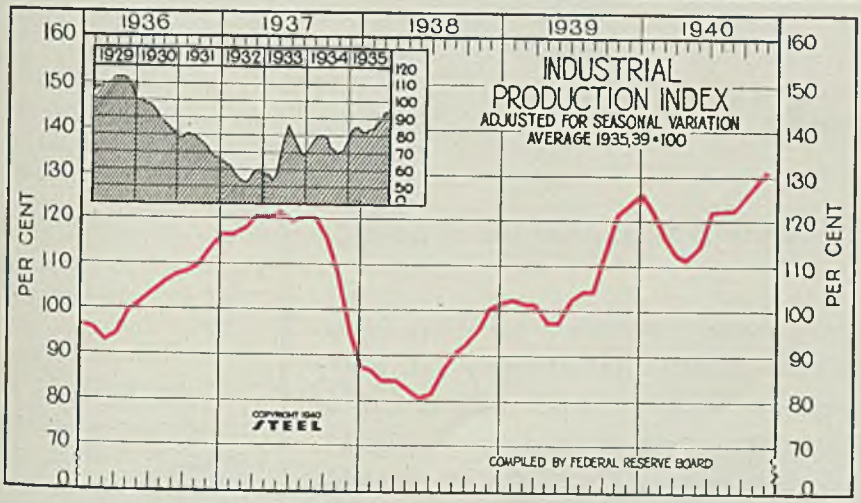
(Million KWH)

Week ended	1940	1939	1938	1937
Sept. 7...	2,463	2,290	2,048	2,154
Sept. 14...	2,639	2,444	2,215	2,281
Sept. 21...	2,629	2,449	2,154	2,266
Sept. 28...	2,670	2,470	2,139	2,275
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

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.	.....	136,119	79,943	....	88.5	51.4
Av.	.....	86,375	51,752	....	62.6	37.3





Industrial Production
Federal Reserve Board's Index

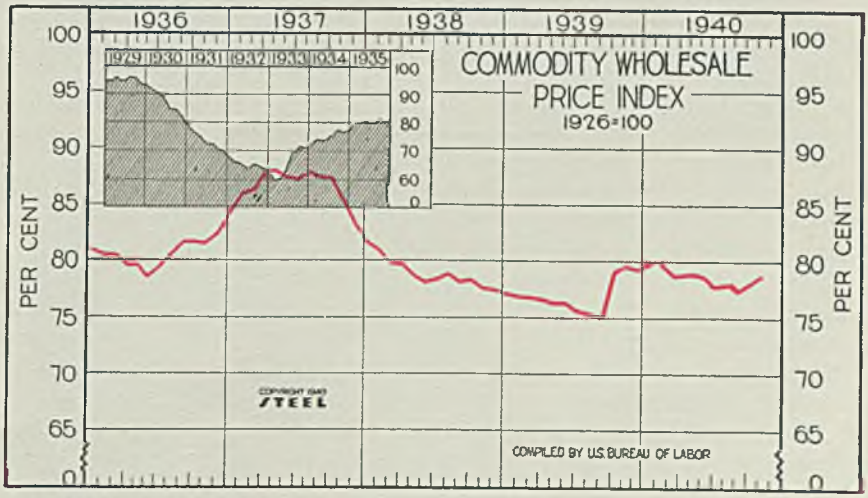
(1935-39 = 100)

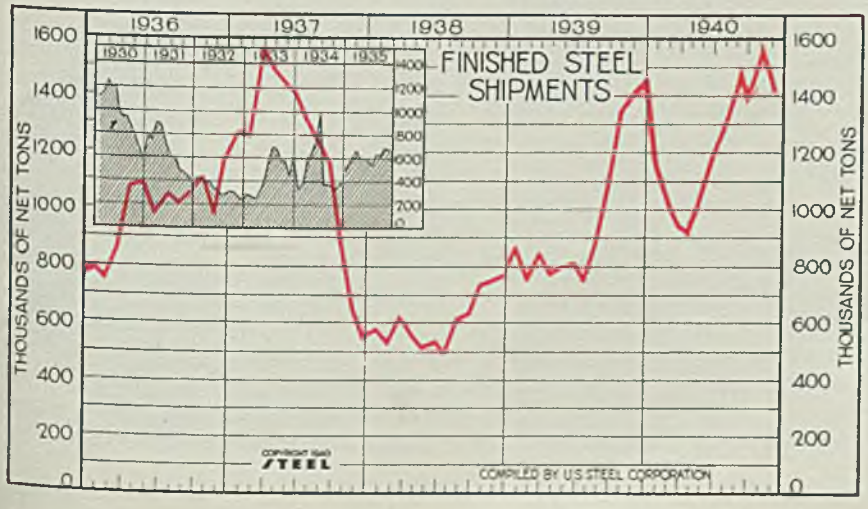
	1940	1939	1938	1937	1936
Jan.	122	102	86	116	95
Feb.	116	101	84	117	92
March ...	112	101	84	120	94
April	111	97	82	120	99
May	115	97	80	121	101
June	121	102	81	119	103
July	121	104	86	120	105
Aug.	121	104	90	120	107
Sept.	125	113	92	115	108
Oct.	129	121	95	107	109
Nov.	132	124	100	95	113
Dec.	...	126	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	77.3	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.	78.7	79.4	77.6	85.4	81.5
Nov.	....	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....	.....	1444.0	765.9	539.5	1178.6
Total† ..	....	11707.3	7315.5	14097.7	11905.0

†After year-end adjustments.

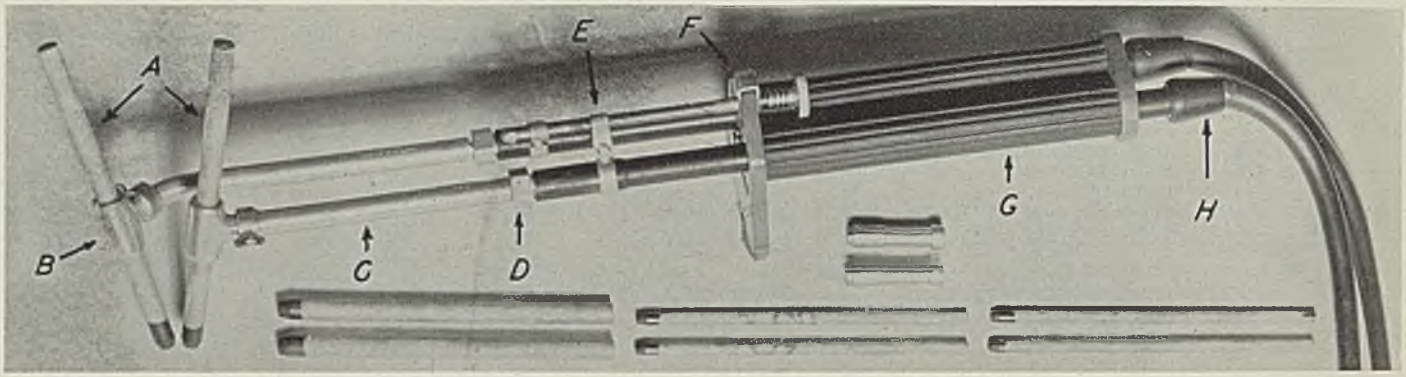


Fig. 1—Showing construction details of typical arc torch equipment

The "Arc Torch"

. . . A Widely Adaptable Heat Source

Greatly enlarging scope of electric arc welding equipment, the arc torch features an extremely hot, easily controlled flame whose chief characteristic is lack of pressure. Thus molten metal is not forced away but can be flowed where wanted. Is particularly valuable for welding aluminum and its alloys, for welding and brazing cast iron, and for brazing all types of steel. Also adapted to many other uses.

By FRANK W. SCOTT

Instructor of Ferrous Metallurgy
University of Minnesota
Minneapolis

■ USERS of electric welding equipment, of either alternating or direct-current type, have been handicapped by the lack of any suitable attachment for doing much of the welding, brazing, soldering and heating work that demands an independent source of heat such as supplied by the oxyacetylene torch. With the arc torch and a suitable electric welder, this deficiency is eliminated, and arc welding equipment becomes a universal tool capable of doing practically all such work and at exceptionally low cost.

The arc torch is an ingenious device whereby an electric arc is steadily maintained between two carbon electrodes held at an angle to each other. As shown in accompanying illustrations, the angle of the electrodes causes the flame of the arc to be deflected below the ends of the carbons. It is this hot, steady, reducing flame that furnishes the heat. While the temperature of the electric arc is above that of the oxyacetylene flame, the actual heat supplied by the arc is easily and accurately controlled by changing the current supplied to the electrodes. The arc-torch flame has no gas pressure behind it to force the molten metal away from the point of impact. This "soft" character of the hot flame, with its reducing properties, makes for easy welding of aluminum and copper alloys. Many alloys regarded as practically impossible to weld may now be joined perfectly after the operator becomes familiar with their physical properties such as recognizing when the metal is molten, its heat conductivity, expansion and contraction characteristics and other considerations. Specific cases will be detailed.

Recommended Applications: The arc torch is recommended principally for welding nonferrous metals and alloys as well as for brazing, soldering and general heating of metals. While welding steel is not recommended, the torch is well suited for welding cast iron with cast iron filler rods and for the application of hard surfaces using any of the commercial hard-surfacing compounds.

Aluminum and Its Alloys: Although aluminum is a readily weldable metal, it has characteristics that involve a different technique than required by iron, steel and other metals. The highly concentrated heat zone obtained with the arc torch prevents excessive expansion of the parts being welded so consequently reduces distortion. The lack of pressure behind the soft, hot flame also makes it possible to butt weld light gage aluminum without backing.

As aluminum is coated with a thin film of oxide that prevents smooth coalescence of the weld metal, a flux is required to break down the surface skin of the oxide and thus permit the liquid metal from the filler rod to flow into the molten parent metal. However, no special flux is needed as any good aluminum flux that is stable and flows just below the melt-

ing point of aluminum is absolutely satisfactory.

No special welding rod is necessary for welding aluminum. A strip of the base metal may be used as filler material, thus giving a weld section of the same color and analysis as the base metal. This is particularly important when the aluminum is to be used for ornamental purposes or is to be treated to withstand atmospheric conditions and prevent discoloration from oxidation. For items to be Alumalited, an anodic process, extreme care must be exercised to weld with the lowest possible heat, to allow the weld to cool naturally and to have the filler material of the same analysis as the base metal to avoid discoloration. When use of same base metal is impractical, alloy rod with 5 per cent silicon may be employed. This rod has a melting point of 1117 degrees Fahr. compared to 1218 degrees Fahr. for pure aluminum and so permits dissipation of some of the stress set up by solidification shrinkage and thermal contraction on cooling.

Always clean aluminum parts to be welded by scraping, filing or grinding. Heat the aluminum with as low a heat as possible, holding the arc flame very close to the spot where the weld is to begin. When the metal is molten under the arc, it looks like mercury and appears to raise slightly. Good grades of aluminum flux begin to flow just before the metal becomes molten, so act as a warning. A thin coating of oxides forms so it is necessary to "poke" the flux-coated filler rod into the puddle to break through these oxides and unite the filler rod metal and base metal. The filler rod should be kept away from the arc flame except when actually adding metal to the weld. If the filler rod becomes too hot, a ball of metal forms which will not unite with the weld. It usually rolls away and is wasted. By holding the filler rod away from the arc flame, the end of it will remain solid and will break through the oxides when "jabbed" in and taken away as rapidly as necessary to supply filler material.

After the weld is started, care must be taken that the aluminum does not get too hot. Although its heat conductivity is great, the part may "load up" with heat after the initial puddle is started. When welding a thin section, it may drop away, leaving a hole. If a hole does occur, it can be closed, but extreme care in heat control is necessary. Avoid this by reducing the heat after the start, either by using less amperage and holding the flame closer to the work, or holding the arc farther away from the metal. The first procedure keeps a smaller section molten than the second as high amperage and holding the arc farther away cause the flame to spread over a larger area.

Fig. 4 shows welding of an aluminum cylinder head.

Fig. 4—Welding an aluminum cylinder head with arc torch. Surface and cross section through weld produced are shown by Figs. 2 and 3 respectively at left

Such heavy aluminum sections should be V'd out to allow complete penetration. Cracks should be cleaned as oxidized aluminum in the cracks will prevent penetration. Most castings can be welded without preheating except those containing hollow sections, such as automotive cylinder heads. These must be preheated thoroughly and evenly to about 700 degrees Fahr. to prevent warping and cracking due to heat expanding the metal.

Fig. 2 shows surface appearance of a typical aluminum weld. Fig. 3, a cross section indicates that little metal has been deposited on the surface and that complete penetration was obtained. It is easy to weld such items as a broken washing machine agitator. Such commercial work with aluminum explains why the arc torch is considered one of the most practical tools yet devised for welding this important metal.

Cast Iron: Welding cast iron with the arc torch will produce exceptionally sound, dense welds, fully as machinable as the parent metal. The absence of gases and blow with the arc flame makes the weld free from gas pockets or pinholes often experienced with other methods. The arc flame is slightly carburizing when held close to the metal, thus preventing any carbon being burned out of the cast iron.

To obtain machinable cast iron, the work should be preheated either with the arc torch, if small, or by the use of a blow torch, forge or furnace. When at a dull red color, burn out the crack with a carbon arc. When the piece is prepared, heat the zone to be welded with the torch until it just begins to melt. Then add cast iron from a flux-coated cast-iron filler rod until the weld is filled with a slight excess of metal. Move the arc flame slowly along, filling the crack smoothly until the weld is completed. Then the casting should be protected from drafts or too rapid cooling by covering it with asbestos paper, or similar means. This precaution assures a weld free from strains or hard spots and will avoid cracking.

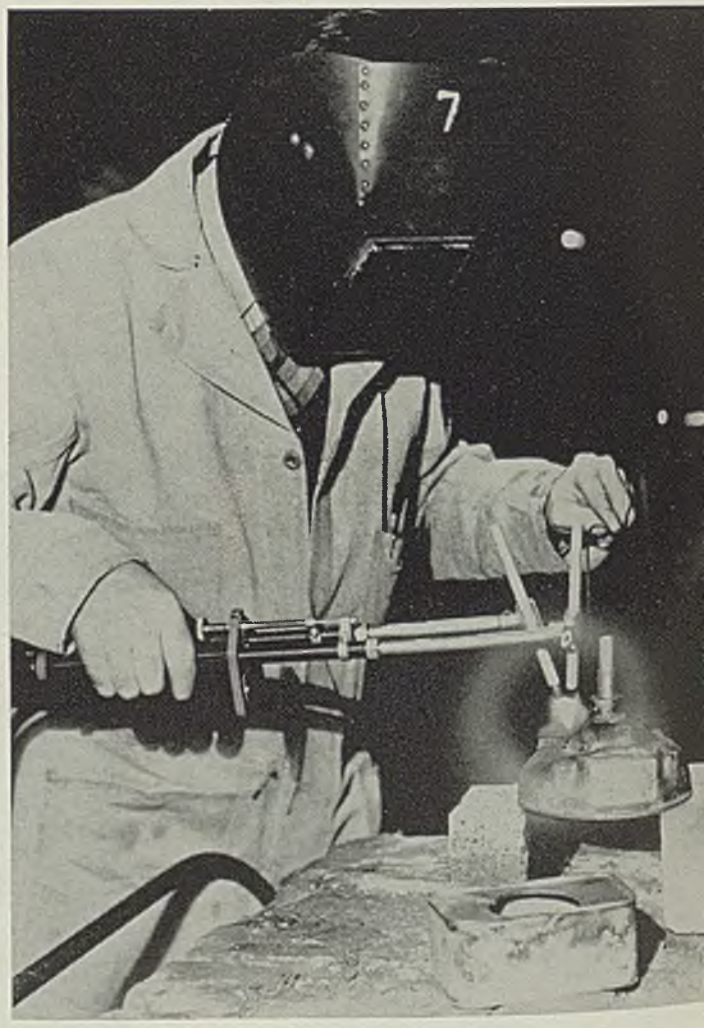
Fig. 6 shows surface appearance of a cast iron weld on a thin section of gray iron, and the nature of the fracture. This view is slightly magnified, about 1½ times, and shows the smooth, continuous character of the weld. The sectional view, Fig. 7, natural size, indicates the iron is gray but with a much finer grain size than the original casting. There is no hard, white iron in or adjacent to the weld.

Brazing cast iron is illustrated in Fig. 5, the work being a cast iron motor end bell. Such light castings are brazed with good results, using the same materials and procedure adopted in gas welding. A good grade of low temperature cast iron brazing flux and a material such as Tobin bronze should be used for best results. The crack should be V'd out to within 1/16-inch of the bottom and the surface area cleaned at least ½-inch on each side of the crack. The heat is supplied by holding the carbons about ¼-inch from the surface being brazed and moving forward at a rate which will build up the metal to the desired height. As a braze always depends on the overlap or reinforcement for strength, care should be taken to obtain an overlap of the V-edge of at least ⅛ to ¼-inch.

Malleable iron can be brazed with excellent results using standard brazing rods and fluxes.

Brazing Steel: The perfect control of amperage permits brazing practically all thicknesses of steel from 30 gage to fairly heavy sections. There is less tendency toward burning the zinc out of the brazing rods with the arc torch than with other brazing methods. The result is an extremely strong, ductile metal, free from porosity, pinholes and blowholes. The brazing metal becomes very fluid under the arc and results in smooth surface with less finishing necessary.

The procedure is simple. Clean the surface to be



brazed and heat with the torch until the part is red hot. Then apply a brazing rod which has been heated and dipped in brazing flux. The molten brass flows freely, filling the cracks and covering smoothly.

Auto body and fender repair work is greatly facilitated by the arc torch. Its speedy operation produces less overheating, and consequently less buckling, than with other heat sources. Cracks seen on the under side of the brazed joint are found filled with brazing metal which flows through from the upper surface to strengthen definitely the torn metal.

Galvanized sheet steel and pipe can be brazed without destroying the zinc adjacent to the braze. With

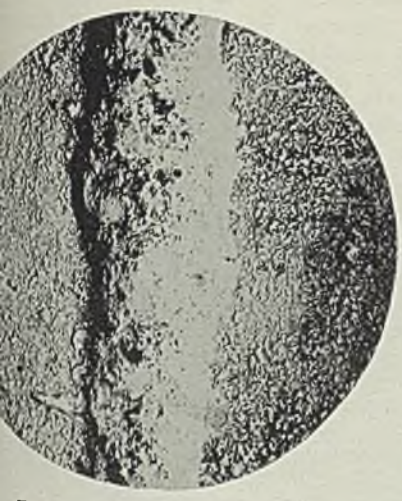
careful control of the heat, and the use of coated Everdur or similar brazing rods and a brazing flux, little zinc is burned off by the soft, reducing flame of the arc.

Other Applications: Brass, bronze or nickel alloys —either rolled, extruded or cast—can be welded with the arc torch. Using common brazing flux and strips of the parent metal as a filler to obtain perfect color match, the welding is done using the same procedure as when brazing.

The welding of white metal (pot or diecasting metal) is the most difficult operation required of the arc torch. Using a good white metal filler rod, the average diecasting can be welded satisfactorily if the operator has sufficient patience and experience to produce results.

The soft, easily controlled arc flame is ideal for the application of any of the hard or silver solders on brass, copper, bronze or low and high carbon steels.

Soft solders usually are applied with ¼-inch carbons, and low currents of 20 to 35 amperes on copper, brass, galvanized or tinned surfaces. Pewter white metal and aluminum cooking utensils may be soldered if the proper special solder is chosen.



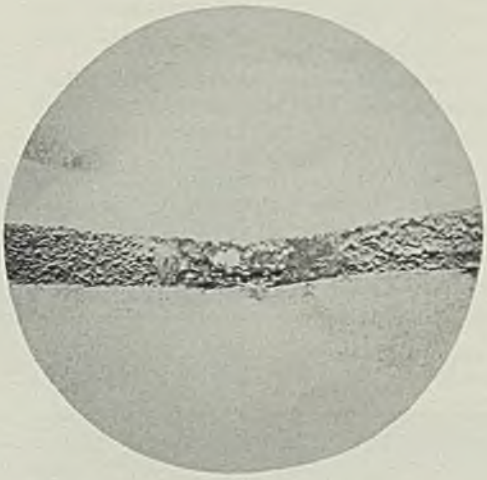


Fig. 5. (Left)—Brazing a cast iron end bell of an electric motor. Fig. 6. (Above)—shows surface appearance of a weld in cast iron with cross section through same weld shown in Fig. 7, right above

Hard-surfacing overlays may be applied using the heat from the arc flame. Again, the absence of flow or force behind the flame assists in producing a smooth surface on a perfectly bonded overlay to parent metal. The carburizing flame prevents any loss of alloys through oxidation.

The arc torch is useful for preheating small castings of aluminum, cast iron, white metal and copper alloys for welding and other operations where cheap and uniform heating is necessary. Large castings can always be heated to better advantage by furnaces. Where metal is to be heated for bending or straightening operations, the arc torch is both economical and practical for all heating work up to its capacity. Pieces up to ½ x 3 inches or 1½ inches in diameter can be heated in reasonable time and with good economy.

Costs: The arc torch, including carbon cost and electric power, will average from 15 cents to 50 cents per hour—about one-fourth the cost of operating similar heat sources. Also a wider scope of work may be handled and extra revenue obtained with the better quality welds produced.

Operation of the arc torch can be better understood if the assembly of the device is considered by referring to Fig. 1. The carbons A are especially designed for use in the torch. They have a soft core of chemically treated materials that are responsible for the soft, hot, stable flame that characterizes its action. A uniform copper plated cover adds to the electrical efficiency and to the life of the electrode by retarding the rate of oxidation in air. For satisfactory operation of the torch, these carbons are essential. Sizes are in proportion to the amperage required by the work. Approximate range of currents for ¼-inch carbons is 20 to 45 amperes; for ⅜-inch carbons, 45 to 125 amperes; for ½-inch carbons, 100 to 175 amperes. Heat from amperages higher than those recommended cause excessive and unnecessary consumption of carbon.

With alternating-current welders, the two carbons used are the same size, as the heat generated is equal at both electrodes. With direct-current machines, the positive terminal liberates approximately 66 per cent of the heat, the negative terminal 34 per cent. Accordingly, special holders and carbons have been designed to compensate for this condition, and are furnished as standard equipment.

Complete heat control is possible. Current as well as distance the arc is held from the work may be regulated. The heat should be adjusted on the machine so the carbons can be held about ¼-inch from the work during welding. This enables the operator to keep only a small section of the metal molten. In the case of light sections, it helps prevent collapse.

Carbon life varies with the heat used. For ⅜-inch carbons with 50 to 100 amperes, the life will vary from 1 to 2 hours. The ¼-inch carbons with 20 to 35 amperes are recommended for extremely low heats. The ⅜-inch carbons also can be used to advantage on low heats as the carbon life is greatly increased by the larger carbons. Most beginners are prone to use more current than necessary. Some practice is required to know the proper size carbons and current for various thicknesses of metal.

The curved carbon holder B in the right handle socket is made of cadmium-plated seamless steel tubing. The split carbon holder has a collar and

clamp screw for easy adjustment. A small hole in the thumb screw permits insertion of a rod turn screw when hot. The straight carbon holder C is constructed like the curved holder. It is placed in the left handle socket, the adjustable member. The holder should be adjusted so the carbons align well. The angle and design of the holders afford maximum visibility over the weld area.

The hexagonal clamping nuts D fit over tapered threads slotted to grip the carbon holder shanks. These nuts are tightened sufficiently to grip securely the holders but permit slight adjustments to be made so that the carbons may be aligned easily.

Carbon adjustment assembly E permits minute alignment of the carbon gap. The knurled thumb wheel affords easy control of the flame which is regulated by the gap between the carbons. A slight recess and spring action permits the arc to be struck easily after gap is adjusted. Release button F allows quick breaking of the arc without destroying the adjustment of the carbons. Immediate re-establishment of the arc can be had by pushing the thumb wheel forward again.

As the arc flame gives off intense ultra-violet rays which cause a skin burn similar to sunburn, it is advisable to have all parts of the body, hands and face covered. Good welder's gloves should be used as the heat is greater than that of an acetylene flame. An ordinary welder's helmet will protect the face.

Cable connections H are positive threaded type with extra flexible, rubber insulated cable. Parts to be welded should not be grounded

Cast Steel Armor May Be Used for Army Tanks

■ The use of cast steel hulls and turrets for army tanks is perhaps the most striking development in the foundry field, according to Frank G. Steinebach, editor of *The Foundry*. At the present, he states a number of steel foundries are producing the cast armor plate.

The editor in quoting *Fortune*, which presented an outsider's view on this development, says much progress is being made by the use of microscopic study of cast steel grain structures, leading to new techniques in heat treatment of castings. This in turn has led to the adoption of castings for tank armor. He says heat treatment has done for the casting what the mill did for rolled plate.

Experiments are constantly being made to give the casting the hard face needed for greater resistance to shell penetration. The castings, however, still have not been developed to the point where they are the precision job of the rolling mill. And for that reason, army ordnance engineers have adopted a rule of thumb that a steel casting is only nine-tenths as good as rolled plate of equal thickness in resistance to projectiles.

Cast steel, on the other hand, has an advantage that offsets this handicap in weight. This is the advantage that is inherent in the principle of casting steel—that of pouring steel to the desired shape.

Shop Features More Than "Meets the Eye"

■ This general view of the modern press shop at Edward G. Budd Mfg. Co., Twenty-fifth and Huntington Park, Philadelphia, contains more features than "meet the eye." The two removable floor slabs seen at right-center give access to a scrap removing conveyor. All press dies are stored in the pit beneath the press floor, and the cross beams of the pit ceiling, which is the press floor itself, besides supporting the presses, can be moved along the beams running lengthwise. Thus by means of hydraulic jacks, both beams and presses can be moved together. Most of the bright light here is provided by a saw tooth roof

Prints Recommendation On Abrasive Grain Sizes

■ Copies of simplified practice recommendation R118-40, "Abrasive Grain Sizes," are now available, according to the division of simplified practice, national bureau of standards, Washington. This recommendation covers a simplified schedule of grain sizes for aluminum oxide and silicon carbide abrasives for polishing uses and for grinding wheel manufacture.

The table of grain sizes constituting the recommendation became effective originally in September, 1930, and has continued in effect since. In 1936 the recommendation was reissued with some minor changes. The current edition carries the original simplified list of grain sizes, but substitutes the recently approved United States standard fine sieve series for a similar reference table appearing in R118-36, the previous edition. The new table states the wire diameters in terms of minima and maxima in slightly different ranges from those provided by the percentage tolerances formerly allowed, and somewhat revises the permissible variation in maximum openings.

Copies of the recommendation, which is effective from August 15, 1940, may be obtained from the superintendent of documents, government printing office, for 5 cents each.

Expands DIESEL Research

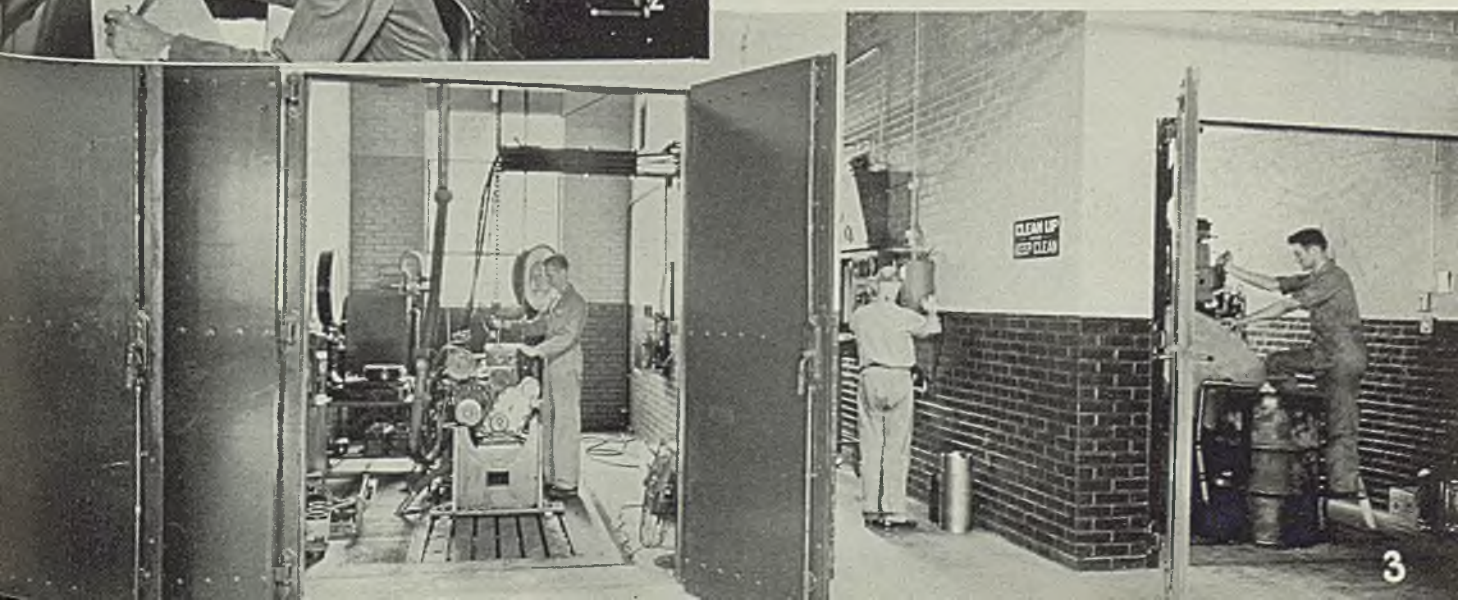
■ THE INCREASED demand for diesel engines resulting from industrial expansion and the national defense program finds the Cummins Engine Co. occupying new research and development headquarters at Columbus, Ind. The compact research building, designed and built by the Austin Co., Cleveland, has a large experimental machine shop with daylight working conditions provided by novel welded "whaleback" cross section which introduces light through a "fin" supported by a 50-foot rigid frame arch as shown in Fig. 1.

One entire side of the building contains six engine test rooms, each 10 x 21 feet and equipped with a monorail and chain hoists of 2 to 5-ton capacity for handling the engines. Individual ventilating fans, exhaust vents and fluorescent tubes provide ideal conditions for accurate testing and observation.

Fig. 2 shows an observation corridor between two test rooms and the advanced equipment for checking engine temperatures and performance. Windows permit observation and recording readings of instruments mounted on the engine. Controls for the dynamometers which load engines during test as well as other instruments are seen. One operator can oversee and record tests on two engines simultaneously. Test instruments include potentiometers with switches to check temperatures at various points, pressure gages for supercharged pressure, water pressure, fuel and oil pressure, vacuum gages for the water and air intakes. Fig. 3 shows several test rooms.

When an engine is being tested, all lubricating oil used is weighed on an extremely accurate scale. A lubricating oil tank rests on the scale. Using a float mechanism in the crankcase, oil in the tank is automatically fed to the engine to maintain constant oil level, thus permitting oil consumption to be weighed accurately during test. This obviates the possibility of error which might occur if the oil were checked by weighing before and after drain periods.

Blow-by, a part of the piston and ring study, is accurately recorded by a meter hooked up through the crankcase. Cold starting tests are accommodated in an insulated cold room at temperatures down to 10 degrees below zero. Complete chemical and metallurgical laboratories back up the performance-testing equipment, permitting close control over materials.



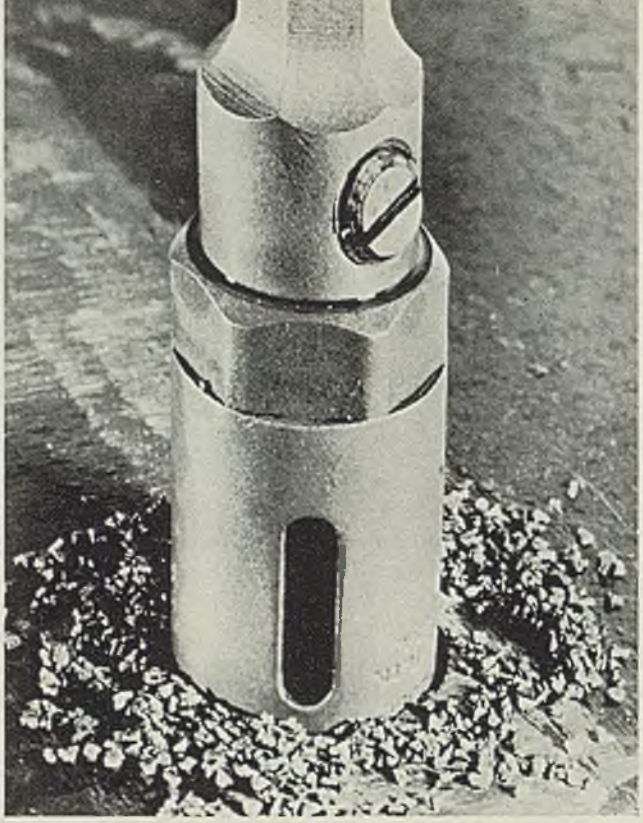


Fig. 1—This hole saw or trepan is used to remove the plug

By HAROLD LAWRENCE
Welding Engineer

Closing Trepanned Openings

Taking, etching and examining trepanned plugs gets too much attention compared with the little accorded proper closure of the hole. Attempting to weld shut a trepanned hole without a backing strip is cause of poor closures. To provide room for proper manipulation of the electrode, hole should be elongated, backing strip or disk tacked in place, and hole filled by building up a plug weld from this backing

■ EVER since the advent of welding as a proper and suitable method for making pressure vessels, engineers have devised tests for checking the quality of the deposited weld metal. These tests are either nondestructive or destructive. The first class includes radiographic, magnetic and stethoscopic inspection. Of these three procedures, the radiographic and magnetic methods are the most widely used.

That leaves the destructive tests of which there are many. Most familiar is the ordinary test coupon from which are made tensile bend and nick-break tests. This thorough testing procedure was designed to satisfy the most skeptical inspector as to the quality of the welded joint.

Inspectors cannot afford to be satisfied with work as long as there is question about it. Even though individual inspectors might overdo their work at the expense of increased cost of welding, adequate inspection work is always warranted. The infrequency of pressure vessel failures stands as a living monument to the thoroughness with which inspection services have operated. Notwithstanding attached test plates, inspectors were justified in seeking further proof of weld soundness . . . such as might be found in the trepanned plug.

The whole idea back of inspection by trepanning lies in the thought that any welder, conscious of the fact that any foot of his weld may be investigated thoroughly will produce fine work consistently. On the other hand, if only the test plate attached to the seam is subject to inspection, the remainder of the welding operation might be slighted. While no welding operator will willingly slight any of his work, at the same time welders are humans and require continuous stimulation to get peak results.

In the beginning, trepanning was proposed for old pressure vessels that had not been constructed with the modern electrodes or techniques available today. So much welding that was absolutely dangerous was discovered that it was only natural to find the method receiving greater attention in the inspection of new work.

Before going into further aspects of the problem of making the closures to fill the trepanned hole, it might be well to review the method briefly. A hole saw, or trepan, as shown in Fig. 1 is used to cut a circular plug from a weld. Generally the saw has a pilot drill to drill a small inner hole and furnish a guide for the sawing operation.

The pilot drills vary in diameter from 3/16 to ⅜-inch. The hole saw may have a minimum diameter of ¾-inch when used to cut plugs from plate ¼-inch or less in thickness. From ¼ to ½-inch inclusive, the saw diameter should be no less than 1-inch. In plate above ½-inch, diameter of the hole must be at least 1¼ inches. Of course the diameter of the saw must be great enough to allow the entire weld and some of the plate material to be seen in each specimen. Fig. 4 shows the plug, the hole and the hole saw in close juxtaposition and gives a clear idea of the scheme.

Power is supplied by a portable electric drill or pneumatic motor. Tiffin, in the January, 1940, issue of the *Welding Journal*, describes a simple drill holding fixture for use in advancing the saw. In most cases, however, the plugs are cut without employing a jig by using the weight of the operator to force the saw through the metal.

Trepanning, after its demonstra-

"A.W." *Quality* PRODUCTS

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Carbon, Copper or Alloy Steels—in *any* Open Hearth analysis, in *any* quantity—to meet *your* specifications . . . Welding qualities, toughness, abrasion resistance, ductility . . . There is an "A.W." Steel made to Alan Wood standards that will give you best results at the lowest possible cost.

"SWEDE" PIG IRON
Foundry, Malleable and Basic.

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Standard and special sizes in any Open Hearth analysis.

BLOOMS, BILLETS AND SLABS
Alloy and Carbon Grades. Forging and Re-rolling Qualities.

SHEARED STEEL PLATES
Special Alloy, Tank, Ship, Boiler, Flange, Fire Box, Locomotive Firebox, Structural and Dredge Pipe.

HOT ROLLED SHEETS
All qualities, special Alloy, Annealed, Blued Finish, Hard Red, Pickled, or Deoxidized.

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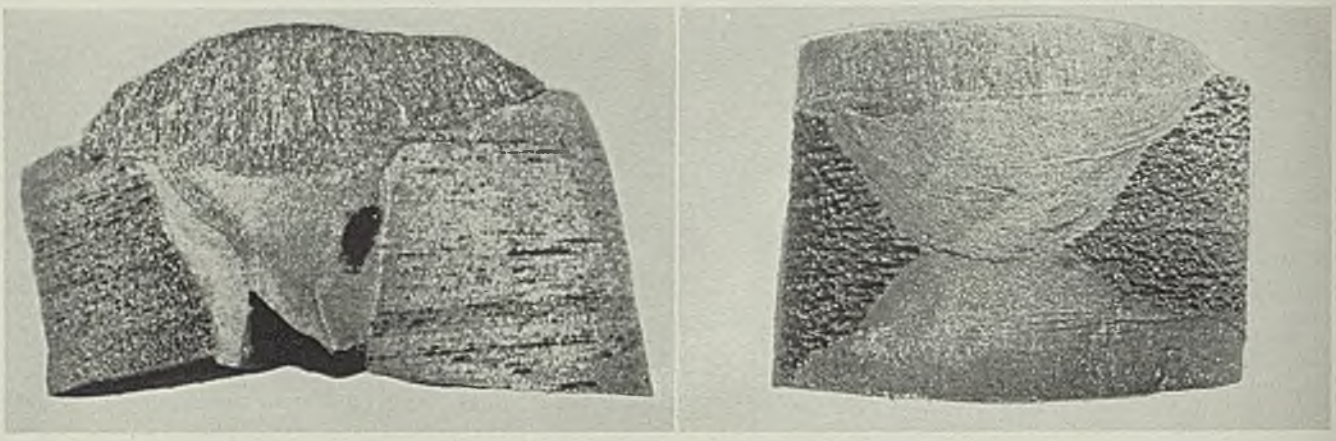


Fig. 2—A large gas pocket and incomplete penetration condemn this weld. Trepanned plugs afford good checks, as illustrated here. Fig. 3 at right shows a sound weld in ½-inch plate

tion by one of the large insurance company inspection services, was adopted as a permissible means of inspection by the American Society of Mechanical Engineers' unfired-pressure-vessel code. In addition, the method was deemed worth while by the American Petroleum Institute in the inspection of all-welded oil storage tanks. Later independent purchasers of pressure vessels incorporated trepanning in their specifications. To get a clear picture of the entire scheme these three sources will be used as a basis for discussion before tackling the problem of closures.

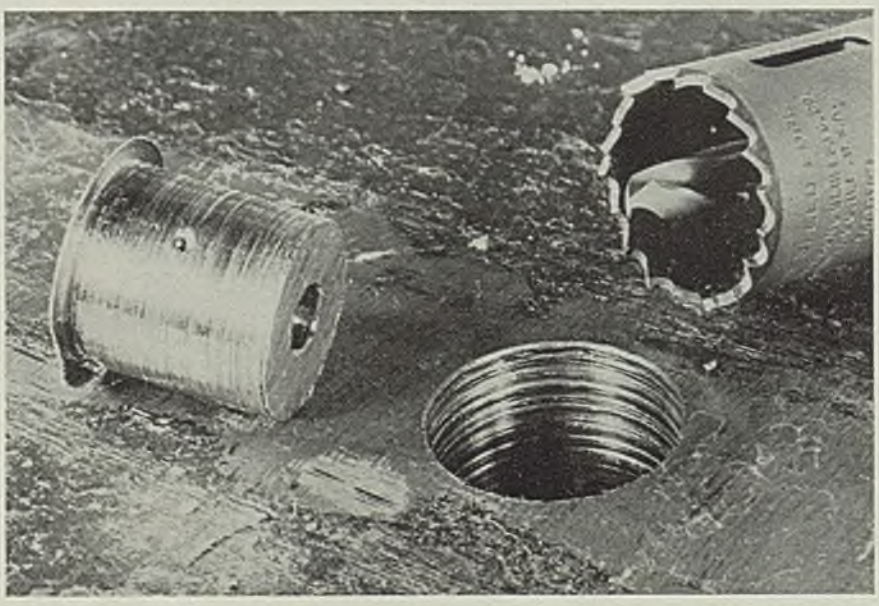
The plan is to take at least one trepan from each 50 or 100 feet of welding or one from each seam. The ASME sets the distance at 50 feet because of the more severe service than that of the API storage tanks which are to be trepanned every 100 feet.

To assure a comprehensive coverage of all welding, plugs must represent the work of every operator on the job. Too, every type of welding must be represented. Although butt welds are the preferred type for inspection by this scheme, lap welds may be checked in the same manner. The outer lap is inspected by the ASME while two plugs are required by the API on vertical joints with the horizontal laps being checked by the outer fillet only.

There is a decided difference of opinion as to the method of preparing the specimens for etching. While the API uses the plugs just as they were cut from the weld, the ASME requires sectioning across the weld to include a plane surface equal to the full width of the weld. This plane surface must then be polished by rough filing or grinding followed by a polishing job using emery cloth of 00 grade.

Preparation: After cutting out the plug, a grinding plan appears to offer the best approach to obtaining a good etch. Following this, the samples are etched. Two cold etchants are in universal favor. One may be used either hot or cold, and one must be employed hot. Ammonium persulphate, one part to nine parts of water, may be applied with a cotton wad and vigorous rubbing at room temperature. Iodine and potassium iodide, one part of powdered solid iodine and two parts of potassium iodide in ten parts of water, may be brushed on the surface to be etched. Either should be continued until a definite structure is revealed. As an alternative, nitric acid one part to three parts water may be applied cold or hot. Because of the fumes evolved in the hot process, a hood should be furnished.

Fig. 4—Plug, hole and saw are all shown here. Note the pilot drill inside the saw

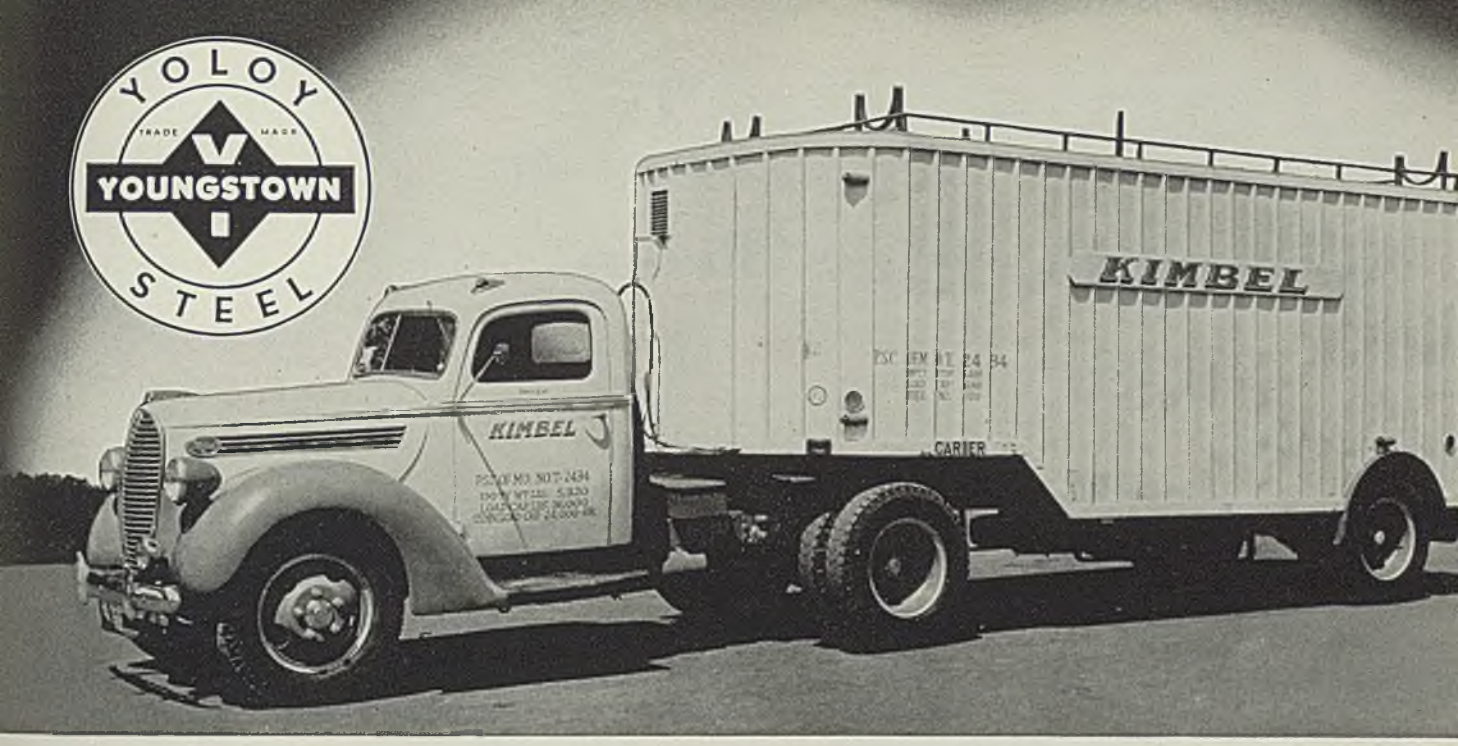


The ASME does not approve the etchant most commonly found wherever weld examinations are made—1:1 hydrochloric (muriatic) acid at a temperature of 160 degrees Fahr. for 30 minutes. It is true that this severe etchant exaggerates the structure but there should be no harm in this. There have been cases where the users of etching were wholly unfamiliar with the appearance of a properly etched specimen. The time and temperature factors of the hot hydrochloric acid etch preclude the possibility of underetching.

All of the authorities are in quite close agreement about what constitutes unacceptable welding. Porosity such as was found in the bare wire sample illustrated in Fig. 2 would be considered excessive. No more than six gas pockets per square inch of exposed weld area are permitted. Incomplete penetration is allowed in accordance with the API design rules although none is permitted by the ASME.

Nobody would accept the lack of fusion in such closing welds. This condition is rarely found today except where inexperienced operators are allowed to perform work with inadequate supervision. Incidental-

(*Please turn to Page* 70)



YOLOY SAVES 120,000 ton mile

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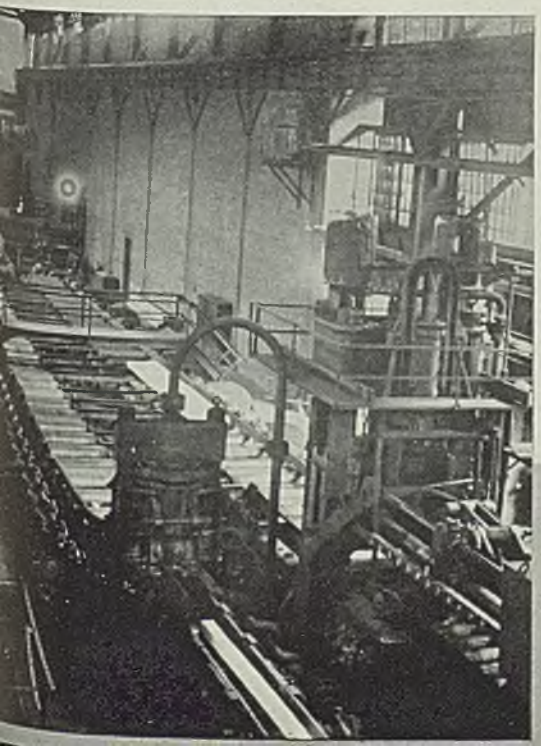

In this trailer, built by Carter Manufacturing Co. of Memphis, Tenn., and operated 400,000 miles since 1935 by the Kimbel lines, there was a 600-pound saving in weight over other steel materials previously available, or 120,000 ton miles saved in 5 years. Newer trailers built to approximately the same design by this company have increased this dead weight saving to one-half ton by more extensive use of Yoloy.

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General Offices - YOUNGSTOWN, OHI

Getting the Most From Cylindrical

(Concluded from Last Week)

Often considerable grinding time can be saved by revising grinding allowances, says Mr. Jacobs. A selective method of fitting oversize pieces to oversize holes, he explains, permits liberal allowances on both internal and external fits. Close limits should not be specified unless actually needed

The Editors

■ THE MANNER in which the work is held for grinding has much to do with efficient production. The majority of parts involving two sizes on one piece generally are "dogged" and held between centers. Many grinding machine operators follow the ineffective practice of taking a piece of work out of the machine, removing the dog, putting the same dog on a fresh piece of work and then mounting the new work in the machine. An efficient operator, on the other hand, sees to it that he has two dogs so that he can "dog" one piece of work while the other is in process of grinding. Thus, when the efficient man is grinding 200 parts, he will save at least 10 seconds on each part by having each one ready to put into the machine as soon as the preceding one is removed. This means that he will save 33 minutes or more by this simple procedure. Thirty-three minutes saved in finishing 200 pieces of any kind is not to be "sneezed at."

Often it is advisable to hold work on special centers which require dogs. Certain kinds of light work can be driven by a square center in the headstock spindle. Then again, a special driver having a pin which enters a hole in the end of the work can be used. On relatively large work such as the swing arm of a milling machine, a hole can be drilled in one end of the work to fit loosely over a pin set into the grinder faceplate.

If a number of small parts are to be ground, pieces —let us say—2 inches in diameter and having a 1-inch hole, it obviously is expensive business to mount them on an arbor one at a time. A better method is to provide a "gang arbor," a nut being used to force a row of several pieces firmly against a shoulder. If two of these gang arbors are provided, the grinding operation is still further expedited. The rather small additional cost of these gang arbors soon is absorbed through savings in production cost of the ground parts.

Allowance left for grinding has much to do with production efficiency. It should be just enough to allow the pieces properly to "clean up." Assume an operator is grinding pieces 3 inches in diameter and 6 inches long, and that after all the tool marks are removed there still remains 0.015-inch of stock to be taken off. *Removal of that excess* 0.015-*inch represents waste labor.* In such a case, the remedy is to reduce the grinding allowance by about 0.010-inch on the diameter so there will be only 0.005-inch to remove after the pieces are rough ground.

The foregoing applies to both soft and hard work. Soft parts should of course be straightened so they run true to within approximately 0.002-inch before they are brought to the grinding machine. Careful check-up on grinding allowances on various parts often will show where considerable time can be saved in grinding operations through revision of these allowances.

Grinding limits on various classes of cylindrical work generally are set in the engineering department and too often poor judgment is shown in this respect because of lack of shop experience there. For instance, it is unwise to specify unduly close limits when they are not needed. Suppose that a piece 1½ inches in diameter is to be ground to establish a press fit. Under ordinary conditions an allowance of 0.0015-inch is sufficient to insure a tight fit. In this case however, limits of 0.0002-inch minus to 0.0003-inch plus could be specified with safety. On the other hand, to specify limits such as "plus 0.0001-inch minus nothing" on a part like this simply means useless expenditure of time in the grinding department in attaining unnecessarily close limits.

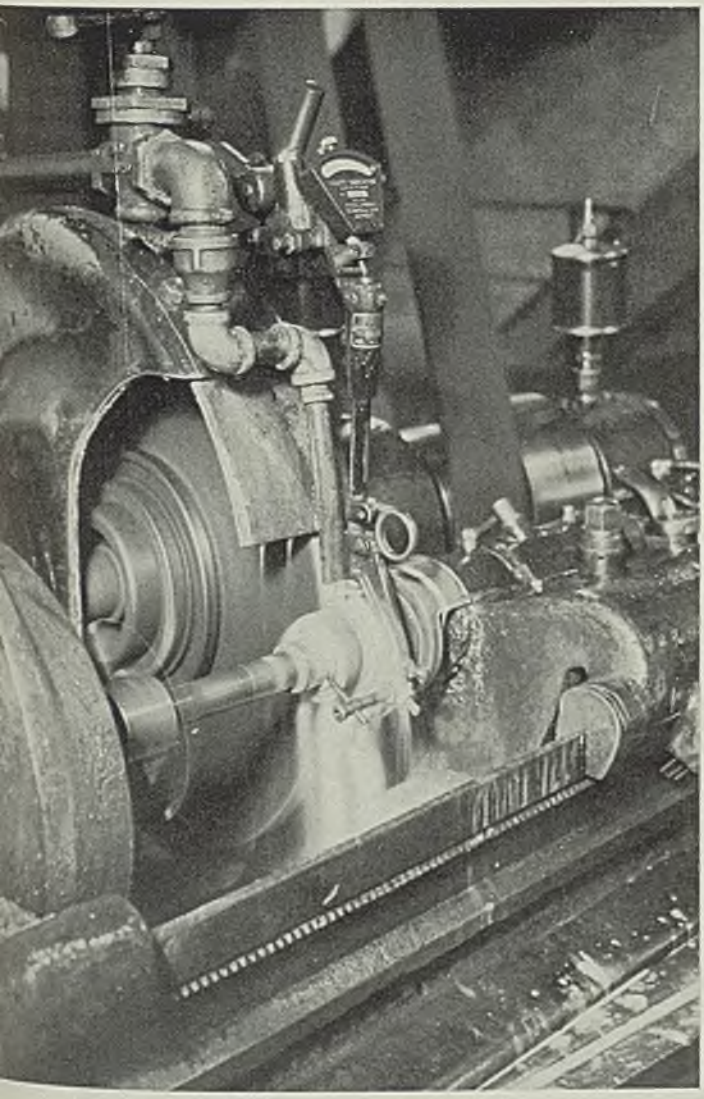
Much time is saved in ordinary manufacturing operations when the selecting method is used. Under this system, oversized pieces are fitted to oversized holes and comparatively liberal allowances can be made both on internal and external fits. If a piece is 0.001-inch oversize, it can be fitted to one with a corresponding oversize hole. On the other hand, if it is 0.0005-inch undersize, it can be fitted to the one with an undersize hole.

A good example of selective assembly is that in the manufacture of ball bearings. If an outer race is ground 0.0005-inch large, then the assembly is

By FRED B. JACOBS

Grinders

made either by using balls 0.0005-inch large or an inner race 0.0005-inch large. If bearing manufacturers were compelled to hold to closer tolerances, ordinary commercial ball bearings would cost at least ten times as much as they do at present. The possibilities of selective assembly are well worth any engineer's study, making possible as they do much more liberal grinding allowances than otherwise would be permissible.



Automatic gages such as the one shown here are extremely useful auxiliary equipment in cylindrical grinding as they furnish a continual indication of the diameter of the surface being worked. In fact, some setups employ the gage to trip off the grinder after a certain specified dimension has been attained

In many cases it is desirable to install two machines, one opposite the other, so a single operator merely has to turn in his tracks to attend to both machines. Under this arrangement the operator loads the work into one machine and sets it going. Then while this first machine is in the process of grinding, he loads and starts the second one—alternating back and forth between the two. Modern grinding machines are provided with automatic feed and knockoff mechanisms so there is no danger of grinding work undersize when working two machines this way. In other cases the two machines can be set up—one with a coarse wheel for roughing, the other with a fine wheel for finishing. The "two-machine" method offers wide possibilities and should be given careful consideration.

"Idle time" in many instances can be turned into "profitable time" by having the grinding machine operator run some other type of machine in addition to his grinder. For example, in a piston production line the operator may be able to drill holes in pistons while his grinding machine is operating. Or perhaps this operator could grind the outside of the pistons on one machine and attend to grinding the piston heads on another machine. In the average production line, there are many places where one man without undue effort can attend to two or more machines without sacrificing the quality of his work. These possibilities always should be weighed carefully.

And now a word about grinding wheels. Choice of abrasive depends of course on the material to be ground. If it is ordinary cast iron, or bronze, then the wheel should be carbide of silicon. However, consideration should be given to the fact that much of the so-called cast iron of today actually is semi-steel, on which manufactured alumina will give better results. The latter abrasive also is used almost exclusively for finish grinding steel, both hard and soft.

Speaking of exceptions to this rule, the author has observed some cases where excellent results have been obtained from the use of silicon carbide wheels for finishing soft steels such as cold rolled material. In these cases it was preferred because of the high finish it imparted. It might be added that emery gives the highest finish of all abrasives, carbide of silicon comes next, and then comes manufactured alumina.

Comparatively high wheel speeds are the general rule today. Some years ago it was thought that a peripheral speed of 5000 feet per minute was sufficient. Today, however, vitrified wheels are run up to 6500 surface feet per minute, while bakelite and shellac wheels can be run even faster. The fact must be borne in mind that the surface of a grinding wheel embodies hundreds of thousands of cutting particles. The oftener these are presented to the work the faster is the cutting action. In other words, high surface speeds, if kept within reasonable limits, mean high production.

Choice of grit of the wheel depends on finish re-

quired. For roughing operations, coarse straight grit wheels can be used. So-called combination grit wheels with the coarse base often are capable of giving fine finishes.

Wheel grade and speed generally should be considered together. For example, a wheel of a hard grade generally should be run slower than one of soft grade for a given operation. On the other hand, with wheels of softer grades, higher speeds are to be preferred. A word regarding wheel balancing is not out of place at this point. If a wheel is not balanced to the highest possible degree, it cannot be expected to do good work. Therefore, after it is mounted on its collet, every grinding wheel should be balanced with extreme care either on rotary or plain type balancing ways. This is extremely important.

The subject of work speed is an interesting one. Generally speaking, the faster the work speed, the faster the traverse feed can be, which means more production. Work speed also must be considered in connection with the grade of wheel which is used. For instance, let it be assumed that a wheel acts hard. This difficulty can be overcome by increasing its work speed. On the other hand, if a wheel acts soft, the difficulty can be remedied by decreasing the work speed. But, if the work speed be decreased, that also slows down the traverse feed, and therefore curtails production.

Proper truing of grinding wheels is another thing which is highly important where efficient production is to be expected. Many years ago the only wheel truing medium used on precision cylindrical grinding machines was the so-called industrial diamond. During the World war, however, the price of industrial diamonds advanced sharply, which led to the introduction of other wheel truing methods. For example, it was found that ordinary star-wheel dressers, when properly used could be relied upon to true cylindrical grinding wheels satisfactorily enough for rough grinding operations. Later such devices were improved by substituting for the star wheels rollers that were specially designed and hardened. Then the abrasive type of wheel truing apparatus was developed. In this device an extremely hard grade carbide of silicon grinding wheel is set at a slight angle and fed past the wheel. Under certain conditions wheels trued by these methods compare favorably in results with those trued with industrial diamonds.

However, the industrial diamond probably never will be entirely replaced by other wheel truing methods. On certain classes of work it still is dispensable.

Regardless of the means used, it is necessary to true wheels frequently enough to keep them free cutting at all times. A general rule followed by some grinding room foremen is to have the wheel just hard enough so it will require truing a few times daily. The wheel at all times must be as nearly as possible a perfect circle and its grinding points must be kept sharp enough to take hold of the work readily.

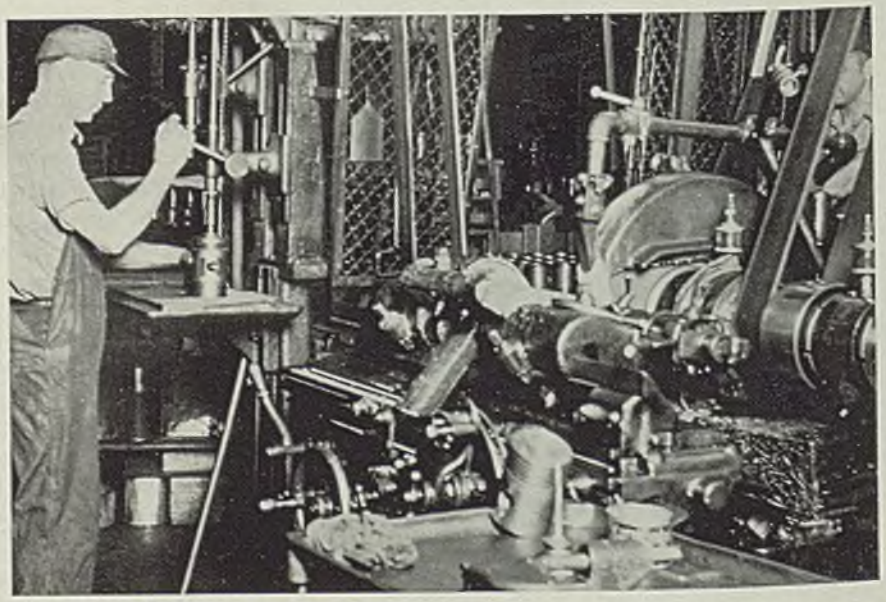
Letting one operator tend two grinders, or run one grinder and also additional machines, the author says, can cut "idle" time significantly and without sacrifice in quality of work done

The majority of cylindrical grinding work today is done by means of the traverse feed. That is, the work advances a given amount for each revolution. On roughing operations where the conditions are ideal, the work should advance at least three-quarters the width of the wheel face for each revolution. Thus, if the wheel face is 2 inches, the work should advance at least 1½ inches for each revolution of the work. When taking the finishing cuts that remove the last 0.002 or 0.003-inch, it is necessary to reduce the work speed, but in roughing operations the traverse feed should be as high as possible.

This again brings up the subject of grinder selection. Some older machines are not equipped to traverse the work at the rapid rates required today. This is one more valid reason why the new, heavier type machines are to be preferred.

Under some conditions no traverse feed is used, the work being fed directly to the wheel. This method is productive of good results. Many machines designed for this type of grinding have means for oscillating the wheel back and forth slightly to break up the wheel marks. This "straight-in" grinding, as it is called, had its original inception in finishing automotive engine crankshafts but has spread successfully to include numerous other types of work.

Coolant should be employed in cylindrical grinding operations to keep down the frictional heat and to assist in imparting a good finish. Plain water is out of the question. While water will act as a coolant, it will rust the machine and the work. For many years following the general introduction of production grinding, sal-soda solution was used as coolant. During the past 20 years or so, well-known makers of cutting compounds used on various machine tools other than grinders have turned their attention to the development of grinding coolants. As a result of their research and development work, a number of excellent grinding compounds are available which can be relied upon to give excellent results if properly selected for the job. In choosing a coolant for a given grinding operation, consult the supplier. The makers of grinding compounds are ready and willing to offer valuable suggestions based upon scientific research, experimentation and practical experience. The value of this service should not be underestimated and no company having grinding problems should fail to take advantage of it.



Here the grinding machine operator runs a drill press "on the side" while grinding work continues in his machine at the right. Thus what otherwise would be idle time is utilized productively

Precision is Assured IN A SOUTH BEND LATH

HEADSTOCK. Cutaway view showing integral type bearing and the capillary oiling system.

SUPERFINISHED SPINDLE is made of alloy steel with bearing surfaces carburized, hardened, ground and superfinished.

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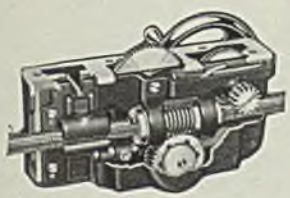
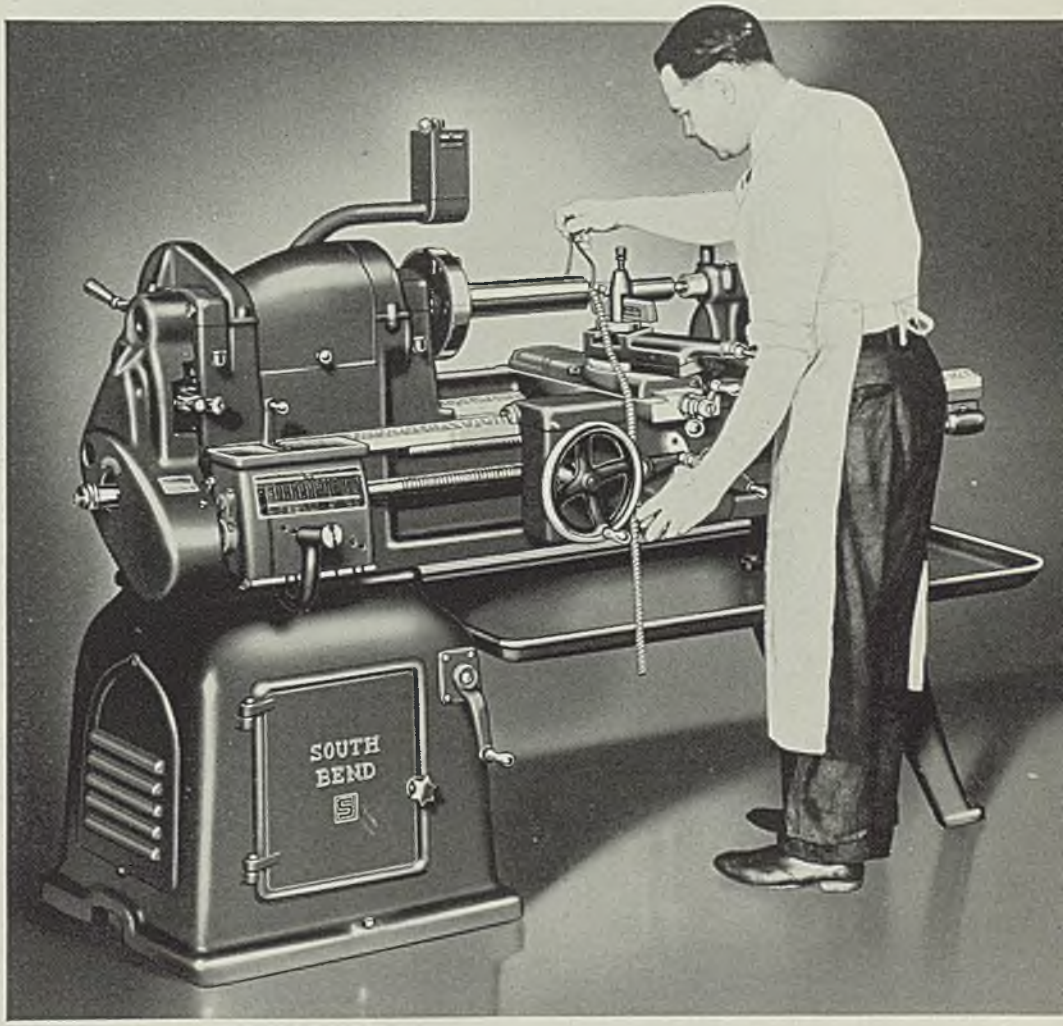


DOUBLE WALL APRON is rigid box type construction with all steel gears running in oil bath.

MULTIPLE DISC CLUTCH. Cutaway view shows alternate keyed steel disc construction.

UNDERNEATH MOTOR DRIVE. Belt drive to spindle is smooth and powerful and provides a wide range of spindle speeds.



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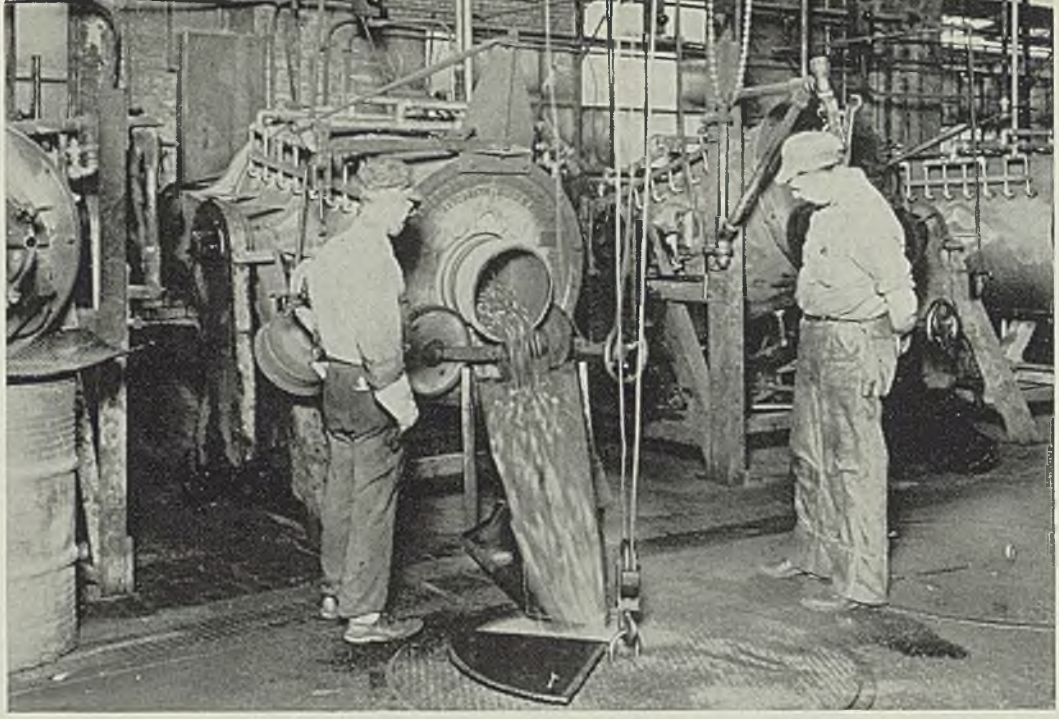

Line of clean-hardening gas-fired rotary-retort machines in the Link-Belt Dodge plant at Indianapolis. Note work being discharged directly into quench tank in floor. Photo courtesy Link-Belt Co., 307 North Michigan avenue, Chicago

Hardening Small Parts Uniformly

Non-uniformity of pack-hardened parts may be one of your problems as it was for the Link-Belt Co. However, their experience with rotary retort furnaces, both for clean hardening and case hardening, has been extremely favorable as is told here. Not only is there an actual cost saving but—as one company official puts it—"The certainty of a uniform treatment has greatly reduced our worries . . . . the elimination of any element of doubt in a customer's mind, regarding the product, cannot be estimated in dollars and cents."

By REGINALD TRAUTSCHOLD
Engineering Consultant

■ USE OF modern rotary gas-fired carburizing machines in place of conventional pack-hardening in oven-type furnaces at the Link-Belt Dodge plant in Indianapolis has resulted in better chains being produced for less money.

This achievement is especially noteworthy in view of the excellence of the chains produced by the previous hardening methods—produced at a price, however, for the processes were costly and accurate thermal control difficult. Alloy pack boxes were employed, the heating of which accounted for substantially half the total furnace load—the batch of chain parts for 35 per cent of the charge and the compound used for the remaining 15 per cent. These box containers absorbed just about as much of the furnace heat as did the work charge and on completion of each furnace run were simply dumped and set to one side to cool. Hence, as much furnace heat was wasted as was productively employed, cost of compound was high and a long time in the furnace was necessary to assure even heat penetration.

Also, the outside rows of boxes heated up first and the material nearer the sides of the boxes reached carburizing temperature before that at the centers, complicating thermal action and making uniform carbon penetration difficult. The cost of the boxes; the multiplicity of box sizes required for different work charges; space requirements and expenses involved in packing the boxes; storage and preparation of the carburizing compound; intermittent operation of the furnaces and their consequent accelerated depreciation—all added to the cost of pack-hardening.

These inefficiencies are now largely avoided by use of rotary hardening and carburizing machines in which rotating retorts serve as repositories for the work charge. These revolving retorts, when once heated, are not allowed to cool between charges, thereby avoiding the former 50-per-cent heat loss in cooling.

These inefficiencies are now largely avoided by use of rotary hardening and carburizing machines in which rotating retorts serve as repositories for the work charge. These revolving retorts, when once heated, are not allowed to cool between charges, thereby avoiding the former 50 per cent heat loss in cooling.

While the cost of the rotary retort per unit of product is much on a par with that of equivalent pack boxes as previously employed in case hardening, the loading of the retort bears no comparable relationship to the expense contracted in packing the boxes—a cent or two as against a dollar or slightly more. Also, the investment tied up at any one time is reported to be only about one-fifth as much in the case of the rotary furnaces.

Heated evenly by gas as the retort revolves, the work charge is turned over and over, coming up to temperature uniformly with the

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SPEED CASE STEEL

Increased Production 66%

Compared With S.A.E. X1315

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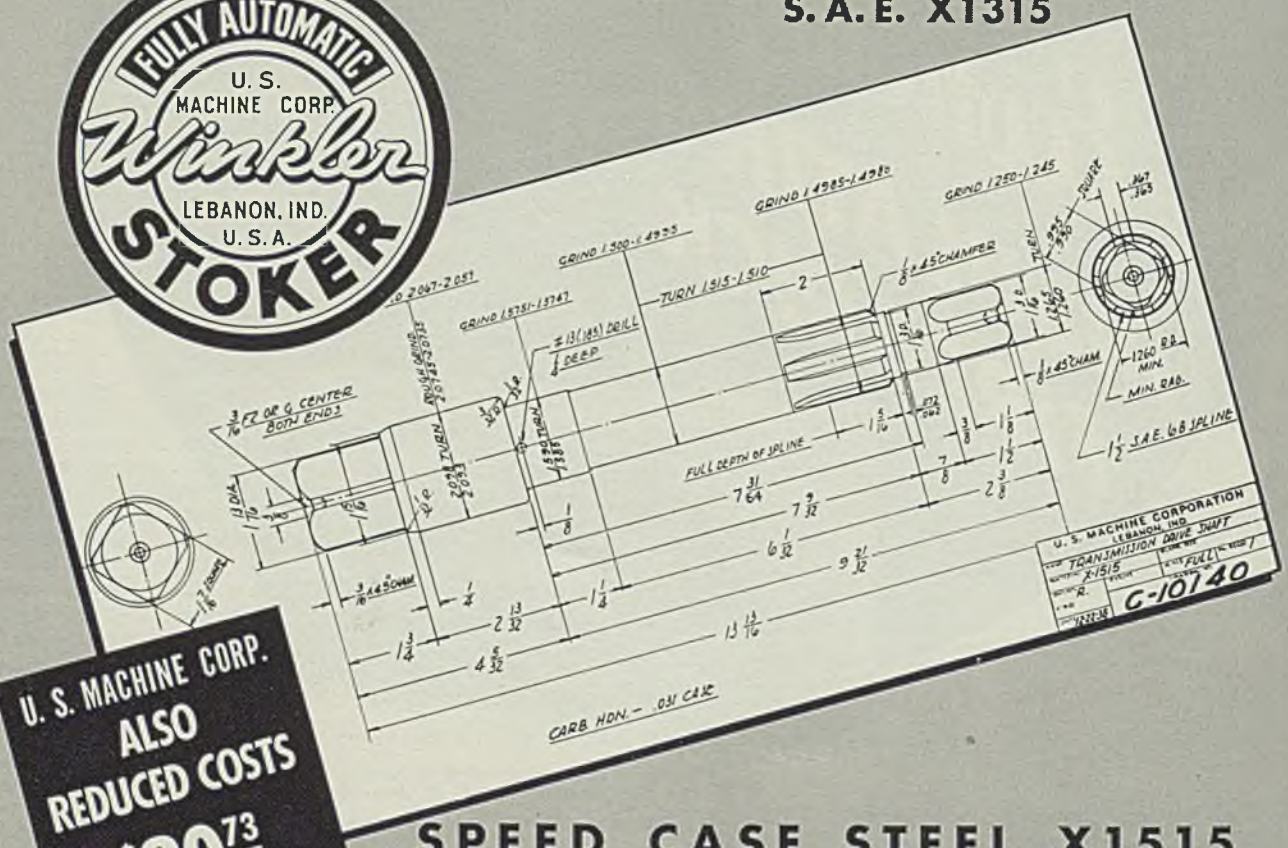

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absorption of carbon by the work commencing simultaneously and at the same rate for all portions of the charge. Equal depth of case and similar thermal treatment for each individual part of the work load are thus secured. Furthermore, a pressure builds up within the closed carburizing retort that serves to hasten and promote carbon penetration.

At the Dodge plant, the pins and bushings of the roller chains are case hardened in a battery of batch-type rotary carburizing machines made by American Gas Furnace Co., Elizabeth, N. J. Side bars and rollers are heat treated in continuous rotary-retort machines of the same make.

Clean Hardening: Heat treating side bars and rollers of "Silverlink" roller chains is conducted in an inert gas atmosphere which has no appreciable carburizing effect. A continuous stream of work is hopper-fed to the revolving retort and leaves the quench, into which the retort discharges, on an endless conveyor belt that runs along the bottom of the compounded oil tank. The quench conveyor picks up the chain parts and delivers them to a washing machine, from which the cleansed bars and rollers are automatically loaded into a container that fits the air tempering furnace in which they are drawn. Then bars and rollers are handled automatically through successive cleaning, cadmium plating and burnishing operations.

The continuous hardening operation is done under closely controlled conditions and at relatively low temperature so any carburizing effect that may occur is negligible. Recording pyrometers regulate thermal conditions and constant checks are made on both temperatures and retort speed by inspectors. Accurate speed control is secured by a variable-speed-transmission gear of the chain actuated type that is incorporated in the retort drive assembly.

Case Hardening: Pins and bushings are carburized in batch-type rotary furnaces, follow much the same procedure as side bars and rollers so far as the quench, draw and cleansing are concerned, but are not plated. A row of rotary carburizers is employed for the case-hardening operation. A long oil and a water quench tank extends alongside the row of carburizers.

The heated rotating-retort case-hardening machines are loaded with individual charges of about 500 pounds of chain parts and necessary carburizing compound. The retort plug or cover—handled by a small jib crane—is removed for the loading and then promptly replaced to close the retort tightly.

Retort is fired tangential from above by several burner flames trained so at no time do they impinge on the retort, thus guarding against possible unevenness in heat distribution and absorption. Sensitive automatic control is provided. Burners are manifold so adjustment of the fuel input can be made at the front, center or rear sections. Another distinctive feature is the delicacy with which the speed of the rotating retort is regulated.

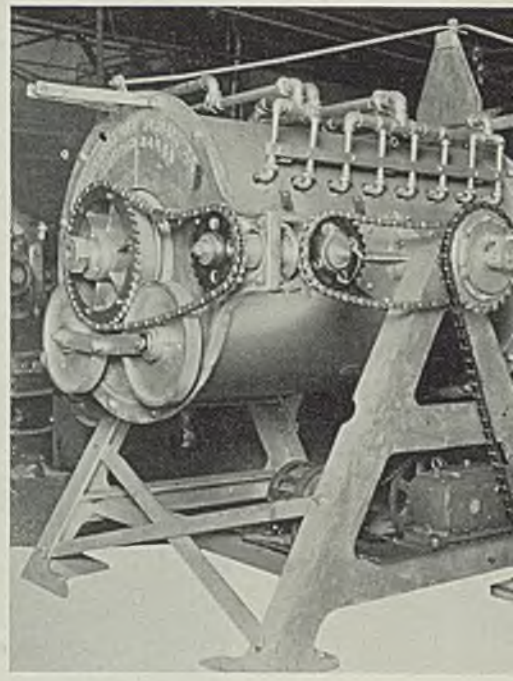
Encased silent-chain transmissions incorporating a chain-actuated variable-speed gear and a planetary speed reducer mounted in line with the trunnion shaft of the machine are employed. The tilting feature of the retort, also under hand wheel control, furnishes the means of regulating the rate of charge discharge when removing work.

Quench Basket: On removing the retort cover upon completion of carburizing, the mass of chain parts and heated compound is discharged through a separating conical screen placed over the open end of the retort. The hot surplus compound drains off into iron storage boxes wheeled into place under the end of the tilted retort, while the chain parts pass over a 2-way removable chute into a basket submerged in the quench pit. This quench basket is of a distinctive, baffled, inverted multiple-cone construction with a lower bottom-discharge sieve section and a top plate that serves as a manhole cover to the quench pit. The charge of heated chain parts enters the quench basket through a hinged trapdoor in the cover plate. On completion of the timed quench, the basket with its load of chain parts is raised from the pit and emptied in tote boxes or barrels.

This workmanlike cycle of operations is conducted under closely controlled conditions, the thermal regulation of the quench, in the case of the water, being effected simply by tank overflow. In oil quenching, the oil is both cooled and conserved by being continuously pumped through an efficient circulating system. Limiting temperatures are closely maintained by regulating the pumping speeds.

Supplementary Furnace Uses: These same carburizers are also employed to advantage at the Dodge plant for other heat treating and reheating operations and have proved well suited for annealing work to which task they are placed regularly over weekends. That is, on Saturdays the carburizers are loaded up with chain parts requiring treatment, closed and allowed to stand for an annealing treatment over Sunday. This practice tends to prolong the life of the furnace refractories since it avoids deteriorative cooling strains. On Mondays the machines are returned to case hardening service with the retort still nearly up to heat.

Such is regular hardening procedure for parts of "Silverlink" roller chains. All pieces are made from carefully selected grades of alloy steels. Each of these special metals is subjected to the individual time-temperature cycle that experience has demonstrated most suitable.



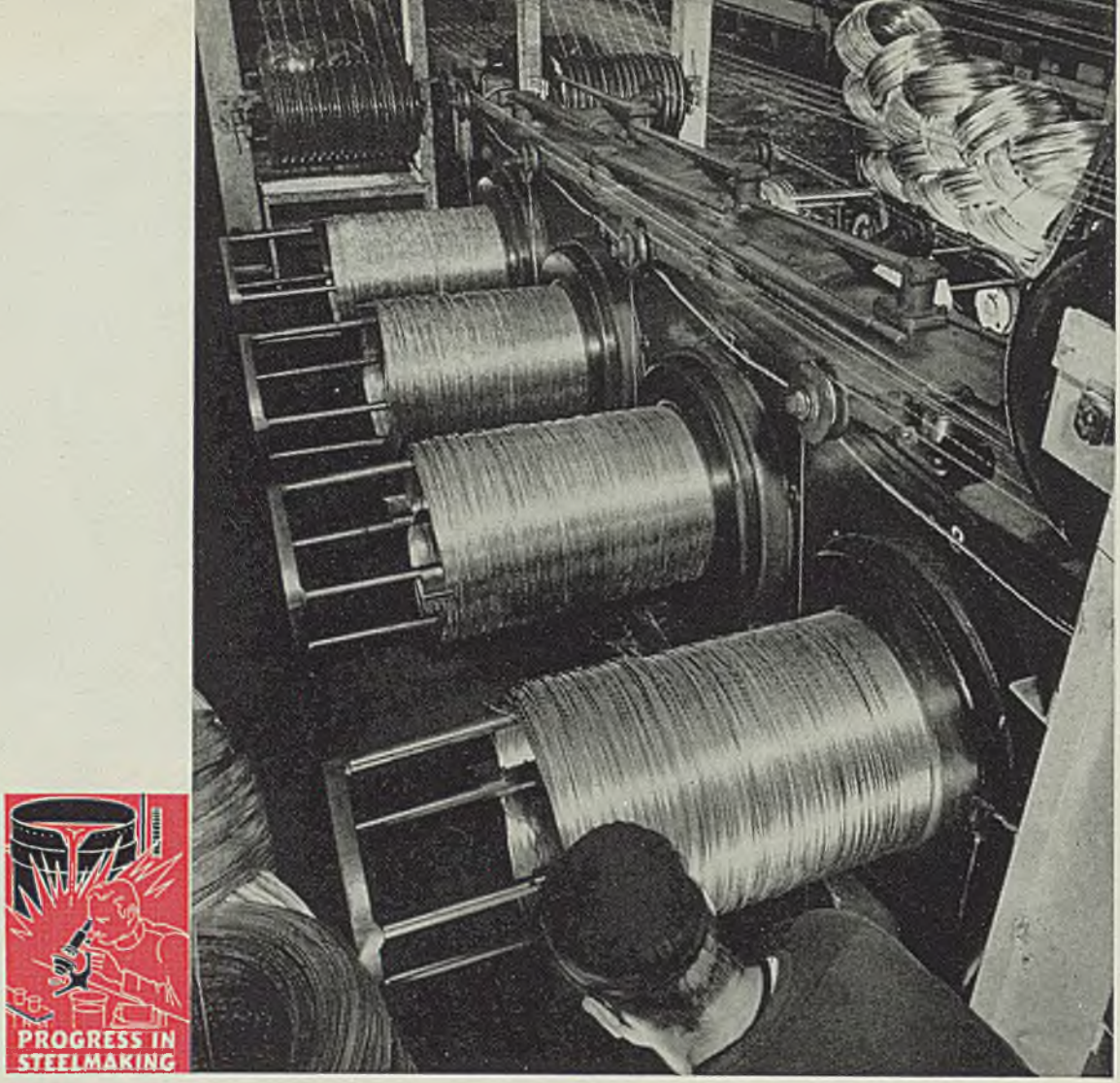
This shows drives of a carburizing machine with the usual enclosing covers removed to afford a good view

The equipment and procedure described afford marked uniformity in the physical characteristics of standard chain parts. The side bars have a hardness of about 400 brinell; rollers are about 50 rockwell C; while pins and bushings of a standard chain are close to 65 rockwell C.

Savings effected: From the viewpoint of present hardening costs, based upon maximum time needs for the usual 500-pound retort charge as computed for a six-month period, figures recently compiled place expeditures at approximately $27.50 per ton of chain manufactured. This sum of substantially 1¾ cents per pound is made up, per 500-pound charge, of:

Gas	$1.651
Compound	.295
Quench oil	.218
Labor	1.700
Machine expense	1.600
Overhead factor	40%

In releasing these itemized expenditures, the statement is also made by the plant official: "The savings effected by the new installation, compared with old methods, has been material and the certainty of a uniform treatment has lessened our worries to a great extent. Complaints are much less frequent and the elimination of any element of doubt in a customer's mind, regarding the product, cannot be estimated in dollars and cents."



Motor-driven reels for coiling bethanized wire at the Maryland division of the Bethlehem Steel Co. The newly installed unit triples the company's production of this type of zinc-coated wire

New Bethanizing Unit

Bethanizing is a process for coating wire with zinc electrolytically and was introduced by the Bethlehem Steel Co. at its Sparrows Point, Md. plant in 1933. The wire is passed through long electrolytic cells containing a zinc sulphate solution, from which metallic zinc is electrolytically deposited on the wire. The accompanying article discusses the bethanizing process

■ ADDITIONS to the bethanizing unit in the Bethlehem Steel Co.'s wire division at Sparrows Point, Md., recently have been completed and will substantially increase output and broaden the range of the types of wire produced. Since the speed at which the wire passes through the bethanizing cells is a prime factor in controlling the coating weight, it follows that tonnage output of the new unit will depend on the coating weights applied. When lighter coatings are produced the output will be higher than with production of heavier weight coatings. Since coating weights may be varied from 0.4-ounce to 2.4 ounces per square foot, or even heavier if desired, the possible latitude in rate of production is considerable. The capacity of the new unit is estimated at between 1500 and 2500 tons per month according to the type of wire produced.

Capacity at the Maryland plant, which is supplemented by a bethanizing unit at the company's Cambria plant, Johnstown, Pa., installed in 1936, will be chiefly given over to production of varied types of manufacturers' wire. Listed according to uses, some of the more important types of wire now being produced are bethanized rope and strand wire, bethanized brush wire, wooden pipe reinforcing wire, chain line fence wire, signal wire, "ruralductor" transmission wire, nail wire, chain wire, spring and mattress wire, redrawing wire and miscellaneous manufacturers' wire of both high and low carbon grades.

A building of steel and brick construction 500 feet long by 100 feet wide houses the new production facilities and provisions for in-

WHAT IS *an* AMPLIDYNE?

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

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

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

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

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

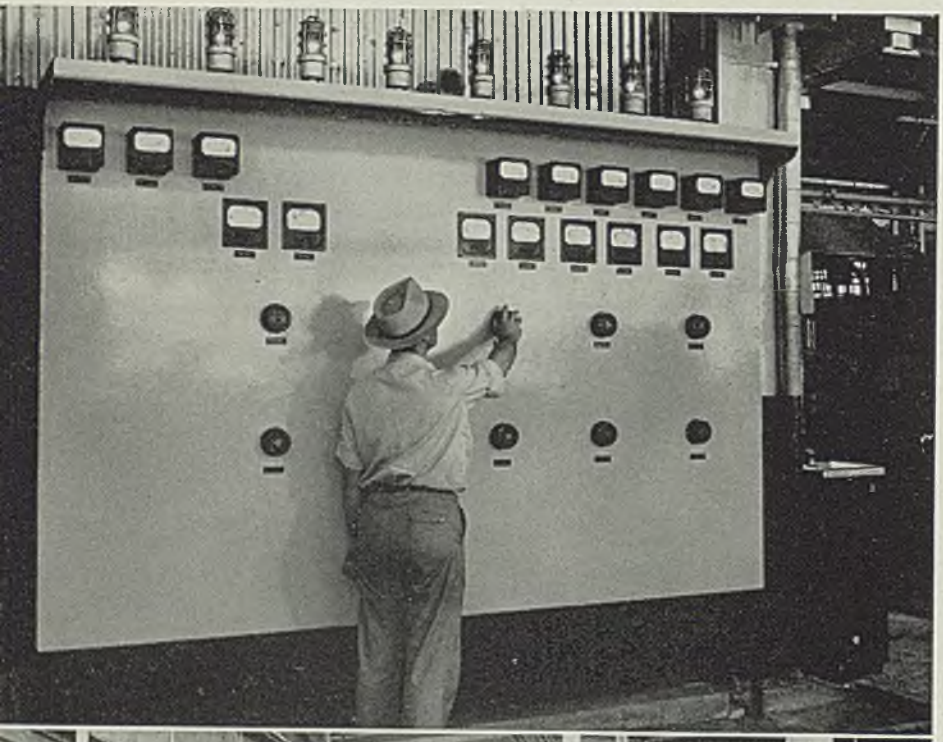
The versatility of this machine is amazing. It will maintain almost any electrical or mechanical value you may choose—voltage, speed, or tension. You can change this value at will, and as often as you like. But, once chosen, this value is maintained.

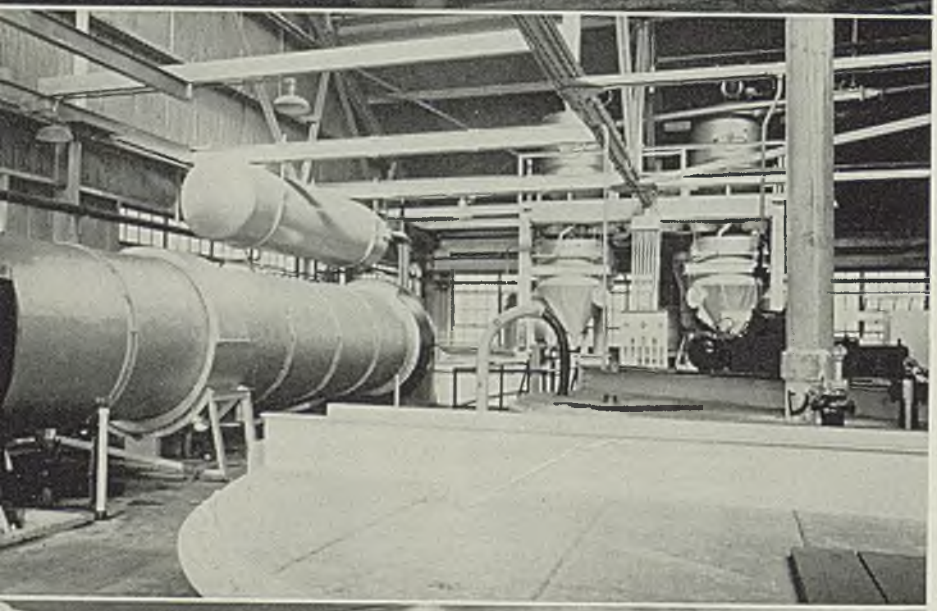
Of course, cold-strip has been rolled successfully without Amplidyne generators, but there may be significance in the fact that they are being used today on mills that are outstanding in the industry for large-tonnage production and low scrap losses. The "amplidyne" supplies new evidence of the steel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

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

GENERAL ELECTRIC

660-4





Above, an electrically-operated system of remote controls govern the production of the electrolytic solution. Center, leach house, showing leach tank in foreground, filters to the left and weigh hoppers in rear. Below, enlarged laboratory facilities have been provided for control work and research

creased inspection, bundling storage and shipping space have been made by the addition of two wings of similar construction to the former shipping division. The additions to the shipping division are respectively 200 x 75 feet and 100 x 100 feet.

The new unit is designed to facilitate flexibility of product as well as to increase tonnage output. In keeping with this objective two different cell lengths are utilized.

The original plant contained four cells, 55 feet long, each having a capacity of eight wires. The equipment that has just been added consists of four 8-wire cells, 80 feet long, and two cells each capable of taking 16 wires at a time which are 40 feet long. As in the older units, the cells are of steel construction and in addition are lined with lead.

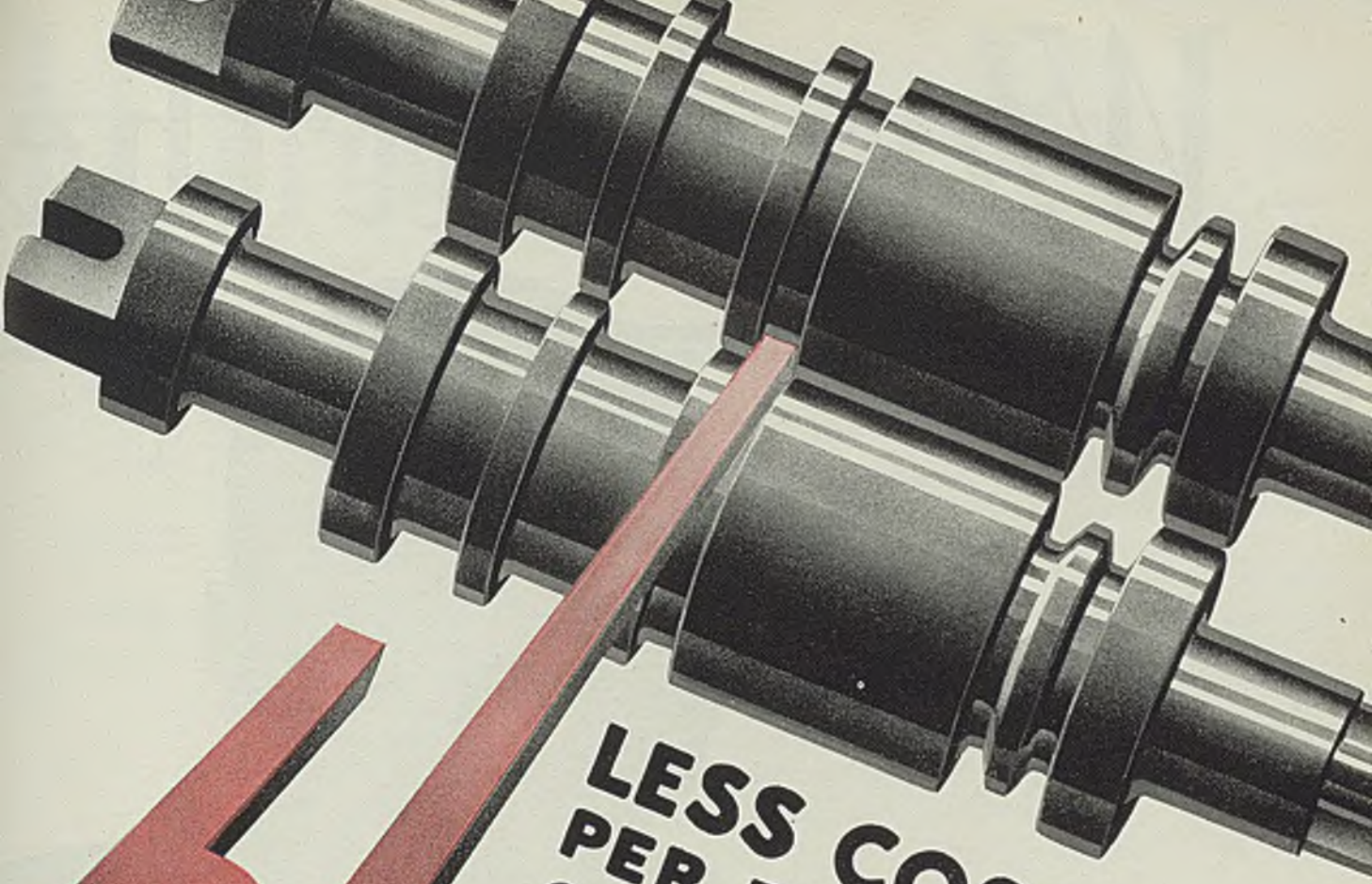
Heavy Coatings Applied

Much of the tonnage produced in the shorter cells of the new plant will be heavy-coated light-gage wire, a type of bethanized wire which has a wide variety of applications in manufacturers' wire, and which is also redrawn to finer gages. Redrawing after bethanizing often imparts physical properties to the wire which it would be difficult to obtain in any other way. Hence, enlarged facilities for heavy-coated light-gage wire will also provide much needed capacity for stock for redrawing after bethanizing, a product for which there has been increasing demand.

Ability to adapt itself to drastic deformations is characteristic of bethanized wire in any weight of coating. The uniformity of the coating and the tightness with which the zinc is bonded to the steel not only adapt it to redrawing but are equally desirable features of the coating both in the "as bethanized" and the redrawn product, and suit it to a wide range of manufacturers' wire uses.

Bethanizing is a continuous operation. Bare wire from the adjoining wire mill passes from takeoff reels to an annealing and cleaning line, then through the bethanizing cells from which it emerges as bethanized wire. After a polishing operation and coiling, it continues on to the bundling, inspection and storage section.

As has been indicated the metal-



LESS COST PER TON OF STEEL ROLLED

blooms

Attention to minute detail governed by years of experience in roll manufacture, has given the products of Pittsburgh Rolls Division an enviable position in the steel industry. The standards of roll performance set up by Pittsburgh Rolls are regarded by many as standards for the industry.

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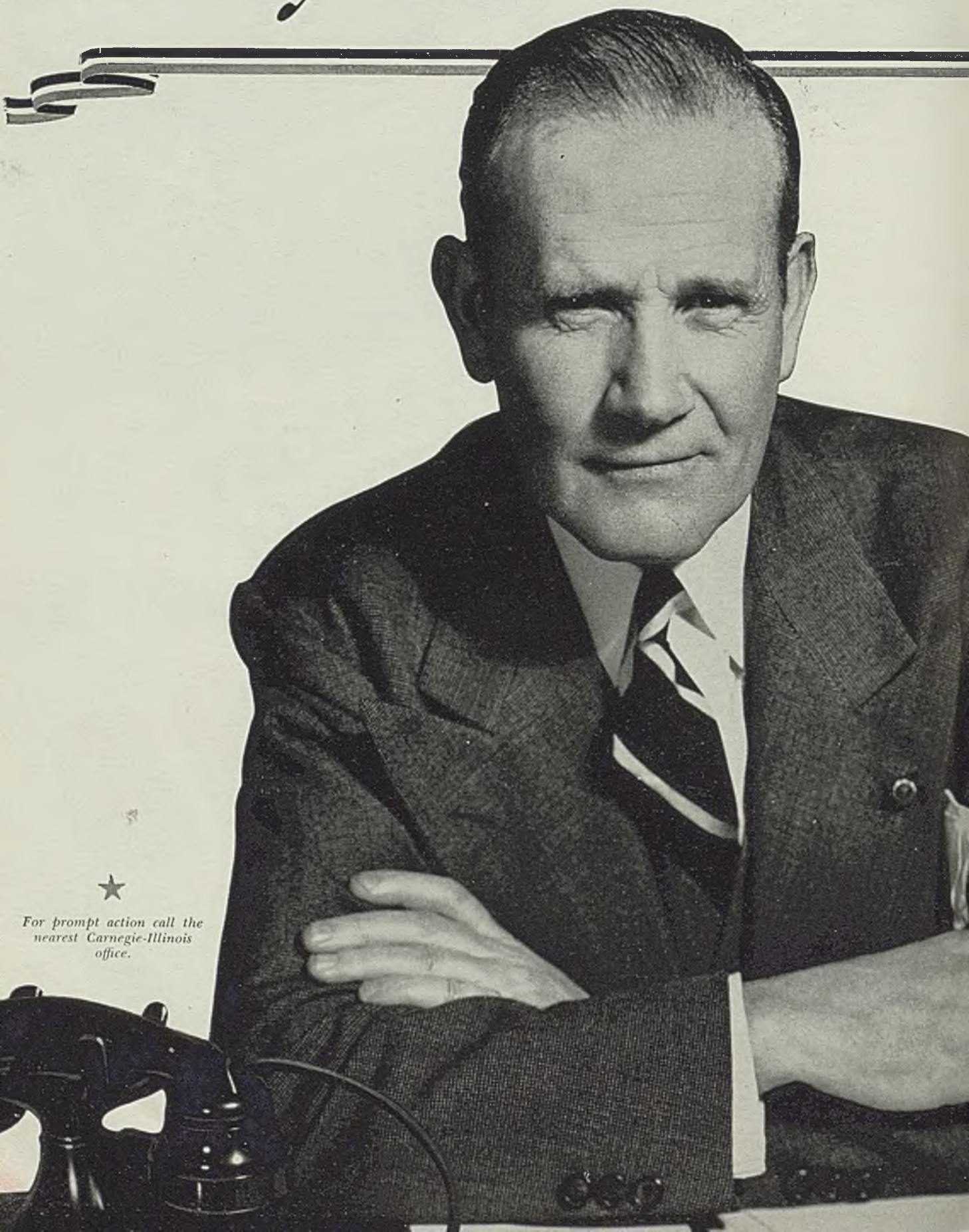

For prompt action call the nearest Carnegie-Illinois office.

Hard Way ?

★★ If your part in the preparedness program involves new problems in the selection and working of steels . . . *use this service*

IF you are being asked to turn from familiar peacetime manufacturing and throw your best efforts into the production of materials for national defense you have no time for trial-and-error methods. Speed is the vital element.

What you want to know is, what are the right steels for your new and unfamiliar requirements—and how they can be put through your manufacturing processes with the least waste, trouble and delay.

Fortunately, we are in a position to supply this information. Here at Carnegie-Illinois we have developed a corps of industrial "trouble-shooters"—engineers and metallurgists whose special job is not to sell steel but to help industry use it more *efficiently*. Their intimate knowledge of the constantly changing steel picture will safely guide you through the complex problem of proper steel selection. Their practical experience with the most advanced shop methods in using the many new and special steels now available will help you avoid time-wasting errors.

In working on your problems, these men can call upon the facilities of the most completely equipped research laboratories and the finest steel-making plants in America. Their advice can be entirely unbiased because they have the most comprehensive range of metallurgy's finest steels from which to choose.

This service is not new. It was initiated long before the present emergency. It is seasoned, tried and widely experienced. We offer it freely to any manufacturer who is anxiously studying unfamiliar blue prints and is seeking a practical way out from a situation that bristles with new problems. We believe we can help you. We welcome the opportunity.

CARNEGIE-ILLINOIS STEEL CORPORATION

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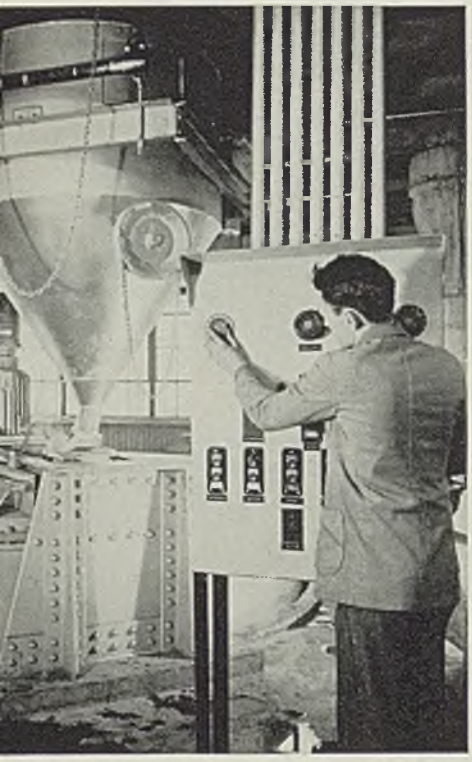
USS

UNITED STATES STEEL



Zinc calcine is released through weigh hoppers into 50-ton agitated leach tanks

lic zinc is electrolytically deposited on the wire from a zinc sulphate solution, electrodes of silver-lead alloy serving as anodes and the wire as cathode. The current that performs this operation is of low-voltage high-amperage type and is supplied by three 7500-ampere 36-volt direct-current generators. The switches and main bus bars, which take the current from the adjacent generator room to the cells, are of aluminum and are suspended from the roof trusses. A central control board indicates the speed in feet per minute at which the wire is traveling in each cell and also the amount of current that is passing through each cell. This makes possible definite speed and current regulation required for a light or heavy zinc deposit as may be required.

Details of Leach Plant

The production of the bethanizing solution, a distinctive operation in itself, is accomplished in a leach plant which occupies a space of 75 x 100 feet beyond the coiler line. Zinc calcine, the source of zinc in the bethanizing cell, is unloaded by a vacuum system from cars on an adjacent siding and is stored for use in six bins constructed of steel plates, each having a capacity of 125,000 pounds. The same vacuum system draws the calcine as needed from the bottom of the bins into weigh hoppers, from which it is released through vibrating feeders into 50-ton agitated leach tanks containing sulphuric acid. From these leach tanks a solution of zinc sulphate is pumped to a large rotary type filter.

Then the material is pumped to an agitated purification tank and finally to a leaf pressure type filter. Here the solution is given a careful check analysis and passes into overhead launders that carry it to the bethanizing cells. An electrically-operated system of remote controls make it possible to govern all of these operations at a central control board.

Major units in the leach plant are of steel construction with acid-resisting brick linings. The new leach plant serves both the new and the old bethanizing cells. Enlarged laboratory facilities are likewise provided for control work and research work.

Produces Steel from Powdered Metal

■ Charles Hardy Inc., 415 Lexington avenue, New York, is marketing a powdered metal called Sinterloy which can be pressed into practically any desired form and then sintered to produce a dense, homogenous steel.

Suitable for the production of gears, cams, pump rotors, washers, pins, rivets and splined shafts, it is available in three compositions, having 0.15 per cent, 0.40 per cent and 0.80 per cent carbon. Each of these contains carefully determined amounts of chromium, and 1.5 to 3 per cent nickel may be added where toughness is desired.

The first two of these compositions are suitable for case hardening by the pack-hardening method. The second composition can be heat treated to a hardness of rockwell C 40, while the third composition can be hardened to rockwell C 50. Tensile strengths of from 80,000 to 120,000 pounds per square inch have been obtained.

Austin Co. Is Builder Of Modern Press Plant

■ Readers who are contemplating a plant expansion or are exploiting the possibilities of an entirely new plant, may be interested to learn that the Austin Co., Cleveland, was the builder of the modern Hydraulic Press Mfg. Co. building, described in the Dec. 2 issue of STEEL, p. 46. This unit is only 115 feet wide by 400 feet long, representing only a one-third increase in floor space, yet it actually doubles this company's capacity. The sash and asbestos siding on the north, east and west sides of the building are merely bolted to the framework to facilitate possible future expansion.

Specifications for Pipe, Pipe Materials Issued

■ American Society for Testing Materials, 260 South Broad street, Philadelphia, announces a 153-page publication which includes ASTM specifications for pipe and piping materials for high-temperature and high-pressure services. It provides in convenient form, standards which are important to those concerned with power plants and industrial installations of piping materials. It is widely used in other connections by manufacturers and purchasers of materials.

Eleven of the twenty-four specifications included cover various types of carbon and alloy steel pipe and boiler tubes, etc., including the specifications for classification and dimensions of wrought iron and wrought steel pipe. Four items cover carbon and alloy steel castings, three pertain to bolting materials including nuts, and there are four items covering forgings and welding fittings. The classification of austenite grain size in steels with two grain size charts also is included.

Copies of this publication are available at $1.25 each. On orders for ten or more copies special prices are in effect.

Markets New High Test Flux-Coated Welding Rod

■ A new high test flux-coated bronze welding rod recently announced by Air Reduction, 60 East Forty-second street, New York, offers eight advantages for bronze welding operations. It is low fuming, has an increased tensile strength and increased hardness of deposit. It also can be applied faster, giving a denser deposit and greater bond strength.

The flux adheres well in shipment and in use. It will not fall off when the rod is excessively bent. For those, however, who prefer a bare welding rod, the same flux is available in liquid paste.

New Outlet for Manganese Steel

■ A sharp increase in the use of manganese steel for tractor tread shoes for power shovels, is reported by Pettibone Mulliken Corp., 4710 West Division street, Chicago. The steel has been found to be particularly suited for the work encountered by the power shovels.

BETWEEN HEATS WITH Shorty

■ Say fellers:

Mebbe 'y 'member my tellin' y' not long ago 'bout a Big Boss I usta know by the name of John Oursler, who had charge of Carnegie Steel Co.'s plant at New Castle, Pa. The boys 'round the mill all called 'im Dad for short 'cuz y' always felt free to go to 'im at any time of the day and spill your troubles all over 'is desk. The more y' dumpd out 'fore 'im, the more he liked it. Many a feller he helped over the hump when the goin' was tough and the whole world seemed 'bout to crash. Many a feller that went into 'is office carryin' a bucket full of troubles came out with the stride of a conqueror.

Tonnage Whether or Not

Mebbe you don't think the boys didn't knock out tonnage for Dad. Didn't make any difference whether he was at the plant or not, the boys over at the bessemer like Billy Lewis and Billy McBride would ring the bell time and time ag'in and the fellers tappin' out iron over at the ol' Red Jacket blast furnace would have a new broom tied to the bleeder pipe at the top-most part of the furnace to let Dad know they were makin' a clean sweep of the other three furnaces in the group when it came to makin' tonnage.

Even the kids liked Dad 'n no wonder for he started the first playground in this country for the children of steel company employes. He had 'er located in the yard of the ol' Rosena blast furnace. 'N on the fenced-in yard he had slides 'n swings 'n a wadin' pool 'n all sortsa things. The kids used to watch for Dad to pass the place 'n they could tell when he was comin' for he had one of the first automobiles in the city 'n she chugged 'long like an ol' yard engine we had at the plant for spottin' cars on the testle.

Well anyway when the kids heard 'im comin' they'd drop everything, run to the fence and when Dad pulled up, they'd shout at the top of their lungs, "Hey Dad."

There was one kid, who just as sure as the whistle 'd blow noon, would yell, "Hey, Dad, Give a look, willya"—'n then he'd run to the trapeze 'n skin the cat. Dad always had a hand-clap for the stunt. 'N then about this time Dad 'd stick 'is hand in 'is coat pocket 'n you shoulda seen the kids They started to dance, 'n with hands stretched high in the air they'd yell, "Hey, Dad, throw me one, throw me one." 'N then Dad would let go with a bunch of tickets all numbered 'n then he'd chuckle as the kids scrambled for 'em. 'Course he always saved out one which he passed through the fence to a little colored girl—"My best girl" as he used to call 'er. The tickets were good fer a ride in Dad's automobile 'n it was nothin' to see 'im with a machine load of kids out for a short joy ride.

I'll betcha, fellers, y' never could guess who dedicated the playground that Dad opened for the kids. None other than Sammy Maitland. He was a water tender at the ol' No. 3 blast furnace. Everybody 'round the furnace liked Sammy; in fact, everybody in the plant had somethin' good to say 'bout 'im. He'd do anything in the world for y' gladly but sometimes he wasn't in condition. You see Sammy liked his booze and he'd get lit up—more'n jus' occasionally.

Goin' Wasn't So Good

Many a night after work y'd see poor ol' Sammy staggerin' up the hill to 'is home. Good water tender alright, but he had a hard time handlin' likker. Many a payday you'd see 'is wife standin' outside the pay window 'n when Sammy 'd step up to get 'is envelop, she'd say to the paymaster, "Mister, wontcha please turn over mah man's pay to me? It'll be gone by nightfall if y' don't. Wontcha, please, Mister?"

'N then Sammy 'd say to the paymaster, "Come on, son, hand over that envelop, she's mine 'n many a good sweat I've had makin' 'er. I'll take care of mah woman alright."

Some of the fellers back in the line 'd say, "Give 'er a break once in awhile, Sammy. Split it with 'er this time. She's not so bad at packin' your bucket."

But the paymaster couldn't do a thing other than hand the pay envelop over to Sammy. 'N then you'd see Sammy walk away from the pay window and head uptown with 'is wife at 'is side pleadin' fer some of 'is pay to keep body and soul alive. He'd head straight for a grocery store, buy a large sack of flour, put 'er over 's shoulder and then walk across the street to 'is favorite saloon. 'N there he'd stay until 'is whole pay was gone. Usually he'd get so drunk he'd have to be assisted, but he'd keep the sack of flour stickin' on 'is shoulder despite the hard goin'. Some good hearted soul usually 'd stop and direct 'im home. 'N when he got home, his broken-hearted wife 'd 'rouse 'im 'n help 'im into the house 'n put 'im to bed.

Hit Low Dust Trail

One day Billy Sunday came to town 'n after he was preachin' fer 'bout a week or so, some 'o the boys 'round the furnace got Sammy to go over 'n hear 'im. At first Sammy balked but when the fellers dared 'im, he sez, "I'll take y' up on it." 'N he did. He not only went one night but several and 'fore he knew it Sammy got religion. 'N from that day to this he's never touched a drop.

Sammy, after his conversion, started to talk to the fellers 'bout their souls 'n then he 'proached Dad Oursler to let 'im preach to the boys all through the mill at lunch hour. Jus' fer fun, Dad allowed 'im to do it. 'N it wasn't long before Sammy quit 'is job as water tender to become a local preacher.

Well anyway it was Sammy Maitland, one of Dad Ourseler's boys at the plant, who dedicated the playground at the Rosena blast furnace of ol' Carnegie Steel at New Castle, 'n he did a good job of it, too. Many a man gathered on the playground the day that Sammy was speakin' from the platform 'n used 'is handkerchief. Even Dad had 'is handkerchief out.

Sammy's speech went over so big that Judge Gary sent 'im to Atlantic City fer a week. Today Sammy Maitland is an ordained minister 'n runs a couple of missions in town. If y' ever meet 'im, ask 'im to fill in some more details to the story but make sure y' have your handkerchief along with ya.

So long, fellers, I'll be seein' ya.

"Shorty" Long

Now

FORMEX
Reg. U. S. Pat. Off.
MAGNET WIRE

HERE

D-C GENERAL-PURPOSE
EEL-MILL MOTORS
R LONG LIFE UNDER
VERE OPERATING CONDITIONS

Stator assembly of typical G-E direct-current motor

SOME of the adverse conditions in steel mills can make it tough for the insulation of d-c motors. Voltage surges, overloads, frequent starting of large motors—these could cause either mechanical shock or injurious overheating, which can damage the insulation or shorten its life, particularly the insulation of the field coils.

That's why General Electric is now using Formex magnet wire for the main field coils of its direct-current steel-mill motors.

"Formex" identifies a new G-E magnet wire insulated with a synthetic resin of the vinyl acetal type. It is a product of many years' research and experimentation by G-E engineers and scientists.

Physically, Formex has outstanding qualities. It retains the high dielectric strength of conventional enamel. It is at least three times tougher and more flexible and much more resistant to abrasion. It shows no tendency to become brittle, crack, and lose its toughness on long exposure to heat.

Another advantage of Formex is that it is resistant to the solvents used in the treating varnishes that are applied to winding assemblies.

Think what just this one feature of G-E direct-current steel-mill motors means! Fewer repairs and replacements, greater assurance of continuous operation, lower costs of production. Why not plan now to get these advantages? You need only specify "General Electric motors" in your equipment order. Or, if you prefer, talk over your requirements with our nearest representative. General Electric Company, Schenectady, N. Y.

GENERAL ELECTRIC

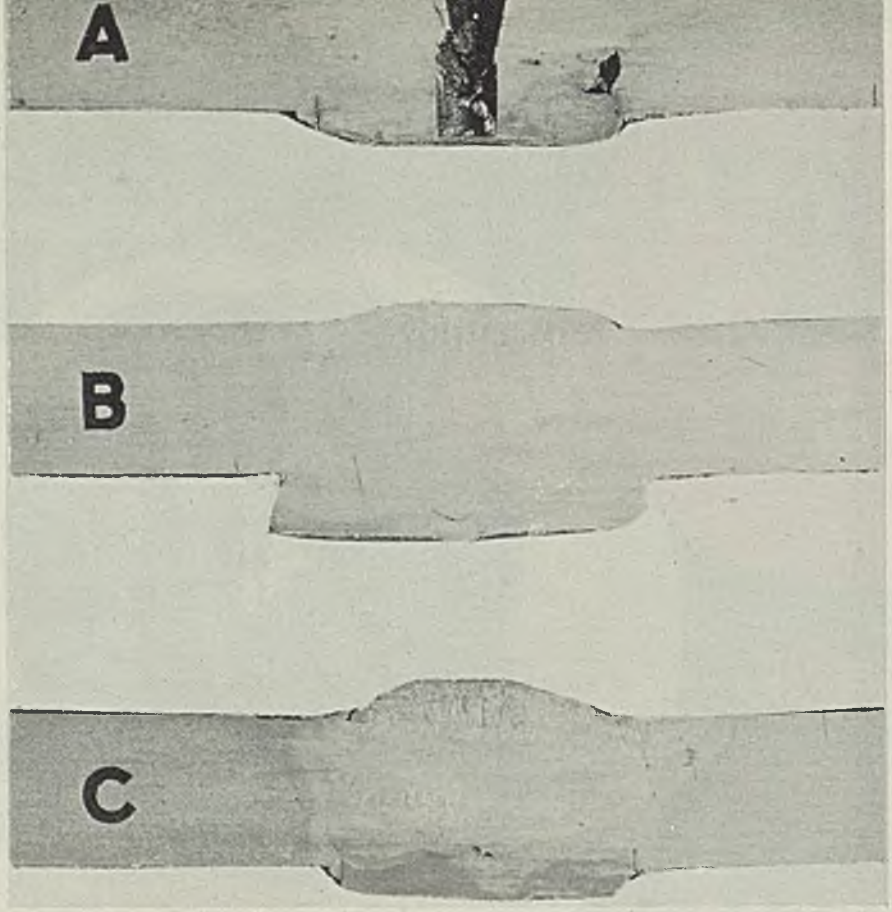


Fig. 5—Attempting to weld the closure as at A leads to difficulties for no matter how skillful the operator, he is handicapped fatally by lack of space to manipulate his electrode properly—and threading and screwing in a plug to fill the final small opening is not always satisfactory. Instead, the trepanned hole should be closed by a plug weld built up from a backing strip or disk as at B and C, respectively

Trepanned Openings

(*Concluded from Page* 50)

ly, the outward appearanace of this weld was excellent and the inspector thought the removal of the plug would be a mere waste of time.

Gas pockets are limited to a maximum of 1/16-inch in any direction. Therefore the weld shown in Fig. 2 would be ruled out on that count as well as because of the decided lack of penetration. Fig. 3 demonstrates the appearance of a sound weld in ½-inch plate.

The truth of the matter is that almost all plugs taken from new work exhibit a uniformity of welding excellence. With the exception of a slight amount of harmless porosity that shows up from time to time in light work, the use of trepanning in the shop on new structures appears to be a needless expense. Where insufficient experience in closing trepan holes is liable to be encountered, the inspection in the shop may well leave the weld in a poorer condition than prior to trepanning.

Closing the Hole: All specifications discuss the closing of the trepan hole. At least two of them suggest closures with a tight fit. This is very sorry practice. No welder, no matter how good he is, can make a closure that is as good as the original weld using a tightly fitting closing piece. The one best method is the elongating of the hole together with the use of a backing strip or disk.

Fig. 5 is presented to prove this contention. A, represents the closure as recommended by the ASME code, 1939 addenda, paragraph U-78. Note the lack of penetration that exists here.

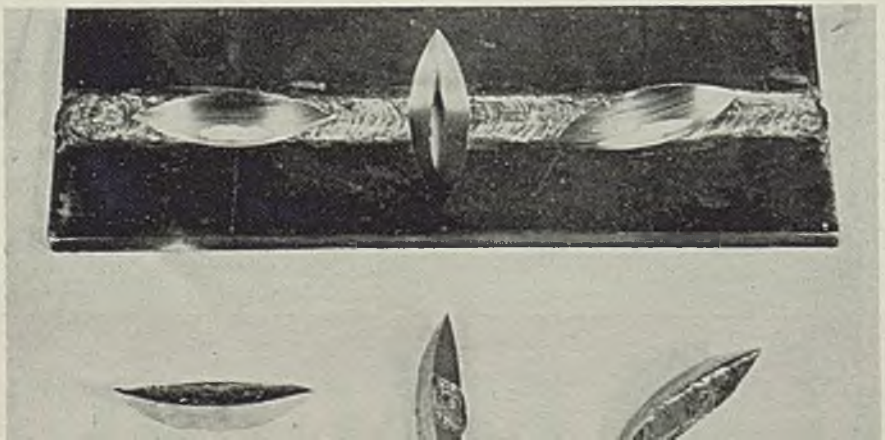
Incomplete fusion is another inherent fault.

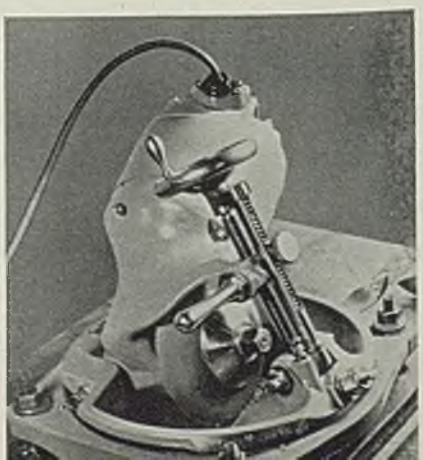
By the way, the central hole is meant to be filled by any suitable means—perhaps by tapping and filling with a ⅛-inch plug. Because of the poor heat capacity of this filler piece with a central hole, it is felt that a better weld would be possible if the hole were omitted. A welding electrode can be frozen to the top surface of the plug to hold it in place until a tack weld can be made. Then the remainder of the welding could be accomplished.

Now consider the two better methods of closure illustrated at B and C. A backing strip inserted below the elongated hole assures a sound patch. B, which was made in just this way, substantiates this statement. To position such a strip in the hole from the outside, the hole may be elongated, so the strip can be inserted the long way of the hole and turned 90 degrees to cover it completely. A flexible wire tack welded to the center of the strip before insertion will aid in positioning and will provide a means of holding the strip in place until weld metal can be deposited to secure the backing strip.

Where it is impossible to locate a backing strip beneath the weld properly, a close fitting disk may be

Fig. 6—Various types of specimens cut from a weld by the Weld-Prober shown at right. Fig. 7—A 6-inch-diameter saw with a 4½-inch-radius spherical curvature cuts out boat-shaped specimen well suited for checking mechanical and physical properties of the weld. Cutouts are large enough to be machined into laboratory test pieces. Opening is easily rewelded without decreasing strength of joint. Sample can be cut in any position and on irregular surfaces. Cutter frame is held in place by bolts tack welded to work. Courtesy Fibre-Metal Products Co., Chester, Pa.





used. Here, as at C, the disk is fused to a welding electrode and lowered in place just beneath the bottom surface of the hole. Then the disk is tack welded in position and the welding rod removed. Next the periphery weld is made with a small diameter, quick solidifying, all position electrode. This deposit is allowed to cool. Then it is cleaned and the weld is completed in much the same manner as any plug weld.

The whole trick to closing trepanned openings is to allow the welder enough room to manipulate his electrode. Close-fitting closures inside the hole do not permit adequate manipulation. Despite the skill of the welding operator, there is bound to be either unsoundness or lack of fusion in addition to incomplete penetration.

That inspection of welds by means of trepanning is an excellent contribution to safety of older welded vessels is beyond dispute. That this scheme offers any improvement in the type of work produced by experienced fabricators is very doubtful. Surely not in the shop where the same skilled personnel welds on pressure work day in and day out. Perhaps in the field where reliance is at times placed on the welds of roving welders whose skill may be open to question there is need for trepanning.

The pressure-vessel work done in shops where radiographic facilities are available is never checked by trepanning. Instead the more costly X-ray inspection is pressed into service. Why? Simply because the welding engineers in these shops are doubtful of the quality of closures. Rather than make a small hole in a heavy seam, these engineers expose a sufficient portion of the weld through the radiograph. They do this in the fair realization that the customer's inspector or the insurance inspector will see more of the weld that way while the consumer will be certain of a consistent weld quality throughout the seams of his vessel.

To Prepare for Future

(*Concluded from Page 37*)

within and you also promote morale and loyalty."

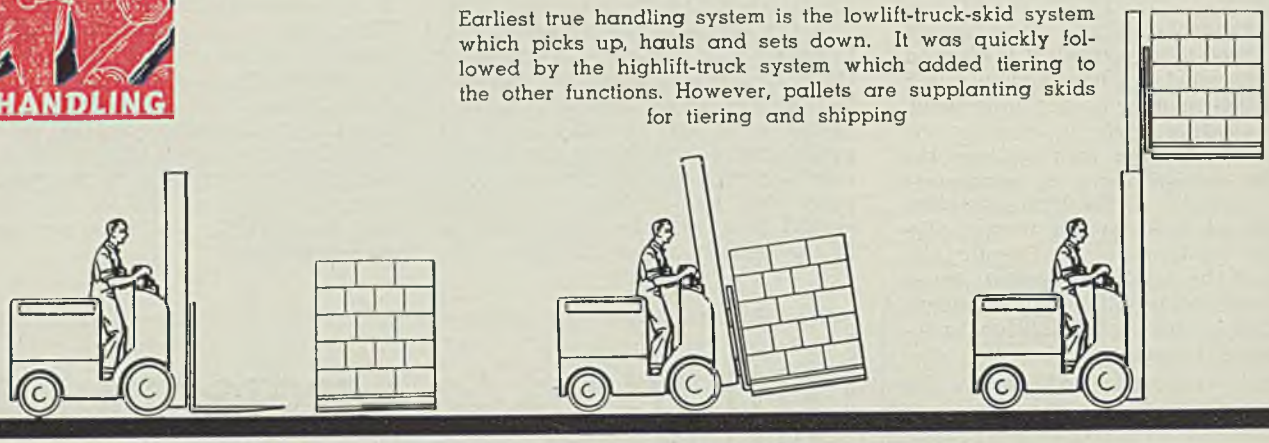
"Friday night has become the big night in most of our industrial picture," declared William Knudsen, production member of the national defense advisory commission in an appeal for speedier execution of the defense program. "It used to be Saturday night; we have cut 20 per cent off our machine time. Can we afford to do this? Can't we stop this blackout, this lack of production, from Friday to Monday and get more use out of the equipment? We can train the men to operate it. Isn't it possible to put the defense job on a war basis even if we are at peace? When I think of the seriousness of the whole world situation where the America's are the only spots where freedom and law still have a foothold I wonder if we are not justified in doing just that.

"Have we done everything we can to utilize existing facilities and offer them to companies having defense contracts? Can we subcontract more of our work and spread it so as to make speed and more speed that way? Every manufacturing company that has a defense contract should be informed of idle facilities in the locality so as to confine the new equipment as far as possible to special machinery."

Corrections Made in List Of N.A.M. Officers

■ National Association of Manufacturers last week issued two corrections in its list of new officers, as published in STEEL, Dec. 16, page 109. John Suman, vice president, Humble Oil & Refining Co., Houston, Tex., is not regional vice president, but is a director. W. C. Trout, president, Lufkin Foundry & Machine Co., Lufkin, Tex., is new regional vice president.

Earliest true handling system is the lowlift-truck-skid system which picks up, hauls and sets down. It was quickly followed by the highlift-truck system which added tiering to the other functions. However, pallets are supplanting skids for tiering and shipping



Smart Management Watches Materials Handling

Because today's great production demands bring added opportunities to cut plant costs by more efficient handling, it is increasingly important that plant superintendents and their assistants as well as department foremen be fully acquainted with the fundamental ideas underlying those efficient handling methods that make possible cutting payroll costs in half, upping outputs 75 per cent and similar astounding achievements that have been reported. Following this series of articles, the first of which is presented here, will help any man see more cost-saving possibilities in his own plant.

■ THE MAJOR objectives of any materials handling system, while more or less self-evident, are not always easily recognized in actual practice. Possibly the most important general principles are:

Handling costs money but cannot add value—so should be reduced to the lowest possible amount.

Correlate handling with production—this will often eliminate separate handling operations.

All handling systems employed should be integrated — essential for maximum handling efficiency.

Handling equipment, like production equipment, should be obsoleted and replaced whenever greater efficiency can thereby be obtained. Improvements in handling equipment and methods often can afford important advantages in lowered costs, greater production, more storage capacity and the like.

The principle which states the case for power handling, sometimes called the principle of the unit load, is:

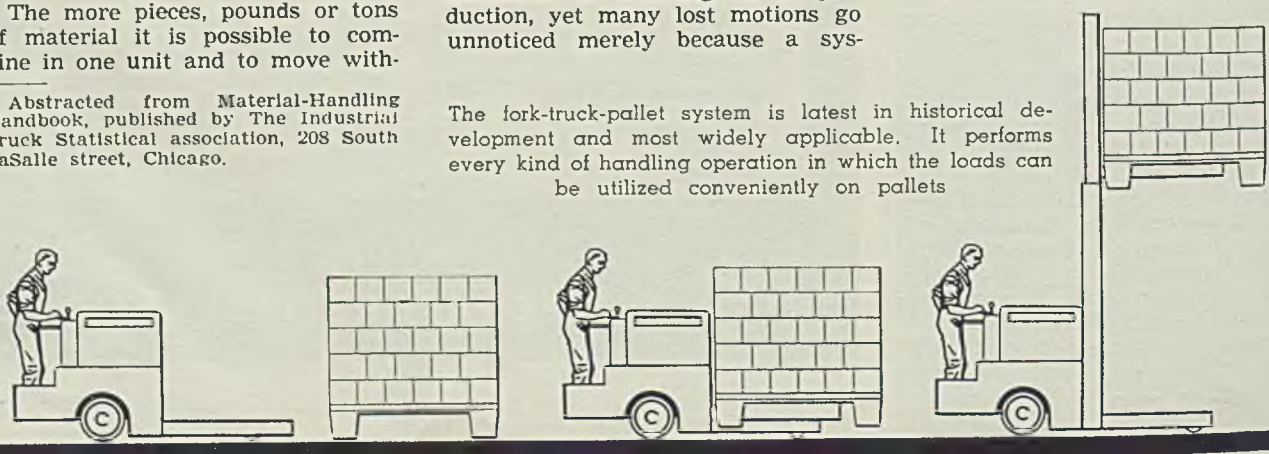
The more pieces, pounds or tons of material it is possible to combine in one unit and to move without breaking bulk, the lower will be the cost per piece, pound or ton and the shorter the time involved. This is the same principle that makes carload shipment cheaper and faster than l.c.l. shipment, but it is always subject to the qualification that the labor and time necessary to make up the larger units should not exceed the saving made possible.

While all these principles are self-evident, when reduced to cases, they may not be recognized so easily. For example, the desirability of eliminating lost motion is just as axiomatic in handling as in production, yet many lost motions go unnoticed merely because a systematic search for them has not yet been made. Among the most common are the motions of picking up material, putting them on a non-selfloading truck and then picking them up again to unload at the destination.

A classic example is a method of handling brake shoes from the foundry to final point for use on the repair track. Brake shoes, 15 at a time, were moved from foundry to the freight car in which they were shipped to a district store. At the foundry they were picked up one at a time, laid down in a wheel-

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

The fork-truck-pallet system is latest in historical development and most widely applicable. It performs every kind of handling operation in which the loads can be utilized conveniently on pallets



barrow one at a time. After being taken to the freight car they were again picked up one at a time and laid down in the car one at a time. These same operations were repeated when unloading the cars on arrival at the local stores and again on delivering them to the point of use. These lost motions were eliminated by setting the brake shoes on skid platforms at the foundry, keeping them on skids throughout their subsequent handling. Use of power trucks made it possible to put approximately 150 shoes on one skid compared to 15 on one wheelbarrow. Tremendous savings in handling costs accrued.

Manual: Most useful manual systems are (1) skids or skid-mounted boxes or racks designed for convenient picking up and setting down of the material and moved from place to place by hand-lift trucks, and (2) caster trucks or live skids on which similar boxes or racks may be mounted and which may be pushed or pulled from place to place by hand. The choice between the two is determined mainly by the question of whether or not stops for storage are necessary between manufacturing processes. When such stops are necessary, the former system is generally preferable because the plain skids are cheaper and can be tiered where necessary. Both systems are generally best for production processes in which movement of materials is in small unit loads and for short distances.

Power: Principal mechanical systems and their respective fields are: Conveyors for movement of materials continuously over fixed lines of travel between fixed points. Overhead traveling cranes for movement of materials intermittently over any desired lines of travel within a fixed area. Industrial trucks for movement of materials intermittently over any desired lines of travel throughout any areas having suitable running surfaces and clearances.

Industrial Trucks: The tractor-trailer system, first in historical development, is primarily a haulage rather than a handling system, its advantage being low dead weight per ton of load, hence low cost per ton-foot. Its use is mainly for handling large tonnages comparatively long distances.

The platform truck system also is a pure haulage system requiring some external means of loading and unloading. It is used principally in departments equipped with cranes.

The low-lift truck skid system represented the first true power truck handling system containing within itself a means of picking up, transporting and setting down without the need of manual or other external handling. The high-lift truck skid system is a development from the low-lift truck, which permits tiering loaded skids one above the other.

Fork-Truck-Pallet System: The idea was conceived that handling tinplate in process and during packing, shipping and carloading would be facilitated by a similar system. This brought about the inception of the fork truck whose capabilities are diagrammed briefly on page 72. The bottom diagram demonstrates the fork-truck-pallet system, most widely applicable of all. It performs every kind of handling operation in which loads can be carried on pallets. These are shallower than skid platforms and permit wider load distribution when double faced and also afford an advantage in tiering. Also pallets can be built more cheaply than skids, in fact so cheaply that for shipping purposes they can be thrown away after use.

Unit Loads: Employing pallets, it is possible to make up extremely large unit loads. As mentioned before, this means that cost per piece or per pound will be lower. Under the best conditions, 1000 pounds would be close to the maximum hand trucking load and 100 feet per minute would be near the maximum speed. A power truck will haul standard production loads of 2, 3 and 5 tons and will travel three to five times as fast. Loads up to 25 tons are not uncommon. Once the material is piled on a trailer, skid or pallet, the load can be moved from one place to another throughout the plant, through shipping and delivering operations without rehandling individual units of the load.

In addition to fork-truck-pallet system of handling, there are many other special systems, some of which are illustrated above, for handling specific types of loads. All of these apply the fundamental principle of the unit load and selfloading to the handling of materials.

Direct Cost: It has been stated frequently that where adoption of modern handling methods has been relatively slow, lack of adequate cost finding has been largely responsible. Whenever a plant with inefficient handling methods has its handling costs actually segregated and discovers that handling comprises as much as 10 to 75 per cent of the direct-labor payroll, a rush to improve methods usually begins. Many modern systems of cost finding segregate stores expenses as well as handling or trucking expenses. When this is done, the information supplied is useful in recognizing such conditions as excessive manual handling, obsolete handling equipment or opportunities for rearranging jobs that are still manually performed.

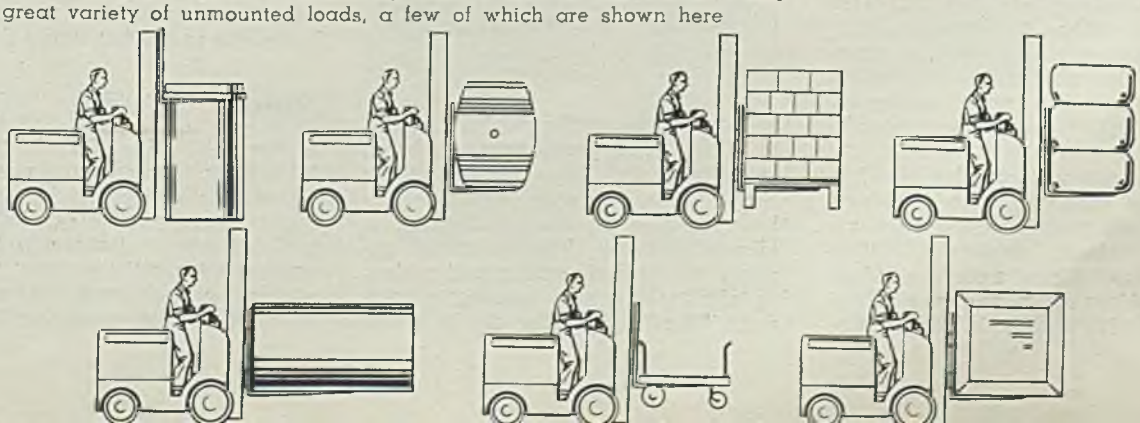
Some systems of cost finding put expense arising from lost time or spoiled work into accounts specifically provided for that purpose since it is considered illogical to charge these costs to the individual jobs on which they were incurred. If such information is available, it often is useful to the management because many such lost-time or spoiled-work expenses are due directly to handling methods employed and can be reduced appreciably if not eliminated entirely by handling improvements.

(Concluded Next Week)

Uses New Containers

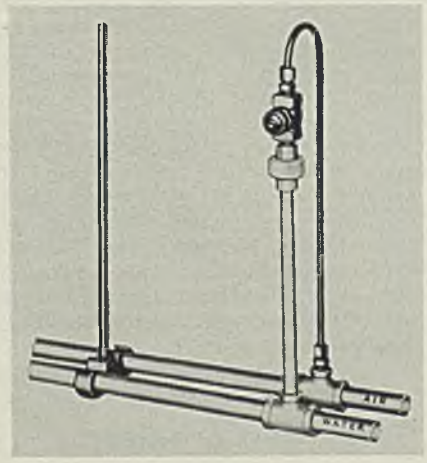
■ The layout fluid for layout work on metals which relieves eyestrain recently introduced by Dayton Rogers Mfg. Co., 2830 South Thirteenth Avenue, Minneapolis, is now being distributed in new improved containers. It is now put up in the following containers: Four-ounce combination brush-in-can for shop use, one pint, one quart, and one gallon cans for stockroom service, together with 5-gallon drums.

Too, the fork-truck-pallet system is extremely flexible and so can handle easily a great variety of unmounted loads, a few of which are shown here



Humidifying Nozzle

■ Spraying Systems Co., 4021-R West Lake street, Chicago, has placed the illustrated humidifying nozzle on the market. A group of these mounted in the ceiling maintains water slightly below nozzle level by means of a float controlled tank. Compressed air is controlled by a solenoid operated valve actuated by a humidistat. The system is fool-proof and cannot



drip. If for any reason air supply is shut off, water will drop back to controlled level.

Coolant Pump

■ Warren Steam Pump Co. Inc., Warren, Mass., announces a new Coolflo coolant pump for the machine tool industry. Built compactly in order to take up as little room as possible, it is of cast iron. The casing is of the volute type, insuring the discharge of liquids through the pump with maximum efficiency and low power requirements.

The open-type impeller is hydraulically balanced, and is keyed to the shaft and fastened with an impeller elastic stop nut. The pump's one piece stainless steel shaft requires no coupling or pump bearings. Its motor is totally enclosed to prevent short circuiting by splashing liquids. It is of the polyphase squirrel cage induction type, wound for 220, 440 or 550, 2 or 3-phase, 50 or 60-cycle, or with special current characteristics if desired. The pump is available in three sizes.

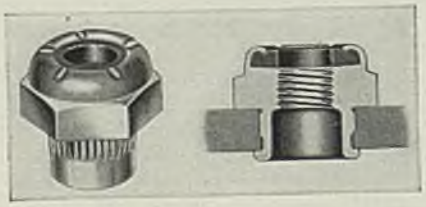
Diesel Plant

■ Kato Engineering Co., 11 Elm street, Mankato, Minn., announces an improved diesel plant for supplying electricity economically. Made in 2, 3, 5 and 8 kilowatt sizes, it

furnishes current the same as that furnished from the highline or city power plant. The unit is driven by a V-belt drive. Its engine is a single cylinder 4-cycle diesel with its generator independently mounted on a sliding base of steel. Because of the two unit construction, there is no direct transfer of engine vibration to the generator. The plant is available with automatic control in all sizes and in all standard alternating and direct-current voltages. The incorporation of a charge control resistor permits adjusting charge rate to suit cranking requirements.

Clinch Nuts

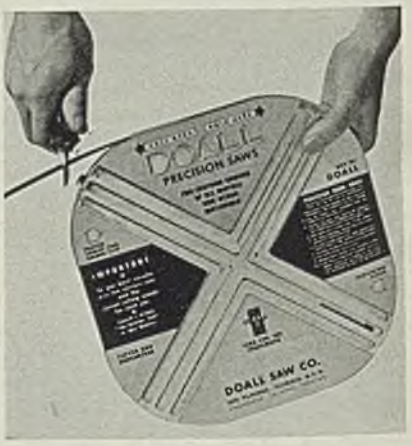
■ Elastic Stop Nut Corp., 2332 Vauxhall road, Union, N. J., has placed on the market a clinch type self-locking nut with knurled shank for fastening sheet-metal assemblies in which the parts must be readily removed and returned to position. It



is installed by drilling a hole in the structure and pressing the shank into the hole. The mouth of the shank then spreads against the back of the structure effecting a clinching hold. The knurling engages the drilled surface and assists in eliminating any turning of the nut. The head of the nut is fitted with a vulcanized fiber collar. This being unthreaded, resists the entrance of the screw, automatically taking up all thread play and bringing the load-carrying thread face of the nut and screw into a tight pressure-contact. As the screw thread impresses its way through the collar, this pressure is maintained and increased to such a degree that the screw cannot work loose, even under severe vibration. Because of the fiber collar, the screw may be removed and replaced repeatedly. The nuts are available in a complete range of sizes, thread systems, shank lengths and materials.

Saw Band Container

■ Doall Co., Des Plaines, Ill., announces a new improved container for saw bands. Consisting of a rigid metal box it is designed so that by holding it in one hand, the saw can be pulled out with the other hand in the same manner as a tape measure is drawn out. When the desired length is pulled out, it is snipped off, ready to weld into a band. Each box contains 100 feet of saw. A

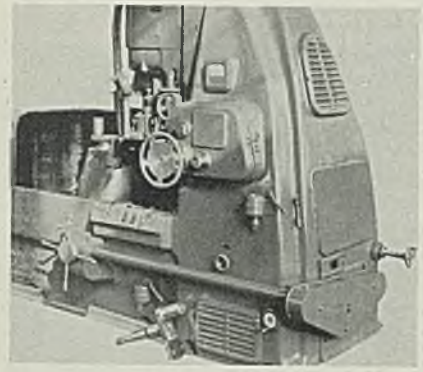


"window" shows how many feet of saw remains in the box. Boxes of saw bands may be stacked on a shelf like books, a label on the outside edge gives complete specifications of the saw. The labels are in three colors to identify the three different sets—raker, wave and straight—so that the operator can reach for the correct box quickly. This type of container prevents cutting hands, tangling the coil and keeps the saw from being damaged.

Rotary Grinder

■ Hanchett Mfg. Co., Big Rapids, Mich., has introduced a special No. 36 rotary surface grinder for grinding aircraft engine crankshafts. It is fitted with a fixture to hold the crankshaft solidly so that the face where the counterweights are later attached can be ground square with

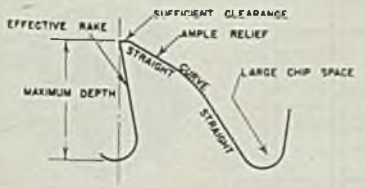
the axis of the shaft to within 0.0004-inch. The grinder is equipped with an 18-inch cylinder wheel which has a special diamond dresser. The grinding wheel is driven by a 30-horsepower, 900 revolutions per minute, built-in motor. The rotary



fixture table is mounted on a carriage and its position under the grinding wheel is controlled by the large handwheel at the front of the machine. This control permits positioning of the crankshaft. Operated by a handwheel at the back of the machine is a micrometer screw stop, which determines correct grinding position for each succeeding crankshaft. Also included is a 175-gallon coolant tank in the bed of the machine with a motor-driven pump.

Milling Cutters

■ Barber-Colman Co., Rockford, Ill., announces that its standard milling cutters are now identified as Paraform cutters. Referring to the sketch, it can be seen that the back of a tooth on one of these cutters consists of two flat surfaces blended by a smooth, curved surface. The relief back of the land is straight to make possible a minimum width land as the cutter is sharpened, and at the same time maintain maximum strength at this important part of the cutter tooth. The flat surface on the back at the base of the tooth,



BARBER-COLMAN "PARAFORM" CUTTER TOOTH

combined with the curving blend between the two flats, makes possible a combination of maximum chip space and maximum strength in the tooth. The rake on the face of the tooth is properly planned for best cutting qualities, and the curve at the root of the chip space is of such a radius as to prevent jamming of the chips between the teeth, permitting them to curl and flow out freely. Note that as the cutter is sharpened the same tooth form is maintained throughout its entire length.

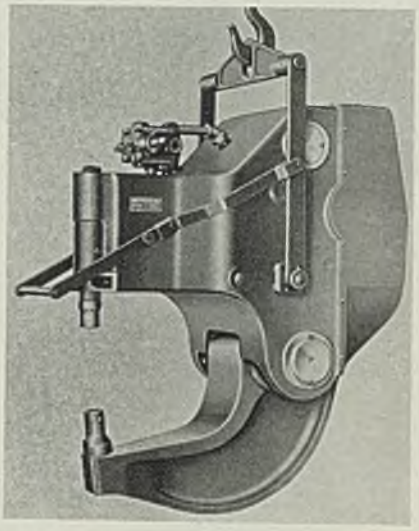
Utility Truck

■ Clark Tructractor division, Clark Equipment Co., Battle Creek, Mich., announces a lifting, carrying, tiering Utilitruck fork truck that will handle loads as heavy as 7000 pounds, and tier them in piles 15 feet high and higher. Gas-powered, it is capable of 24-hour continuous operation. This new finger truck is made in several models including straight lift, tilting and telescopic tiering. Its minimum height is 61½ inches, enabling it to negotiate low doorways, and its minimum capacity is 1 ton. The truck's heavy steel fingers, with chisel points, vary in length and are adjustable sidewise on the front plate. The operator inserts these fingers under any cleated

or uncleated load, lifts the load clear of the floor, tilts it back 10 degrees in 1 second for safe riding, elevates it at the rate of 7 inches per second and tilts it forward 3 degrees in ½ second for tiering. The machine is powered with a 6-cylinder heavy duty tractor motor, and travels at speeds from 1 to 7 miles per hour. It climbs ramps under load, has rear wheel steer and hydraulic brakes. The lifting unit is powered with a hydraulic vane type oil pump, driven by a direct drive from the motor.

Pinch Bug Riveter

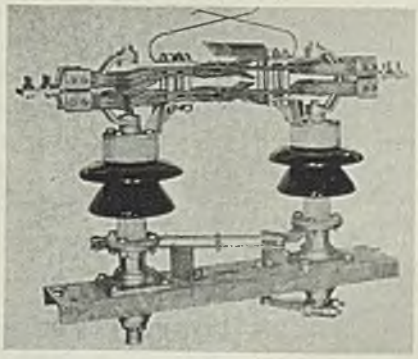
■ Hanna Engineering Works, 1765 Elston avenue, Chicago, has introduced a pneumatic type heavy duty Pinch Bug riveter for riveting 1⅛ to 1¾ inch diameter structural rivets. Rivets are inserted from above and driven from below. A feature of this unit is the skids are maintained at the most efficient working height. Mechanism of the riveter is entirely enclosed. A hardened and ground alloy steel wedge transmits the power of the cylinder piston unit upon hardened and ground rollers mounted in the driving jaw. The moving or driving jaw closes upon the rivet and exerts a uniform predetermined pressure on



the dies even though the variation in length of rivet and grip be as much as ½-inch. The early part of the die stroke is closed quickly at relatively small power consumption while the heading of the rivet is performed under known conditions. The riveter illustrated develops 80 tons upon the dies when operated at 100 pounds air pressure. The die stroke is 4 inches. The reach of this riveter is 22 inches, the gap 20 inches. The gap may be varied by the use of interchangeable jaws.

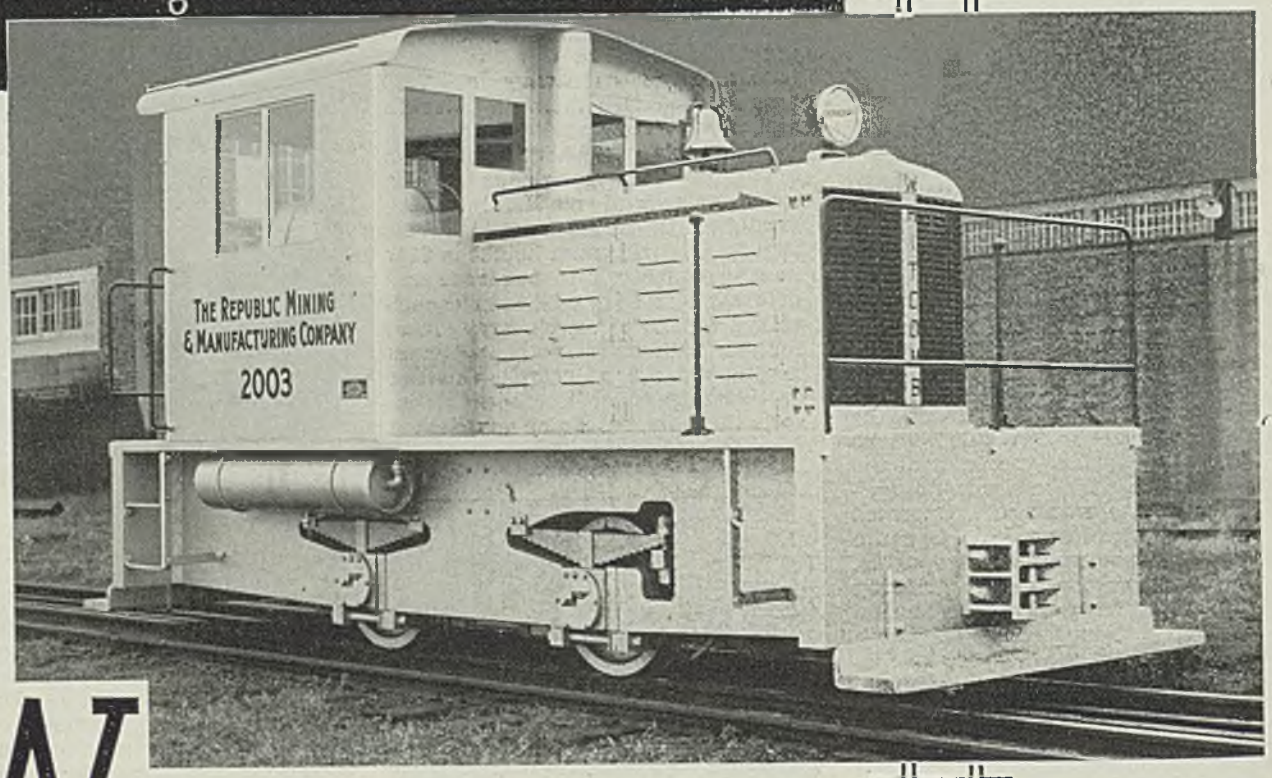
Space Saving Switches

■ Delta-Star Electric Co., 2400 Block, Fulton street, Chicago, has introduced a 2000 ampere, 23 kilovolt type PM-22 switch for use in places where space is at a premium. It is easy to operate due to both blade portions opening on the same



side of the channel base, causing a combined shearing and twisting action for breaking ice or corrosion. Its overall length is less than the 3-insulator types, and the shorter blade permits closer phase spacing than the 2-insulator single horizontal break switches having the blade the full length between insulators.

Bringing the cost of steel mill haulage down with locomotives that give MAXIMUM performance with MINIMUM maintenance . .



WHITCOMB LOCOMOTIVES

absorb all the punishment that is encountered in switching and hauling, and come back for more. Day after day these sturdy, uncomplicated and inexpensively produced locomotives stand up under long hours of continuous service, operate with the greatest economy, and require the least in maintenance attention. WHITCOMB has always stood for the finest in industrial and switching locomotives, and the high standards of design and workmanship in today's models, live up to the WHITCOMB reputation. We suggest that you send for our latest book "Maximum performance at low cost". As you study these 35 to 80 ton little giants, you may hit upon a solution to your own switching and haulage problems. Enthusiastic users say that WHITCOMB locomotives meet all requirements for dependable, economical power, simple design, rugged construction and low cost operation.

BLW
THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

Subsidiary of the Baldwin Locomotive Works

PLANT AT ROCHELLE, ILL.

Holiday Steel Respites This Year Are Curtailed

Only few non-defense consuming plants close bulk of week for repairs. Orders are maintained in volume.

MARKET IN TABLOID ★

Demand
Has not receded.

Prices
Strong.

Production
Down ½-point to 95.

■ HOLIDAY shutdowns among steelmakers and users will be least extensive in many years. Virtually all plants will observe Christmas only, one of the two or three accepted holidays of the steel industry. On rare occasions consuming plants without defense orders close Tuesday for all week, chiefly to repair machinery and take inventory.

Steel ingot production last week declined a half point to 95 per cent, the lowest since mid-October and a recession of two points from the peak.

December shipments are remarkably large, often better than November, and despite a tax on year-end inventories in several states. Broadly speaking, incoming orders show no abatement and are at the rate of 140 per cent of production. Accordingly, backlogs increase continually and deliveries fall behind. More sales are being made into second quarter.

Where orders do not increase the steelmaker is usually not well diversified in products, makes chiefly carbon steel or caters largely to the automobile industry where demand is tapering. Particularly where alloy steel is involved orders are increasing.

In the last category is a large diversified company, with alloy steel a major product. On a typical day last week orders were received at the rate of 134½ per cent of production; sales at the middle of December were 10 per cent ahead of mid-November, while last week total backlog of orders reached the highest tonnage in the company's history.

Impression is that conditions along the Atlantic seaboard are more feverish than farther West, possibly because the East is more convenient for furnishing Britain. Mid-West retailers have been shipping to eastern customers of their own branch warehouses.

About 180,000 tons of steel, largely plates, will be needed for constructing 60 freighters, 10,000-ton displacement each, for the British, the contract placed with Todd Shipyards Corp., New York. Steel in large tonnage will be needed for building additional shipyards in the United States at the expense of Britain.

Automobile makers have this year produced close to record number, anticipating heavy demand for cars and need later to concentrate on defense orders, which makes decline in steel buying now natural. Sheet and strip makers welcome falling off in automobile quality to supply other urgent and very diverse needs.

Estimated automobile production for the week of Dec. 21 is 125,350 units, off 275 from last week, comparing with 117,705 this time last year.

Though at least three large steelmakers announce plans to increase pig iron and coke facilities, thus providing for greater ingot production, apparently no serious mention has been made of expanding ore facilities. It is pointed out that the present Lake ore fleet of about 300 vessels is sufficient. This year the full fleet was not employed for ore until September. In 1941 they can start the season with a rush, and, if necessary, curtail hauls of coal and other commodities to expedite ore, as well as transport more ore by rail.

The exact price status of pig iron, recently advanced $1 by a prominent merchant, is not quite clear, though the trade expects that by the new year the higher price will be general. Even at the new price of $24 per ton for several basing points pig iron is $1 per ton cheaper in some areas than scrap, as tested by sales, whereas scrap is usually several dollars under iron.

Rail purchases for the week totaled 39,500 tons, Baltimore & Ohio taking 25,000 tons, Wabash 10,000 tons and Erie 4500 tons, with substantial numbers of cars and locomotives bought.

About 80 per cent of steel orders placed in Canada during the past six months has been for war purposes. Large overflow orders are being placed in the United States.

With tin plate production no more than 50 per cent some makers are rolling sheets on tin mills, typical of the flexibility and adaptability in the industry now.

Declines in ingot production last week included Pittsburgh, off 1 point at 95 and Chicago, off ½ point to 97½ and Youngstown, down 1 point to 91. New England gained 10 points to 100 per cent. Remaining at previous rates were Eastern Pennsylvania at 95, Wheeling at 98½, Cleveland at 86½, Buffalo at 93, Birmingham at 100, Cincinnati at 87, St. Louis at 87½ and Detroit at 90 per cent.

STEEL's price composites were unchanged for finished steel at $56.60 and scrap at $21.37, but 4 cents higher at $38.32 for iron and steel.

COMPOSITE MARKET AVERAGES

	Dec. 21	Dec. 14	Dec. 7	One Month Ago Nov., 1940	Three Months Ago Sept., 1940	One Year Ago Dec., 1939	Five Years Ago Dec., 1935
Iron and Steel ..	$38.32	$38.28	$38.18	$38.08	$37.93	$37.42	$33.31
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	53.70
Steelworks Scrap..	21.37	21.37	21.29	20.72	20.05	17.88	13.17

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

	Dec. 21, 1940	Nov. 1940	Sept. 1940	Dec. 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.15	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	2.225
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	1.98

Pig Iron

	Dec. 21, 1940	Nov. 1940	Sept. 1940	Dec. 1939
Bessemer, del. Pittsburgh	$25.34	$24.34	$24.34	$24.34
Basic, Valley	23.50	22.50	22.50	22.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	24.34
No. 2 foundry, Pittsburgh	25.21	24.21	24.21	24.21
No. 2 foundry, Chicago	24.00	23.00	23.00	23.00
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.)	25.215	25.215	25.215	25.215
Malleable, Valley	24.00	23.00	23.00	23.00
Malleable, Chicago	24.00	23.00	23.00	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	23.17	23.17	23.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt. steel, Pitts.	$22.75	$21.50	$20.15	$18.50
Heavy melt. steel, No. 2, E. Pa.	[illegible]	19.75	19.70	17.60
Heavy melting steel, Chicago	20.75	20.25	19.30	16.65
Rails for rolling, Chicago	25.00	24.55	21.40	19.85
Railroad steel specialties, Chicago	24.00	23.25	21.65	19.60

Coke

Connellsville, furnace, ovens	$5.50	$4.75	$4.75	$4.75
Connellsville, foundry, ovens	6.00	5.75	5.75	5.75
Chicago, by-product fdry., del.	11.75	11.75	11.25	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

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
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,	Cleve.,	Pitts.
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 ⅝ 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 72.5-10 off; with nuts attached 72.5 off; bulk 82 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅛-inch and less.	66	70
⅛-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	--

Hexagon Cap Screws

Upset 1-in., smaller	70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

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

Structural	3.40c
½-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		
⅜ 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
3" 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 11/16-in. incl.	2.15

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

Skelp

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

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.75- 5.00
Connellsville, fdry.	5.25- 6.00
Connell. prem. fdry.	6.00- 6.50
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	$29.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birmingham, Ala.§	19.38	.....	18.38	24.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	23.00	23.00	22.50	23.50
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.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	-
Neville Island, Pa.	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.	23.00	23.00	22.50	23.50
Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	....	23.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	∫Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81
St. Louis, northern	23.50	23.50	23.00	.....
St. Louis from Birmingham	†23.12	.....	22.62	.....
St. Paul from Duluth	25.63	25.63	.....	26.13

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

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

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

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

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

Ladle Brick

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

Dry press	$28.00
Wire cut	26.00

Magnesite

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

Basic Brick

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

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

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
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
Do., 26-28% 49.50

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 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. tl., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot 1c higher

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

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

15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots. 160.00
Do., spot, ton lots 165 00

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

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c 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	3.86	4.86	3.85	3.85	5.66	3.51	4.48	4.86	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.76	3.76	3.76	3.75	5.56	3.38	4.40	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.75	4.25	3.55	3.55	5.25	3.35	4.05	4.25	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	.
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	..
Buffalo	3.35	3.62	3.62	3.62	3.40	5.25	3.05	4.30	4.60	3.22	3.75	8.40	6.75
Pittsburgh	3.35	3.40	3.40	3.40	3.40	5.00	3.15	....	4.45	....	3.65	8.40	6.75
Cleveland	3.25	3.30	3.30	3.40	3.58	5.18	3.15	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.23	3.48	3.60	3.65	5.27	3.23	4.30	4.64	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	3.05	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	3.30	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	3.62	3.52	3.52	3.47	3.47	5.07	3.18	4.12	4.87	3.41	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	...
Indianapolis	3.60	3.55	3.55	3.70	3.70	5.30	3.25	....	4.76	....	3.97	....	...
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	..
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	..
Tulsa, Okla.	4.44	4.34	4.34	4.33	4.33	5.93	3.99	....	5.71	....	4.69	....	..
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	..
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	..	..
Houston, Tex.	3.50	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	3.85	5.20	3.65	3.75	5.75	3.70	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	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	7.31	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	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	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; 300-4999 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 Official Rates of Exchange

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons: **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	.....	$33.23	3 18 0
Basic bessemer	.....	.....	.....
Hematite, Phos. .03-.05	.....	.....	.....
Billets	.....	$31.95	3 15 0
Wire rods, No. 5 gage	.....	60.71	7 2 6
Standard rails	.....	$48.99	5 15 0
Merchant bars	2.97c 16 10 0	2.77c	7 6 0
Structural shapes	2.79c 15 10 0	2.83c	7 9 0
Plates, +¼ in. or 5 mm	3.04c 16 17 6	3.53c	9 6 0
Sheets, black, 24 gage or 0.5 m.m.	4.01c 22 5 0	2.98c	7 17 0 c
Sheets, gal., 24 ga., corr.	4.61c 25 12 6	3.94c	10 7 6
Bands and strips	.....	2.76c	7 5 0
Plain wire, base	.....	3.15c	8 6 3
Galvanized wire, base	.....	3.75c	9 17 6
Wire nails, base	.....	3.56c	9 7 6
Tin plate, box 108 lbs.	$6.33 1 11 4	....	.....

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French ‡‡Francs	Belgian ‡‡Francs	Reich ‡‡Mark
Fdy. pig iron, Si. 2.5.	$25.86 6 8 0(a)	$17.18 788	$31.44 950	$25.33 63
Basic bess. pig iron	24.34 6 0 6(a)	....	29.79 900	27.94 (b) 69.50
Furnace coke	7.27 1 15 11	4.91 225	10.92 320	7.64 19
Billets	49.49 12 5 0	26.62 1,221	42.20 1,275	38.79 96
Standard rails	2.61c 14 10 6	1.69c 1,692	2.06c 1,375	2.38c 132
Merchant bars	3.17c 17 12 0††	1.53c 1,530	2.06c 1,375	1.98c 110
Structural shapes	2.77c 15 8 0††	1.49c 1,487	2.06c 1,375	1.93c 107
Plates, +¼-in. or 5 mm.	2.91c 16 3 0††	1.95c 1,951	2.42c 1,610	2.29c 127
Sheets, black	4.10c 22 15 0§	2.30c 2,295‡	2.85c 1,900‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.70c 26 2 6	3.59c 3,589	4.80c 3,200	6.66c 370
Plain wire	4.28c 23 15 0	2.34c 2,340	3.00c 2,000	3.11c 173
Bands and strips	3.30c 18 7 0††	1.71c 1,713	2.48c 1,650	2.29c 127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel.

(a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed

††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. ‡‡No quotation.

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.	19.00
Bos. dock No. 1 exp.	17.00-17.25
New Eng. del. No. 1	17.00-17.50
Buffalo, No. 1	22.00-22.50
Buffalo, No. 2	20.00-20.50
Chicago, No. 1	20.50-21.00
Chicago, auto, no alloy	19.50-20.00
Cincinnati, dealers.	19.00-19.50
Cleveland, No. 1	21.50-22.00
Cleveland, No. 2	20.50-21.00
Detroit, No. 1	†17.50-18.00
Detroit, No. 2	†16.50-17.00
Eastern Pa., No. 1	20.50-21.00
Eastern Pa., No. 2	19.50-20.00
Federal, Ill., No. 2	18.00-18.50
Granite City, R. R. No. 1	18.50-19.00
Granite City, No. 2.	17.75-18.25
Los Ang., No. 1 net	13.00-13.50
Los Ang., No. 2 net	12.00-12.50
N. Y. dock No. 1 exp.	†16.50
Pitts., No. 1 (R. R.)	23.50-24.00
Pittsburgh, No. 1	22.50-23.00
Pittsburgh, No. 2	20.50-21.00
St. Louis, No. 1	18.25-18.75
St. Louis, No. 2	17.75-18.25
San Fran., No. 1 net	13.50-14.00
San Fran., No. 2 net	12.50-13.00
Seattle, No. 1	15.00
Toronto, dirs., No. 1	11.00-11.25
Valleys, No. 1	22.50-23.00

COMPRESSED SHEETS

Buffalo	20.00-20.50
Chicago, factory	20.00-20.50
Chicago, dealers	18.50-19.00
Cincinnati, dealers.	18.00-18.50
Cleveland	21.00-21.50
Detroit	†19.00-19.50
E. Pa., new mat.	21.00
E. Pa., old mat.	17.50-18.00
Los Angeles, net	9.75-10.25
Pittsburgh	22.50-23.00
St. Louis	15.50-16.00
San Francisco, net	10.00-10.50
Valleys	21.00-21.50

BUNDLED SHEETS

Buffalo, No. 1	20.00-20.50
Buffalo, No. 2	18.50-19.00
Cleveland	17.00-17.50
Pittsburgh	21.00-21.50
St. Louis	14.00-14.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	15.00-15.50
Cincinnati, dealers.	13.50-14.00
Detroit	†15.75-16.25
St. Louis	13.50-14.00
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1.	17.00
Buffalo, No. 1	20.00-20.50
Chicago, No. 1	19.50-20.00
Cincin., No. 1 deal.	15.50-16.00
Cincin., No. 2 deal.	8.50- 9.00
Cleveland, No. 2	14.50-15.00
Detroit, No. 1 new	†18.50-19.00
Valleys, new, No. 1	21.50-22.00
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	8.50
Buffalo	14.50-15.00
Chicago	15.00-15.50
Cincinnati, dealers.	11.00-11.50
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	†10.00-10.50
Pittsburgh	16.00-16.50
St. Louis	11.50-12.00
San Francisco	5.00
Toronto, dealers	7.25- 7.50
Valleys	14.50-15.00

SHOVELING TURNINGS

Buffalo	15.50-16.00
Cleveland	15.00-15.50
Chicago	14.75-15.25
Chicago, spcl, anal.	15.50-16.00
Detroit	†13.00-13.50
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†9.25- 9.75
Buffalo	14.50-15.00
Cincinnati, dealers.	10.25-10.75
Cleveland	15.00-15.50
Eastern Pa.	13.50-14.00
Detroit	†12.50-13.00
New York	†9.75-10.00
Pittsburgh	15.50-16.00
Toronto, dealers	7.00- 7.25

AXLE TURNINGS

Buffalo	17.50-18.00
Boston district	†12.50-13.00
Chicago, elec. fur.	20.50-21.00
East. Pa. elec. fur.	19.50-20.00
St. Louis	14.25-15.00
Toronto	7.25- 7.50

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†10.00-10.50
Buffalo	14.50-15.00
Chicago	14.50-15.00
Cincinnati, dealers.	10.25-10.75
Cleveland	14.50-15.00
Detroit	†12.50-13.00
E. Pa., chemical	15.00-15.50
New York	†10.50-11.00
St. Louis	11.75-12.25
Toronto, dealers	7.25- 7.50

RAILROAD SPECIALTIES

Chicago	23.75-24.25

ANGLE BARS—STEEL

Chicago	23.75-24.25
St. Louis	21.75-22.25

SPRINGS

Buffalo	26.00-26.50
Chicago, coil	25.00-25.50
Chicago, leaf	24.00-24.50
Eastern Pa.	25.00-26.00
Pittsburgh	27.50-28.00
St. Louis	23.50-24.00

STEEL, RAILS, SHORT

Birmingham	21.00
Buffalo	25.50-26.00
Chicago (3 ft.)	24.00-24.50
Chicago (2 ft.)	25.00-25.50
Cincinnati, dealers.	26.75-27.25
Detroit	†23.00-23.50
Pitts., 2 ft. and less	27.00-27.50
St. L. 2 ft. & less	24.75-25.25

STEEL RAILS, SCRAP

Birmingham	19.00
Boston district	†16.50-17.50
Buffalo	22.50-23.00
Chicago	20.50-21.00
Cleveland	25.50-26.00
Pittsburgh	24.00-24.50
St. Louis	21.00-21.50
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.50-15.00
Cincinnati, dealers.	14.00-14.50

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	14.00-14.50
Cincinnati, dealers.	13.50-14.00
Eastern Pa.	18.50-19.00
New York	†13.00-13.50
St. Louis	15.00-15.50

RAILROAD WROUGHT

Birmingham	17.00
Boston district	†9.50-10.00
Eastern Pa., No 1	20.00-20.50
St. Louis, No. 1	15.50-16.00
St. Louis, No. 2	17.75-18.25

FORGE FLASHINGS

Boston district	†14.00-14.25
Buffalo	19.50-20.00
Cleveland	19.00-19.50
Detroit	†18.00-18.50
Pittsburgh	21.00-21.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	24.50-25.00

LOW PHOSPHORUS

Buffalo, plates	26.50-27.00
Cleveland, crops	27.00-27.50
Eastern Pa., crops	25.00-25.50
Pitts., billet, bloom, slab crops	28.00-28.50

LOW PHOS. PUNCHINGS

Buffalo	26.00-26.50
Chicago	24.00-24.50
Cleveland	23.00-23.50
Eastern Pa.	25.00-25.50
Pittsburgh	27.00-27.50
Seattle	15.00
Detroit	†20.75-21.25

RAILS FOR ROLLING

5 feet and over

Birmingham	20.00
Boston	†18.50-19.00
Chicago	24.75-25.25
New York	†19.00-19.50
Eastern Pa.	25.00-26.00
St. Louis	24.50-25.00

STEEL CAR AXLES

Birmingham	19.00
Boston district	†20.00-21.00
Chicago, net	25.50-26.00
Eastern Pa.	25.00-25.50
St. Louis	26.00-26.50

LOCOMOTIVE TIRES

Chicago (cut)	24.50-25.00
St. Louis, No. 1	21.75-22.25

SHAFTING

Boston district	†19.75-20.00
New York	†20.00-20.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"	20.50-21.00

CAR WHEELS

Birmingham, iron	20.00
Boston dist., iron	†16.00-16.50
Buffalo, steel	26.00-26.50
Chicago, iron	21.50-22.00
Chicago, rolled steel	24.00-24.50
Cincin., iron deal.	20.50-21.00
Eastern Pa., iron	22.50-23.00
Eastern Pa., steel	25.50-26.00
Pittsburgh, iron	22.50-23.00
Pittsburgh, steel	27.50-28.00
St. Louis, iron	21.75-22.25
St. Louis, steel	23.50-24.00

NO. 1 CAST SCRAP

Birmingham	18.50
Boston, No. 1 mach.	†17.50-18.00
N. Eng., del. No. 2	17.50-18.00
N. Eng. del. textile.	21.50-22.00
Buffalo, cupola	19.50-20.00
Buffalo, mach.	20.50-21.00
Chicago, agri. net.	16.50-17.00
Chicago, auto net.	18.50-19.00
Chicago, railr'd net	17.75-18.25
Chicago, mach. net.	18.75-19.25
Cincin., mach. deal.	22.50-23.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net.	†17.25-17.75
Eastern Pa., cupola.	23.50-24.00
E. Pa., No. 2	20.00
E. Pa., yard fdry.	20.00
Los Angeles	16.50-17.00
Pittsburgh, cupola.	22.00-22.50
San Francisco	14.50-15.00
Seattle	14.50-16.00
St. L., agri. mach.	19.75-20.25
St. L., No. 1 mach.	21.00-21.50
Toronto, No. 1 mach., net dealers	18.00-18.50

HEAVY CAST

Boston dist. break.	†16.25-16.50
New England, del.	17.00-17.50
Buffalo, break	18.50-19.00
Cleveland, break, net	18.50-19.00
Detroit, auto net.	†17.50-18.00
Detroit, break.	†15.50-16.00
Eastern Pa.	21.50-22.00
Los Ang., auto. net.	13.00-14.00
New York break.	†17.00

STOVE PLATE

Birmingham	12.00-13.00
Boston district	†16.00-16.50
Buffalo	17.50-18.00
Chicago, net	13.75-14.25
Cincinnati, dealers	14.00-14.50
Detroit, net	†12.00-12.50
Eastern Pa.	18.50-19.00
New York fdry.	†15.00
St. Louis	15.00-15.50
Toronto dealers, net	12.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	24.00-24.50
Chicago, R. R.	24.25-24.75
Cincin. agri., deal.	18.50-19.00
Cleveland, rail	25.00-25.50
Eastern Pa., R. R.	22.50-23.00
Los Angeles	12.50
Pittsburgh, rail	26.00-26.50
St. Louis, R. R.	22.00-22.50

Ores

Lake Superior Iron Ore

Gross ton, 51½ %

Lower Lake Ports

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

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract.	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos	nom.
Spanish, No. African basic, 30 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%	54.00-55.00
Indian, 49-50%	54.00
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 78, 79

Pittsburgh—Sheet mill operations continue steady at 85 per cent of capacity. Buying for inventory continues heavy. Releases against automobile placements are active. Cold mills are reported running at virtual capacity. Galvanized sheet production rate is up one point to 84 per cent.

Cleveland — Deliveries promised have become quite uniform among products, usually nine to ten weeks after placing orders. With some makers galvanized sheets are prompter than average; with others, more belated. December sales nearly keep pace with November, with shipments in some cases better. One large maker reports sales past week as substantially better.

Chicago—Orders for sheets and strip continue steady, although tending toward an easier position. Deliveries have improved somewhat, except for strip mill sizes; deliveries for strip are still lengthening. For the past month, new business has exceeded rollings, making it impossible for mills to make appreciable reduction in backlogs.

Boston—Incoming orders for narrow cold strip are unabated, volume this month being fully up to that of November. With new bookings in excess of shipments, backlogs leave little capacity for new tonnage will be available for first quarter. Hot strip deliveries are also behind schedules. Consumers in more instances are placing tonnage with the claim they have priority slips for the material. This has prevailed to considerable extent in stainless steel in recent weeks.

New York—Leading sheet sellers report specifications so far have been in excess of those in the corresponding period in November. There is question, however, as to whether specifications for all of December will forge ahead of last month, because of the approaching holiday and inventory period. Most sellers are unable to offer shipments on hot and cold-rolled sheets under eight weeks and in some cases under 10 or 12 weeks. Galvanized sheet deliveries range around eight to nine weeks.

Narrow cold strip mills, having booked nearly all available capacity for first quarter, in some instances are booking second quarter tonnage at open prices. Deliveries are lengthening further and incoming volume continues heavy.

Philadelphia—Sheet bookings continue too heavy to permit improved deliveries. Supplies of hot-rolled for shipment before February are particularly tight. Some producers are heavily booked on this grade through first quarter. Pressure for shipment attests to relatively small stocks held by some consumers. Distributors are moving large tonnages but generally are well protected by forward coverage.

Buffalo—Orders for sheets and strip steel are heavy and December tonnage is expected to equal that of November. Mills find buying is becoming more of a defense nature. Motor demands, however, still run heavy.

Cincinnati—Buying of sheets and strip is unabated, averaging recently about 150 per cent of mill capacity. Backlogs are growing and deliveries gradually becoming more extended. The broad demand includes steady specifying for automobiles. There is a trend toward more tonnage bearing national defense priority label. The greatest delivery problem currently is in galvanized.

St. Louis — Orders and shipments of sheets show no signs of diminishing. Despite the high rate of production, it is likely that the principal makers will close the year with backlogs at the peak of the season. Releases on strip by the automotive trade have receded moderately, but are still large. Deliveries of galvanized and enameling stock have been further delayed.

Toronto, Ont.—Sheet buying con-

tinues heavy and backlogs are the highest in history. Current orders are for delivery late in June, and tonnage is building rapidly. The automotive industry has been an important factor and also has been placing large orders in the United States.

Plates

Plate Prices, Page 78

Pittsburgh—Local plate fabricators report they are still unable to buy for inventory replacement purposes, although most are able to buy enough for immediate consumption. Some depletion of inventories is reported, particularly among barge builders here.

Cleveland—Plates continue among foremost items in demand, with deliveries tending to slip behind. Conditions are perhaps slightly calmer as consumers and producers are better adjusted to the situation.

Chicago — Deliveries, recently quoted from eight to ten weeks, and now extended to late March, indicate the tight position of heavy steel plates. Sheared plates in smaller sizes, formerly available in two to three weeks, now are about four to five weeks.

Boston—Plate buying and pressure for deliveries have eased only slightly. Shipyard specifications are heavy and miscellaneous demand continues active. While most large tank contracts have been placed, smaller units for gasoline storage and taking light plates are coming out.

New York—Plate deliveries are receding, with little available under eight to ten weeks. Next month the situation is expected to become particularly complicated by releases of ship plates for the 200 navy vessels awarded last September. Incidentally, the navy program has undergone further expansion with the award of 40 destroyers within the past few days to various yards. These vessels will require about 48,000 tons of steel, it is said. Maritime commission will open bids Jan. 13 on a number of cargo ships of 6100 gross tons each.

Approximately 180,000 tons of steel largely plates will be required for 60 freighters of 10,000 tons displacement just placed by the British purchasing commission with Todd Shipyards Corp., New York.

Philadelphia—Plate bookings are being maintained with producers unable to improve deliveries. Heavy domestic demand continues from ship and railroad equipment builders, tank and boiler shops and miscellaneous industries. Export inquiry is more active, particularly from South America and Africa, following the recent lull. Doubts are growing over the possibility of extended maintenance of present prices in view of current and prospective increases of raw material costs.

Seattle—Seattle-Tacoma Shipbuilding Co., Seattle, with contracts to build 25 destroyers for the navy, and Associated Shipbuilders, Seattle, also holding navy contracts, will place considerable plate tonnage in the immediate future. Navy defense projects in this area and Alaska involve numerous fuel and water storage tanks. Shops report a steady volume of orders for less than 50 tons each, while conversion of merchant vessels into naval transports, several under contract here, require important quantities of plates.

San Francisco—Awards of plates aggregated 4900 tons, bringing the year's total to 199,441 tons, compared with 92,206 tons for the corresponding period in 1939. The Seattle-Tacoma Shipbuilding Corp. was awarded five additional destroyers for the navy, involving 4500 tons. Southwest Welding & Manufacturing Co. took 400 tons for mooring buoys for the navy at Los Angeles.

Toronto, Ont.—Plate consumption is considerably above production. Several thousand tons are to be closed immediately for new merchant and warship construction, and orders pending for war tank construction.

Plate Contracts Placed

4500 tons, five destroyers for navy, to Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash.

705 tons, fabricated high-strength low-alloy steel plates with eyebolts, nosing plate, bolts and cap screws, Panama, schedule 4567, to United States Steel Export Co., Washington.

400 tons, mooring buoys for navy, Los Angeles, to Southwest Welding & Mfg. Co., Alhambra, Calif.

300 tons, 50 buoys for naval department, Pearl Harbor, T. H., to Berkeley Steel Construction Co., Berkeley, Calif.

278 tons, 16-inch, 10-gage welded pipe, San Bernardino, Calif., to Western Pipe & Steel Co., San Francisco.

150 tons, 30-inch welded steel pipe, Spokane, Wash., to Steel Tank & Pipe Co. of Oregon, Portland, Oreg.

131 tons, 16-inch 10-gage welded pipe, San Bernardino, Calif., to Southern Pipe & Casing Co., Alhambra, Calif.

110 tons, 454 pieces structural noncopper plate steel, Panama, schedule 4561, to Lukens Steel Co., Coatesville, Pa.

100 tons, or more, 300,000-gallon elevated water tank, Raritan arsenal, Metuchen, N. J., awarded Chicago Bridge & Iron Co., Chicago, under readvertised contract C. A. 727-41-108 at $29,920.

Unstated tonnage, 500,000-gallon elevated steel tank, Fort Sill, Okla., to Pittsburgh-Des Moines Steel Co., Des Moines, Ia.

Plate Contracts Pending

5800 tons, four 15-foot diameter penstocks for Shasta dam, Corma, Calif.; bids Jan. 2.

600 tons, estimated, six welded steel oil barges, 196 x 35 x 10½ feet, Inland Waterways Corp., New Orleans; bids Jan. 11.

564 tons, fabricated high-strength low-alloy steel plates with bolts, eyebolts, nosing plate and cap screws, Panama, schedule 4621, bids Dec. 23, Washington.

300 tons, estimated, two 500,000-gallon water storage tanks, Fort Huachuca, Ariz., bids in Dec. 20, constructing quartermaster, inv. 6203-9.

Unstated tonnage, eight welded dump scows or barges, Panama, schedule 4579, United States Steel Export Co., Washington, low, $1,108,400; bids Dec. 6, Washington.

Unstated tonnage, 40 underground gasoline tanks, 5000-gallon capacity, bureau of supplies and accounts, navy department, delivery, Charleston, S. C.; also 50 for Mare Island, Calif., and 30, New York, sch. 4488, bids Jan. 3.

Bars

Bar Prices, Page 78

Pittsburgh—In most cases delivery dates are being met if the tonnage was placed far enough in advance. It is now impossible to place tonnage for delivery much before the end of first quarter, except on small orders and items which through certain circumstances may be run in on mill rollings already scheduled. Backlogs are high. There is little available capacity on bar mills here, and production is dependent upon available semi-finished.

Cleveland — Widely diversified steelmakers mention bars as continuing most active item, with sales for some 10 per cent better than a month ago. Purchases are widely scattered as to types of buyers. Some sales have been made for May and June delivery at prices then prevailing.

Chicago—Bar demand is particularly strong. Alloy grades are in chief demand. Although automotive production has passed its peak, orders from this field are declining slowly because of national defense production now under way in auto plants. Farm implement and tractor makers are busy and getting ready to turn out defense items.

Boston—On 2500 tons nickel steel bars for the Boston navy yard all bidders quoted 5.21c, a pound, delivered, and on a 187-ton lot uniform quotations were 5.06c. Material is for chainmaking and contracts will be awarded by lot. Deliveries will extend beyond first quarter. Demand for merchant steel bars is heavy and with requirements broadening some tonnage on books for this district will not be shipped before next quarter, due to heavily sold position of mills.

New York—With most bar sellers unable to offer little before March, and not much then in many cases, there has been a particular spurt in demand due to concern of buy-

ers over possibility of higher prices for second quarter. For the same reason sellers are increasingly cautious. Deliveries on hot carbon bars run ten weeks and beyond; on cold-drawn, 12 to 13 weeks; alloy bars, 25 to 30 weeks, and where special heat treatment is involved, many weeks beyond that.

Philadelphia — Bar demand is steady. Deliveries from various producers are becoming more evenly balanced but average shipments are slightly more extended. Defense work is an important influence in demand though still heavier requirements are indicated for next quarter. The navy has bids on 456 tons of tool steel for Philadelphia delivery with bids on most items uniform but Jessop Steel Co., Washington, Pa., apparently low on a large part of the tonnage.

Buffalo — With backlogs mounting, widespread industrial demand is exerting pressure on mills for immediate delivery of bars. Mills are working near capacity with little tonnage left for delivery in first quarter. Alloys are not promised before April and other grades run from eight to ten weeks.

Toronto, Ont.—Bar orders are increasing. Mills are closing forward delivery contracts, but have nothing available for immediate shipment. On heavy sizes delivery is March and April and light sizes are quoted for delivery in May and June.

Pipe

Pipe Prices, Page 79

Pittsburgh — Weakness continues in eastern secondary markets on standard pipe. Mill prices are strong. Demand continues heavy, but stocks are being maintained at reasonable levels in most sections. Mills here expect a revival in oil country business within 30 to 60 days as the new production year gets under way.

Cleveland—Merchant pipe demand exceeds all expectations, tending to increase. Recent removal of a discount, making for higher prices, did not slow demand. Consumers and jobbers who a month ago suspected they were over-buying, now find the opposite occurred. Line pipe is slow; casings are fair.

Seattle—While no large tonnages are up for figures, important contracts for cantonment and housing projects will be placed in the future. Marckman & Williams, Seattle, have taken 400 tons of 3 to 12-inch universal pipe for the Bremerton housing authority and 200 tons for the Seattle yard of Seattle-Tacoma Shipbuilding Co.

Boston—Sales of merchant steel and cast pipe are high for this season, and, while demand is slackening final quarter tonnage will be well in excess of last year. The district cast pipe foundry is operating six days per week filling rush shipments, mostly for defense camp facilities, and, with stocks low, will continue high operations for some time after current buying slackens further.

San Francisco — While awards were limited to lots of less than 100 tons, bids have just been opened on several fair sized lots. To date this year 49,041 tons have been booked, compared with 42,753 tons for the same period a year ago.

Cast Pipe Placed

1100 to 3300 tons, 3 to 14-in., Phoenix, Ariz., to United States Pipe & Foundry Co., Burlington, N. J.

400 tons, 3 to 12-inch universal pipe for Bremerton, Wash., housing authority, to Marckman & Williams, Seattle, for Central Foundry Co., Holt, Ala.

200 tons, Seattle-Tacoma Shipbuilding Co.'s Harbor Island plant, Seattle, to Marckman & Williams, Seattle, for Central Foundry Co., Holt, Ala.

Cast Pipe Pending

155 tons, 4-inch, class 150, procurement division, treasury department, Harrisburg, Pa., bids in.

128 tons, 8 and 6-in., Sacramento, Calif.;

American Cast Iron Pipe Co., Birmingham, Ala., low.

128 tons, 6-in., Sacramento, Calif.; bids Dec. 27.

Rails, Cars

Track Material Prices, Page 79

Railroads display considerable activity at the year end, although rails buying is lighter than usual. New York Central will open bids Dec. 30 on miscellaneous steel requirements for first quarter.

During the past week three roads destributed orders for 39,500 tons of rails, 29 steam and diesel locomotives and 633 cars, with a number of pending lots under each classification.

Locomotives Placed

American Steel & Wire Co., one 660-horsepower switcher, to Baldwin Locomotive Works, Eddystone, Pa.

Atchison, Topeka & Santa Fe, one 1000-horsepower diesel-electric, to Baldwin Locomotive Works, Eddystone, Pa.

Boston & Maine, two 4-8-2 steam locomotives, to Baldwin Locomotive Works, Eddystone, Pa.; in addition to three ordered in September.

Chief of engineers, war department, Washington, seven 8-ton type, 2 gasoline-mechanical drive 60-gage locomotives to Whitcomb Locomotive Co., Rochelle, Ill., and three 56½-gage to Vulcan Iron Works, Wilkes-Barre, Pa., bids Nov. 6.

Central of Georgia, two 600-horsepower, diesel-electric, to Electro-Motive Corp., La Grange, Ill.

Phelps, Dodge Corp., New York, nine electric locomotives, to Baldwin Locomotive Works, Eddystone, Pa.

Philadelphia, Bethlehem & New England, two 600-horsepower, diesel-electric, to Electro-Motive Corp., La Grange, Ill.

Republic Steel Corp., two diesel-mechanical locomotives, to Fate-Root-Heath Co., Plymouth, O.

Seaboard Air Line, one 660-horsepower switcher, to Baldwin Locomotive Works, Eddystone, Pa.

St. Louis-San Francisco, five 4-8-2 type freight locomotives and three 4-8-4 type passenger locomotives, to own shops.

Youngstown Sheet & Tube Co., one steam switcher, to Heisler Locomotive Works, Erie, Pa.

Locomotives Pending

Missouri Pacific and subsidiaries, two 1000-horsepower and five 600-horsepower diesel switchers, ten 44-ton diesel switchers, one streamlined motor car; court authority granted.

Panama, schedule 4620, three oil-burning steam locomotives, five-foot gage; bids Dec. 30.

Car Orders Placed

Hercules Powder Co., 12 steel tank cars, to American Car & Foundry Co., New York.

International Nickel Co. of Canada, fifteen 70-ton ore cars, to National Steel Car Corp., Montreal.

Litchfield & Madison, 100 fifty-ton hoppers; 50 to American Car & Foundry Co., New York, 50 to General American Transportation Corp., Chicago.

Pennsylvania Salt Mfg. Co., six tank cars to American Car & Foundry Co., New York.

St. Louis-San Francisco, 500 forty-ton all-steel box cars, reported placed with own shops.

Car Orders Pending

Chicago & Northwestern, 1000 fifty-ton gondolas, 500 fifty-ton box cars and 200 seventy-ton ore cars.

Missouri Pacific and subsidiaries 1200 fifty-ton coal hoppers, 100 fifty-ton box cars, two well-type cars; court authority granted.

Pittsburgh & Lake Erie, 1000 box cars, Pressed Steel Car Co., Pittsburgh, low.

Rail Orders Placed

Baltimore & Ohio, 25,000 tons; 16,250 tons to Carnegie-Illinois Steel Corp., Pittsburgh, 8750 tons to Bethlehem Steel Co., Bethlehem, Pa.

Erie, 4500 tons, equally to Carnegie-Illinois Steel Corp., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa.; in addition to 12,800 tons placed in October, completing year's program.

Wabash, 10,000 tons; Carnegie-Illinois Steel Corp., Chicago, 5500 tons; Inland Steel Co., Chicago, 2000 tons; Bethlehem Steel Co., Bethlehem, Pa., 2500 tons.

Rail Orders Pending

Navy, delivery White Plains, Md., 590 tons, schedule 4330; bids in Dec. 17.

Buses Booked

A.c.f. Motors Co., New York: Fifty buses; 20 for Montreal Tramways Co., Montreal, Que.; 11 for Harrisburg Railways Co., Harrisburg, Pa.; six for Bee Line, Inc., Rockville Centre, Long Island, N. Y.; six for Valley Transportation Co., Lemoyne, Pa.; two for Williamsport Transportation Co., Williamsport, Pa.; two for Norfolk Southern Bus Corp., Norfolk, Va.; two for Quaker City Bus Co., Ocean City, N. J.; one for Bangor & Aroostook Transportation Co., Bangor, Me.

J. G. Brill Co., Philadelphia, 50 trackless trolly omnibuses for Philadelphia Transportation Co.

Wire

Wire Prices, Page 79

Pittsburgh—There is apparently less inventory buying in wire than in other finished steel products as most current wire orders reflect current production needs. Export business continues heavy. Manufacturers' wire releases are active, and buyers in the merchant markets report some trouble finding adequate sources of supply. Prices on merchant wire products have strengthened considerably and some difficulty is reported in getting adequate deliveries on fencing.

Cleveland—Business is stable as to sales volume, rate of shipments and period of delivery. New flurry of demand is expected when farm regions start buying for spring consumption in late winter. Fairly prompt deliveries, compared with other steel items, are still possible.

Chicago — Orders and inquiries for wire are at high levels. Deliveries are much delayed, as mills operate near capacity. Demand is well diversified, with defense requirements accounting for only a minor proportion. Bulge in national defense requirements is expected to come in 1941.

Boston — Wire buying, notably specialties, is maintained, with incoming tonnage still exceeding shipments, finishing departments operating at capacity in most instances. Deliveries are gradually lengthening and there is no easing in the tight situation prevailing in rod supplies. Consumers in some cases are offering tonnage for shipment at open prices beyond next quarter.

New York—A slight decline in wire bookings has not eased delivery pressure and new orders are still well above shipments. A leading producer is taking first quarter busines at firm unchanged prices, but without formal announcement. Rod supplies are hampering production by some mills. December buying will be close to that of November and well in excess of shipments.

Toronto, Ont.—Demand for wire and wire products is gaining steadily and producers experience difficulty in obtaining sufficient wire rods to meet demands. One local plant is operating at capacity, while another in Ontario has cut to single shift owing to scarcity of wire rods.

Shapes

Structural Shape Prices, Page 78

Pittsburgh—Fabricators are hopeful that a priority system will be instituted shortly, to enable them to get better delivery. It is difficult for most fabricators to bid on jobs now in the market because of questionable delivery time.

Cleveland — Inquiries have been most numerous for several months. Deliveries have slipped another month behind, or four to five months, sometimes six. New prospects offset work completed. The U. S. government will build a plant at Canton, O., costing $16,000,000, with one contemplated near Sandusky, costing $18,000,000 both naval ordnance plants. Largest live project, over 3000 tons, involves army depot at Columbus, O. Further delayed deliveries are due to full fabricating capacity rather than shortage of shapes.

Chicago — Awards of shapes last week were less than for several weeks. However, all fabricating shops are well engaged and are estimating on numerous large projects. Deliveries on standard shapes range upwards to 13 weeks, as compared with the former ten.

Boston—With 1300 tons, exclusive of H-piles, for the Martin Point

project, Portland, Me., closing Jan. 3, active bridge tonnage is the heaviest in months, approximating 18,000 tons. Most of this, however, is for one project, the Thames river span, New London-Groton, Conn., closing Dec. 23. Shipyard and defense requirements are also impressive and industrial expansions indirectly due to government contracts continue to come out frequently, although most such work requires small individual tonnage.

New York—Bridge and elevated highway requirements feature structural activity, 14,000 tons having been bought or bid in the last 10 days. New Jersey takes estimates this week on 2355 tons. Current awards are also heavier and include 1000 tons for a state hospital building, Long Island. Shipyard extensions, industrial expansions and miscellaneous construction are developing in good volume. Plain material deliveries have lengthened to around 10 weeks with most mills.

Philadelphia — Structural fabricators are getting some relief from the heavy rush of inquiries over the past few months. The lighter volume of new work is not yet reflected in operations, which are still brisk, or in deliveries of plain material, which are extended to eight weeks or more. Industrial plants dominate awards and inquiries.

Buffalo—Inquiries in the structural steel market continue to increase but bidding dates on several projects are not expected to be announced until after the turn of the year. Backlogs remain substantial with delivery extensions running seven to eight weeks.

Seattle—Defense program projects continue to bring out large tonnages involving structures, at Puget Sound navy yard and other army and navy jobs. Nelse Mortensen & Co., Seattle, has the award for four buildings at navy ammunition depot, tonnage unstated. Other bids are called Dec. 26. Important awards are pending at two local shipyards.

Shape Contracts Placed

5500 tons, seven warehouses, Invitation 6585-41-58, Hill Field, Utah, to Kansas City Structural Steel Co.

4400 tons, elevated highway section, contract B-16, Brooklyn, N. Y., to American Bridge Co., Pittsburgh; through Corbetta Construction Co., New York.

4386 tons, shell loading plant, Elwood ordnance plant, Elwood, Ill., Sanderson & Porter, Joliet, Ill., contractor, to Wisconsin Bridge & Iron Co., Milwaukee, bids Dec. 6.

3250 tons, bridge, North channel, Mississippi river, Winona, Minn. and Bluff Siding, Wis.; includes 2500 tons state of Minnesota and 750 tons Wisconsin; Industrial Construction Co., Minneapolis, contractor; to American Bridge Co., Pittsburgh.

3000 tons, five destroyers, to Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash.

1700 tons, hydraulic director building, General Electric Co., Schenectady, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

1400 tons, electric shop, steam test plant and addition to building No. 382, Mare Island navy yard, Calif., to Herrick Iron Works, Oakland, Calif.

1315 tons, shipbuilding cranes, San Pedro and San Francisco, to American Hoist & Derrick Co., St. Paul.

1000 tons, reception building, state hospital, Deer Park, N. Y., to American Bridge Co., Pittsburgh; Amsterdam building Co., New York, contractor.

830 tons, grade crossing elimination, Woodhaven boulevard, Brooklyn, N. Y., Long Island railroad project, to American Bridge Co., Pittsburgh; Poirier & McLane Co., New York, contractor.

800 tons, steel sheet piling, Puget Sound navy yard pier; to Bethlehem Steel Co., Seattle; Puget Sound Bridge & Dredging Co. and Rumsey & Co., Seattle, joint contractors.

710 tons, St. Helena's church, Bronx, New York, to American Bridge Co., Pittsburgh, through George A. Fuller Co., New York, contractor.

Shape Awards Compared

	Tons
Week ended Dec. 21.....	34,296
Week ended Dec. 14	32,761
Weed ended Dec. 7	14,966
This week, 1939	23,268
Weekly average, year, 1940	28,108
Weekly average, 1939	22,411
Weekly average, Nov.	28,153
Total to date, 1939 1,150,609	
Total to date, 1940.....1,433,499	

Includes awards of 100 tons or more.

Behind the Scenes with STEEL

Christmas Spirit

■ From one of the big aircraft factories there comes a Christmas story that's a little different. Some of the men conceived the novel idea of giving a Christmas gift to a machine. All the foremen co-operated and they had quite a ceremony. The machine selected was a big turret lathe which consistently had the best time records and so they had a foundryman cast a bronze plaque which was fastened to the lathe on a night trick. With bottles of coke and a regular ceremony and speeches it was "dedicated." The plaque reads: *Christmas*—1940. *We, the workers, award this little token of remembrance to one of the best workers we've had in this busy year of defense.*

Defense Line Banished

■ We like, too, the sentiment of this friendly little message, emblazoned on an attractive plaque in the reception room of the Package Machinery Corp., Springfield, Mass., reminding visiting salesmen and job-hunters that they need fear no "buffer" technique from fibbing receptionists. It reads: "Our information desk is for Co-operation, not Defense."

Army's Grog

■ And while we're on the subject of defense, there may be something in what George B. Sipple, president of the Master Brewers' association has to say. Says sipper Sipple: "Soldiers are entitled to and are benefited by a bottle of beer after a hard day's work in the army." Tin plate men and canners have agreed but prefer to delete the word "bottle" in favor of a container which, they are sure, "is much more adaptable to the strenuous labors of war."

Apologies To Kipling

■ A machine shop foreman wants to know who wrote that 1941 Yearbook of Industry ad of STEEL's about the honest serving men. He says it's such a blamed good rhyme that it keeps going 'round and 'round and comes out in all sorts of parodies. His version, neatly typed on the back of a work-routing slip, goes:

Darn those six bright serving men,
That 'Steel' the show for you;
Instead of counting sheep at night—it's
What, where, why, when, how and who!

Diesel Diseases

■ The up-to-date diesel engineer, so we're told, now carries a sort of doctor's stethoscope, called a "Test-A-Tone" in his tool kit. Just like a medic, listening to the old pump, the mechanician applies his stetho and listens intently. A faulty bearing, connecting rod slap, and miscellaneous pings, bams, squeaks and groans may be spotted, and, as the doctor would say, "localized and treated."

How To Lose Friends

■ Out in Great Falls, Montana, American Steel & Wire salesman J. O. Paddock has been losing sleep for weeks and getting more and more irritable—and you can blame it all on us. The whole thing dates back to that damned problem of trying to get three hoses from each of three hydrants into three different houses without any of the hoses crossing each other. Mr. Paddock apparently saw the original problem but never our confession that it just couldn't be done, and he now has so many of his Montana friends (all the way from Powder River to the Cour d'Alenes) working on it that he doesn't dare call on them again without furnishing the solution. That just goes to show how really important it is to read STEEL faithfully each week.

■ And since we won't see you until next week, here is a wish for a really Merry Christmas from Ann, the little woman, and . . .

SHIRDLU.

700 tons, apartment, 120 Central Park South, New York, to Dreier Structural Steel Co., New York.

650 tons, machine shop, United Engineering & Foundry Co., Youngstown, O., to American Bridge Co., Pittsburgh.

550 tons, bottling building, Ballantine brewery, Newark, N. J., to H. R. Goeller Inc., Newark, through M. Burns Co., Newark, contractor.

520 tons, addition, Roosevelt hospital, New York, to Harris Structural Steel Co., New York, through Vermilyea-Brown Co., New York, contractor.

500 tons, four buildings, specification 10111, naval supply depot, Oakland, Calif., to Judson-Pacific Co., San Francisco.

450 tons, steel doors, addition to Boeing plant, Seattle, to Truscon Steel Co., Youngstown, O.

300 tons, marine terminal building, Atlantic Refining Co., Philadelphia, to Belmont Iron Works, Philadelphia.

250 tons, air corps hangar, Frederick, Md., to Belmont Iron Works, Eddystone, Pa.; August Stang, Philadelphia, contractor; bars to Taylor-Davis Co., Philadelphia.

206 tons, sheet steel piling, Columbus & Southern Ohio Electric Co., Columbus, O., to Carnegie-Illinois Steel Corp., Pittsburgh.

200 tons, 6000-man mess hall, Lowry Field, war department, Denver, to Midwest Steel & Iron Works Co., Denver.

200 tons, government hangar, Frederick, Md., to Belmont Iron Works, Philadelphia.

200 tons, steel piling, McRae Bros., Seattle, Wash., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, H-piling, Washington state highway work, to Bethlehem Steel Co., Seattle; Neukirk & Co., Seattle, general contractor.

188 tons, Apple river highway bridge, proving ground, war department, Savanna, Ill., Ferguson & Son, Rockford, Ill., contractor, to Clinton Bridge Works, Clinton, Iowa; bids Dec. 10.

165 tons, powerhouse extension, Kings county hospital, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Gruss, Droste & Moller Inc., New York, contractor.

150 tons, building, Leeds & Northrup Co., Philadelphia, to Belmont Iron Works, Philadelphia.

135 tons, grade crossing elimination, Genesee county, New York, to American Bridge Co., Pittsburgh; Mohawk Paving Co., Inc., Buffalo, contractor.

125 tons, office building addition, Central Steel & Wire Co., Chicago, to American Bridge Co., Pittsburgh.

115 tons, cafeteria building, air base, Quonset Point, R. I., to Lehigh Structural Steel Co., Allentown, Pa.; Merritt-Chapman & Scott and George A. Fuller Co., New York, joint contractors.

101 tons, steel piling, rehabilitation project, navy department, Guam Island, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, steel doors for Tongue Point, Oreg., naval air base, to Truscon Steel Co., Youngstown, O.

Shape Contracts Pending

14,000 tons, state bridge, Thames river, Groton-New London, Conn.

5675 tons, fabricated material and parts, Panama; bids Jan. 2.

4400 tons, elevated highway section, contract B-16, Brooklyn, N. Y.; Corbetta Construction Co., New York, low, bids Dec. 17; Triborough bridge authority.

4000 tons, Hotel Statler, Washington.

3100 tons, addition to 500 tons tubular piling, assembly shop, specification 10172, Hunters Point drydock, San Francisco; Barrett & Hilp, 918 Harrison street, San Francisco, general contract at $782,000.

3000 tons, U. S. army warehouses, Columbus, O.; bids Dec. 27.

2500 tons, building, duPont Co., Morgantown, W. Va.

1700 tons, state bridge, Berry's creek, Rutherford, N. J.

1500 tons, airplane repair shop, Invitation 6585-41-72, Hill Field, Utah; James I. Barnes Construction, Santa Monica, Calif., low.

1400 tons, electric shop, steam test plant and addition to building No. 382, Mare Island, Calif.; bids opened.

1300 tons, manufacturing plant, warehouse and office building, Continental Can Co., St. Louis.

1288 tons, Martin Point bridge, Presumpscot river, Falmouth-Portland, Me., including 1062 tons, structural steel; 95 tons, movable span machinery; 92 tons, wrought iron for piers, and 39 tons, open grid floor; also 24,900 linear feet, steel H-beam piles; bids Jan. 8, Maine State Highway commission, Augusta.

1000 tons, extensions, submarine base, New London, Conn.

900 tons, manufacturing building, Houde Engineering Co., Buffalo.

850 tons, auditorium, high school, Berkeley, Calif.; bids Dec. 26.

750 tons, reconstruction track stringers, Manhattan bridge, New York.

750 tons, buildings for United Airlines, Inc., Mills Field, San Francisco; bids soon.

600 tons, bridge, Mahoning creek, Dayton, Pa., Baltimore & Ohio.

600 tons, sheet piling, pier ammunition depot, Bremerton, Wash.; general contract to Daily Construction & Engineering Co., Lloyd Building, Seattle, Wash. and A. W. Quist Co., Exchange Building, Seattle, Wash. at $179,397.

580 tons, two bridges, Cuyahoga county, Ohio; bids Dec. 17.

550 tons, factory buildings, Timken Roller Bearing Co., Canton, O.

526 tons, under-crossing of Santa Fe tracks, Azusa, Los Angeles county, Calif. for state; bids Jan. 9.

525 tons, bridge and railroad crossing elimination at Mt. Kisco-Katonah, N. Y.; Andrew Gallow Inc., Bronx, N. Y., low.

500 tons, A. Leo Weil elementary school, Pittsburgh.

500 tons, assembly shop, Lockheed Aircraft Co., Burbank, Calif. bids opened.

450 tons, state bridge, Cranbury, N. J.

400 tons, buildings addition, Corning Glass Co., Corning, N. Y.

400 tons, airdock, airplane motor testing plant, Cleveland airport; bids Jan. 3.

378 tons, Chesapeake & Ohio viaduct, readvertised; bids Dec. 17.

375 tons, state bridges RC-40-91-92, Leicester, N. Y.

375 tons, Ohio state highways, Warren county; bids Dec. 27.

350 tons, grade crossing elimination, Livingston county, New York; Bero Engineering & Construction Co., North Tonawanda, N. Y., low.

350 tons, building, F. W. Woolworth Co., Detroit.

340 tons, machine shop extension, Blaw-Knox Co., Groveton, Pa.

300 tons, state bridge, Adair street, Jefferson county, Kentucky.

300 tons, bridge, Windham-Franklin, Conn.

260 tons, cold roll process building, American Rolling Mill Co., Middletown, O.

250 tons, project for Tuscarawas county, Ohio; bids Dec. 17.

235 tons, cold-finishing mill extension, Ford Motor Co., Dearborn, Mich.

215 tons, factory and office building, Sheffield Gage Co., Dayton, O.

215 tons, Washington state highway projects; bids in at Olympia.

210 tons, drum shop, Badenhausen Corp., Cornwells Heights, Pa.

200 tons, submarine base facilities, Key West, Fla.

200 tons, building, General Electric Co., Conneaut, O.; bids Dec. 24.

190 tons, bakery building, Fishers' Bakery, St. Bernard, O.

185 tons, bridge, route 29, section 2-E, Union county, New Jersey; Highway Corp., Newark, low.

185 tons, West Nolan overhead, Mingo county, West Virginia, for state.

175 tons, five Missouri State highway projects.

175 tons, highway bridge, East Hartford, Conn.

165 tons, state bridge, Browntown, N. J.

160 tons, building addition, Hall China Co., East Liverpool, O.

155 tons, state bridge 603, Medford, Wis.

150 tons, state bridge, Ft. Atkinson, Wis.

150 tons, under-pass, Burbank, Calif., for state; bids Jan. 2.

145 tons, viaduct, Fairmont, Nebr., for state.

145 tons, bridge, Asotin county, Wash., for state; bids opened.

140 tons, trashracks and guides, Cherokee dam, Watts Bar Dam, Tenn., Tennessee Valley authority.

135 tons, state bridge, Wyocena, Wis.

130 tons, intake gates, guides, etc., Wilson power house, Sheffield, Ala., for Tennessee Valley authority.

125 tons, state bridge, St. Joseph river, Williams county, Ohio.

120 tons, administration building and cell block, state penitentiary, Moundsville, W. Va.

110 tons, stock house, Cliffside Brewing Co., Cincinnati.

103 tons, sheet piling, schedule 2850, 12th Naval District, San Francisco; bids opened.

Unstated, yard buildings; bids to Puget Sound navy yard, Dec. 26.

Unstated, eight whirley cranes for Seattle-Tacoma Shipbuilding Co., Seattle.

to Washington Iron Works, Seattle.

Unstated, navy crane for Hunters Point drydock, California, to Star Iron & Steel Co., Tacoma.

Unstated, power house and other structures, Puget Sound navy yard; Nelse Mortensen & Co., Seattle, general contractor.

Reinforcing

Reinforcing Bar Prices, Page 79

Pittsburgh—With continuing mild weather concrete bar buying is heavy. Apparently the only seasonal effect will be in easing up delivery dates on certain projects. Prices are firm on new billet steel, and most current reports on rail bar producers indicate a fairly strong price on that product.

Cleveland — Largest number of new inquiries in several weeks pend, largely for Ohio highway projects, totaling for northern Ohio about 2500 tons for a dozen projects. Several accompany inquiries for structurals, which are also more numerous. No seasonal let-down is in sight.

New York—Highways and bridges for the first time in some weeks account for most pending reinforcing steel volume, approximately 5000 tons being supplemented by a substantial number of industrial and general contraction projects, including better than 1000 tons for housing. There is a tendency on the part of contractor-buyers to close on needs more promptly in view of lower stocks and lengthening deliveries.

Chicago — Sales of reinforcing bars and steel have dropped off sharply, although a number of tonnages are pending and are expected to be placed shortly. Many of these jobs are related to the defense program in which construction is being rushed.

Seattle — Sizable tonnages are pending, mostly for navy defense projects. Mills report considerable volume in small lots for general construction. Backlogs are large. Washington state opened highway bids Dec. 17 for several projects involving 425 tons, including four bridges in King county.

San Francisco—A fair tonnage of reinforcing bars was placed, 2187 tons, bringing the aggregate to date to 172,161 tons, compared with 163,105 tons for the same period last year. Gilmore Fabricators Inc. took 380 tons for four buildings for the naval supply depot, Oakland, Calif.

Reinforcing Steel Awards

8000 tons, ammunition loading plant, Union Center, Ind., to Inland Steel Co., Chicago, and Bethlehem Steel Co., Bethlehem Pa., through Jos. T. Ryerson & Sons Inc., Chicago; Bates & Rogers, contractors.

2000 tons, shipways, New York Shipbuilding Corp., Camden, N. J., to Jones & Laughlin Steel Corp., Pittsburgh; Merritt-Chapman & Scott, contractors.

1800 tons, Panama, schedule 4506, bids Nov. 14, to Joseph T. Ryerson & Son Inc., Chicago.

1600 tons, offices and machine shop, Wright Aero Corp., Lockland, O., to Pollak Steel Co., Cincinnati; Frank Messer & Sons, contractors.

1000 tons, rack house, Belvedere Corp., Lawrenceburg, Ind., to Pollak Steel Co., Cincinnati, through Ferro-Concrete Construction Co., Cincinnati.

935 tons, housing project, Newark, N. J., to Igoe Brothers, Newark, N. J., through Pellechia Construction Co., Newark.

900 tons, quartermaster depot, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; Wark & Co., Philadelphia, contractors.

900 tons, Peralta Housing project, Oakland, Calif., to Herrick Iron Works, Oakland, Calif.

500 tons, veterans' hospital, Marion, Ill., to Laclede Steel Co., St. Louis, through Ring Construction Co., general contractors, Minneapolis.

450 tons, warehouse and office, Sears-Roebuck Co., Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.

380 tons, four buildings, specification 10111, naval supply depot, Oakland, Calif., to Gilmore Fabricators, Inc., San Francisco.

330 tons, U. S. engineer, Providence, R. I., 168 tons to Capital Steel Co., New York, pro. 77, and 162 tons, to Carroll-McCreary Co., Brooklyn, pro. 82.

250 tons, Sardis Dam, Miss., relocation of Illinois Central Railway and Mississippi Highway No. 7, to Laclede Steel Co., St. Louis, through Robinson & Young, Baton Rouge, La., general contractors.

249 tons, state hospital, San Francisco, to Gunn, Carle & Co., San Francisco.

200 tons, hospital, Sisters of Mercy, Detroit, to Bethlehem Steel Co., Bethlehem, Pa.

170 tons, highway bridges, St. Louis county, to Laclede Steel Co., St. Louis, through Blackwell Corp., St. Louis, general contractors.

170 tons, housing project, Danville, Ill., to Sheffield Steel Co., Kansas City, Mo.

135 tons, six underground and four port ordnance magazines, Hamilton Field, Calif., to Soule Steel Co., San Francisco.

117 tons, bars, 2,535,000 square feet welded wire mesh, quartermaster depot, Washington, to U. S. Steel Export Co., Washington.

110 tons, chemistry building, University of Nevada, Reno, Nev., to Bethlehem Steel Co., San Francisco.

100 tons, army cantonment, Camp Lee, Va., to Bethlehem Steel Corp., Bethlehem, Pa., through Virginia Steel Co.;

Concrete Bars Compared

	Tons
Week ended Dec. 31	13,096
Week ended Dec. 14	5,261
Week ended Dec. 7	9,286
This week, 1939	6,896
Weekly average, year, 1940	9,827
Weekly average, 1939	9,197
Weekly average, Nov.	11,748
Total to date, 1939	473,447
Total to date, 1940	501,182

Includes awards of 100 tons or more.

Doyle & Russell & Wise Construction Co., contractor.

Reinforcing Steel Pending

2000 tons, plant, Western Cartridge Co., St. Louis.

2000 tons, expansion Curtiss-Wright Co.; H. B. Deal & Co., St. Louis, general contractors.

1200 tons, two sections, elevated highway, Brooklyn, N. Y., Turecano Construction Co., New York, low on contract B-9 and Corbetta Construction Co., New York, low on contract B-16; bids Dec. 17 to Triborough Bridge Authority, New York.

1018 tons, Bureau of Reclamation, Invitation A-33,109-A, Coram, Calif.; bids opened.

1000 tons, shell loading plant, Elwood ordnance plant, war department, Elwood, Ill., Sanderson & Porter, Joliet, Ill., contractor; bids Dec. 18. Total requirements about 3000 tons, of which 100 tons placed previously.

750 tons, three U. S. army warehouses, Columbus, O.; bids Dec. 27, with possibility of one, two or three more similar buildings.

600 tons, under-pass, Burbank, Calif., for state; bids Jan. 2.

500 tons, U. S. government aero research laboratory, Sec. B, Cleveland.

485 tons, Proj. 329, Sandusky county, Ohio; Launder & Son, Toledo, O., contractor; bids Dec. 17.

480 tons, Bureau of Reclamation, Invitation A-44,201-A, Earp, Calif.; bids opened.

460 tons, A. Leo Weil school, Pittsburgh; Siesel Construction Co., contractor.

425 tons, Washington state road projects; bids in.

400 tons, plant, Continental Can Co., St. Louis, Mo.

380 tons, four buildings, specification 10111, naval supply depot, Oakland, Calif.; general contract to K. E. Parker, 135 South Park, San Francisco at $398,498.

368 tons, four state bridges, King county, Washington; bids opened.

350 tons, Martin's Point bridge, Portland, Me.

320 tons, replacement of pier, naval ammunition depot, Bremerton, Wash.; general contract to Dally Construction & Engineering Co., Lloyd Building, Seattle and A. W. Quist Co., Exchange Bldg., same city at $212,397.

300 tons, Norton housing project, Akron, O., Weinstein Construction Co., Akron, low.

283 tons, bars and mesh, highway and bridge, route 29, section 2-E, Union county, New Jersey; Highway Corp., Newark, low.

275 tons, highways, Kern county, California, for state; bids opened.

250 tons, Proj. 330, Summit county, Ohio, A. J. Baltes, Norwalk, O., contractor; bids Dec. 17.

235 tons, Proj. 326, Clark and Greene counties, Ohio, Hinton & Smalley, Lima, O., contractors; bids Dec. 17.

200 tons, bridge and railroad crossing elimination, Mt. Kisco-Katonah, N. Y.; Andrew Gallow Inc., Bronx, N. Y., low.

200 tons, laboratory group, Ethyl Gasoline Corp., Oakland county, Michigan.

180 tons, post office, Burlingame, Calif.; bids in.

150 tons, crossing, Washington county, Oregon; bids opened.

125 tons, highway bridge, Livingston County, Pa.; bids Dec. 18.

125 tons, Proj. 327, Cuyahoga county, Ohio, National Engineering & Contracting Co., Cleveland, contractor; bids Dec. 17.

110 tons, state highways, Tuscarawas county, Ohio; bids Dec. 17.

100 tons, Panama, schedule 4596; bids in.

100 tons, C. K. Eddy garage, Saginaw, Mich.

Unstated, several large structures, Puget Sound navy yard; bids at yard Dec. 26.

Unstated tonnage, ordnance plant, war department, Ogden, Utah; Olson Construction Co. and Dobson & Co., Lincoln, Nebr., low; bids Dec. 19.

Pig Iron

Pig Iron Prices, Page 80

Pittsburgh—As yet there has been no clarification on pig iron prices for first quarter. Few sales have been made, principally odd cars for delivery in first quarter, and, although this cannot be verified, it is reported some of this material has sold at $1 over the fourth-quarter price. Producers continue to hold back announcement.

Cleveland—The exact price status for the industry following the advance of $1 by an important merchant producer is not yet perfectly clear, but indications lean more to the higher price as general. Other than regular customers have bought from the higher-priced producer, indicating no cheaper iron elsewhere. Many thousands of tons have sold at the new price. The iron supply becomes tighter, with low phos and bessemer irons particularly scarce. Shipments may be somewhat less in December, particularly because of the Ohio tax on year-end inventories.

Chicago—Although the pig iron price situation is not completely clarified, evidence seems to indicate that the $1 advance by one large seller a week ago may be followed by other interests. Some sellers are booking first quarter tonnages at the new price but others are declining to take new business at the moment. With demand for iron well maintained, all sellers are well booked and making shipments somewhat behind schedule.

Boston—The district blast furnace has taken no action on first quarter price but is expected to do so early this week. Meanwhile, some limited business for first quarter shipment is being taken at open prices, although full coverage is geing held in abeyance, not all tonnage is being taken out. Consumer pressure for coverage has increased, with foundry melt at a high rate.

New York—Pig iron sellers genally in this district have not opened books for first quarter, notwithstanding action by some producers in the midwest in advancing prices $1 per ton. The trade here consequently continues much in the dark as to what is in store after the turn of the year. Only one

seller, so far as can be learned—a Pittsburgh interest with a freight rate handicap into the east—has definitely indicated that prices will be unchanged. To many buyers the question is largely academic, as they are already covered well into next quarter, some for the entire period.

Philadelphia—Some pig iron sellers in eastern Pennsylvania are asking prices $1 higher on new business. Relatively small tonnages are being offered, but in most cases buyers are fairly well covered. A leading producer reportedly is out of the market, although all sellers have indicated intention of taking care of regular customers, meanwhile generally turning down inquiries from others. Additional foundries are extending operations to Saturday despite overtime wages involved in the extra time.

Buffalo—Major interest centers around first quarter prices. Current shipments of pig iron are at about the best level of the movement. With buying on an orderly basis, despite heavy demand, sellers report merchant iron consumers are being assured of material when it is needed.

Cincinnati—Conditions in pig iron are confused. Northern and southern furnace representatives are delaying opening of books and price announcement for first quarter. Stocks of merchant iron at Hamilton are limited, and Armco may postpone the proposed switch of No. 2 furnace, now on basic, until February. Shipments are establishing a new peak for the year.

St. Louis — A leading producer of southern iron selling extensively in this district has announced an advance of $1 per ton, which brings the quotation to $24.12 per ton on No. 2 foundry, delivered St. Louis. Representatives of other blast furnace interests report they have not had definite advices as to prices.

Considerable volume of iron has been purchased during the past week or ten days for first quarter delivery, at prices prevailing at that time. Iron placed, however, is mainly to regular customers and in quantities which sellers estimate they will actually require.

Seattle—First quarter price of Columbia iron, which is generally used in this territory, has not been announced but contracts are being made for 1941 delivery at open prices. At present the price is $22 base for No. 2. The freight rate from Provo, Utah, has recently been reduced from $5.50 to $4.95.

Scrap

Scrap Prices, Page 82

Pittsburgh—Local scrap market continues strong, although no increase has been made in quotations. Buying is active and supplies are not more than adequate.

Cleveland — Scrap supplies are tightening and most current buying is in small lots. Prices are firm. Shipments are mainly against contracts and between dealers.

Chicago—Tone of the scrap market here continues strong in spite of desultory trading. Quotations on No. 1 heavy melting steel remain in the $21.50 to $21 bracket, although no mill sales are known to have been made at the top figure last week. Several specialties, particularly those for foundry use, have advanced slightly.

Boston—With several grades of scrap higher and others firm, buying and shipments are well maintained despite the approach of the holiday period. Specialties are also strong with demand mounting. Advances in short turnings, chemical borings, busheling, stove plate and heavy melting steel for barge loading are noted, one broker paying $17.25 and $16 for the latter grades.

New York—Buying and shipments are active with prices firmer on several grades, including heavy melting steel for eastern mill consumption, and mixed borings and turnings. Supplies are coming out fairly freely, ainded by the open winter thus far. All offerings are being absorbed.

Philadelphia — Scrap prices are stronger, partly reflecting restriction in supplies resulting from higher markets in adjacent districts. Yard shipments by local operators have been resumed following settlement of the wage dispute with workers, on the basis of a wage increase of 5 cents an hour. Heavy melting steel is unchanged, but cast scrap continues to advance.

Buffalo—Prices advanced 50 cents a ton on sales to mills on the basis of $22 to $22.50 for No. 1 heavy melting steel. Dealers are busy shipping against substantial orders. Heavy boat shipments have helped mills build up reserves.

Detroit—Scant stocks in dealers' yards, large purchases by outside buyers, inability of dealers to build up inventories at current prices, and apprehension over the outcome of Washington conferences have combined to advance prices $1 or more per ton. All grades share in the upward movement, which appears to be a somewhat belated recognition of strength in other districts as well.

St. Louis — Prices of iron and steel scrap continue to mount. On top of sharp recent advances, quotations have been marked up again 25 to 75 cents per ton, with virtually all grades affected. Generally offerings are small, the advance having failed to release small dealer and industrial material in expected volume.

San Francisco — Movement of scrap into yard stock of open-hearth producers on the Pacific Coast continues strong and prices are unchanged. In the San Francisco metropolitan district No. 1 and No. 2 heavy melting holds at $13.50 to $14 and at $12.50 to $13, respectively, f.o.b. cars a net ton.

Cincinnati—The effect of recent

increases in iron and steel scrap has worn off, after bringing in a fair tonnage, and dealers are raising prices again. Wanted grades are apparently not available in quantity. No. 1 heavy melting steel is bringing $19 to $19.50. Shipments to mills continue steady and heavy. Foundry grades are exceptionally active.

Seattle — Receipts at tidewater have declined, due to unfavorable weather in the interior but coast supplies are ample for increased consumption by rolling mills, which are buying steadily at $15 and $14 for No. 1 and No. 2, respectively. Exporting houses still have considerable stocks on hand which they were unable to ship and this material is being absorbed in domestic plants. Foundries are buying in larger volume.

Toronto, Ont.—Firmer prices have developed in the scrap market, dealers advancing buying prices on machinery cast, dealers' cast and stove plate 25 cents. No change was announced for steel grades. Demand continues heavy for both steel and iron grades.

Steel in Europe

Foreign Steel Prices, Page 81

London (*By Cable*)—Apart from government contracts no new business is being placed in Great Britain for delivery before next year. War requirements are being met by increasing output of steel and iron and larger imports of American pig iron, ingots, billets, plates, hematite ore and ferromanganese.

Basic pig iron output is satisfactory. Alloy steel makers are fully occupied and sheetmakers are working at capacity. Some tonnage is available for export. South America is buying tin plate. Scrap prices have been increased slightly from Dec. 9.

Warehouse

Warehouse Prices, Page 81

Cleveland — For some retailers sales are less, for others the same as in November. In some cases Cleveland warehouses are supplying customers of branch warehouses in other cities, particularly in the East where the drain on stocks has been more severe. Locally, plates are scarcest.

Chicago—Warehouse demand has slipped off seasonally the past week, although the drop is comparatively light. It is anticipated that orders will continue to taper moderately for the next 30 days. Sales, while still at a high level, are well distributed as to products and consumers, with national defense exerting a continuously growing influence.

Boston—Demand for steel out of warehouse is widely distributed and for the time being procurement of material is as important as sales. Extended deliveries and heavy sales in recent weeks has lowered inventory on some products and replacement specifications are delayed, due to mill congestion.

New York — With galvanized sheets advanced to 5.00c base, prices on steel products out of warehouse are the firmest in recent years. Jobber sales have not declined much below the high record rate of the last two months and warehouse stocks are further affected by delayed mill shipments.

Cincinnati—Heavy sales of structurals continue the spectacular feature in the warehouse market. A recent increase in demand for galvanized sheets also aids in sending volume to a level which will likely make this the best month of the year.

Buffalo—Demand for warehouse items shows no indication of even the usual seasonal slackening. While distributors have difficulty keeping stocks balanced, all demands are being filled, including an overflow from mills.

Philadelphia — Sustained metalworking activity is holding business near record levels for December with warehouses benefiting from inability of mills to give early delivery.

St. Louis — Sales of warehouse and jobbing interests show no signs of usual seasonal slowing down. Present indications point to December business being the largest for any month this year. Sheets, bars and special steels are reported among the most active items.

Iron Ore

Iron Ore Prices, Page 82

Cleveland—Consumption of Lake Superior iron ore in November was 5,973,007 gross tons, against 6,051,347 tons in October and 5,477,969 tons in November, 1939, states the Lake Superior Iron Ore association, Cleveland. Consumption for the year to Dec. 1 has been 56,253,276 tons, against 38,822,915 tons in a like period of 1939.

Ore on hand at furnaces and Lake Erie docks Dec. 1 was 41,711,704 tons, against 41,125,450 tons a month ago and 40,732,096 tons a year ago. Stocks Dec. 1 consisted of 36,925,061 tons at furnaces and 4,786,643 tons at Lake Erie docks.

Tungsten Ore Steady

New York—Tungsten prices are nominally unchanged, although there are no offerings at present from China and few from domestic producers, who are already sold so far ahead that they do not wish to commit themselves. Some speculators who have some South American ores for sale are quoting increasingly higher prices. However, such ores do not meet standard requirements in this country, and consequently have never been in much demand here, with the result that current offerings are having little effect at present. One reason for the stronger market on

South American ores is said to be the substantial buying by Japan over recent weeks.

Ferroalloys

Ferroalloy Prices, Page 80

New York—The heavy movement in ferroalloys continues, with shipments this month likely to exceed those of any previous month this year, except possibly June and July, when price advances stimulated particular activity.

Ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports, and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa., and 26 to 28 per cent, at $49.50.

Nonferrous Metals

New York—Increased supervision over distribution of available copper and zinc supplies seems pending as the way is cleared for larger British armament orders and as our own program absorbs heavy tonnages.

Copper—Metals Reserve Co. has contracted to buy 100,000 tons of Latin American copper through Anaconda Copper Mining Co., American Metal Co. Ltd., Phelps-Dodge Corp., and Kennecott Copper Corp. The price, subject to certain adjustments, was 10.00c, f.a.s. New York. This purchase augments supplies available to consumers working on government and British orders and tends to stabilize the market around the 12-cent domestic level. Demand in the open market was sufficiently large to maintain premiums of ⅜ to ½-cent in the custom smelters' and brokers' markets.

Lead—Mine producers generally balanced their intakes but other sellers reported light inquiry. Prices held at 5.35c, East St. Louis.

Zinc—Producers continued to ship and sell all metal they had available. Prime western was unchanged at 7.25c, East St. Louis. Shortage of supplies likely will force a curtailment in brass production early in the year, but this situation is expected to be corrected by the second half of the new year.

Tin—Straits tin held at 50.05c through Tuesday and at 50.10c over the balance of the week. Buying interest generally was light, reflecting in part the continued large flow of metal to this country.

Died:

■ J. WALLACE CARREL, 72, vice president and general manager, Lodge & Shipley Machine Tool Co., and secretary-treasurer, Carlton Machine Tool Co., at his home in Cincinnati, Dec. 16. He entered the machine tool business in 1888 as a stenographer for the former Lodge, Davis & Co., later serving as salesman in New York and Cleveland. He was at one time president of Draper Machine Tool Co.

♦

William Miller, chairman, Pyle-National Co., railroad equipment manufacturer, Chicago, Dec. 4, in that city.

♦

F. E. Saecker, president, Appleton Machine Co., Appleton, Wis., since its organization in 1882, Nov. 21, in Appleton.

♦

Charles Tyler Miller, for many years secretary-treasurer, Canadian Bridge Co. Ltd., Walkerville, Ont., Nov. 28, in Altadena, Calif.

♦

Fred A. Jordan, 68, geologist in charge of mining properties of Youngstown Sheet & Tube Co., Youngstown, O., Dec. 14, at his home in that city.

♦

Burton A. Ployd, 46, salesman in the Detroit office of Sharon Steel Corp. six years, in Detroit, Dec. 7. He was formerly associated with Newton Steel Co., Monroe, Mich., and Steel & Tubes Inc., Philadelphia.

♦

Edgar Allen McDowell, vice president and a director, F. E. Myers & Bro. Co., Ashland, O., Nov. 22, in Ashland. Mr. McDowell had been associated with the Myers company about 50 years and since 1937 had been vice president in charge of production and purchasing.

Nonferrous Metal Prices

Dec.	Copper Electro, del.	Copper Lake, del.	Copper Casting,	Straits Tin, New York	Lead	Lead East	Zinc	Aluminum	Antimony Amer.	Nickel Cath-
14	12.00	12.00	12.12½	50.05	50.05	5.50	5.35	7.25	17.00	14.00	35.00
16	12.00	12.00	12.12½	50.05	50.05	5.50	5.35	7.25	17.00	14.00	35.00
17	12.00	12.00	12.12½	50.05	50.05	5.50	5.35	7.25	17.00	14.00	35.00
18	12.00	12.00	12.12½	50.10	50.10	5.50	5.35	7.25	17.00	14.00	35.00
19	12.00	12.00	12.12½	50.10	50.10	5.50	5.35	7.25	17.00	14.00	35.00
20	12.00	12.00	12.12½	50.10	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)	19.23
Copper, hot rolled	20.62
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	21.98
Seamless copper	21.12

Rods

High yellow brass	14.76
Copper, hot rolled	17.12

Anodes

Copper, untrimmed	17.87

Wire

Yellow brass (high)	19.48

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.00-8.25
Cleveland	8.62½-9.12½
Chicago	8.25-8.50
St. Louis	8.37½

Heavy Copper and Wire

New York, No. 1	9.62½-9.87½
Cleveland, No. 1	9.37½-9.87½
Chicago, No. 1	9.62½-9.87½
St. Louis	9.37½-9.50

Composition Brass Turnings

New York	7.62½-7.87½

Light Copper

New York	7.62½-7.87½
Cleveland	7.37½-7.87½
Chicago	7.62½-7.87½
St. Louis	7.37½-7.50

Light Brass

Cleveland	4.12½-4.37½
Chicago	5.50-5.75
St. Louis	4.87½

Lead

New York	4.60-4.70
Cleveland	4.00-4.25
Chicago	4.50-5.00
St. Louis	4.00-4.25

Zinc

New York	5.25-5.50
Cleveland	3.25-3.50
St. Louis	3.50-3.75

Aluminum

Mis., cast, Cleveland	9.25-9.50
Borings, Cleveland	6.50
Clips, soft, Cleveland	14.25
Misc. cast, St. Louis	7.75-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.25
Standard No. 12 aluminum	15.00-15.50

Tin Plate

Tin Plate Prices, Page 78

Pittsburgh—No change is reported in production, with mills estimated at 48 per cent of capacity. There has been no revival of tin plate business, although estimates for 1941 indicate a considerably heavier year than 1940. In all probability the up-swing will begin during February, or earlier than usual.

Chicago — Tin plate orders are mounting and involve some substantial tonnages, as compared with recent weeks. However, the volume of business is still subseasonal.

Equipment

Seattle—All items in stock are moving freely. Electrical and automotive equipment continues in strong demand. General Electric Co. is low at $566,876 for furnishing four 25,000-kva transformers to Bonneville project for a main line into Seattle and Tacoma. Same authority has awarded contracts for disconnecting switches to Pacific Electric Co. at $22,664, and Bowie Switch Co.

Construction and Enterprise

Ohio

BEDFORD, O.—Lempco Products Inc., maker of automotive service equipment and machinery, has let contracts to expand its plant and production facilities. Capacity will be increased almost 50 per cent.

CLEVELAND—Ohio Crankshaft Co., 6600 Clement avenue, is enlarging facilities by construction of 330 x 520-foot addition to plant. W. C. Dunn is president.

CLEVELAND—Aircraft Fittings Co., recently organized, will move into the old Simmons Mfg. Co. plant at 3650 East Ninety-third street. Plant is being cleaned and installation of equipment will start soon. A. L. Bigelow is president-treasurer.

CLEVELAND—White Motor Co., 842 East Seventy-ninth street, will erect factory addition for truck and assembly inspection quarters. Howard Jones is plant manager, and A. R. Black is in charge of construction.

ELYRIA, O.—Bendix-Westinghouse Automotive Air Brake Co. has plans for $235,000 factory, office building and gate house at 901 Cleveland avenue here.

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 88 and Reinforcing Bars Pending on page 91 of this issue.

Bids will be opened Dec. 27 by D. C. McGuire, general manager, Argonaut Realty division of General Motors Corp., Detroit.

LOCKLAND, O.—Wright Aeronautical Corp., Paterson, N. J., has let contract for construction of one-story factory here to Mahony-Troast Construction Co., Passaic, N. J.

NEW PHILADELPHIA, O.—Ladel Conveyor Mfg. Co., A. L. Schwab, secretary-treasurer, will proceed with erection of proposed factory addition early in 1941, comprising about 18,000 square feet of floor space.

PAINESVILLE, O.—Light Alloys Mfg. Co., 301 Richmond street, has acquired five and one-half acre site on which new foundry building will be built early in 1941. Amos Walton is president of company.

RAVENNA, O.—City, Wilbur Zoll, service director, has retained Floyd Brown & Associates, Marion, O., to make preliminary report on erection of sewage disposal system.

WARREN, O.—Standard Transformer Co., Dana avenue, has awarded contract for $50,000 factory addition to W. B. Gibson Co., 238 Chestnut street, Northwest. (Noted Dec. 2).

Pennsylvania

BEAVER FALLS, PA.—Board of education, J. Roy Jackson, superintendent, has selected Carlisle & Sharrer, Martin building, Pittsburgh, to prepare plans and specifications for new shop building. Approximate cost $60,000.

CHAMBERSBURG, PA. — Chambersburg Engineering Co. is expanding its facilities by erection of addition to machine shop which will add 27,000 square feet of floor space to plant.

UNIONTOWN, PA.—Coca Cola Bottling Co. is having plans prepared by Emil R. Johnson, 24 Robinson street, Uniontown, for bottling plant here. Edward Howard, 512 Butler County National Bank building, Butler, Pa., consulting architect. Cost $45,000.

Michigan

DETROIT—Metal Rolling & Stamping Corp. has been organized to manufacture metal mouldings; Harry W. Lutz, 127 Seward avenue.

DETROIT—American Brakeblok division of American Brake Shoe & Foundry Co., 4600 Merrit, has awarded contract to Austin Co. 429 Curtis building, for construction of $170,000 addition to its factory.

DETROIT—Vickers Inc., 1400 Oakman boulevard, has let contract for $180,000 addition to plant to Austin Co., 429 Curtis building, Detroit.

DETROIT—Myles Standish, Detroit contractor, 49 West Hancock, will erect a $20,000 factory building for Bromley Properties Inc., Detroit. Charles Horner, Highland Park, architect.

DETROIT—Continental Aviation & Engineering Corp. has let contract for foundations for 14 test buildings to F. H. Martin Construction Co., Detroit. Giffels & Vallet Inc., L. Rossetti, Detroit, architects.

GROSSE POINTE, MICH.—Wayne Die & Engineering Co. Inc., Grosse Pointe, has awarded contract for $35,000 factory in Warren township, Macomb county, to Myles Standish, 49 West Hancock, Detroit. Charles Horner, Highland Park, architect.

WYANDOTTE, MICH. — City council has authorized municipal service commission to enter into contract with Burns & McDonnell Engineering Co., Kansas City, Mo., for complete plans and specifications for $560,000 extension to city power plant, including installation of turbine-generator.

Illinois

BELLWOOD, ILL.—Engineering Systems Inc., 221 North LaSalle street, Chicago, has been retained to prepare plans and specifications for plant to be erected here for W. M. Hart. Cost with equipment $250,000.

MONEE, ILL.—Cardox Corp., 307 North Michigan avenue, Chicago, has awarded general contract for factory and boilerhouse to Sumner S. Sollitt Co., 307 North Michigan avenue, Chicago. Estimated cost with equipment $100,000.

ROCK ISLAND, ILL.—City plans construction of 1,000,000-gallon capacity steel water tank and new pumping equipment. Martin T. Rudgren is city clerk.

SOUTH BELOIT, ILL.—Warner Electric Brake Mfg. Co. is preparing to build a one-story addition of 16,800 square feet and costing about $100,000 with equipment.

ST. ELMO, ILL.—City council has engaged services of Engineering Service Corp., Decatur, Ill., to prepare plans for municipal light and power plant.

SYCAMORE, ILL.—Ideal Commutator Dresser Co. plans one-story, 100 x 145-foot factory addition to cost $50,000 with equipment. G. A. Johnson, Rockford, Ill., architect.

Indiana

HUNTINGTON, IND.—Hosdreg Co. Inc., 245 Lucretia street, has been organized with 1000 shares of no par value to operate machine shop and manufacture tools, dies, etc. C. H. Drew, 245 Lucretia street, Huntington, is agent.

Maryland

SPARROWS POINT, MD. — Rheem Mfg. Co., maker of steel barrels and containers, will erect an addition to its recently completed plant here. The one-story structure will contain in excess of 100,000 square feet of area. Contracts for the design and construction have been awarded to Brown & Matthews Inc., New York.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids as follows: Jan. 3, schedule 4512, seven motor-driven, jack-knife type, arm, radial drills, delivered various points; schedule 4515, eight drill grinders, without motors, for Sewall's Point, Va., and Mare Island, Calif.; schedule 4517, four universal crank shapers, without motors, for Sewall's Point, Va., and Mare Island, Calif.; schedule 4525, motor-driven turret lathes, for Boston, Charleston, S. C., Norfolk, Va., and Mare Island; schedule 4535, four motor-driven upright drills, for Sewall's Point, Va., and Mare Island; schedule 4593, one motor-driven, rotary surface grinding machine, for Quantico, Va.

Missouri

LEBANON, MO.—Laclede electric cooperative, J. R. Haugh, superintendent, has let contract to George B. Heath, 3829 West Pine boulevard, St. Louis, for erection of 293 miles of transmission lines to serve 745 customers. A. Y. Taylor & Co., Central building, Clayton, Mo., consulting engineer.

ST. LOUIS—WPA has allotted $266,747 to Normandy sanitary sewer district of St. Louis county for construction of sewage treatment plant, G. S. Russell, 4903 Delmar boulevard, St. Louis, consulting engineer.

ST. LOUIS—Curtiss-Wright Corp., E. E. Christopher, plant engineer, Robertson, Mo., has let contract to H. B. Deal & Co. Inc., 1218 Olive street, for masonry work at airplane plant here, consisting of manufacturing, assembly, office, power plant and auxiliary buildings. Total cost including equipment estimated at $11,000,000. Albert Kahn Inc., 345 New Center building, Detroit, architect.

ST. LOUIS—Air Reduction Sales Co., 630 South Second street, has let contract for one-story factory addition, 30 x 40 feet, to Murch-Jarvis Co. Inc., 943 Cotton Belt building.

ST. LOUIS—War department has awarded contract to Dickie Construction Co., 317 North Eleventh street, for construction of one-story radio school building, 200 x 340 feet, at Scott Field, Ill.

ST. LOUIS—Continental Can Co. Inc., New York, is taking bids on construction of one-story building 440 x 460 feet and two-story office section and warehouse, 340 x 400 feet. Included are a steel frame train shed and loading platform. Cost estimated over $1,000,000. (Noted Oct. 28).

Wisconsin

BLACK RIVER FALLS, WIS.—Inland

Steel Co., 38 South Dearborn street, Chicago, plans construction of mining plant in the Iron Mound district at cost of about $1,000,000.

BLACK RIVER FALLS, WIS.—City has begun construction of munipical light and power plant building to cost $100,000. Contracts will be let for equipment. E. M. Hagen, city clerk. Meade, Ward & Hunt, Madison, Wis., engineers.

FOND DU LAC, WIS.—Giddings & Lewis Machine Tool Co. has begun erection of new buildings which will provide 41,000 square feet of floor space. The first unit will be a high-bay large machine shop, 60 x 190 feet; the second unit, a medium high-bay machine shop, 30 x 176 feet, and the third unit, a low-bay machine shop, 60 x 120 feet. The company is also purchasing new machine tools.

LA CROSSE, WIS.—City, F. L. Kramer, clerk, will build an iron removal plant costing $16,400.

LAONA, WIS.—Connor Lumber Co. plans construction of factory building, 97 x 208 feet, and improvements to present plant. G. A. Krasin, Marshfield, Wis., architect.

MUSCODA, WIS.—Village plans installation of new diesel engine generating equipment in municipal power plant. E. F. Richter is village clerk. (Noted Sept. 16.)

RICE LAKE, WIS.—City, Thomas G. Hoff, clerk, plans sewage disposal plant.

Minnesota

JORDAN, MINN.—Minnesota Valley electric co-operative, H. A. Schimelpfenig, acting manager, will take bids soon on construction of 124 miles of transmission lines to serve 281 customers. Banister Engineering Co., 1586 University avenue, St. Paul, consulting engineer.

KEEWATIN, MINN.—Village, John Rebrovich, recorder, is taking bids to Dec. 27 for mechanical equipment for its new sewage disposal plant, including sewage pumps, sludge pump and chlorinating equipment. J. D. Taylor, Hibbing, Minn., engineer and architect.

LYLE, MINN.—Village, C. Dyrland, clerk, voted at recent election in favor of construction of new water filter plant.

MINNEAPOLIS — Pioneer Engineering Works, 1515 Central avenue, will construct a two-story concrete addition to its plant.

MINNEAPOLIS—Minneapolis Electric Steel Castings Co., Sheldon V. Wood, president, has awarded general contract to James Leck Co., 211 South Eleventh street, for addition and extensive improvements to plant.

NEW ULM, MINN.—City plans addition and improvements to municipal light and power plant to cost $150,000. A. C. Sannwald is city clerk. Ralph D. Thomas & Associates, 1200 Second avenue, South, Minneapolis, engineers. Project will include new steam generating unit and turbine.

ST. JAMES, MINN.—South Central Electric association, E. C. Meier, superintendent, awarded contract to E. W. Wylie, 2239 Highland Ford parkway, St. Paul, for construction of 185 miles of rural transmission lines to serve 364 customers. Banister Engineering Co., 1856 University avenue, St. Paul, consulting engineer.

WHEATON, MINN.—Village, M. J. Fridgen, clerk, rejected all bids taken Dec. 5 on construction of sewage treatment plant. G. M. Orr & Co., 542 Baker Arcade building, Minneapolis, consulting engineer. No definite plans have been announced. (Noted Nov. 18).

Texas

GARLAND, TEX.—Southern Aircraft Corp., Willis C. Brown, president, has acquired 23-acre site for erection of airplane factory.

HOUSTON, TEX.—Chicago Bridge & Iron Co., 918 Richmond avenue, will soon start erection of warehouse, 60 x 160 feet, to accommodate an electric hoist of three-ton capacity, and chain hoist of two-ton capacity. Expansion program also includes a small machine shop.

SONORA, TEX.—City has retained Albert C. Moore & Co., 2404 Smith-Young tower, San Antonio, Tex., to prepare preliminary plans for constructing electric light and power plant. George E. Smith, city manager.

Kansas

COUNCIL GROVE, KANS.—Flint Hills rural electric co-operative, W. M. Leslie, superintendent, has let contract to R. E. Mattison, Britton, Okla., at $184,953 for erection of 270 miles of transmission lines. Paullette & Wilson, Salina, Kans., consulting engineers. (Noted Oct. 14).

North Dakota

FARGO, N. DAK.—Dakota Tractor & Equipment Co., E. O. King, president, will build a one-story display, parts and shop building, 106 x 160 feet, to cost $75,000. W. F. Kurke, is architect.

GRAFTON, N. DAK.—City will install 450-horsepower engine generating unit in municipal power plant. W. F. Schutt, city auditor.

HILLSBORO, N. DAK.—Red River Valley electric co-operative, Ralph Diehl, chairman, has made application to REA for funds to finance construction of additional 200 miles of transmission lines. M. S. Hyland, Fargo, N. Dak., consulting engineer.

KINDRED, N. DAK.—Cass County electric co-operative, A. J. Truskind, manager, is completing plans for erection of additional 300 miles of rural transmission lines. M. S. Hyland, Fargo, N. Dak., consulting engineer. (Noted Sept. 23).

Nebraska

BEATRICE, NEBR.—State board of control, Harold F. Peterson, secretary, Lincoln, Nebr., is preparing plans for sewage disposal plant at institute for feeble minded here to cost $60,000. B. P. Daxon, Lincoln state hospital, Lincoln, architect.

KEARNEY, NEBR.—State board of control, Harold F. Peterson, secretary, Lincoln, Nebr., plans heating and power plant at industrial school here to cost $54,000. B. P. Daxon, state hospital, Lincoln, architect.

LINCOLN, NEBR.—State board of control, Harold F. Peterson, secretary, Lincoln, Nebr., will construct heating and power plant at state hospital here to cost $75,000. B. P. Daxon, Lincoln, state hospital, architect.

NORFOLK, NEBR.—State board of control, Harold F. Peterson, secretary, plans sewage disposal plant at Norfolk state hospital to cost $60,000. B. P. Daxon, Lincoln state hospital, Lincoln, Nebr., architect.

OMAHA, NEBR.—Site has been selected and work will start soon on plane factory for the government to cost about $10,000,000. Plant will be operated by Glenn L. Martin Co., Baltimore.

OMAHA, NEBR.—Metropolitan utilities district, Walter Byrne, general manager, has been authorized to retain consulting engineers to prepare plans for erection of a new wing containing two new 500-horsepower boilers at its gas plant at cost of $250,000.

Iowa

AMES, IOWA—City, John W. Prather, clerk, is considering plans for construction of sewage disposal plant.

DES MOINES, IOWA—Globe Hoist Co., manufacturer of automobile hoists, and Globe Machinery & Supply Co., have awarded general contract to Weitz Co. Inc., 713 Mulberry street, for construction of plant and warehouse to cost about $75,000. Proudfoot, Rawson, Brooks & Borg, Hubbell building, architects.

DUBUQUE, IOWA—J. P. Smith Shoe Co., Chicago, plans construction of factory here, the first unit to cost about $50,000.

FORT DODGE, IOWA—United States army engineers, war department, Rock Island, Ill., have made preliminary surveys for construction of hydroelectric dam to cost about $12,000,000. This will probably replace proposed Madrid, Iowa, dam, which has been abandoned.

FORT DODGE, IOWA—Fort Dodge Gas & Electric Co. will spend approximately $1,000,000 on improvements to its plant here.

KEOSAUQUA, IOWA—City is considering construction of sewage disposal plant and sanitary sewer system.

OSAGE, IOWA—City will take bids in January on municipal light and power plant, to cost about $325,000 with equipment. (Noted Oct. 14).

ROCK RAPIDS, IOWA—City council is considering plans for addition to municipal light and power plant, including installation of new generating unit and auxiliary equipment.

SIOUX CITY, IOWA—Sioux City Gas & Electric Co., 517 Fifth avenue, plans improvements to its Riverside plant to cost about $90,000.

Colorado

SEVERANCE, COLO.—Poudre Valley electric co-operative has awarded contract subject to REA approval to Snyder & Johnson, Humboldt, Iowa, at $246,413 for 383 miles of rural transmission lines.

California

BURBANK, CALIF.—Menasco Mfg. Co., engine manufacturer, has let contract for new factory building at 805 East San Fernando road, Burbank. Cost about $45,000.

LOS ANGELES—Aviation Repair Station has been incorporated in Los Angeles with capital of $200,000. Directors are: McIntyre Faries, San Marino, Calif.; E. H. Feldman and W. R. Hackett, both of Los Angeles. The new corporation is represented by Faries-McDowell, Subway Terminal building, Los Angeles.

LOS ANGELES—Wiley Machine Co., 637 East Slauson avenue, has plans for construction of addition to factory building, 60 x 65 feet, costing about $10,000.

SAN BERNARDINO, CALIF.—Morrow Aircraft Corp. has let contract for construction of airplane manufacturing building on East Third street. Cost estimated at $65,000.

SAN PEDRO, CALIF.—Building permit has been issued to Los Angeles Shipbuilding & Drydock Co. for construction of shipyard crane structure. Cost estimated at $135,000.

VENICE, CALIF.—Airesearch Mfg. Co., 5963 West Third street, Los Angeles, has awarded contract for construction of new factory building here, 200 x 380 feet, costing $125,000.

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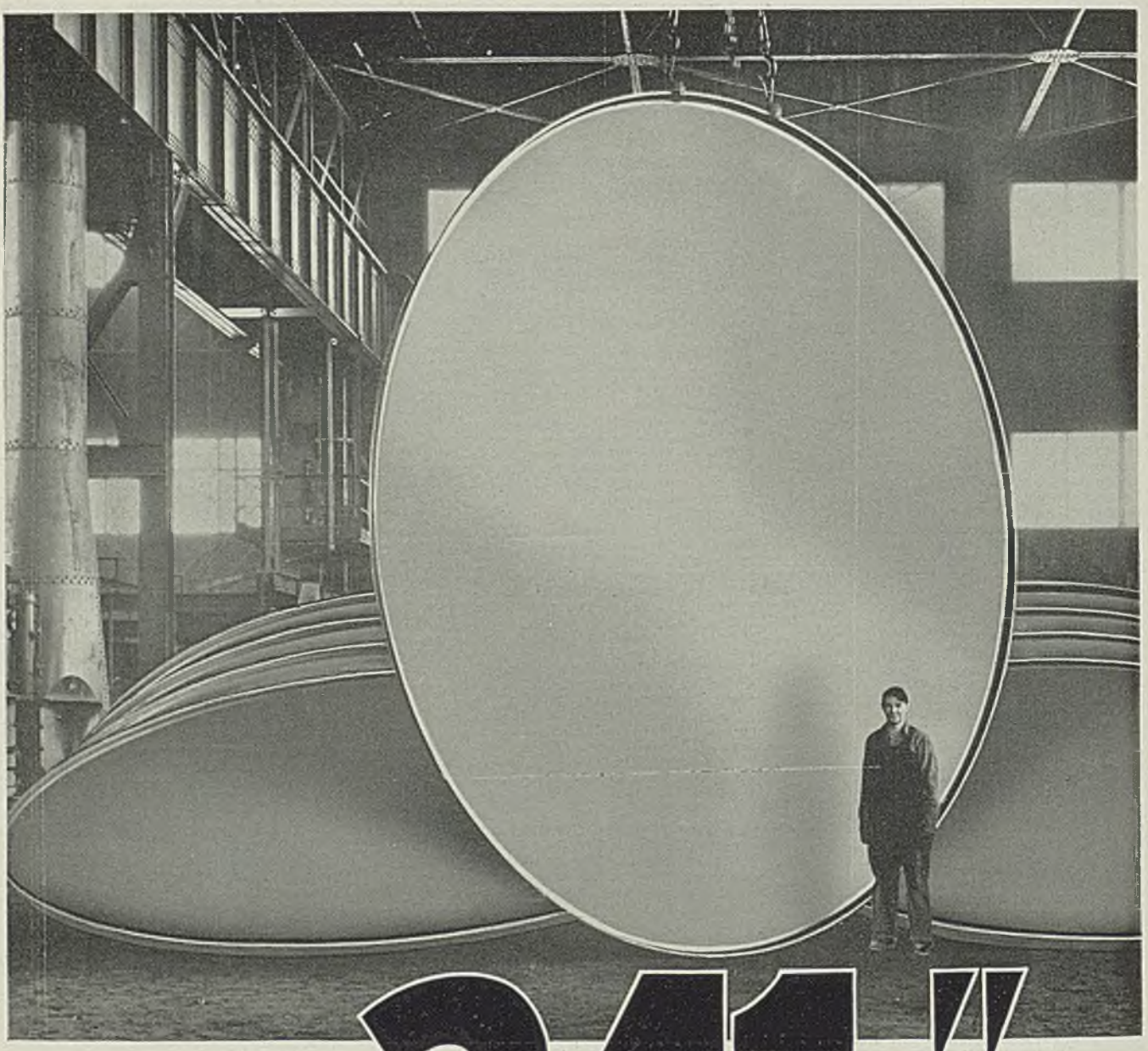

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