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STEEL

ESTABLISHED 1882

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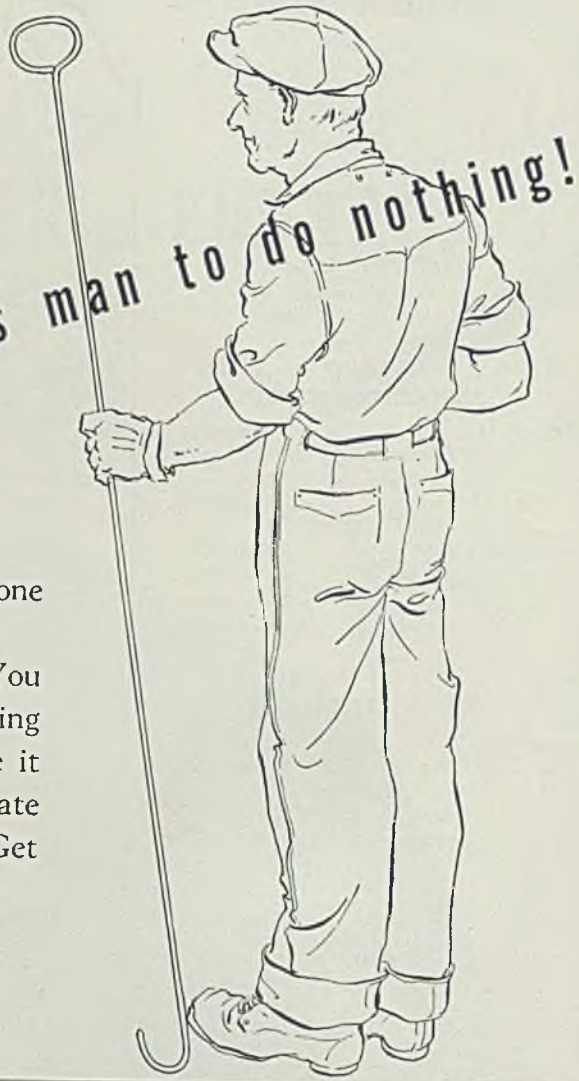

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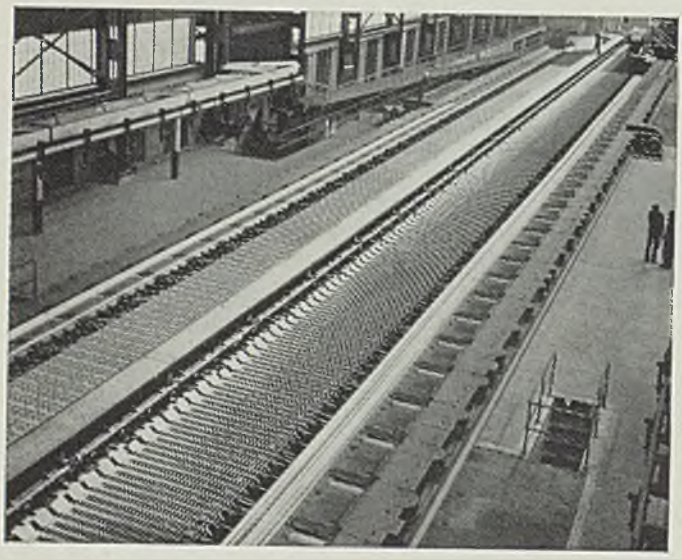

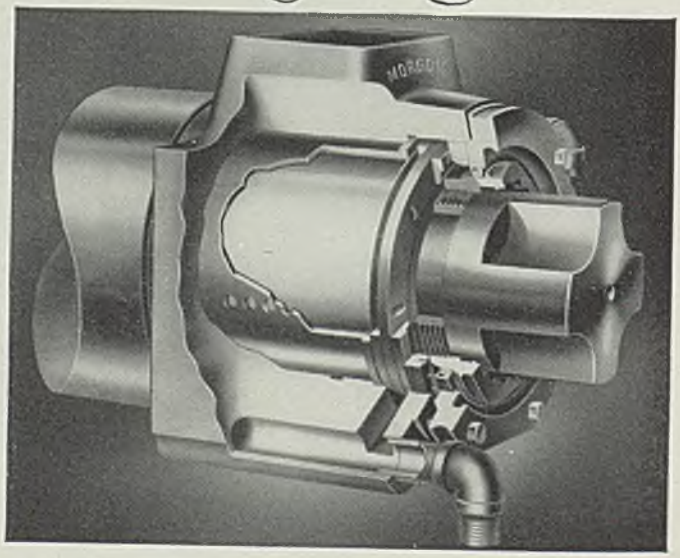

Left: An automatic carry-over cooling bed receiving deformed concrete bar, double strand, from a Morgan Continuous Mill at the rate of 60 to 65 tons an hour.

Right: Morgoil Bearings ride on a film of oil. They offer extremely low coefficient of friction, high load capacity and freedom from wear. They are available in all capacities for replacement.

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HIGHLIGHTING
THIS ISSUE

■ ALTHOUGH current steel buying involves most of the output over the next few months, this is not due to any real scarcity of steel but to a precautionary policy on the part of consumers. They are having their forward requirements entered on mill books in order to make sure that they will get material as and when they need it. Action also is being taken **(p. 79)** to guard against future scarcity. Steps are being taken, for example, to prevent a bottleneck in the supply of plates when more tonnage of that product is needed for ships and various other armament items. Additional capacity also is relieving the bottleneck in the supply of electric furnace steel.

• • •

Gano Dunn Makes Study

It would appear from all present indications that existing capacity for steel production should prove sufficient. However, a final decision on this controversial subject seems due in the next two or three weeks. Gano Dunn **(p. 20)** is making a study of steelmaking capacity as related to requirements and will present his conclusions to the President who then is expected to make a ruling one way or the other. In the meantime, it is pointed out **(p. 20)**, the steel industry still has 3,000,000 tons of ingot capacity idle. . . . Recent survey shows majority of Americans **(p. 13)** would like to pay-as-you-go for defense. Surprisingly, 32 per cent would favor a general federal sales tax.

• • •

Steel Scrap Is Lower

While second quarter prices probably will not be announced until mid-March, present indications are they will remain unchanged. This is because the scrap iron and steel industry is heeding government disapproval **(p. 18)** of current scrap prices. Holders have indicated their willingness **(p. 79)** to sell at $1 to $1.50 under recent quotations but there has been no test of the market. Approximately two-thirds of the increase in steelmaking costs since last April has resulted from higher scrap prices. . . . Government orders for "critical" machine tools **(p. 23)** were increased by 50 per cent last week. . . Due to the emergency the automobile industry **(p. 78)** has called off its annual show in New York this fall.

• • •

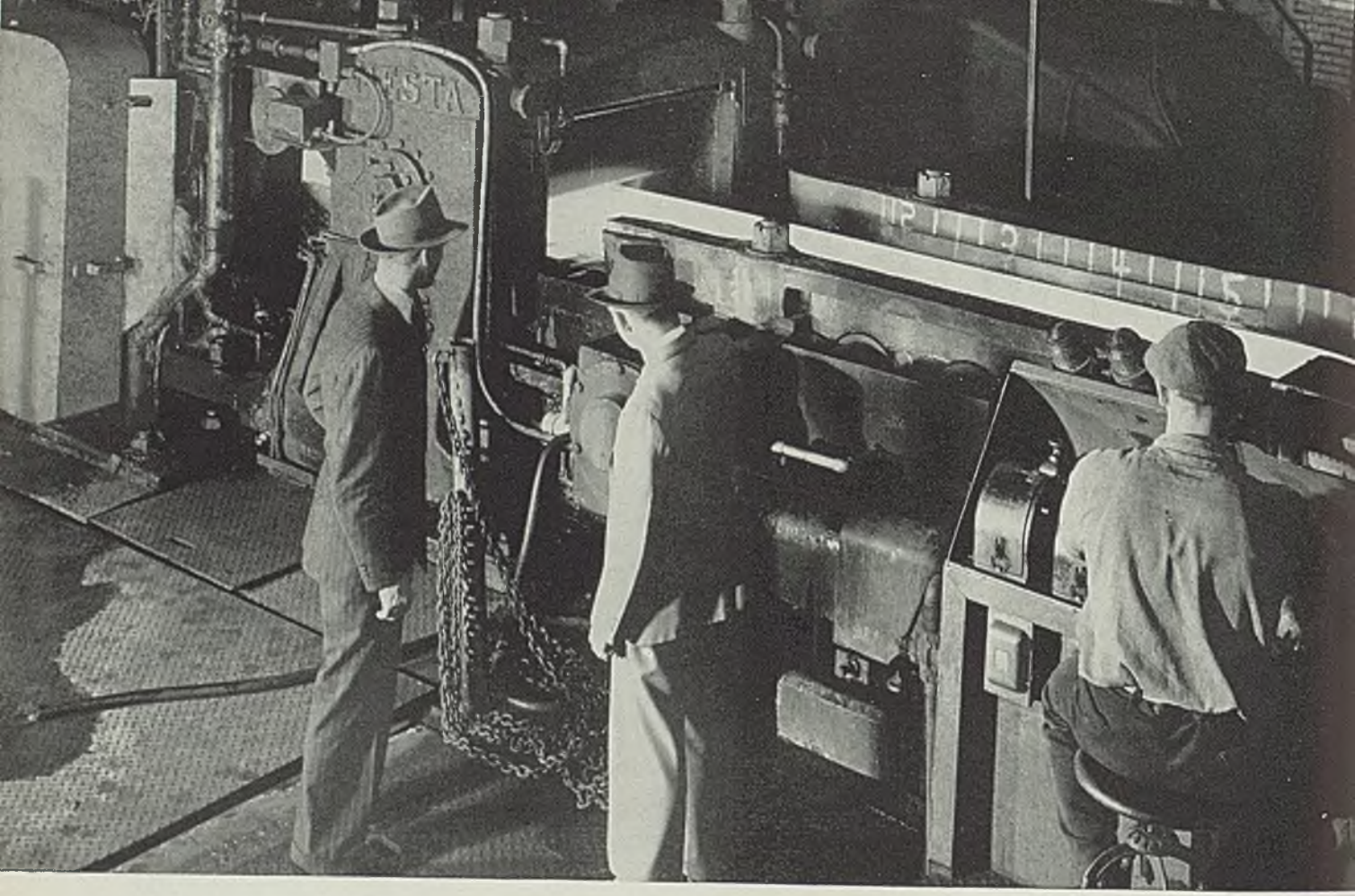
Shells Live Subject

One of today's timely and vital subjects is the fabrication of shells, an activity that is scheduled to assume vast proportions in the near future. Fortunately, the technique is well understood so that the required educational period should be much shorter now than during the World war. Great improvements in methods and equipment have been made since that time. In the first of a series of articles on this subject F. G. Schranz **(p. 48)** discusses methods and equipment for shell forging. . . . Vitamin pills are recommended by Leighton Wilkie **(p. 46)** to prevent cold epidemics which interfere with production in winter months, with the climax usually coming in February.

• • •

Crawler Cranes

Crawler cranes usually are thought of in connection with their applications in the construction industries. For some reason or other less recognition is given to them as highly versatile units for performing a vast variety of materials handling tasks. STEEL **(p. 64)** portrays a number of crawler cranes engaged in some typical handling operations in and around industrial plants. . . . H. T. Herbst **(p. 54)** describes methods and machines for high-speed, automatic gas welding, brazing and hard surfacing. . . . A new safety goggle lens **(p. 53)** has high shock resistance. . . . E. E. Halls **(p. 60)** discusses loose films on rustproofed steel surfaces and their effect on subsequent finishes.



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By ELRICK B DAVIS

What Industrial America Thinks about

DEFENSE, NATIONAL POLICIES

■ WHAT DO management and workers think about the problems connected with national defense? In what respects do they see eye-to-eye and in which do they widely differ? And how, now that industry is charged with building the armament and equipment not only to serve as this country's defense but to supply Great Britain, do both management and men vary, as responsible industrial workers, in their opinions from the national average?

Believing that these questions must be of primary importance to all America, to all the world, as well as to American industry's executives and workmen, the National Association of Manufacturers employed Elmo Roper to make a national survey of public opinion concerning the basic problems of the times. As is well known, Elmo Roper is the surveyor of public opinion whose pre-election surveys for *FORTUNE* so accurately forecast the outcome of the presidential balloting.

The first thing the survey sought to discover was, what does Mr. and Mrs. Average American think about the country's economic prospects for the next two years? Will the people in it be better off, worse off, or will their condition be the same?

In answer to this question (see Chart 1) 38 per cent think that two years from now we will be economically and individually in better shape than we are at the moment; 33 per cent think conditions will be the same; 15 per cent think we will be worse off; and 14 per cent don't know.

That is a picture of optimism. It was what the psychologists had expected. As a people, Americans are always optimistic about their economic future. During ten years of depression the man in the street never quit thinking that prosperity was just around the corner, as the records of the finance companies show.

But this was a more revealing survey than one which simply re-evidences a national characteristic. There were distinct differences between the optimism shown by people coming from different localities, and among economic groups.

To be short, optimism is highest in the defense-industry areas: and among executives and factory workers. Here management and workmen see almost eye-to-eye. Executives' expectation of better times runs 52 per cent and factory workers' 51—against a national average of 38. Housewives and retired persons have the lowest hopes, 30 per cent in each case.

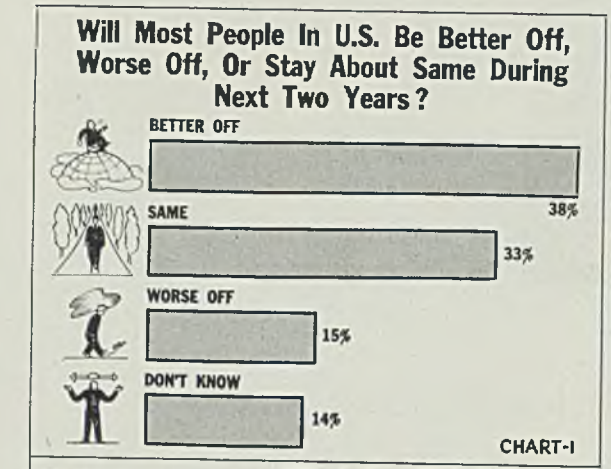
The next question was, "Regardless of what you *hope*, what do you think are the chances that the United States will get into the war?"

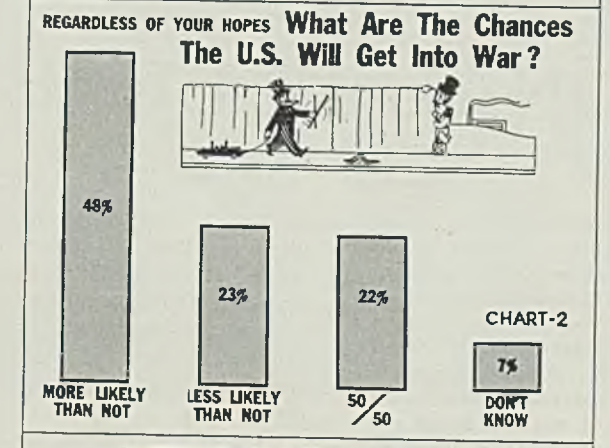
The national average (see Chart 2) ran 48 per

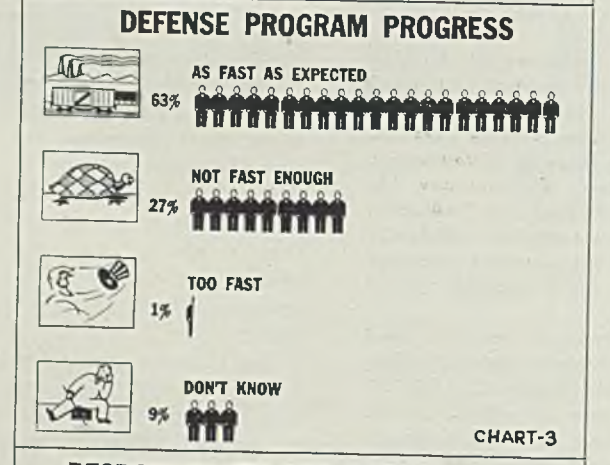
■ Will the average American be better or worse off during the next two years? How should the government raise the money to pay for national defense? If taxes must be increased how should more money be raised? What are the chances that the United States will get into war? Who is to blame for lags in the defense program? Should the government take over and operate defense industries? Should working hours per week be increased? Should strikes be prohibited by law?

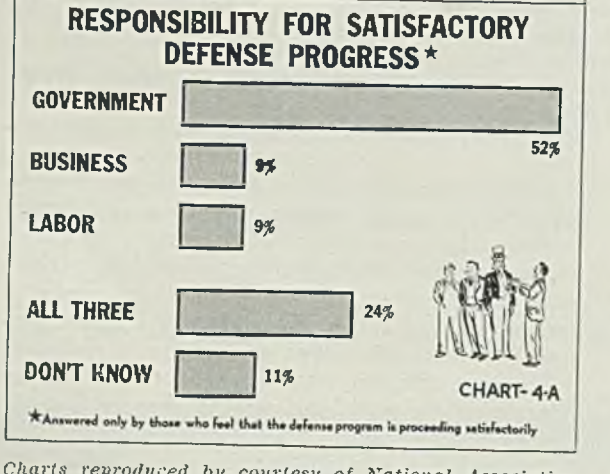
These and other vital questions of the day were answered in a recent survey conducted by Elmo Roper for the National Association of Manufacturers. The answers were most interesting, and in several respects encouraging. They also were suggestive. For instance, Mr. Davis concludes with the finding that "industrial management has not taken workmen sufficiently into its confidence about the practical problems of defense production . . . a problem of information is great."

Mr. Davis is a consultant in industrial and public relations work, with headquarters in New York. He was born in St. Charles, Ill., July 28, 1894, where his father was an official in the Moline Malleable Iron Co. He worked as an apprentice for this company, while formal education was obtained at Lake Forest college, Columbia School of Journalism, Kenyon college and University of Chicago. He has served on editorial staffs of several newspapers.









Charts reproduced by courtesy of National Association of Manufacturers.

cent "more likely than not", 23 per cent "less likely than not", 22 per cent "a 50-50 chance", and 7 per cent would not hazard a guess.

This disturbed the psychologists a good deal. It represents a defeatism against peace; a resignation to the thought that if there is a war on, we will willy-nilly get into it; a feeling that if there is a chance that we will get into a war nothing can be done to stop our getting into it, which goes a long way toward letting us into a war we do not want to join. The threshold of resistance is down, due to various reasons.

And what makes the situation even more dangerous is that executives and factory workers join in this defeatist apprehension. Together these two groups are, with the exception of some of the professional people, the most sanguine, analytic and skilled members of the community. Their resignation is momentous.

The workmen exactly express the national average, 48 per cent "more likely than not." Management is even more resigned, 5 points above the national average. The only groups equally divergent, but the other way, *below* the national average, are housewives and students. In their case hope may beget thought.

Progress of the defense program presents questions on which both management and factory workers may have more ground for genuine opinion that have most members of the other population groups. This survey was completed the day before William S. Knudsen, as production chief of the national defense advisory commission, spoke to the country from the annual Congress of American Industry held by the National Association of Manufacturers, for the first time apprizing the country that the progress of the defense building program was too slow.

The interviewers asked how satisfactorily the people thought that manufacture for defense was going along. Sixty-three per cent of the country (see Chart 3) was satisfied; progress was as fast as had been expected. Twenty-seven per cent thought it was not fast enough. One per cent said it was too fast; and 9 per cent not fast enough.

Here, on the absolute eve of the Knudsen warning, factory workers' satisfaction was above the national average; and executives' below.

Far from seeing eye-to-eye, the divergence of opinion was about equal above and below the national norm. Sixty-six per cent of the workers thought that production was up to where it should be if the country's materials for defense were to be built in time; only 59 per cent of the executives shared that view.

Active dissatisfaction over the rate of progress showed an even greater difference of opinion between management and men. Only 28 per cent of the men thought the rate of progress too slow; but 38 per cent of the executives were distinctly apprehensive.

In all the country the group least satisfied with the rate of progress included the professional people. This may be important.

For the professional group includes the professional molders of opinion and instructors of the public, the people who earn their livings on the ground

that they are particularly trained analysts and finders of fact. Their deviation of dissatisfaction from the national average was 14 points, compared to the executives' 7.5.

Fifty-two per cent of the people who thought that defense production is going along fast enough (see Chart 4A) gave the credit to government; 53 per cent who thought it is too slow (see Chart 4B) gave the government the blame. Nine per cent of the first group gave the credit to business and an equal proportion of the second group blamed business. The same percentage of the first group gave credit to labor, but 30 per cent who apprehended that the defense program was lagging said that labor is at fault.

The high blame and credit given government illustrates a psychological tendency. In matters of foreign affairs and national crisis, the people always tend to follow or to blame their leaders who, in a democracy, are elected political officers.

But in the matter of the rate of progress of the defense program, both factory workers and management were more critical than in accordance with the national folk-psychology. Among the satisfied section, the difference of opinion from the national average was present but not striking enough to remark. But among the unsatisfied, 75 per cent of management blamed government, and 47 per cent of the factory workers did likewise.

The difference between the amount of blame each group, management and labor, visits on the other, is more striking. With truly charming unanimity not a recordable fraction of a single per cent of the executive group thinks that business is to blame for any defense lag, but 31 per cent do find labor blameworthy. The factory workers seem to be far more objective. Twenty-two per cent chiefly blame business, but 23 per cent blame themselves.

Of the more than half of the population which thinks that government either should be praised or condemned for the current rate of defense production (see Chart 5) 57 per cent of the satisfied give credit to the President, and 61 per cent of the dissatisfied blame him. This is in accord with the psychological tendency to play "follow the leader," noted above. The percentages of credit and blame that go to congress are 18 and 25.

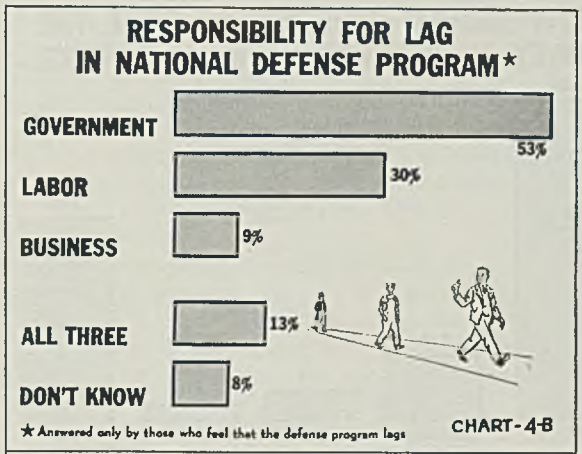
More interesting is the credit, 26 per cent, and the blame, 13 per cent, which goes to the national defense commission. This is noteworthy because industry, as such, and labor, as such, each has a responsible member or members on the board.

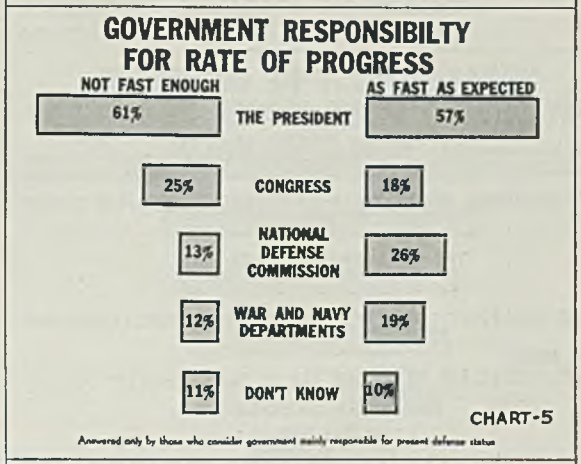
This may be the reason that, among the satisfied, the defense commission receives more credit, and, among the dissatisfied, less blame than does congress, which is the whole people's elected representatives.

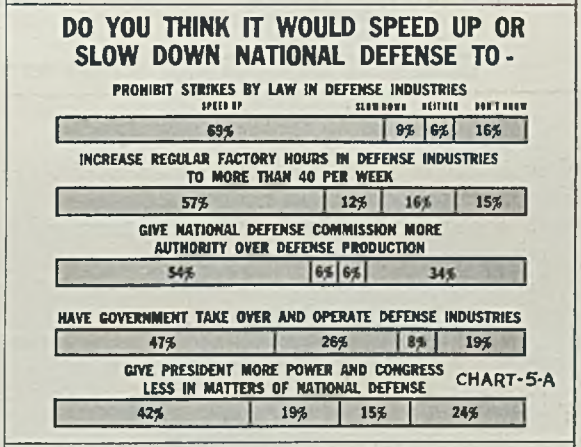
That may be worthy of cogitation, anyway, at a time when the tendency of government throughout the world is to take more and more power from and repose less and less responsibility in, elected bodies than in single leaders and those leaders' personal delegates.

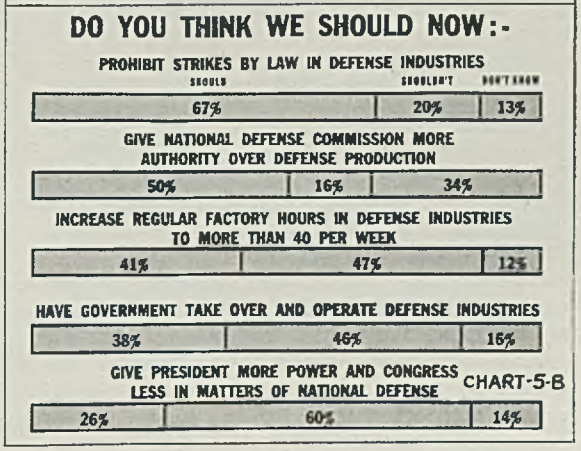
Next (see Chart 5A) the survey asked a set of five questions, each of them two ways, of the public.

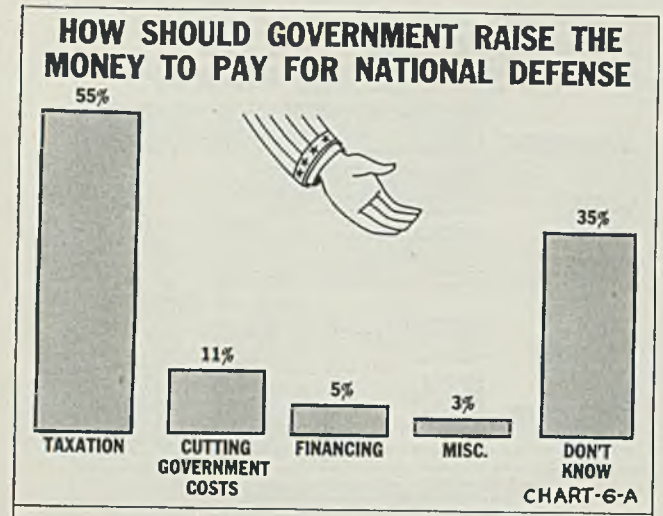
First, "Regardless of whether you think we should

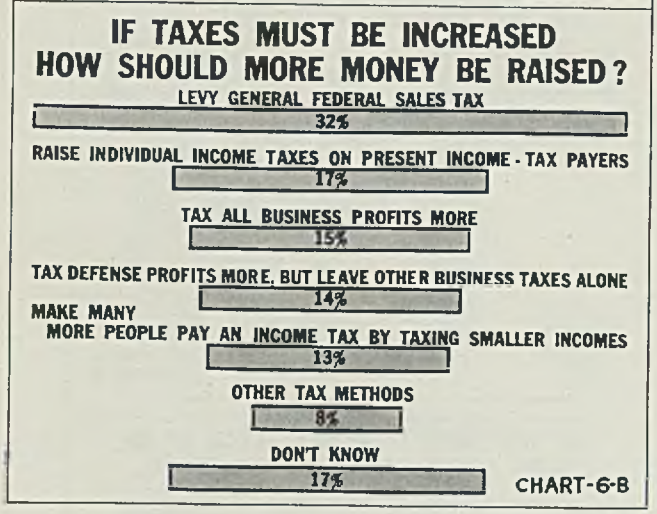












do it or not, do you think that it would speed up or slow down national defense to:

1. Prohibit strikes by law in the defense industries?

2. Increase the regular work-week in defense industries to more than 40 hours?

3. Give the national defense commission more authority over defense production?

4. Have the government take over and operate the defense industries?

5. Give the President more power and congress less in matters of national defense?"

After these questions were answered, the people (see Chart 5B were asked, "Should these steps be taken *now?*"

The answers were dramatic. Unanimously the survey experts said that they proved two things:

First, that whatever the turmoil and uncertainty now in the world, the American people are still willing to use and make up their own minds;

Second, that whatever their personal interest and emotional bias may be the American people are still willing to say truly what they believe to be right.

And even more important, the answers to this double set of questions, as the returns are placed against each other, proved to the survey experts that there is now no hysteria in this country. Specifically in the cases at hand some certain things may have to be done. But only as a last resort. We are far from the last ditch now and they do not have to be done yet!

Let's go back to the questions.

1—Sixty-nine per cent of the people think that it would speed up production in the vital industries if strikes in those industries were prohibited by law. Sixty-seven per cent think such a law should be passed at once.

2—Fifty-seven per cent of the people think that to increase the regular work-week to more than 40 hours would speed up defense. But only 41 per cent, a difference of 16 points, are willing to see it done now.

3—Up to the moment of Mr. Knudsen's speech the public apparently had very little notion of what the function of the national defense commission might be. The survey showed then that 54 per cent thought it would speed up the program to give the commission more power; 50 per cent thought that should be done at once; and 34 per cent did not know enough about the commission to have any idea on the matter.

How radical a change in public opinion resulted from Mr. Knudsen's declaration that defense production must be speeded up to the point where delivery dates could be advanced three months, is indicated that within a week after the Knudsen revelation, the President provided the defense commission with responsible organization and announced that its powers would be real.

4—Almost half, 47 per cent, of the public seriously believes that defense production would be speeded up if the government were to take over and operate the vital defense industries. But only 38 per cent are prepared to do that now.

5—And 42 per cent of the people think that defense production would be speeded up if the President were given more power and congress less. But when it comes to the notion of doing that *now,* there is a sharp change of public opinion. Only 26 per cent of the people are willing to do that at once; 14 per cent "don't know," and 60 per cent, a greater proportion than voted to return the President to office, third term or no third term, plump solidly to leave to congress the powers it now has.

How do the opinions of management and workmen differ from the national average on these matters of basic public policy? And how do they differ from each other?

One might have guessed that management would be unanimously for, and labor unanimously against, the prohibition of strikes in defense industries. But only three-fourths of the executives think that that would in fact speed up production. And two-thirds of the workmen agree. When the question is *now,* the proportion of executives favoring it remains unchanged. But that of the workmen drops only 10 points, to 56.6 per cent. The average of opinion between executives and workmen is exactly the average of the opinion of the nation-at-large.

A word of caution is due there. This question was asked only about the defense industries. The factory workmen had national defense in mind, the

survey psychologists warn.

On the question of increasing the number of hours in the regular work week, the divergence of opinion is sharper. Of the executives, 58 per cent favored doing it now; of the workmen, 32.5. But 71 per cent of the executives, and only half of the workmen, think that would speed up production of national defense materials.

A larger proportion of the workmen, 55 per cent, and a slightly smaller proportion of the executives, 71 per cent, think increase in the power of the defense commission will speed up production, but only 47 per cent of the workmen favored it before Mr. Knudsen's revelation of "terrible urgency." Before that, the highest demand in the country for actual establishment of powers in the defense commission, the survey shows, was among executives, who have experience in getting work out in an emergency.

The factory workers think two-to-one that the government is actually more competent than private management to operate the defense industries. The psychologists pointed out that that judgment is biased by the workmen's economic prejudices. But only 44 per cent of the workmen are prepared to recommend that that be done at once.

A trifle more than half of the factory workers, but only a third of the executives, think that it would speed up production to give the President more power and congress less. But only a third of the workmen favor doing it now; and on that question management declares an overwhelming, an almost unanimous NO.

The country accepts philosophically the fact that the defense program will have to be paid for. And 55 per cent of the people (see Chart 6A) recommend that it be paid for by taxation, pay-as-you-go.

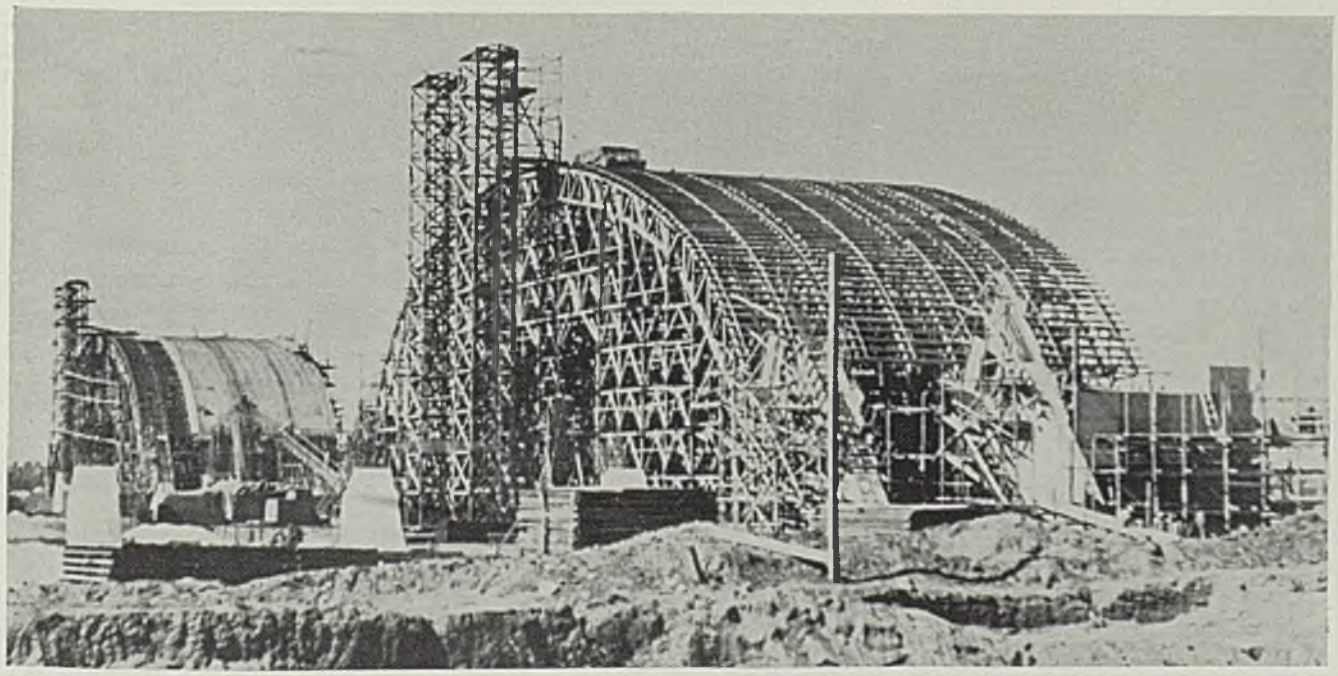
What is surprising is that only 11 per cent realize that one way to pay the defense bill is to cut other, nondefense, public expenditures. Executives who know from experience what the meeting of great new costs means strongly favor the cutting of nondefense government expenditures. But of factory workers only 4 per cent favor that.

The most surprising discovery of the entire survey was that of all forms of taxation, that most strongly favored is a general federal sales tax. Thirty-two per cent of the country (see Chart 6B) is ready to recommend that now. No other method of taxation now has more than half that much support. The survey found very little "tax the rich" feeling. Sales tax sentiment was surprisingly heavy even in the lower income levels. But its recommendation by the executive group ran 14 points above the national level; by factory workmen 4 per cent below.

What the survey added up to is this: The country is in dead earnest about the defense program. It wants it completed, without hysteria, and it is willing to pay for it. Divergences of opinion between management and men about details are not very serious.

But where these divergences are greatest the fault seems to be management's—in this way: Industrial management has not taken workmen sufficiently into its confidence about the practical problems of defense production. The "terrible urgency" which Mr. Knudsen voiced, and which was the burden of the President's Christmas-week speech, is an urgency of production. It is a production problem.

Steel Houses U. S. "Flying Fortresses" at Caribbean Bases



■ Steel hangars for "Flying Fortresses" are rising at strategic points outside continental United States as this country lengthens its defense arm. Here is shown part of an $8,100,000 army base being constructed on a former sugar cane field at Punta Borinquen, Puerto Rico. Acme photo

Scrap Industry, National Defense Officials

Working Toward Price Limitation

Voluntary reduction to around $20 for No. 1 heavy melting steel, Pittsburgh, urged by Henderson. Ceiling would tend to stabilize finished steel quotations. Immediate effect is confusion in market, nominal quotations, lower prices

■ NATIONAL defense officials' effort to establish a ceiling over iron and steel scrap prices, the first important price control action affecting the metals industries, last week was interpreted as: Tending to stabilize finished steel quotations by more or less freezing an important raw material cost; and foreshadowing the government's attitude in controlling prices of other commodities. It also, of course, creates many and complicated problems within the scrap industry itself.

Immediate effect in the scrap market was to create uncertainty, to make most quotations nominal, and later, to weaken prices. Few sales were reported, pending clarification of the issue.

The government's move was instituted in Washington by a conference of scrap dealers called by the price stabilization section of the national defense advisory commission. Dealers were requested to make every effort to reduce prices several dollars a ton. Twenty dollars for No. 1 heavy melting steel, Pittsburgh, with usual differentials at other points, was suggested as the "critical point" in scrap prices.

Steel producers several weeks ago warned national defense officials they could not expect to maintain prices at the present level if raw materials costs continued to advance. Especially affected by the raw materials increases have been the nonintegrated producers, who, of necessity, depend on purchased scrap to a far greater extent than do the integrated producers.

Scrap Dealers Co-operate

The scrap industry countered the defense officials' warning with a pledge of full co-operation in the defense effort and went to work to determine what could be done to effect the proposed reduction and control of prices.

Conferees from Washington proceeded to Baltimore where the thirteenth annual convention of the Institute of Scrap Iron and Steel was held Jan. 7-9. There Joseph E. Jacobson, institute president, warned members against deviating from the path indicated by the government. The industry, he said, must learn to function as the handmaiden of the steel industry in supplying scrap in sufficient quantities and at a reasonable price.

"We are very much in the public eye and not too high in public favor at this moment, but our government understands our problems and is anxious to help us," he continued. "We must not refuse to grasp that hand in co-operation, because if we do, it will not be offered again in the same way."

Advises Voluntary Control

Leon Henderson, head of the price stabilization section, national defense advisory commission, warned the scrap men: "If you don't handle your business, it will get handled." Henderson said he apparently had failed to put over this point at the first conference with scrap dealers last October.

The scrap industry, he said, must supply the steel industry with adequate tonnage at a "decent price".

If the requests of the price stabilization division are not met, he declared, it may be necessary to set up a scrap industry control, which might include taking over the handling of railroad scrap and further might make it necessary to go directly to producers of scrap.

Mr. Henderson said he wished to make clear that he heads a price stabilization section and not a price fixing division. His entire economic theory, he declared, is based on the proper relationship between costs, prices and profits, and attributed the "damage done in the early twenties to disregard for prices."

Increase in industrial production to the "astounding" figure of 136 in December was due to improved relationship of these factors, he opined.

A joint committee of scrap consumers and suppliers was proposed by G. L. Rathel, vice president, Continental Steel Corp., Kokomo, Ind., as a means of handling scrap problems during the present emergency. The committee would be given power to take necessary action to prevent a runaway market as well as to provide the additional 4,000,000 tons of purchased scrap to be required in 1941. The 4,000,000-ton figure is predicated on Washington officials' belief that 80,000,000 net tons of steel will be required and produced this year.

Committee proposed by Mr. Rathel would comprise five members from the steel industry and an equal number from the scrap trade headed by a chairman familiar with both buying and selling problems. He said that unless some such organization is set up, the scrap trade inevitably faces government price fixing, desired neither by industry nor the price stabilization division.

Mr. Rathel said the government is determined to keep prices down as part of its program of maintaining a ceiling over the steel price structure, as well as all costs, both on commodities and labor, involving the defense effort.

Can't Absorb Added Costs

"It is physically impossible for the steel companies to absorb increased tax and labor costs, plus increased scrap prices unless they increase their own prices on finished goods," said Mr. Rathel. "If, however, steel prices do increase, it means additional cost in our rearmament program and an increase on all finished steel products used by the consumer."

Emphasizing that the scrap industry is faced with a duty involving patriotism as well as other responsibilities, Mr. Rathel said: "We have started on this great rearmament program, and if it is to be carried through on an efficient and successful basis, consumers and suppliers alike must translate their responsibilities into a real service. They must not hesitate to make any

sacrifice for the general welfare of our country."

Mr. Rathel's plan for keeping control of scrap in the hands of private industry already has been presented to Mr. Henderson.

In view of the problems involved, the institute probably has held no more important meeting in its history as evidenced by the record attendance of more than 800. In addition to the necessity for keeping prices down, the industry must supply an estimated 28,200,000 gross tons of scrap to steel plants and foundries during 1941. As part of the solution, a plan for equalizing freight rates may be evolved which would permit shipment of material from out-of-the-way places.

In discussing the supply aspects of the defense program, William L. Batt, deputy commissioner, industrial materials division, national defense advisory commission, said the commission is in agreement in its determination to persuade private industry to keep prices down. He stated that "the power is there" to prevent an upward spiral in both labor costs and prices and will be applied if necessary. He warned the scrap industry against higher prices and hoarding of material. The defense commission is convinced, he said that a constantly rising market does not bring out more material and hoarding scrap is not a patriotic act.

Mr. Batt said he was not "very happy" over the prospects for foreign trade after the war ends, since present moves toward self-sufficiency on raw materials normally obtained outside the country will make it even less possible for other nations to buy here. Exports since 1914 topped imports by $32,000,000,000, he said.

In Mr. Batt's opinion some agency should be set up now to study means of softening the shock after the emergency ends. At the same time, industry should increase its research activities and development of new products.

Mr. Batt indicated plans still are under way for a tin smelter in this country, but pointed out that Bolivian ore output would be sufficient to supply only half our requirements. As for zinc, he said civilian needs will have to stand aside for defense and British needs.

The scrap institute is preparing to move its headquarters from New York to Washington.

Louis J. Borinstein, Indianapolis, was elected president of the institute, succeeding Mr. Jacobson. Mr. Borinstein has been vice president of the association and has long been active in its affairs.

Other officers elected were: Vice president, Phil W. Frieder, Philip W. Frieder Co., Cleveland; secretary, George L. Sturm, Middletown Iron & Steel Co., Middletown, O.; treasurer, Everett B. Michaels, Hyman-Michaels Co., Chicago; comptroller, Thomas F. Kelly, Brooklyn, N. Y.

Directors-at-large were elected as follows: Abe Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va.; Harry J. Kiener, Hickman, Williams & Co. Inc., St. Louis; Darwin S. Luntz, Luntz Iron & Steel Co., Canton, O.; Mather Moffett, Summer & Co., Columbus, O.; Barney H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J.; Max Schlossberg, M. S. Kaplan Co., Chicago; Benjamin Schwartz, Schiavone-Bonomo Corp., Jersey City, N. J.; Joseph E. Jacobson, Luria Bros. Inc., Pittsburgh; Harry S. Grant, Grant Iron & Metal Co., Detroit.

Hold Scrap Supply Adequate For Heavy 1941 Requirements

National defense advisory commission officials were told the country's scrap supply will be adequate for the high steel production rate expected in 1941 by the war service committee of the Institute of Scrap Iron and Steel, it was reported, following a committee meeting in Washington. No formal statement was issued.

Sixteen committee members attended the conference which was for the purpose of completing a scrap procurement plan. William Wolf, Hamilton, O., is chairman.

Scrap Institute Underwrites 20 Ambulances for Britain

Twenty ambulances for Great Britain will be provided by the Institute of Scrap Iron and Steel. Each chapter will sponsor one ambulance, at a total cost of $27,000. Units will cost about $1000 each and $350 each is provided for one year's maintenance.

■ What effect will a price ceiling have on scrap collections? This question was being asked last week after the government moved to bring about a voluntary reduction in quotations. Approximately 4,000,000 tons more will be needed in 1941 than in 1940, if steel production approaches 80,000,000 net tons as anticipated in some quarters

Defense Commission Expert To Survey Steel Industry's Expansion Needs

Gano Dunn will attempt to reconcile varying recommendations for increases in capacity. Melvin de Chazeau believes 10,000,000 more tons necessary. Steel producers wonder why they are not asked for opinions on new construction

WASHINGTON

■ GANO DUNN, J. G. White Engineering Corp., New York, and industrial expert attached to the national defense advisory commission's staff is preparing a report on possible steel expansion needs. His findings will be submitted to the President.

It is stated Mr. Dunn is seeking a path midway between the report of Melvin de Chazeau, defense commission economist, and the steel industry itself. Mr. De Chazeau is said to have recommended an increase of about 10,000,000 tons in steelmaking capacity. The industry itself feels no additional capacity is required to handle defense and normal needs.

Representatives of the steel industry are said to be co-operating with Mr. Dunn in his report, and are claimed to have conferred with W. L. Batt, deputy defense commissioner. Mr. Dunn, reports indicate, was called in as a disinterested party to attempt to settle differences in opinion between government economists and the industry. The defense commission apparently has never reached an agreement on the steel production situation, as commission members and experts have held conflicting views on the matter.

In addition to the De Chazeau report which Mr. Dunn is reviewing, it is understood he also has steel reports of the national resources planning board and the National Economic and Social Planning association. Steel Workers Organizing committee of the CIO is also said to be preparing a steel report.

3,000,000 Tons Reserve Steel Capacity for Defense Needs

The steel industry had sufficient unused capacity in reserve during fourth quarter, 1940, to meet demands for additional output at the rate of at least 3,000,000 tons annually, although production in that quarter broke all records, according to the American Iron and Steel institute.

Of total capacity not in use during the fourth quarter about 60 per cent was in plants of 1,000,000 tons capacity and over.

Larger steel companies have a wider range of products available for defense work and consequently they operate at a higher rate. The average production rate for larger companies in fourth quarter was 97 per cent of capacity; for smaller units it was 86 per cent. There are 270 companies in the steel industry, 70 of which produce ingots. Many of the smaller interests make a limited range of steel products, some of which have not been required in large quantity thus far in the defense program. The unused facilities of these companies provides a cushion if increased pressure for steel is felt.

Producers Await Report on Probable Steel Requirements

NEW YORK

Report by the national defense advisory commission on the steel capacity expansion problem is awaited by leading steel producers with considerable interest. So far as can be learned, none of the producers has been called into consultation on the survey. In fact, at no time since the beginning of the present emergency have individual producers been called upon by Washington for views on the industry's ability to meet preparedness demands, according to best information here. Producers believe, that regardless of what contacts or sources of information the government has, the steelmakers have much to contribute to any study of expansion of needs.

National resources planning board, which late last year suggested a huge expansion would be necessary, so far as can be learned, called on no producers for suggestions. The board's report, of course, was started before the present emergency and involves factors which do not now apply while neglecting other factors which have arisen with the emergency.

In the many statements from Washington indicating need for large steel expansions much emphasis has been placed on growing consumer demands expected to result from rearmament spending. Such demands may develop, but there still is the question of whether the larger consumers goods industries themselves have the capacity or manpower to handle the anticipated increase in business.

The automotive industry, producers point out, is an example. Already deluged with defense orders, it is doubtful the industry has capacity to handle any increase in peace time production.

Industry spokemen say they are willing to undertake whatever is needed in the present emergency, but they believe they should be in on the discussion leading to final decision.

Six More Materials Under Export Control

Six additional materials were placed under the export licensing system last week by President Roosevelt. The action was taken at recommendation of Col. Russell L. Maxwell, administrator of export control.

Materials added to those already under the licensing system include copper, brass, bronze, zinc, nickel and potash. Their exportation must now be controlled, it was explained, because of the defense program's accelerating needs.

Effective date of the proclamation placing these materials under export control will be Feb. 3.

1940 Ingot Output 7 Per Cent Over 1929

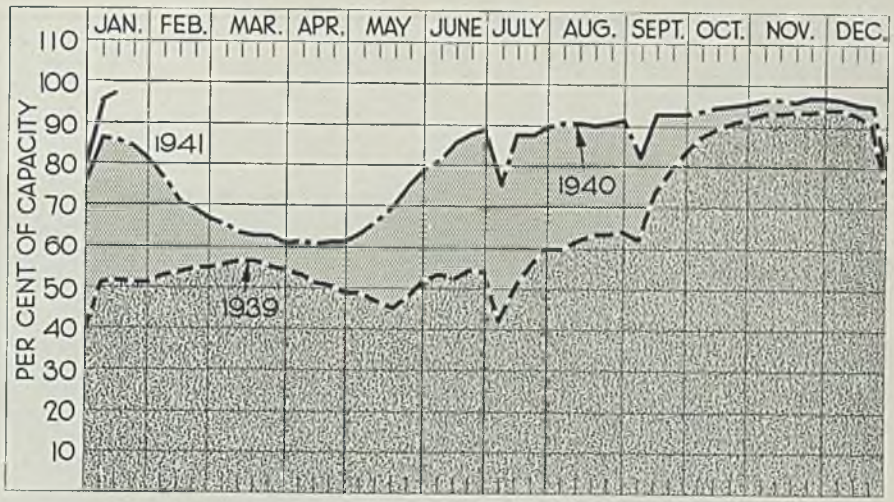
■ Production during December of 6,300,768 net tons of open-hearth and bessemer steel ingots brought output for 1940 to the record-breaking total of 65,246,953 tons, according to the American Iron and Steel institute.

The total for 1940 was 7 per cent higher than the previous peak in 1929 of 60,829,752 tons and exceeded by 26 per cent the 1939 figure of 51,584,986 tons.

In producing its new record output last year, the steel industry operated at an average of 82.22 per cent of capacity as of Dec. 31, 1939. In 1929, operations averaged 89.05 per cent of capacity, while during 1939 the industry operated at an average of 64.70 per cent of capacity. During the final quarter of 1940 the industry operated at an average of 95.49 per cent of capacity.

Ingot production in December was slightly ahead of the November total of 6,282,824 tons, and was 8 per cent greater than December, 1939, when 5,822,014 tons was produced. The rate of operation in December was 93.92 per cent of capacity, compared with 96.49 per cent in November and 86.13 per cent in December, 1939.

During last month ingot production averaged 1,425,513 tons per week, against 1,464,528 tons per week in November and 1,317,198 tons per week in December, 1939.



PRODUCTION . . . . Up

■ STEELWORKS operations, in gaining momentum after the holiday interruption, advanced 1½ points last week, to 97 per cent. A year ago the rate was 86 per cent; two years ago it was 52 per cent.

Detroit—Up 4 points to 94 per cent, with one open hearth down all week and one taken off Tuesday for rebuilding.

Birmingham, Ala.—Unchanged at 100 per cent, with 24 open hearths in production.

St. Louis—Held at 87½ per cent, 23 open hearths active.

Buffalo—Down 2½ points to 90½ per cent as one open hearth was withdrawn for repair.

Central eastern seaboard—Production remained at 95 per cent, only a few small furnaces idle. Carnegie-Illinois Steel Corp. will reopen Pencoyd plant, near Philadelphia, about Feb. 1, after being idle since April, 1928. It is rated at 240,000 tons of ingots annually.

New England—Gain of 1 point to 86 per cent resulted from slight changes in active furnaces.

Chicago—Advanced ½-point to 100 per cent, equaling alltime peak of week of Nov. 18.

Pittsburgh—Unchanged at 95½ per cent, which is close to practical capacity under present stress.

Wheeling—Necessity for repairs to open hearths cut production to 91 per cent, a loss of 5 points.

Cleveland—Addition of an open hearth raised the rate ½-point to 84½ per cent

Cincinnati—With only four open hearths idle in the district the rate advanced 1½ points to 88½ per cent.

Youngstown, O.—With a gain of 2 points to 94 per cent, the rate is the highest since 1929 with the exception of a brief period in 1939.

Steel Ingot Statistics

Period	Calculated Monthly Production—All Companies—Open Hearth—Net tons	Open Hearth—Per cent of capacity	Bessemer—Net tons	Bessemer—Per cent of capacity	Total—Net tons	Total—Per cent of capacity	Calculated Weekly production, all companies net tons	Number of weeks in month
1940 Reported by Companies which in 1939 made 97.97% of Open Hearth and 100% of Bessemer.								
Jan.	5,369,601	86.40	285,714	56.10	5,655,315	84.11	1,276,595	4.43
Feb.	4,203,508	72.37	205,527	43.19	4,409,035	70.16	1,064,984	4.14
March	4,073,196	65.54	191,559	37.62	4,264,755	63.42	962,699	4.43
April	3,798,371	63.11	176,335	35.76	3,974,706	61.04	926,505	4.29
May	4,582,694	73.74	258,709	50.80	4,841,403	72.00	1,092,867	4.43
June	5,228,529	86.88	304,381	61.72	5,532,910	84.97	1,289,723	4.29
July	5,272,708	85.03	322,362	63.44	5,595,070	83.40	1,265,853	4.42
Aug.	5,663,363	91.13	369,674	72.59	6,033,037	89.72	1,361,859	4.43
Sept.	5,530,044	92.10	365,188	74.22	5,895,232	90.75	1,377,391	4.28
Oct.	6,053,845	97.41	408,053	80.13	6,461,898	96.10	1,458,668	4.43
Nov.	5,864,333	97.44	418,491	84.86	6,282,824	96.49	1,464,528	4.29
Dec.	5,901,720	95.18	399,048	78.54	6,300,768	93.92	1,425,513	4.42
Total	61,541,912	83.91	3,705,041	61.65	65,246,953	82.22	1,248,029	52.28
1939 Reported by Companies which in 1939 made 97.97% of Open Hearth and 100% of Bessemer.								
Jan.	3,413,783	55.35	165,080	27.22	3,578,863	52.83	807,870	4.43
Feb.	3,149,294	56.55	219,621	40.10	3,368,915	55.07	842,229	4.00
March	3,621,177	58.71	217,950	35.93	3,839,127	56.67	866,620	4.43
April	3,122,418	52.27	230,356	39.22	3,352,774	51.11	781,532	4.29
May	3,104,697	50.34	190,467	31.40	3,295,164	48.64	743,829	4.43
June	3,314,012	55.48	209,868	35.73	3,523,880	53.71	821,417	4.29
July	3,308,029	53.75	256,798	42.43	3,564,827	52.74	806,522	4.42
Aug.	3,965,515	64.29	276,479	45.58	4,241,994	62.62	957,561	4.43
Sept.	4,436,792	74.45	332,676	56.77	4,769,468	72.87	1,114,362	4.28
Oct.	5,626,685	91.22	453,492	74.77	6,080,177	89.75	1,372,500	4.43
Nov.	5,694,788	95.34	452,995	77.12	6,147,783	93.71	1,433,050	4.29
Dec.	5,468,880	88.87	353,134	58.35	5,822,014	86.13	1,317,198	4.42
Total	48,226,070	66.43	3,358,916	47.05	51,584,986	64.70	989,355	52.14

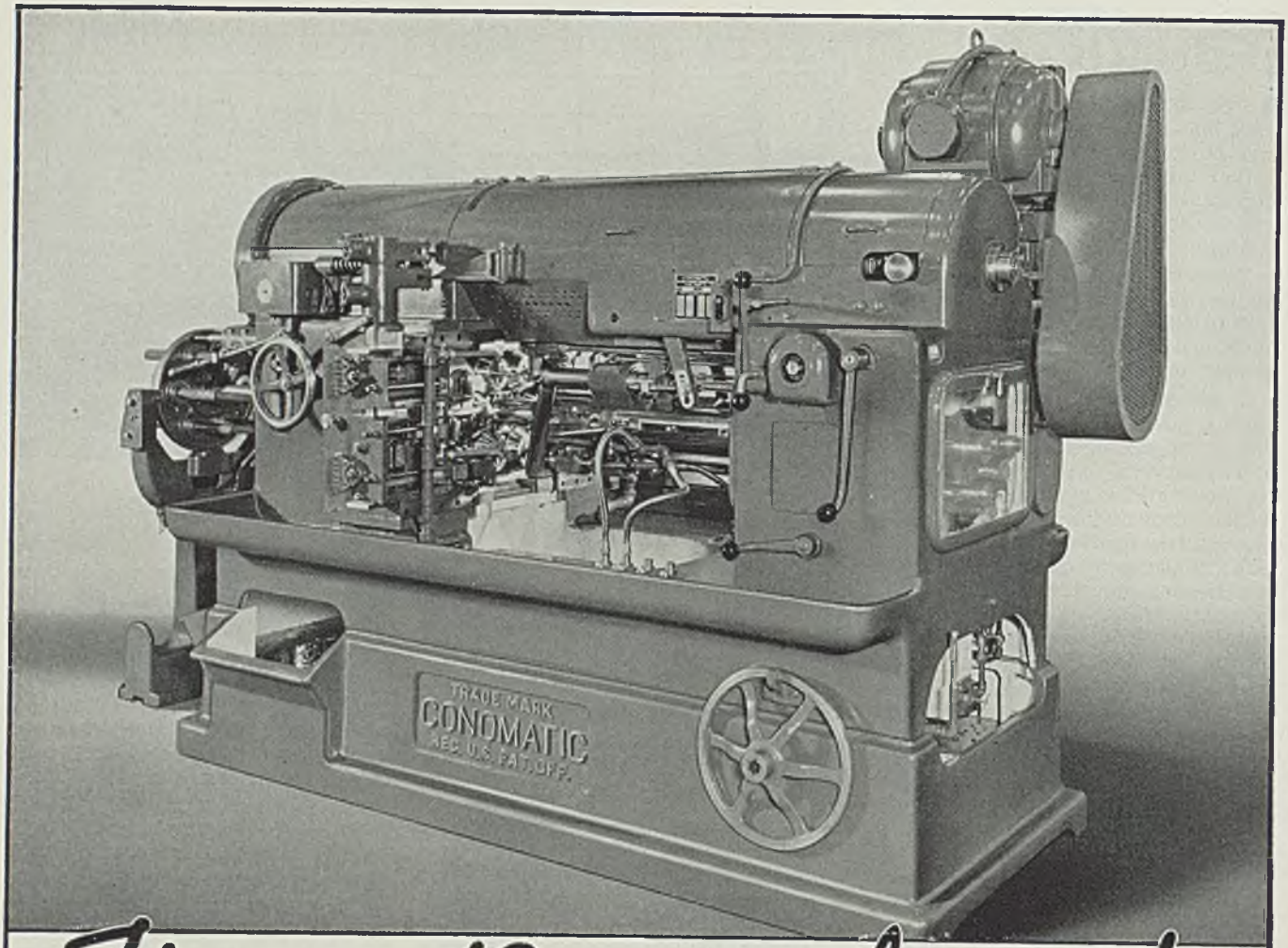
The percentages of capacity for 1939 are calculated on weekly capacities of 1,392,331 net tons open hearth ingots and 136,918 net tons Bessemer ingots, total 1,529,249 net tons; based on annual capacities as of Dec. 31, 1938, as follows: Open hearth ingots, 72,596,153 net tons; Bessemer ingots, 7,138,880 net tons.

The percentages of capacity operated for 1940 are calculated on weekly capacities of 1,402,899 net tons open hearth ingots and 114,956 net tons Bessemer ingots, total 1,517,855 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth ingots, 73,343,547 net tons; Bessemer ingots, 6,009,920 net tons.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Jan. 11	Change	Same week 1940	Same week 1939
Pittsburgh	95.5	None	88	44
Chicago	100	+ 0.5	90.5	49
Eastern Pa.	95	None	82	34
Youngstown	94	+ 2	80	55
Wheeling	91	— 5	89	64
Cleveland	84.5	+ 0.5	85	56.5
Buffalo	90.5	— 2.5	72	44
Birmingham	100	None	94	77
New England	86	+ 1	83	75
Cincinnati	88.5	+ 1.5	74.5	65
St. Louis	87.5	None	75	40
Detroit	94	+ 4	93	87
Average	97	...	86	52



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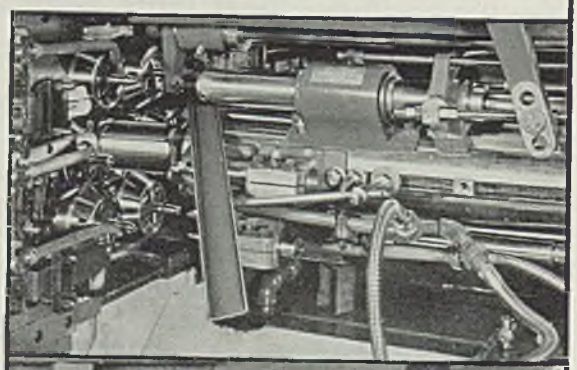
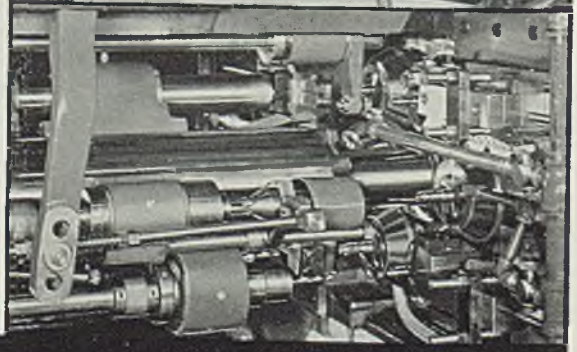




CONE AUTOMATIC MACHINE CO.
WINDSOR, VERMONT, U. S. A.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Machine tool builders link plan to expedite production with request that government set up "orderly delivery schedule based on order of importance" . . . Fifty per cent increase in orders of "critical" defense equipment for delivery in 1940 reported accepted . . . President asserts powers granted OPM are as broad as law permits, declaring he will not interfere . . . Asks increased appropriations, authorizations

WASHINGTON

■ LEADING machine tool builders held a conference here last week in connection with the bottleneck in the industry. Conference heard the charge defense commission "mishandling" in planning priority of production was a major factor delaying delivery of finished planes, guns, shells and tanks. The manufacturers, and officers, directors and defense committee members of the National Association of Machine Tool Builders met at the Carlton hotel.

Three-sided plan for a production speed-up linked with a request to the government for "an orderly delivery schedule based on the order of importance," was discussed. Plan includes:

An effort to utilize every inch of unused plant capacity, particularly among small manufacturers, by stimulating subcontracts for machine tool parts, and even complete machines ordered by the government from companies with a thick backlog of unfilled orders;

Expansion of productive capacity by squeezing additional machinery into existing plants and rushing construction of new buildings, financed by bankable government contracts and certified as vital to defense needs to permit 5-year amortization;

Accelerating training of new skilled workers, plus overtime work where necessary, to throw the entire industry on a 24-hour basis.

Plans for further speeding up machine tool output beyond increases already announced for 1941 were formulated.

F. V. Geier, president of the association, stated at the conclusion of the meeting that December production passed all previous monthly records and that totals would continue to mount throughout 1941.

"On Dec. 27," Mr. Geier said, "the industry sent a letter to Mr. Knudsen advising him it could be expected to turn out machine tools to the value of $650,000,000 in 1941. Today we called upon our members to speed up deliveries even further.

"Members of the industry have pledged themselves to increase production beyond the previous promise to Mr. Knudsen and look to the following methods for accomplishing the result:

"(1) Subcontracting more work to outside concerns: This will bring still more of the country's facilities into prompt production for more machine tools;

"(2) Employing and training more men: The industry has proved its ability to train new men extensively, and will expand this program;

"(3) Further plant expansion as indicated by specific needs;

"(4) Maximum utilization of plants and equipment.

"In his New York speech before the National Association of Manufacturers, Mr. Knudsen said our industry 'has set a very good example of speeding up' and this program is in line with our effort to 'do the impossible again.' "

"Our industry is fully aware of the difficulties of determining defense requirements for machine tools. We have considered it our duty in the past to point out the nation's defense job cannot be done effectively unless we are given definite information as to requirements, so that we shall know what is needed, when it is needed, and where it is needed, in the order of critical importance.

"Members of the industry are very glad to learn definite plans are now under way on the part of the national defense commission to meet our request. We have been assured every effort will be made to define more accurately the actual machine tool requirements for national defense, and we can promise positive assurance such definition will be reflected in specific, immediate programs of accomplishment."

"Critical" Tool Orders Increased 50%

Government orders of "critical" machine tools to be delivered for defense production in 1941 were arbitrarily increased 50 per cent last week. Increase in orders of tools required in manufacture of airplanes, tanks, guns and other war *materiel* was made to meet requests of machine tool manufacturers that more specific and accurate information concerning total requirements of the British and American armament programs be made available.

In reporting the increase, government authorities said that since needs growing out of the European war cannot be accurately determined in advance, it was decided to ask the manufacturers to add 50 per cent to all orders they already had for delivery this year.

The arrangement and the machine tool builders' acceptance of it was described by defense officials as one of the most important steps taken to end "industrial blackouts." The way is now open, it was said, for the industry to proceed with plans for production totaling probably $700,000,000 this year. Previous schedules had estimated pro-

duction in 1941 would aggregate about $600,000,000. Normal output is approximately $150,000,000 per year.

Increase in orders applied only to tools listed as "critical." Included are horizontal and vertical boring machines, radial drills and planers, gear manufacturing machinery and jig boring machines.

Virtually all the large machine tool companies in the United States, about 200, were reported employing two or more shifts per day at present. Increased orders will make necessary overtime work in many instances.

OPM Powers "Broad as Possible" says Roosevelt

Powers granted the new office for production management, headed by William S. Knudsen and Sidney Hillman, defense advisory commission members, are as broad as possible, President Roosevelt asserted last week. He himself, the President declared, would have nothing to do with the OPM except when its members wished to consult him on policy. This, he said, would happen rarely. Executive order issued by Mr. Roosevelt to create the OPM recited authority delegated the new board as follows:

Power to "formulate and execute" all measures to speed arms production and to provide emergency plant facilities;

Power to co-ordinate needs of the army, navy and other government branches with requirements of "foreign governments," which includes Great Britain, China and Greece, and could take in Latin American neighbors;

Power to advise regular government departments on their defense purchasing plans, which may mean virtual control of all defense buying;

Power to take "all lawful steps necessary" to assure an adequate supply of raw materials;

Power to "mobilize" production facilities of the nation;

Power to "stimulate and plan" creation of more production facilities, and to see that existing facilities are used to the utmost;

Power to take over what the President called "rambunctious" factories, if they do not co-operate with national defense;

Power to act as liaison between the old national defense advisory commission and the war and navy departments and power to "perform such other functions as the President may from time to time assign or delegate to it."

OPM will do its work through three subdivisions: Production, headed by John Biggers, glass industry executive, who has been serving the defense commission; purchases, directed by Donald M. Nelson, chain-store executive, in charge of purchasing at the defense commission; and priorities, headed by Edward R. Stettinius, defense commissioner in charge of industrial materials.

Significant was a power given the office for emergency management to "advise and assist the President in discharge of extraordinary responsibilities imposed upon him by any emergency arising out of war, the threat of war, imminence of war, flood, drought, or other condition threatening the public peace and safety."

Steel Priorities Committee Appointment Believed Near

Appointment of a priorities committee and administrator for the steel industry was believed imminent last Friday. Selection of such a committee is understood to have been virtually completed before the President set up the OPM and announcement withheld until the new office and the revised priorities board were established.

Revised priorities board established under the executive order creating the OPM held an organization meeting Friday, with E. R. Stettinius Jr., chairman, presiding. Other members of the new board are Mr. Biggers, Mr. Nelson, and Leon Henderson, defense commissioner in charge of price stabilization. Mr. Knudsen and Mr. Hillman are members *ex officio*.

President Asks "Greatly Increased" Appropriations

There is immediate need for a swift and driving increase in our armament production program the President told congress last week when he discussed the "state of the union" in his annual message.

Mr. Roosevelt told the legislators he is not satisfied with "progress thus far made" in the program. Discussing the progam to this point he said "we are behind schedule in turning out finished airplanes; we are working day and night to solve the innumerable problems and to catch up.

"We are ahead of schedule in building warships; but we are working to get even further ahead of schedule.

"To change a whole nation from a basis of peacetime production of implements of peace to a basis of wartime production of implements of war is no small task. And the greatest difficulty comes at the beginning of the program, when new tools and plant facilities and new assembly lines and shipways must first be constructed before the actual materiel begins to flow steadily and speedily from them."

Again Mr. Roosevelt told congress "new circumstances are constantly begetting new needs for our safety. I shall ask this congress

(*Please turn to Page* 78)

Steel Guards Congressmen Under Weakened Roof

■ Under bare steel girders supporting a weakened roof, members of the United States house of representatives are led in prayer by chaplain on the opening day of the seventy-seventh congress. Soon after, the members settled down to the task of speeding the defense program. NEA photo

Weirton To Build Blast Furnace, Coke Ovens; Other Plants Expand

■ NATIONAL Steel Corp. directors have approved construction of a new blast furnace and 45 coke ovens at Weirton Steel Co., Weirton, W. Va., a subsidiary. Additions will increase pig iron capacity approximately 300,000 tons annually.

Several weeks ago the rebuilding of a blast furnace at Detroit and another at Buffalo, was authorized by National directors (STEEL, Dec. 23, p. 16). The entire program will cost about $15,000,000, increase pig iron capacity 700,000 tons a year.

In addition to blast furnace, coke ovens and auxiliary equipment, the Weirton expansion will include extension to the ore yard, extension or construction of a number of plant buildings, and installation of cranes, power lines and other types of equipment. The Weirton program will increase coke and pig iron capacity by about 40 per cent, and without additions to primary steel producing facilities, add about 240,000 tons a year to ingot capacity. New facilities will be ready for operation late in 1941.

Republic To Install Light Armor Plate Mill, Improve Mines

Substantial addition to the nation's light armor plate capacity will be installed by Republic Steel Corp., Cleveland, at its plant in Massillon, O., and will go into partial operation early in the year. The new mill will absorb three sheet mill buildings, with a total of nearly 300,000 square feet of floor space.

Republic will begin immediately to install equipment for heat treating and cutting, finishing and shaping armor plate. Ultimate capacity of the plant will be reached by late summer.

First installation will consist of 18 new heating furnaces to supplement existing furnaces, presses for straightening armor plate after it has been heat treated, and shaping equipment.

Electric furnace steel for the armor plate mill will be produced in Republic's Canton, O., electric furnace plant, for which the sixth 50-ton electric furnace was recently ordered.

Republic also has announced improvements to be made at its Witherbee-Sherman mines, Mineville, N. Y., and Chateaugay mines, Lyon Mountain, N. Y.

At Witherbee-Sherman, a hoist capable of handling ore from a mile-deep shaft will be installed. Underground workings in the Old Bed and the Harmony mines eventually will be connected, simplifying future developments, transportation, ventilation, drainage, and distribution of materials and supplies.

Completion of these changes will substantially increase ore output which has been about 500,000 tons a year.

At the Chateaugay mine, capacity of the mill will be increased 15 per cent. Main hoisting shaft, now 1900 feet deep, will be extended an additional 650 feet.

When completed, the New York mines and Lake Superior holdings can be developed to adequately supply requirements of Republic's northern plants.

Company recently purchased the Troy blast furnace, Troy, N. Y.

Timken Roller Bearing Co. Installs Fuel Oil System

Timken Roller Bearing Co., Canton, O., is installing a heavy fuel oil system to insure continued operation of equipment used on defense work in case of possible failure of the natural gas supply. System includes a central storage tank of 1,250,000 gallons capacity, sufficient for one month's capacity operations. Provision also is made to pump oil from five freight cars simultaneously into feeder lines leading to two 100,000-gallon distributing tanks. System will cost $250,000, will be completed this month.

Timken also is erecting an additional 200,000-gallon water tank to serve sprinkling system.

Donner-Hanna Plans Coke Works Expansion

Donner-Hanna Coke Corp., Buffalo, controlled jointly by Republic Steel Corp., Cleveland, and National Steel Corp., Pittsburgh, is reported considering a $2,000,000 plant expansion to include 55 new coke ovens and modernization of the by-products units which could make such defense materials as explosives.

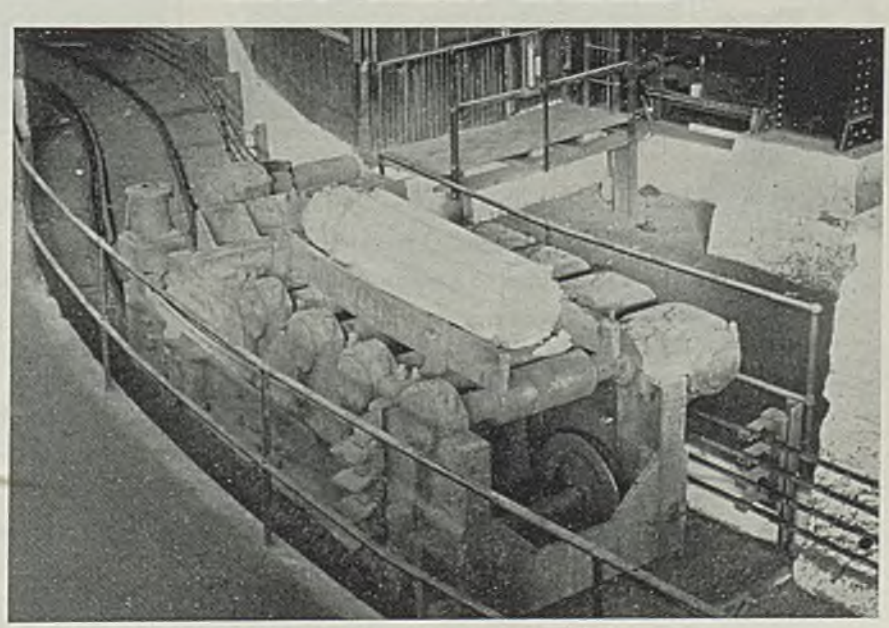
Company has filed an application with the war department to amortize the cost over a five-year period.

Gisholt Machine Will Reopen Long-Idle Plant

■ Gisholt Machine Co., Madison, Wis., will reopen its Northern works in that city to meet defense program demands for turret lathes. Reopening will add 60,000 square feet to manufacturing facilities.

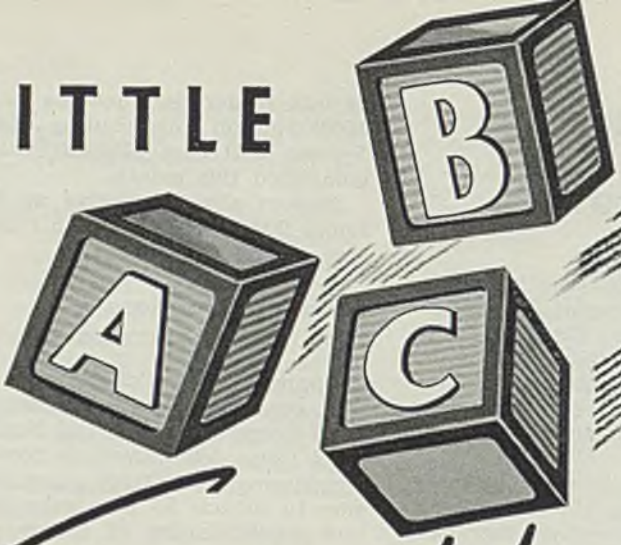
Operations will start in this plant by May 1 and production is expected to be fully under way by mid-year. Work already has started on reconditioning the building, last used in 1930. All necessary machinery and equipment will be installed as soon as the building is ready.

Steel's "Chariot" in Action

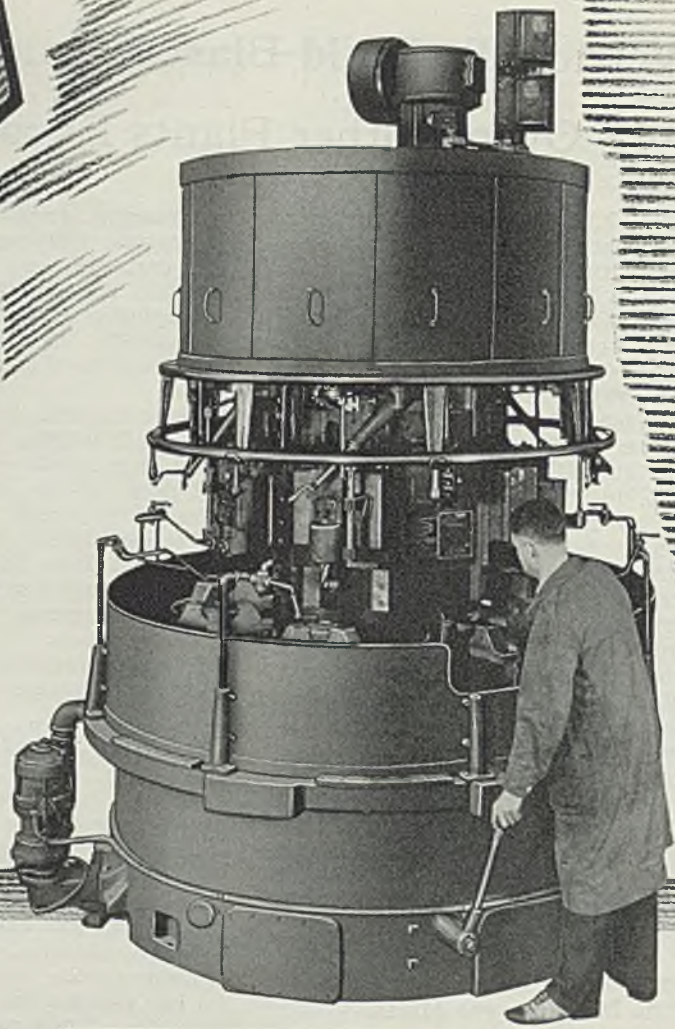


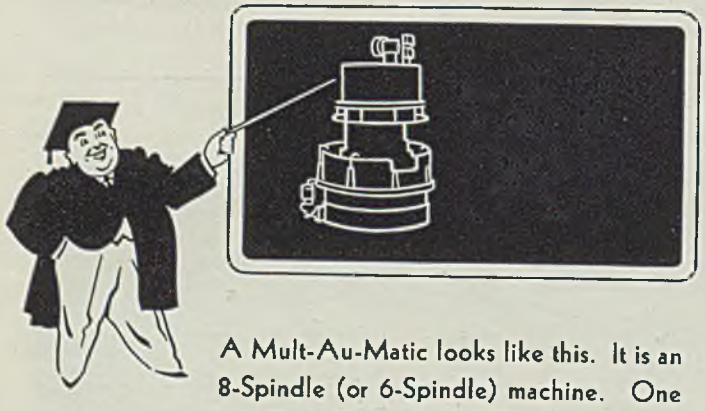
■ At the call of the roller-man when he blows a whistle, this motor-driven buggy receives a white-hot steel ingot at the soaking pits and carries it several hundred feet to the approach-table serving the blooming mill. Arriving there, the rollers under the ingot start up and run it along to the first break-down pass. The carrier then returns to the soaking pits for another ingot; fast action, entirely responsive to remote control. Photo, courtesy Timken Roller Bearing Co.

A LITTLE



Stuff





A Mult-Au-Matic looks like this. It is an 8-Spindle (or 6-Spindle) machine. One spindle is devoted to loading and unloading. *All* the others are working *all* the time. One man can operate it.

If a Mult-Au-Matic had only one work spindle, this is what you would have. It would take eight of them with eight operators and eight times the space to do the same amount of work.

When the economy of the Mult-Au-Matic Method is considered, plus the fact that Bullard experience produces machines capable of unusual sustained accuracy, the reason for their popularity becomes clear as crystal. Current demand has put a heavy load on our plant, even under 24 hours-a-day operation. We are doing our best to meet it.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Mirrors of *MOTORDOM*

By A. H. ALLEN
Detroit Editor, STEEL

Military displays and discussions of aircraft and defense production steal the limelight at the annual convention of automotive engineers . . . Analysis of strategic metals situation in U. S. shows no dire shortages impending. Stockpiling and perfection of workable substitutes point the way in defense emergency . . . 250,000 vehicles for new army by fall . . . "Big three" to supervise three types of bombers

DETROIT

■ FASHIONABLE Washington boulevard in the downtown area bristled last week with modern implements of war as the ordnance department and quartermaster corps displayed their latest wares to visiting members of the Society of Automotive Engineers, here for the society's annual meeting, and to thousands of curious Detroiters. Motorcycles, scout cars, half-tracks, a 12-ton tank, a 3-inch antiaircraft cannon and a wide assortment of motor vehicles, many of them replete with machine guns and cannon, were strange sights in what is normally the Park Row of Detroit.

The program of addresses for the meeting was dominated by military and defense subjects. Army, navy and air corps officials presented papers. A dozen experts recited details of aircraft design and engineering. Sir Louis Beale of the British purchasing commission ably picked up the torch of the late Lord Lothian in outlining British armament needs. Gen. Hugh S. Johnson was a last-minute substitute for W. S. Knudsen, OPM chief, who was scheduled to speak Thursday evening but was forced to cancel the engagement.

An observer could sniff a certain tenseness in the air, a certain grimness over the task which lies ahead of the nation's industries. Speakers addressed their subjects with all the seriousness of a nation hard at war. Throngs pressing around the military vehicles on display in the boulevard examined them minutely and showed surprising familiarity with technical features. Three miles away, in the lobbies of the General Motors building, other crowds pressed around GM military trucks set out for inspection there.

A small boy, sighting along the massive barrel of an aircraft cannon which was pointed ominously skyward shouted to a pal, "Tell me when you see 'em coming."

Looking into the situation of strategic metals in the United States, Dr. H. W. Gillett, Battelle Memorial institute, Columbus, O., pointed out that this country was fortunate in possessing resources of metals far beyond what were available at the time of the last war, but that there were a number of fairly critical elements involved —tungsten, antimony, chromium, tin and manganese.

Three Possible Solutions

Normally these materials are imported over long sea lanes which in time of war might be closed to merchant ships of this country. The solution is three-fold: Build up sufficiently large stockpiles before any emergency arises, develop low-grade domestic ore deposits, or perfect suitable substitutes using domestic metals. In some cases, stockpiling was started months ago, but this is no permanent cure. The matter simmers down to techniques, with mining, metallurgy and chemistry perfecting substitutes, or use of low-grade ores.

Dr. Gillett examined each of the critical elements in turn. With regard to tungsten, 20 per cent of the metal used in this country is not readily replaceable, but 80 per cent is used in high-speed steels, and already it has been found feasible to substitute molybdenum for tungsten in these steels, with no sacrifice of properties and with little difference in price. Heat treatment of the molybdenum high-speeds admittedly is more critical due to the tendency of the steels to develop a soft skin, but new types of controlled-atmosphere furnaces have solved this difficulty.

Chief use of antimony is in storage batteries and it has been found that calcium is a suitable substitute. Furthermore, smelters are being proposed to refine Mexican and Bolivian antimonial ores. There is the additional possibility of reclaiming antimony from defunct batteries.

Chromium finds its chief use in alloy steels, ores coming from South Africa, New Caledonia and Turkey. Low-grade domestic deposits as yet have not proved suitable for reduction, but some interesting experiments have been made with Montana chrome ores, compounded with sodium nitrate, ferrochrome and other materials to produce a thermit or exothermic reaction when added to molten steel.

At this point is may be pertinent to mention suggestions which are rumored to have been made to auto builders that from 1942 models they remove all the bright metal trim and decoration in the interests of conserving chromium. If indeed such a suggestion ever was made at all, it is certainly a short-sighted one. Analysis shows that all the chromium plate on an average car comprises about 4 or 5 ounces at the most, or perhaps 500 tons of chromium for 4,500,000 cars built in a year's time. Far more important is the demand for chromium in alloy steel which in the average car figures to about 1 per cent of the weight of total alloy steel, or roughly 2-3 pounds per car.

Considering that stainless steel

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carries upward of 18 per cent of chromium, it might be a more sensible suggestion for car builders to eliminate stainless steel moldings, trim, etc., in favor of chromium-plated carbon steel, but this suggestion probably would not be received very favorably by the stainless steel producers.

At any rate, it will be a difficult thing to sell any automobiles devoid of bright metal trim so you can be pretty sure the 1942 jobs will have either stainless or chrome plate to match cars of former years.

Some makers patently have overdone the bright metal application, and a more restrained usage would lend better eye-appeal, as well as release a few drams of chromium for defense.

Continuing with Dr. Gillett's discussion of strategic elements, tin is next on the list. He called it one of the most vital metals under consideration and pointed out that stockpiling of Bolivian ores is now under way. Figures on tin consumption show that in 1937 some 90,000 tons was poured into products in this country—39,000 tons for tin plate, 20,000 tons for solder, 6500 tons for babbitt, 6500 tons for bronze and 18,000 tons for miscellaneous uses.

Substitutes Available

Thus, tinplate and solder comprise the two most important uses. Most tin plate goes into cans, and 4000 of the 20,000 tons for solder also is used by the can industry. Dr. Gillett stated that one of the main reasons for the use of tin plate in cans was to facilitate soldering of the side seam and not particularly for providing resistance against corrosion or deterioration of the contents. He suggested it might be possible to weld tin cans, using black steel strip lacquered for protection of the steel. He showed a sample of such a can and claimed it was satisfactory for 90 per cent of the uses of present tinned containers.

Other ways to save on tin might include: Use of lead-silver solder instead of lead-tin for radiators; elimlnate tin in wiping solder by introduction of lead burning; use lead-base instead of tin-base babbitts. Summarizing, the speaker estimated we could get by on one-tenth of the present consumption of tin and still not alter costs appreciably by using substitute metals.

Insofar as manganese is concerned, it was pointed out that each ton of steel produced requires 11 pounds of manganese, thus entailing some 90,000,000 pounds of manganese or 10,000,000 tons of high-grade manganese ore for yearly steel output of 80,000,000 tons. Ferromanganese is now quoted at $100-$125 per ton, comparing with better than $300 per ton during the last war. At a cost of $160-$185 per ton of ferro it is claimed that low-grade manganese ores of domestic ores could be utilized.

Furthermore, flotation processes have yielded high-grade ores from low-grade deposits in Montana, Cuba and Brazil.

Several processes have been developed for processing low-grade manganese ores, chief difficulty being with phosphorus in the ore. A proper combination of equipment, personnel and technique ultimately will provide the best means, in the opinion of Dr. Gillett. Stocks now being built up will handle steelmaking needs for two years which should be ample time for erection of pilot plants and determination of the best and most economical process for handling domestic ores.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

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

Estimated by Ward's Reports

Week ended:	1940	1939†
Dec. 14	125,625	118,405
Dec. 21	125,350	117,705
Dec. 28	82,545	89,365
Jan. 4	76,690	87,510
Jan. 11	115,935	111,330

†Comparable week.

■ QUARTER of a million special vehicles, required by the quartermaster corps for the proposed army of 1,400,000 men, will be delivered by early fall, according to Maj. Gen. E. B. Gregory, quartermaster-general. He told the S.A.E. the army is receiving ten different types of motor vehicles now at a rate of 25,000 a month, and will have 190,000 in service by July 1.

Breakdown of the 250,000 goal called for in the procurement program is as follows: 27,000 motorcycles, 4500 quarter-ton midget trucks, 5900 passenger cars, 3400 ambulances, 69,000 half-ton pickup trucks, 44,000 one-and-a-half ton trucks, 58,000 two-and-a-half ton trucks, 3800 four-ton trucks, 3800 six-ton and heavier trucks, 37,800 two-and-a-half ton truck-tractors with one trailer each.

The quartermaster-general lauded the S.A.E. advisory committee for its work in standardizing parts and accessories. For example, types of storage batteries have been reduced from 29 to five, spark plugs and generators from eight to two, and fan belts from 21 to three.

■ INCLUDED in vast new sums appropriated for airplane engine plant construction is $24,313,150 to Buick for a plant in which to build Pratt & Whitney 14-cylinder double-row 1830-type engines; and $36,799,300 to Studebaker for a plant to build Wright 2600-type engines. The Buick project, confirmed by Flint officials, has been mentioned here before.

The location of the plant has not been determined, although it will be in proximity to other Buick plants in Flint, perhaps adjoining some of them. No announcement has been made as to the extent of the initial contract for engines, either. It should require a minimum of 18 months just to build and equip the plant.

Ford officials, including Edsel Ford, C. E. Sorenson and others, are now on the West Coast in connection with impending arrangements for Ford to supervise manufacture of subassemblies for Consolidated bombing planes, this being one phase of the auto industry's committee for air defense activity. Chrysler will perform similar work for Martin 26 bombers, and General Motors for North American bombers.

Survey of Potential Defense Power Asked

■ Call to manufacturers to survey their plants and men down to the "last ounce of manufacturing power" to discover capacity now unused for defense production, was issued last week by Walter D. Fuller, president, National Association of Manufacturers.

"Factories and facilities, even to every back-alley machine shop, every obscure country foundry, every hole-in-a-corner shop, every employer of two or three or a dozen mechanics who can perform a productive service to the program of defense building which the present 'terrible urgency' demands be done, must be mustered into the service of supply for embattled democracy.

"In order to do this, we are conducting an exhaustive survey of potential defense facilities of the nation. Not a square foot of industrial capacity nor an ounce of manufacturing power should be overlooked.

"The muster must be completed by Jan. 25."

for GEAR PRODUCERS

Another Real Service from Gear Production Headquarters

In keeping with our aim of being of maximum service to gear producers in connection with their gear production problems, we are pleased to announce that a new "Tables" booklet is now ready for distribution.

Included in the 40 pages of useful data in this booklet are:

1. New and simpler hobbing machine change gear formulae and tables.
2. Formulae for checking gears by ball and pin methods.
3. Complete tables of decimal equivalents of fractions.
4. Hobbing speed tables.
5. Formula for checking hobbing time.
6. Descriptions of hob-checking equipment.

A limited number of copies of the new booklet (No. 266-41) are available without charge to gear production men. May we send you your copy? (In writing please give your company connection.)

And this is but *one* of many practical printed aids to gear producers provided by 'Gear Production Headquarters'. Also available are such reference and shop booklets as "Hobbing", "Better Gears", "Gear Finishing", "Gear Cutting Tools",—and our monthly bulletin "Production Highlights". (Are you on the mailing list?)

MICHIGAN TOOL COMPANY

7171 East McNichols Road **Detroit, U. S. A.**

Coke Iron Production in 1940 Nearly Equal to 1929 Record

■ PRODUCTION of coke pig iron and ferroalloys in United States in December totaled 4,542,864 net tons, according to complete returns from operators of the country's 231 potential coke blast furnaces. This is essentially as reported in STEEL, Jan. 6, p. 359, in a compilation which included estimates for the last day or two in December.

Total output in 1940 was 46,894,676 tons, exceeded only by 47,342,605 tons in 1929, the all-time high. Including charcoal and electric furnace iron, the total last year was more than 47,400,000 tons.

Daily average production in December was 146,544 tons, 45 tons less than in November. However, it was 7.6 per cent higher than daily average of 136,119 tons in December, 1939.

For 1940, average daily production was 128,128 tons, nearly 33 per cent more than the average of 96,740 in the preceding year.

Rate of furnace operation in December remained the same as in November, 96.4 per cent. Last month was the first since May, 1940, in which the operating rate failed to increase over the month preceding it. Average rate of furnace operations for 1940 was 84.3 per cent.

Stacks in blast Dec. 31, 1940, with three blown in and three removed from blast in the month, totaled 202, unchanged from the prior month, and highest since October, 1929, when 203 were active. Aggregate production in the latter, however, was 4,018,724 tons, 11.5 per cent less than in December.

Twenty-eight iron producers, aggregating 109 stacks, both merchant and nonmerchant, reported all their furnaces were in blast Dec. 31. Republic Steel Corp., Cleveland; Bethlehem Steel Co., Bethlehem, Pa.; Jones & Laughlin Steel Corp., Pittsburgh; Wheeling Steel Corp., Wheeling, W. Va.; and Interlake Iron Corp., Chicago, were among those which listed all their stacks in blast at the year's end.

Total of coke ferroalloys, spiegeleisen and ferromanganese reported produced last year was 702,903 tons. Ferromanganese amounted to 472,511 tons; spiegeleisen, 230,392 tons.

Two stacks were reported dismantled in 1940. Missouri furnace of Mississippi Valley Iron Co., at St. Louis, and Steelton E stack of Bethlehem Steel Co., at Steelton, Pa., were removed from the list of potential furnaces.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION

(Relation of Production to Capacity)

	1940[1]	1939[2]	1938[3]	1937[4]
Jan.	85.4	51.0	33.6	76.6
Feb.	75.0	53.5	33.6	79.5
March	69.5	56.1	34.2	82.5
April	68.9	49.8	33.4	83.7
May	74.2	40.2	29.4	84.3
June	83.6	51.4	25.5	76.6
July	86.1	55.0	28.2	82.9
Aug.	89.9	62.4	34.8	85.7
Sept.	91.5	69.7	40.5	83.7
Oct.	94.2	85.2	48.0	68.4
Nov.	96.4	90.3	55.0	49.3
Dec.	96.4	88.5	51.4	35.6

[1] Based on capacity of 55,628,060 net tons, Dec. 31, 1939; [2] capacity of 56,222,790 net tons, Dec. 31, 1938; [3] capacity of 56,679,168 net tons, Dec. 31, 1937; [4] first six months on capacity of 55,454,265 net tons, Dec. 31, 1936—last six months on capacity of 55,695,065 net tons, June 30, 1937. Capacities by American Iron and Steel Institute.

MONTHLY IRON PRODUCTION

Net Tons

	1940	1939	1938
Jan.	4,024,556	2,436,474	1,618,245
Feb.	3,304,368	2,307,405	1,463,093
March	3,270,575	2,680,446	1,646,636
April	3,139,043	2,301,965	1,554,569
May	3,497,157	1,923,625	1,412,249
June	3,813,092	2,373,753	1,188,037
July	4,060,513	2,638,760	1,358,645
Aug.	4,234,576	2,979,774	1,674,976
Sept.	4,172,551	3,218,940	1,885,069
Oct.	4,437,725	4,062,670	2,315,599
Nov.	4,397,656	4,166,512	2,561,060
Dec.	4,542,864	4,219,718	2,478,244
Total	46,894,676	35,310,042	21,156,422

DECEMBER IRON PRODUCTION

Net Tons

	No. in blast last day of Dec.	No. in blast last day of Nov.	—Total Tonnages— Merchant	Non-merchant
Alabama	17	18	128,298*	194,565
Illinois	15	16	85,986	306,582
Indiana	18	18	582	521,149
New York	13	13	107,816	196,313
Ohio	46	45	159,174	872,153
Penna.	68	67	134,601*	1,301,951*
Colorado	3	3		
Michigan	5	5		
Minnesota	2	2	25,606*	186,265
Tennessee	1	1		
Utah	1	1		
Kentucky	2	2		
Maryland	6	6		
Mass.	1	1	20,457*	301,366
Virginia	1	1		
West Va.	3	3		
Total	202	202	662,520*	3,880,344*

*Includes ferromanganese and spiegeleisen.

AVERAGE DAILY PRODUCTION

Net Tons

	1940	1939	1938	1937
Jan.	129,825	78,596	52,201	116,327
Feb.	113,943	82,407	52,254	120,800
March	105,502	86,465	53,117	125,385
April	104,635	76,732	51,819	126,956
May	112,811	62,052	45,556	128,083
June	127,103	79,125	39,601	116,304
July	130,984	85,121	43,827	126,501
Aug.	136,599	96,122	54,031	130,677
Sept.	139,085	107,298	62,835	127,604
Oct.	143,152	131,053	74,697	104,450
Nov.	146,589	138,883	85,369	74,929
Dec.	146,544	136,119	79,943	54,319
Ave.	128,128	96,740	57,962	112,642

World Tin Output Up 800 Tons in November

■ World tin production in November is estimated at 21,800 tons, compared with a revised figure of 21,000 tons in October. Total production for first 11 months in 1940 approximates 209,800 tons, compared with 156,200 tons in 11 months, 1939.

United States deliveries totaled 106,139 tons for 11 months last year, an increase of more than 75 per cent over the 60,530 tons in 11 months, 1939. Last year's deliveries include tin acquired for emergency reserve stock.

World stocks of tin, including smelters' stocks and carryovers, increased by 1388 tons during November to 55,278 tons. Stocks Nov. 30, 1939, amounted to 50,607 tons.

Factory Building Costs Advance 13.2 Per Cent

■ Factory building costs continued to rise during the last quarter and now stand at a point 13.2 per cent above the level of a year ago, according to the quarterly index compiled by The Austin Co., Cleveland. Index records the average cost of typical one-story steel frame monitor type plants since 1913, and at 94 is up three points from previous quarter.

"We have not yet seen the peak of construction activity for the defense program," said George A. Bryant, company president. "Problems of getting delivery on materials and the upward trend in prices can be expected to continue.

"In certain sections where construction activity traceable to the defense program has increased to three or four times the normal rate, the limited supply of locally-produced building materials has sent prices up anywhere from 25 to 75 per cent above last spring.

"Because building activity hinges so much on the availability of fabricated structural steel, the premiums now being paid to get deliveries add further to the overall costs reflected in this index. Another factor which accounts for part of the increase is the inevitable advance of labor costs as a result of overtime work on many jobs."

Finished Steel Output 83.7% of Capacity

■ Finished steel made for sale in November amounted to 4,760,948 net tons, 176,440 tons less than in October, according to the American Iron and Steel institute. The decrease was due in part to the shorter month. Output was at the rate of 101.2 per cent of finishing capacity, compared to 102.2 in October.

Production for export was 562,587 tons, or 11.82 per cent of the total. Shipments to other members of the industry for further conversion amounted to 280,953 tons.

Estimated steel finishing capacity, based on a yield from ingots of 68.9 per cent, is 53,946,300 net tons. Production for 11 months was 43,671,187 tons, of which 6,969,339 tons were for export and 2,328,461 tons for further conversion.

In November sheets were the leading item of production, at 1,059,645 tons. Other important groups were: Bars, 837,834 tons; plates, 432,680; shapes, 373,825.

Production of finished products for the 11 months, less shipments for further conversion, was 41,342,726 net tons, representing 83.7 per cent of finishing capacity.

Exports in the 11 months amounted to 15.96 per cent of the total; for the first ten months they had been 16.47, compared to 6 per cent for all of 1939.

Following is a summary of the reports, which started on a monthly basis last April, in net tons:

	Output	Exported	Pct. Exported
April....	3,005,218	371,532	12.37
May.....	3,576,860	476,761	13.33
June	3,802,485	601,668	15.8
July.....	4,173,839	835,385	20.0
Aug.....	4,649,065	1,053,110	22.6
Sept.....	4,446,555	951,555	21.4
Oct.....	4,937,388	783,652	15.87
Nov.....	4,760,948	562,587	11.82

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

November - 1940
revision

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	To Date (11 Months - 1940): Total	To Date: Per Cent of capacity	To Date: Shipments: Export	To Date: Shipments: To members of the industry for conversion into further finished products
STEEL PRODUCTS	Ingots, blooms, billets, slabs, sheet bars, etc.	34	1	xxxxxxx	540,222	xxx	202,502	123,304	5,056,332	xxx	2,372,787	1,071,844
	Heavy structural shapes	8	2	5,205,300	373,825	87.5	36,113	xxxxxxx	2,817,737	59.1	374,070	xxxxxxx
	Steel piling	4	3	328,000	26,988	100.3	1,950	xxxxxxx	194,938	64.9	19,523	xxxxxxx
	Plates—Sheared and Universal	20	4	6,095,450	432,680	86.5	63,991	2,312	3,747,524	67.2	572,186	19,323
	Skelp	8	5	xxxxxxx	91,331	xxx	18,198	41,414	764,660	xxx	163,714	280,099
	Rails—Standard (over 60 lbs.)	4	6	3,647,600	95,813	32.0	11,894	xxxxxxx	1,376,858	41.2	189,103	xxxxxxx
	Light (60 lbs. and under)	6	7	306,800	14,134	56.1	5,731	xxxxxxx	117,007	41.7	44,949	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	118,000	4,144	42.8	892	xxxxxxx	25,253	23.4	4,621	xxxxxxx
	Splice bar and tie plates	15	9	1,300,200	21,746	20.4	939	xxxxxxx	455,022	38.2	9,699	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	495,011	xxx	46,946	50,884	4,298,501	xxx	664,142	339,975
	Concrete reinforcing—New billet	16	11	xxxxxxx	120,777	xxx	14,773	xxxxxxx	1,193,211	xxx	248,803	xxxxxxx
	Rerolling	18	12	xxxxxxx	9,429	xxx	884	xxxxxxx	133,000	xxx	8,860	xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	77,080	xxx	4,073	xxxxxxx	637,836	xxx	20,776	xxxxxxx
	Alloy—Hot rolled	16	14	xxxxxxx	118,535	xxx	11,591	11,287	928,931	xxx	82,096	70,733
	Cold finished	15	15	xxxxxxx	10,246	xxx	961	xxxxxxx	88,458	xxx	4,578	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	6,756	xxx	514	xxxxxxx	93,088	xxx	8,484	xxxxxxx
	TOTAL BARS	54	17	12,389,265	837,834	82.4	79,742	62,171	7,343,025	64.7	1,037,739	410,708
	Tool steel bars (rolled and forged)	15	18	110,220	7,685	85.0	933	xxxxxxx	65,664	65.1	5,913	xxxxxxx
	Pipe and tube—B. W.	13	19	1,851,860	128,400	84.5	7,481	xxxxxxx	1,017,101	60.0	71,836	xxxxxxx
	L. W.	10	20	1,246,340	32,947	32.2	2,540	xxxxxxx	325,822	28.6	30,545	xxxxxxx
	Electric weld	5	21	735,520	22,097	36.6	2,464	xxxxxxx	257,021	38.2	27,832	xxxxxxx
	Seamless	15	22	3,159,840	152,102	58.7	14,303	xxxxxxx	1,631,708	56.4	191,574	xxxxxxx
	Conduit	6	23	151,145	8,657	69.8	142	xxxxxxx	72,267	52.2	1,650	xxxxxxx
	Mechanical Tubing	13	24	554,825	33,220	73.0	3,157	xxxxxxx	273,446	53.8	22,607	xxxxxxx
	Wire rods	18	25	xxxxxxx	107,394	xxx	14,334	19,738	1,120,025	xxx	320,702	174,939
	Wire—Drawn	37	26	2,255,210	165,548	89.5	11,822	1,392	1,387,121	67.2	155,580	11,022
	Nails and staples	19	27	1,091,690	60,656	67.7	3,265	xxxxxxx	577,053	57.7	54,947	xxxxxxx
	Barbed and twisted	16	28	438,270	17,924	49.8	4,518	xxxxxxx	192,261	47.9	47,871	xxxxxxx
	Woven wire fence	15	29	772,790	14,874	23.5	131	xxxxxxx	207,584	29.3	1,943	xxxxxxx
	Bale ties	11	30	119,050	3,925	40.2	29	xxxxxxx	63,546	58.3	294	xxxxxxx
	All other wire products	5	31	27,030	409	18.4	-	xxxxxxx	4,867	19.7	-	xxxxxxx
	Fence posts	13	32	147,485	4,006	33.1	15	xxxxxxx	49,965	37.0	862	xxxxxxx
	Black plate	12	33	653,295	24,090	44.9	4,141	73	316,631	52.9	43,094	56,084
	Tin plate—Hot rolled	9	34	1,201,960	22,572	22.9	356	xxxxxxx	404,514	36.8	75,132	xxxxxxx
	Cold reduced	10	35	2,930,860	177,529	73.8	9,402	xxxxxxx	2,081,921	77.6	308,751	xxxxxxx
	Sheets—Hot rolled	26	36	xxxxxxx	584,715	xxx	34,914	12,540	5,163,064	xxx	476,733	144,618
	Galvanized	16	37	xxxxxxx	147,142	xxx	10,629	xxxxxxx	1,395,551	xxx	145,138	xxxxxxx
	Cold rolled	18	38	xxxxxxx	267,525	xxx	4,652	xxxxxxx	2,181,858	xxx	69,689	xxxxxxx
	All other	15	39	xxxxxxx	60,263	xxx	1,594	xxxxxxx	539,734	xxx	21,724	xxxxxxx
	TOTAL SHEETS	27	40	13,255,610	1,059,645	97.4	51,789	12,540	9,280,207	76.5	713,284	144,618
	Strip—Hot rolled	24	41	3,525,110	155,967	52.9	7,709	18,009	1,370,178	42.5	81,944	159,824
	Cold rolled	35	42	1,313,360	83,076	77.1	1,173	xxxxxxx	701,644	58.4	15,824	xxxxxxx
	Wheels (car, rolled steel)	5	43	424,385	17,305	49.7	45	xxxxxxx	171,777	44.2	2,529	xxxxxxx
	Axles	5	44	472,280	14,037	36.2	434	xxxxxxx	94,211	21.8	2,319	xxxxxxx
	Track spikes	11	45	327,275	7,948	29.6	360	xxxxxxx	97,312	32.5	3,903	xxxxxxx
	All other	3	46	9,100	218	29.2	12	xxxxxxx	8,987	107.9	12	xxxxxxx
	TOTAL STEEL PRODUCTS	134	47	xxxxxxx	4,760,948	xxx	562,587	280,553	43,671,187	xxx	6,969,339	2,328,461
	Estimated total steel finishing capacity based on a yield from ingots of 68.9 %	-	48	53,946,300	xxxxxxx	101.2	xxxxx	xxxxxxx	xxxxxxx	83.7	xxxxxxx	xxxxxxx
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	26	49	xxxxxxx	595,351	xxx	7,180	206,776	5,398,328	xxx	491,061	1,507,997
	Ingot moulds	4	50	xxxxxxx	60,456	xxx	81	xxxxxxx	449,952	xxx	4,451	xxxxxxx
	Bars	10	51	160,600	3,139	23.8	-	56	29,530	20.1	364	1,772
	Pipe and tubes	3	52	109,377	4,649	51.8	158	xxxxxxx	39,535	39.5	1,008	xxxxxxx
	All other	3	53	71,180	1,693	29.0	347	-	11,607	17.8	2,523	2,326
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	12	54	276,247	9,481	41.8	505	56	80,672	31.9	3,895	4,098

Total number of companies included..... 153

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current month 4,479,995 *N.T.;* 101.2 *% of Finishing Capacity.*
To date 41,342,726 *N.T.;* 83.7 *% of Finishing Capacity*
The above tonnages represent 68.9 *% of the ingots produced by companies whose products are included above.*

November Export, Import Tonnage at Low Level

■ November steel and iron exports, scrap excluded, totaled 713,827 gross tons, valued at $42,863,811, a decline of 15.7 per cent in quantity and 9.3 per cent in value from the October total of 846,584 tons, valued at $47,244,586. This was the third consecutive monthly decline, according to the metals division, department of commerce. In November, 1939, exports totaled 332,899 tons, valued, at $22,791,622. Total for eleven months was 7,050,362 tons, valued at $432,091,928, roughly three times as great in quantity and value as in the comparable period in 1939, when they were 2,104,967 tons, valued at $150,896,242.

The United Kingdom continued the chief export market, though taking less iron and steel than in October. Its November purchases were 400,953 tons, 56 per cent of total exports. Canada was second with 83,946 tons, Union of South Africa third with 34,297 tons, followed by Netherlands Indies, 19,657 tons and Brazil with 19,240 tons.

Nonalloy ingots, blooms and other semifinished steel was the largest export item, 226,437 tons, of which 206,202 tons went to the United Kingdom, 11,347 tons to Canada and 3811 tons to Japan. Alloy semifinished steel was second with 58,404 tons, 52,083 tons going to the United Kingdom and 6312 tons to Canada.

Imports of iron and steel, other than scrap, in November totaled 728 gross tons, valued at $165,009, a new low in the modern record of foreign trade. This was only about 20 per

IRON AND STEEL FOREIGN TRADE STATISTICS

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Nov. 1940	Oct. 1940	Jan. through Nov. 1940
Pig Iron	27,838	48,426	484,615
Ferromanganese and spiegeleisen	246	787	12,833
Other ferroalloys	1,579	3,250	21,844
Ingots, blooms, etc.:			
Not containing alloy	226,437	208,461	2,024,969
Alloy, incl. stainless	58,404	110,632	236,982
Steel bars, cold fin.	15,669	9,310	53,765
Bars, iron	788	689	12,935
Bars, concrete	8,275	6,578	120,854
Other steel bars:			
Not containing alloy	37,950	51,250	439,410
Stainless steel	297	86	1,318
Alloy not stainless	2,062	13,113	37,310
Wire rods	22,169	31,253	270,804
Boiler plate	983	1,137	10,274
Other plates, not fab.			
Not containing alloy	54,440	51,933	493,071
Stainless steel	45	9	452
Alloy not stainless	3,066	332	5,226
Skelp, iron or steel	21,547	32,009	138,249
Sheets, galv. iron	566	273	8,593
Sheets, galv. steel	9,907	10,548	142,620
Sheets, "black" steel:			
Not containing alloy	42,706	30,913	427,729
Stainless steel	148	123	1,609
Alloy not stainless	1,232	3,715	9,060
Sheets, black iron	1,174	652	24,600
Strip steel, cold-rolled:			
Not containing alloy	10,069	4,535	56,983
Stainless steel	26	97	631
Alloy not stainless	24	32	478
Strip steel, hot-rolled:			
Not containing alloy	8,788	11,787	124,034
Stainless steel	23	81	206
Alloy not stainless	124	39	1,049
Tin plate, taggers' tin	13,809	18,453	361,926
Terne plate (incl. long ternes)	298	542	5,593
Tanks, except lined	2,928	3,987	28,861
Shapes, not fabricated	36,524	55,187	366,733
Shapes, fabricated	5,587	6,801	66,126
Plates, fabricated	3,163	5,401	22,152
Metal lath	228	123	1,389
Frames and sashes	83	213	1,847
Sheet piling	616	997	11,841
Rails, 60 lbs.	15,362	20,097	183,290
Rails, under 60 lbs.	3,893	6,903	31,450
Rails, relaying	64	2,968	17,582
Rail fastenings	956	1,035	9,541
Switches, frogs, crsgs.	227	240	2,756
Railroad spikes	568	432	4,440
Railroad bolts, nuts, etc.	315	442	3,081
Boiler tubes, seamless	3,140	2,028	22,391
Boiler tubes, welded	224	103	1,899
Pipe:			
Seamless casing and oil-line	11,539	31,587	137,686
Do., welded	1,721	1,881	30,893
Seamless black	2,364	1,538	27,977
Pipe fittings:			
Mall.-iron screwed	352	423	4,619
Cast-iron screwed	157	103	2,323
Pipe and fittings for:			
Cast-iron pressure	3,156	5,803	49,035
Cast-iron soil	496	595	15,918
Pipe, welded:			
Black steel	5,863	2,671	38,746
Black wrought-iron	737	900	8,157
Galvanized steel	6,191	4,394	50,372
Galv. wrought-iron	855	727	7,766
All other pipe, fittings	1,354	1,067	14,052
Wire:			
Plain iron or steel	4,726	6,385	80,475
Galvanized	6,963	5,345	59,605
Barbed	4,125	7,014	39,142
Woven-wire fencing	366	430	4,143
Woven-wire sc'n cloth:			
Insect	57	64	717
Other	306	211	2,244
Wire rope and cable	1,273	1,113	10,783
Wire strand	223	37	1,364
Electric welding rods	470	587	3,962
Card clothing	2	3	16
Other wire	1,343	1,802	15,401
Wire nails	2,952	2,201	46,294
Horseshoe nails	263	162	1,279
Tacks	65	65	755
Other nails, staples	558	336	4,881
Ordinary bolts, machine screws	4,619	5,286	30,480
Castings:			
Gray iron (incl. semisteel)	552	540	4,526
Malleable iron	241	185	2,235
Steel, not alloy	164	268	1,909
Alloy steel, incl. stainless	98	174	1,405
Car wheels, tires, axles:			
Wheels and tires	1,586	1,722	13,418
Axles, no wheels	235	106	1,792
Axles, with wheels	58	323	1,295
Horseshoes and calks	36	5	307
Forgings, n.e.s.:			
Not containing alloy	3,023	2,398	25,744
Alloy, incl. stainless	171	131	3,222
Total	713,827	846,584	7,050,362
Scrap, iron and steel	73,809	258,482	2,725,583
Scrap, tin plate	25	...	2,866
Tin plate circles, strips, cobbles, etc.	396	324	3,969
Waste-waste tin plate	97	120	5,588
*Terne plate clippings and scrap	22	...	15,102
Total scrap	74,349	258,926	2,753,108
GRAND TOTAL	788,176	1,105,510	9,803,470
Iron ore	127,741	209,408	1,385,792

*New class.

U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

	1940		1939	
	Exports	Imports	Exports	Imports
Jan.	583,521	8,274	362,672	27,664
Feb.	671,301	6,740	359,690	19,149
Mar.	663,980	5,096	474,360	25,369
April	612,906	6,674	394,008	44,083
May	783,964	7,759	532,641	28,142
June	936,047	5,505	588,856	32,587
July	1,034,938	3,542	513,664	30,851
Aug.	1,402,075	2,105	477,078	28,328
Sept.	1,221,052	2,598	575,613	29,874
Oct.	1,105,510	3,966	591,856	19,189
Nov.	788,176	980	605,555	15,216
Dec.	.....	.....	600,437	14,709
Total	.....	.....	6,076,429	315,161

ORIGIN OF NOVEMBER IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore
Spain	5,500	...	.....
Canada	28,486	98	.....
Mexico	219	...	52
Cuba	11,400	...	10,508
Chile	165,200	...	.....
Newfoundland	10,670	...	.....
Brazil	7,650	...	7,840
South Africa	.....	...	6,386
Netherlands Indies	.....	...	227
British India	.....	...	13,750
Soviet Russia	.....	...	1,152
Philippine Is.	.....	...	180
Gold Coast	.....	...	18,024
Total	229,125	98	58,119

	Sheets, skelp and sawplate	Structural steel	Steel bars
United Kingdom	1	6	1
Canada	3	...	...
Sweden	...	...	52
Total	4	6	53

U. S. IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Nov. 1940	Oct. 1940	Jan. 1940
Pig iron	98	590	10,242
Sponge iron	.....	.....	610
Ferromanganese (1)	.....	42	8,572
Spiegeleisen	26	2,714	11,953
Ferrochrome (2)	.....	.....	1
Ferrosilicon (3)	82	101	1,191
Other ferroalloys (4)	8	.....	223
Steel ingots, blooms, etc.	.....	.....	3
Billets, solid or hollow	.....	.....	437
Concrete reinforc. bars	.....	.....	8
Hollow bar, drill steel	1	15	871
Bars, solid or hollow	53	1	1,852
Iron slabs	.....	.....	.....
Bar iron	4	.....	198
Wire rods	.....	.....	3,986
Boiler and other plate (including skelp)	1	2	13
Sheets, skelp, saw plate	4	1	120
Die blocks, blanks, etc.	.....	.....	12
Tin plate, taggers' tin and terneplate	11	15	115
Structural shapes	6	.....	716
Sashes and frames	10	.....	26
Sheet piling	.....	.....	.....
Rails and track material	1	138	1,584
Cast-iron pipe, fittings	.....	.....	419
Mall. iron pipe fittings	.....	.....	29
Welded pipe	82	.....	113
Other pipe	140	32	2,857
Cotton ties	.....	.....	13
Other hoops and bands	.....	10	611
Barbed wire	.....	.....	86
Round iron, steel wire	5	.....	888
Teleg., telephone wire	1	.....	1
Flat wire, steel strips	105	.....	2,160
Wire rope and strand	13	16	519
Other wire	.....	.....	1
Nails, tacks, staples	1	1	109
Bolts, nuts, and rivets	1	.....	130
Horse and mule shoes	.....	.....	3
Castings and forgings	75	46	589
Total	728	3,724	51,261
Iron and steel scrap	252	242	1,978
GRAND TOTAL	980	3,966	53,239

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

cent as large in volume as the 3724 tons, valued at $196,854, imported in October and only about 5 per cent of the 14,379 tons, valued at $1,005,774, imported in November, 1939.

Cumulative imports for 11 months this year total 51,261 tons, valued at $5,890,441, only 18.8 per cent in volume and 28 per cent in value of the 272,227 tons, valued at $21,135,399, brought in during the comparable period in 1939.

Canada was the principal source of supply in November, 355 tons, Sweden second with 295 tons and the United Kingdom third with 61 tons.

Scrap imports totaled 252 tons, valued at $3519, comparing with 242 tons, valued at $3351, in October. Honduras contributed 149 tons, Mexico 99 tons, Canada four tons.

Scrap Exports Sharply Reduced by License

■ Scrap exports in November, the first full month under license, totaled only 74,349 gross tons, valued at $1,303,814, compared with 258,926 tons, valued at $4,650,299 in October and 272,656 tons, valued at $5,173,374 in November, 1939. For eleven months scrap exports were 2,753,108 tons, valued at $47,012,303, approximately 18 per cent less in volume and 9 per cent in value than the 3,371,025 tons, valued at $51,746,059, exported in the comparable portion of 1939.

Of November iron and steel exports, 35,709 tons went to Canada, 33,971 tons to the United Kingdom and 2685 tons to Honduras. Japan toook all the 25 tons of tin plate scrap exported in November. China took 366 tons of tin plate cobbles, circles, etc., 56 tons of waste-waste tin plate and 22 tons of terne plate.

FTC Issues Complaint Against Wire Rope Group

■ Wire Rope and Strand association, Washington, three of its officers and 16 member companies manufacturing about 95 per cent of this country's wire rope, have been charged with "unlawful agreement, combination and conspiracy to eliminate competition" in a complaint issued by the federal trade commission.

According to the complaint, the association, organized to meet requirements of the national industrial recovery act, continued to function after that act was declared unconstitutional. Complaint alleges that to the extent the respondent association members act collusively and collectively in the pricing and distribution of wire rope, they are in a position to dominate and control the prices at which this product must be purchased by distributors, dealers, users, including federal, state and local governments.

Complaint further charges the association members have fixed and maintained uniform delivered prices, terms and conditions, and have maintained a uniform method of computing net delivered prices. Respondents, the commission charges, divided the country into basing point areas so that purchasers in each area get the same delivered prices regardless of distance from manufacturers.

Respondent officers of the association are: Harry J. Leschen, St. Louis, president; George S. Whyte, Kenosha, Wis., chairman of the board, and George P. Lamb, Washington, executive secretary.

Respondent manufacturer members are: American Chain & Cable Company Inc., New York; American Steel & Wire Co., Cleveland; Bethlehem Steel Co., Bethlehem, Pa.; Broderick & Bascom Rope Co., St. Louis; Columbia Steel Co., San Francisco; E. H. Edwards Co., San Francisco; A. Leschen & Sons Rope Co., St. Louis; MacWhyte Co., Kenosha, Wis.; Pacific Wire Rope Co., Los Angeles; Rochester Ropes Inc., Jamaica, Long Island, N. Y.; John A. Roebling's Sons Co., Trenton, N. J.; Union Wire Rope Corp., Kansas City, Mo.; Upson-Walton Co., Cleveland; Wickwire-Spencer Steel Co., New York; Wire Rope Corp. of America Inc., New Haven, Conn., and Wire Rope Manufacturing & Equipment Co., Seattle.

Conference Board Revises Inventories, Orders Data

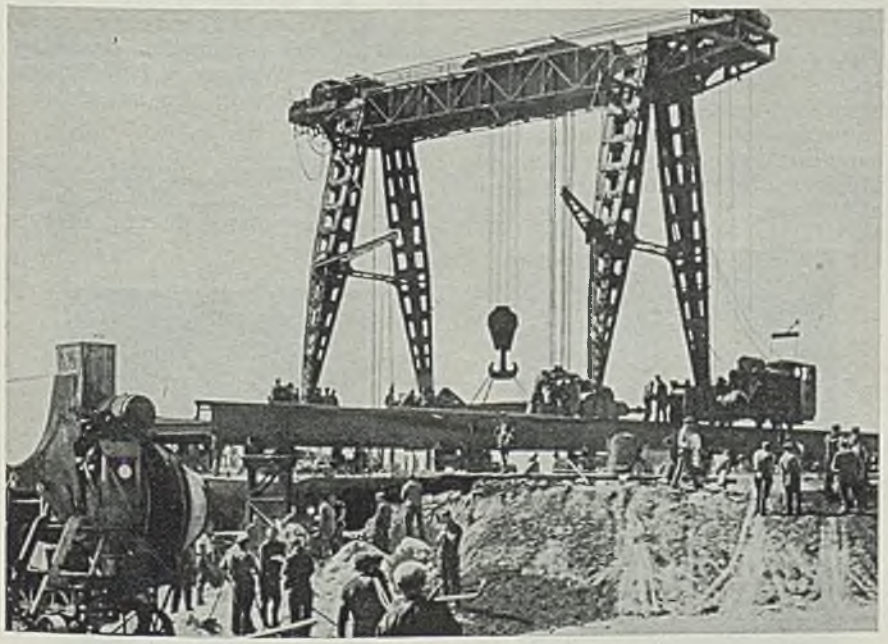
■ Manufacturers' inventories still are slightly below the 1937 peak, in value, although new orders are at the highest level on record. In relation to value of shipments, inventories are low, and, at the moment, there is a greater possibility that shortages will develop in certain lines than that over-expansion will occur in stocks of goods held by manufacturers.

These are conclusions of National Industrial Conference board statisticians after revising indexes on inventories, shipments and orders, 1929-1940, to take into account a considerable increase in the number of co-operating companies.

Revised data show that since July, 1939, last month before the "war boom" began, increases for the three factors have been: Inventories, 21 per cent; shipments, 46 per cent; and new orders, 91 per cent.

Indexes and data on inventories, shipments and order first were published by the board about a year ago. Since the service was inaugurated many additional companies have reported data and some trade associations are collecting and reporting the information for their industries. The wide coverage has made possible a breakdown of durable and nondurable goods, seasonal adjustment; and analysis of unfilled orders is being undertaken. The board warns, however, that despite the increased coverage, certain blind spots still exist and that the data must be considered tentative.

Nazis Extending Channel Coast Fortifications



■ Crane hoists steel girder into position as a support for one of the huge gun emplacements being built by the Germans along the channel coast facing England. Nazis report their line of fortifications now extends for 620 miles along the channel from where "Big Berthas" shell the island and attack British shipping.
NEA photo

MEN of

R. G. Glass

O. T. Barnett

■ **RICHARD M. MARSHALL,** heretofore vice president and secretary, Woodward Iron Co., Birmingham, Ala., has been elected executive vice president, Pittsburgh Coke & Iron Co., Pittsburgh. He succeeds the late Albert P. Meyer. Mr. Marshall will take over his new duties about Jan. 15. Before becoming associated with Woodward in 1935, he was vice president and general manager, Sloss-Sheffield Steel & Iron Co.

♦

Robert G. Glass has been promoted to assistant manager of operations, Chicago district, Carnegie-Illinois Steel Corp. The past four years he has been assistant to manager. A graduate of Ohio State university, Mr. Glass has been associated with Carnegie-Illinois since 1912.

♦

E. F. Weinheimer has been made assistant sales manager, Ironton Fire Brick Co., Ironton, O.

♦

E. L. Harcourt is no longer associated with Hiram Swank's Sons, Johnstown, Pa.

♦

Charles W. Cristal has been appointed sales manager, electrical construction department, Dingle-Clark Co., Cleveland.

♦

D. C. Mills has been appointed assistant to W. F. Ames, manager of compensation and safety, Bethlehem Steel Co., Bethlehem, Pa.

♦

V. R. Hawthorne, secretary of the mechanical division, Association of American Railroads, with headquarters in Chicago, has been promoted to the newly created post of executive vice chairman of the division. **A. C. Browning,** assistant to the secretary, has been advanced to secretary of the division.

♦

Edward D. Gangwere, for 37 years associated with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and since 1937 employed in the works equipment, inspection and test department, has been promoted to director of equipment.

♦

Orville T. Barnett has joined the welding electrode department of Metal & Thermit Corp., New York, as engineer of tests. A graduate of Armour Institute of Technology in chemical engineering, Mr. Barnett was formerly associated with the Carnegie-Illinois Steel Corp., and later with Black, Sivalls & Bryson Inc., Oklahoma City, Okla.

♦

W. L. Beaudway has been named executive vice president, Chicago Malleable Castings Co., Chicago, and **J. T. Llewellyn II** has been made vice president.

♦

Gerald B. Duff, 68 Clinton avenue, Newark, N. J., has been appointed exclusive sales engineer in the Newark and New York territory for Despatch Oven Co., Minneapolis.

♦

F. J. Griffiths has retired as executive vice president, Copperweld Steel Co., but continues as director and consultant. He joined the company in 1939 and had been in charge of organizing its alloy steel division at Warren, O. Before that he was president of Griffiths-Bowman Engineering Co. From 1914 to 1926 he was associated with Central Steel Co. in positions ranging from general superintendent to president. Subsequently he became chairman of the board, Central Alloy Steel Corp., and president of Republic Research Corp. and Timken Steel & Tube Co. He is a director, Eaton Mfg. Co. and Graphite Bronze Co., Cleveland, and Aetna-Standard Engineering Co., Youngstown, O.

♦

Carl W. Pierce, Sharon, Pa., has retired as open-hearth metallurgist at the Farrel works of Carnegie-Illinois Steel Corp., after serving 40 years with the corporation and its predecessors.

♦

Charles E. Wilson was elected president, General Motors Corp., Detroit, at a meeting of directors Jan. 6. Mr. Wilson had been acting president of the corporation since last June when William S. Knudsen retired to assist in the national defense program.

♦

R. C. Wietersen, formerly associated with Hercules Motors Corp., has been appointed director of pur-

F. J. Griffiths

R. C. Wietersen

INDUSTRY

C. T. Hapgood

R. C. Garvey

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chases, National Supply Co., Superior Engine division, with offices at Springfield, O., and Philadelphia.

♦

Matthew Townsend, superintendent of the melt shop, Atha works, Crucible Steel Co. of America, New York, has become associated with the Warren, O., steel division of Copperweld Steel Co. as general superintendent.

♦

Eric B. Vesey has been named general purchasing agent, General Motors of Canada Ltd. He succeeds the late Robert J. MacFarlane. Mr. Vesey's first association with General Motors was with the export division in 1927.

♦

Dr. E. J. Fithian, one of the founders of Bessemer Gas Engine Co., Grove City, Pa., which later was merged into the Cooper-Bessemer Corp., has retired as chairman of the board of Cooper-Bessemer but will continue as a director.

B. B. Williams, the past 20 years president of Cooper-Bessemer, has been made chairman of the board, succeeding Mr. Fithian. **C. B. Jahnke,** vice president and general manager, has been elected president, general manager and a member of the executive committee.

♦

C. T. Hapgood and **R. C. Garvey** have been appointed assistant district sales managers at Los Angeles and San Francisco, respectively, by Jones & Laughlin Steel Corp., Pittsburgh. Mr. Hapgood joined Jones & Laughlin in 1930 as an inspector in the Aliquippa tube mills. Mr. Garvey joined the company in 1937.

♦

Milton G. Englert, associated with Jones & Laughlin Steel Corp. since 1936, has been appointed sales representative at Milwaukee, under direction of the Chicago district sales office. Since 1939 he had been with the Boston sales office.

♦

H. O. Edoff has become sales manager of the Springfield, Mass., branch office of Graybar Electric Co. Inc., New York. **J. P. Lawton** has been named manager of Graybar's Des Moines, Iowa, branch. He will have as his assistant **L. E. Williamson,** service supervisor.

♦

Dr. George A. Campbell has been awarded the Edison medal for 1940 by the American Institute of Electrical Engineers, New York, "in recognition of his distinction as scientist and inventor and for his outstanding original contributions to the theory and application of electric circuits and apparatus." The medal will be presented to Dr. Campbell at the winter convention of the institute in Philadelphia, Jan. 27-31.

♦

Lyle C. Harvey, president and general manager, Bryant Heater Co., Cleveland, has been elected to the newly created post of second vice president, Association of Gas Appliance and Equipment Manufacturers, New York. Mr. Harvey is also a director, Dresser Mfg. Co., Bradford, Pa., and chairman of the association's committee on laboratory activities.

♦

Dr. J. V. N. Dorr, president, Dorr Co. Inc., was presented with the Perkin medal, awarded annually by the American section of the Society of Chemical Industry, for valuable work in applied chemistry, at a meeting at the Chemists' club, New York, Jan. 10.

♦

J. C. Schmidtbauer, northwestern district manager of Westinghouse Electric Supply Co., Chicago, has been elected a vice president. He will continue to have headquarters in Chicago and will act as consultant to J. H. Fisher, the new manager.

♦

Homer B. West has been named manager of manufacturing, transformer division, Westinghouse Electric & Mfg. Co., Sharon, Pa., while **A. R. Rutter** has been made assistant manager of the engineering department of Westinghouse meter division at Newark, N. J.

♦

J. K. Bybee, formerly with the Indianapolis office of Ampco Metal Inc., Milwaukee, has been placed in charge of the Michigan territory, with headquarters in Detroit. **E. A. Svoboda** of the Chicago office has been transferred to Indianapolis;

B. B. Williams

C. B. Jahnke

W. B. McKenzie, recently of Ampco's Buffalo office, has been promoted to the Chicago office, while **A. J. Reynolds,** previously at Boston, has also been transferred to Chicago. **H. R. Gordon** now is representative in New England states, with headquarters at Boston, and **Frank P. Gey** has been assigned to the Pittsburgh territory.

♦

D. A. Wallace, president, Chrysler division, Chrysler Corp., Detroit, has been named by the American Society of Tool Engineers to represent that organization on the committee dealing with the classification and designation of surface qualities of the American Standards association.

♦

Harrison Dixon, the past seven years sales metallurgical engineer, Electro Alloys Co., Elyria, O., has become assistant general manager, Park Chemical Co., Detroit. A graduate of the University of Michigan, he was for one year associated with General Motors Research Corp., six years with Crucible Steel Co. of America, and one year with New Jersey Zinc Co.

♦

Dr. Howard T. Hovde, assistant professor of marketing, Wharton School of Finance, University of Pennsylvania, Philadelphia, was elected president of the American Marketing association at the organization's annual meeting at the Stevens hotel in Chicago, recently. He succeeds Dr. Donald R. G. Cowan, director of commercial research, Republic Steel Corp., Cleveland.

♦

Dr. George W. Taylor, associate professor of industry, University of Pennsylvania, specializing in labor law and labor relations, has been selected permanent umpire under the terms of the agreement between General Motors Corp. and the UAW-CIO. Dr. Taylor succeeds Dr. Harry A. Millis who served as umpire until his appointment as chairman of the national labor relations board in December. Dr. Taylor will make his headquarters in Detroit.

♦

Alfred W. Thompson, vice president and general manager, Ludlow Valve Mfg. Co. Inc., Troy, N. Y., has been elected president. He succeeds **Livingston W. Houston,** who has become chairman of the board. **Harry Hoffman** has been elected vice president.

♦

D. S. Mix has been assigned responsibility for media and publishers relations, General Electric Co., Schenectady, N. Y. He succeeds the late F. R. Davis. Since 1932 Mr. Mix has devoted his time to publicity department training programs, personnel, and special assignments, which he will continue to handle.

MEETINGS

Conference Board Will Discuss Defense Problems

■ NATIONAL Industrial Conference board's evening meeting Jan. 23, at the Waldorf-Astoria, New York, will be devoted to discussion of problems of business policy and the defense program. Session will follow an informal dinner starting at 6 p. m. During the afternoon of the same day will be four simultaneous round-table discussions on the following subjects: "Developments in International Economic Relations"; "Defense Mobilization of Industry"; "Current Fiscal and Financial Problems"; and "Problems of Wage Adjustment."

Pittsburgh Traffic Club To Hear M. V. Clement

M. V. Clement, president, Pennsylvania railroad, will be the principal speaker at the fortieth annual dinner of the Traffic Club of Pittsburgh, William Penn hotel, Pittsburgh, Jan. 24.

Will Speak on Galvanized Coatings and Prefluxes

R. W. Sandelin, metallurgist, Atlantic Steel Co., Atlanta, Ga., will discuss the "Influence of the Base Metal on Hot Dip Galvanized Coatings" and R. J. Kepfer, research chemist, E. I. du Pont de Nemours & Co., Cleveland, "Galvanizing Preflux Solutions" at the annual meeting of the American Hot Dip Galvanizers Association Inc., William Penn hotel, Pittsburgh, Feb. 27-28. Members and guests will visit the plant of the Hanlon-Gregory Galvanizing Co., afternoon of Feb. 28.

Convention Calendar

Jan. 17-18—National Slag association. Annual meeting, Tutwiler 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.

Feb. 12-13—Steel Founders' Society of America. Annual meeting, Edgewater Beach hotel, Chicago. R. L. Collier, 920 Midland building, Cleveland, is secretary.

Feb. 12-14—American Management Association. Annual personnel conference, Palmer house, Chicago. H. L. Howlett, 330 W. 42nd. street, New York, is secretary.

Feb. 27-28—American Hot Dip Galvanizers Association Inc. Annual meeting, William Penn hotel, Pittsburgh. S. J. Swensson, 903 American Bank building, Pittsburgh, is secretary.

Rush Refrigerators for Training Camps

■ You can't throw an ice box at the enemy, but it is surprising what a well filled one will do for Uncle Sam's trainees. Above is a scene in the Weber Showcase & Fixture Co. Inc. plant, Los Angeles, where 1400 units, costing a half million dollars, are being manufactured for the United States army. Order was received in November, will be completed in January. NEA photo

$700,000,000, Total of Defense Plant Expansion Awards to Jan. 3

■ CONTRACT awards by the federal government for national defense plant expansion, construction and equipment to Jan. 3, 1941, aggregated $700,000,000, according to a report published last week by the national defense advisory commission. Eighty plants were mentioned.

Included were high explosives plants, ammunition loading and manufacturing establishments, armorplate factories, tank and aircraft plants and shipbuilding facilities. Contracts varied widely, from strictly government-owned munitions works operated on a fixed-fee basis, to contracts financed by private manufacturers, amortized by government payments over a five year period, purchase option remaining with the manufacturer.

Government-owned munition and ordnance plants are expected to remain government property. Additions to productive facilities of airplane manufacturers and fabricators of other items necessary in peacetime will, in most instances, be purchased by the private interests in five years. Aggregate of $700,000,000 represents many authorizations from the government to the manufacturers, with private capital financing the construction.

Remington Gets Large Contract

Plant expansion contracts reported last week included: Ford Motor Co., Dearborn, Mich., $21,965,420.43 for new aircraft engine factory and magnesium casting foundry at Dearborn; E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., $3,490,000 for expansion of powder manufacturing facilities at naval powder factory, Indian Head, Md., and $23,000,000 for increased facilities for manufacture of smokeless powder at Indiana Ordnance Works, Charlestown, Ind.; Remington Arms Co. Inc., Bridgeport, Conn., $102,249,880, for equipping and operating a small arms ammunition plant near Denver; Goodyear Engineering Corp., Akron, O., $13,899,541 for equipping and operating bag loading plant at Charlestown, Ind. Solvay Process Co., subsidiary of Allied Chemical & Dye Co., New York, is to operate a government-owned anhydrous ammonia plant to be constructed at West Henderson, Ky.; estimated cost, $11,132,440.

Navy department contracted with Fairchild Engine & Airplane Corp., Farmingdale, Long Island, N. Y., for acquisition, construction and installation of additional plant facilities and equipment at the corporation's Farmingdale plant. Total estimated cost was $1,478,800.

President Roosevelt and the national defense committee last week approved two plant expansion projects for manufacture of items necessary to defense. Projects approved: Erection of a new plant at Lockland, O., by Wright Aeronautical Corp., Paterson, N. J., for manufacture of Wright Aeronautical engines; estimated cost, $42,488,548. Construction of new plant by Otis Elevator Co., New York, at Harrison, N. J., for manufacture of Wright Aeronautical engine crankcases for the Wright Corp. Cost is estimated at $6,954,735.

Total of contracts reported in last two weeks awarded by the departments of war and the navy was $351,254,164. Plant expansion contracts accounted for a large share of the total.

War department announced the following:

Air Corps Awards

American Steel & Wire Co., Cleveland, cable, $60,027.

Bell Aircraft Corp., Buffalo, maintenance parts for airplanes, $237,875.99.

Boeing Aircraft Co., Seattle, fuel tanks, $61,689.

Cincinnati Electrical Tool Co., Cincinnati, buffers, polishers and grinders, $75,648.04.

Fairchild Engine & Airplane Corp., Fairchild Aviation division, Hagerstown, Md., cockpit canopies, $51,400.

Heil Co., Milwaukee, oil servicing trucks, $202,230.

Martin Co., Glenn L., Baltimore, maintenance parts for airplanes, $892,012.74.

Roth Office Equipment Co., Dayton, O., cabinets, $80,411.

Standard Steel Works, North Kansas City, Mo., trailers and dollies, $83,812.

Ordnance Department Awards

American Nut & Bolt Fastener Co., Pittsburgh, washers, $2221.89.

Barber-Colman Co., Machine & Small Tool division, Rockford, Ill., cutters, $1309.50.

Bennel Machine Co., Brooklyn, N. Y., machinery, $2054.40.

Bethlehem Steel Co., Bethlehem, Pa., alloy steel forgings, $11,890.02.

Blount, J. G., Co., Everett, Mass., lathe, $1638.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, $1184.05.

Duplex Mfg. Corp., Sherman, N. Y., steel chests, $13,879.32.

Foote-Burt Co., Cleveland, broaching machines, $14,755.

Louden Machinery Co., Albany, N. Y., conveyor systems, $2261.85.

Machinery Builders Inc., Long Island, N. Y., presses, $12,352.50.

Molded Insulation Co., Philadelphia, fire control equipment, $3835.30.

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., gages, $1882.50.

Oliver Iron & Steel Corp., Pittsburgh, steel carriage bolts, $11,862.45.

Parsons Co., Detroit, metal parts assemblies, $115,392.50.

Peoria Malleable Castings Co., Peoria, Ill., thumb nuts, $1881.

Precise Tool & Mfg. Co., Farmington, Mich., gages, $1712.50.

Schauer Machine Co., Cincinnati, thread cleaning machine, $4992.

Standard Tool & Mfg. Co., Arlington, N. J., vises, $2732.40.

Stevens Walden Inc., Worcester, Mass., cartridge holders, $47,808.

Union Twist Drill Co., Athol, Mass., cutters, $1700.

U. S. Machine Corp., Lebanon, Ind., artillery ammunition, $127,000.

Watson-Stillman Co., Roselle, N. J., presses, $6300.

Williams, J. H., & Co., Buffalo, wrenches, $1680.

Quartermaster Corps Awards

Aluminum Products Co., La Grange, Ill., stock aluminum pitchers and pots, $498,160.

Anderson-Tully Co., Memphis, Tenn., tent pins, $39,825.

Aqua Systems Inc., New York, air corps gasoline fueling system, San Angelo airport, Texas, $65,246.

Ashton Heating & Ventilating Co., Salt Lake City, Utah, ductwork, grilles, and vents for technical buildings, Salt Lake City airport, Utah, $1350.

Bellaire Enamel Co., Bellaire, O., kitchenware; $12,320.

Briggs, R. W., & Co., San Antonio, Tex.; Thos. S. Byrne Inc., and James T. Taylor, Ft. Worth, Tex., tent camp, Abilene, Tex., $3,978,377.

Certified Heating Service Co., Buffalo, warm air heating system, Ft. Niagara, New York, $2795.

Clyde Cutlery Co., Clyde, O., kitchenware, $12,640.

Consumer Power Co., Jackson, Mich., gas mains and service line, Selfridge field, Michigan, $7555.60.

Corbitt Co., Henderson, N. C., trucks, $1,460,000.

Devine, Maurice M., Inc., Boston, repair of wharf, Ft. Duvall, Massachusetts, $3800.

Dixie Metal Products Co., Birmingham, Ala., trunk lockers, $154,800.

Dover Stamping & Mfg. Co., Cambridge, Mass., accessories for field ranges, $15,682.50.

Emporia Mfg. Co., Emporia, Va., tent pins, $9631.25.

Exterkamp, John G., Covington, Ky., utilities, Ft. Thomas, Ky., $12,825.

Fischer, L. C., San Francisco, temporary housing, Ft. Mason, California, $8992.

Gorsuch, James A., Jr., Jeffersonville, Ind., component parts for tent stoves, grates, $70,000.

Greeson Mfg. Corp., Montgomery, Ala., tent pins, $25,605.

Griswold Mfg. Co., Erie, Pa., kitchenware, $17,120.

Hadley Construction Co., Philadelphia, temporary housing, Ft. Dupont, Delaware, $367,806.

Hawaiian Plumbing & Sheet Metal Ltd., Honolulu, T. H., cold storage insulation and equipment in air corps depot, Hickam field, Hawaii, $17,906.11.

Hendrich, W F., Co. Inc., Buffalo, temporary housing, Ft. Niagara, New York, $179,000.

Highway Steel Products Co., Chicago Heights, Ill., trunk lockers, $79,945.

Hoffman, L. H., Portland, Oreg., general hospital, Vancouver barracks, Washington, $948,304.

Honeycutt, A. J., Co. Inc., Birmingham, Ala., temporary hangar, Drew field, Tampa, Fla., $80,271.

Houserman, E. F., Co., Cleveland, metal partitions and doors, supply building, Chanute field, Illinois, $5892.

Inco Metal Products Co., Birmingham, Ala., trunk lockers, $63,700.

Katzinger, Edward, Co., Chicago, kitchenware, $59,600.

Knox Stove Works, Knoxville, Tenn., cast iron griddles, $33,800.

Kuhne Simmons Construction Association, Rantoul, Ill., laundry, Chanute field, Rantoul, $164,700.

Lalance & Grosjean Mfg. Co., Woodhaven,

N. Y., kitchenware, $33,840.
Landers, Frary & Clark, New Britain, Conn., accessories for field ranges, $172,370.
Lee, Ray M., Co., Atlanta, Ga., three cold storage plants, Ft. Benning, Georgia, $226,116.
Long Island Water Supply Co., Syosset, Long Island, N. Y., deep well and equipment, Mitchell field, New York, $9744.
Loving, T. A., & Co., Goldsboro, N. C., additional construction of temporary buildings, Ft. Bragg, North Carolina, $13,861,593.
Mack International, Long Island City, N. Y., trucks, $759,200.
Mine Safety Appliance Co., Pittsburgh, firemen's helmets, $10,241.
Mion Construction Co., Atlanta, Ga., construction and completion of hospital buildings, Ft. Benning, Georgia, $24,-824.
Monarch Decorating Co., Chicago, temporary housing, Drew field, Tampa, Fla., $15,800.
Moore & Roberts, San Francisco, temporary housing, McClellan field, California, $119,488.
Morgan, Holbrook Exchange, San Francisco, utilities in hospital mess, Stockton airport, California, $1495.
Nash-Kelvinator Corp., Detroit, trailers, $3,063,750.
Owen-Ames-Kimball Co., Grand Rapids, Mich., temporary buildings and hospital, Ft. Custer, Michigan, $1,383,140.
Pittsburgh-Des Moines Steel Co., Des Moines, Iowa, steel tank, piping and accessories, Elmendorf field, Anchorage, Alaska, $75,527.
Prentice, G. E., Mfg. Co., New Britain, Conn., buckles, end clips, $21,831.10.
Royal Silver Mfg. Co., Norfolk, Va., accessories for field ranges, $30,345.
Savory Inc., Newark, N. J., kitchenware, $10,720.
Schoedinger, F. O., Columbus, O., kitchenware, $21,150.
Schroeder Mfg. Co., Huntington, Ind., kitchenware, $12,000.
Scrimgeour, William, Washington, kitchenware, tableware, $656,896.
Simmons Co., J. L., Inc., Indianapolis, and J. C. O'Conner & Sons Inc., Ft. Wayne, Ind., facilities at ordnance proving ground, Madison, Ind., $4,183,-770.
Spiniello Construction Co., Newark, N. J., additions to water and sewer systems, Ft. Hancock, New Jersey, $19,-800.88.
Taylor Metal Products Co., Mansfield, O., component parts for field ranges, grates, $33,660.
Thompson, John W., Co., Trenton, N. J., railroad spur, Ft. Dix, New Jersey, $15,193.
Trueheart & Caldwell, San Antonio, Tex., cast iron water lines, Ft. Sam Houston, Texas, $62,429.89.
Wackman Welded Ware Co., St. Louis, tent stoves, $3948.
Welker Mfg. Co., Cromwell, Conn., buckles, $20,209.50.
West Coast Construction Co., Seattle, water main, Ft. Lewis, Washington, $21,900.
Yellow Truck & Coach Mfg. Co., Pontiac, Mich., trucks, $31,718,137.50.

♦

Navy department announced the following:

Bureau of Supplies and Accounts Awards

Allegheny Ludlum Steel Corp., Brackenridge, Pa., corrosion-resisting steel, $26,756.50.
Aluminum Co. of America, Pittsburgh, aluminum and aluminum alloy, $109,-169.13.
Aluminum Cooking Utensil Co., New Kensington, Pa., aluminumware, $56,-311.50.
Aluminum Goods Mfg. Co., Manitowoc, Wis., aluminumware, $81,320.
Aluminum Products Co., La Grange, Ill., aluminumware, $158,896.50.
American Car & Foundry Co., New York, stretcher weights, $58,145.
American Smelting & Refining Co., New York, slab zinc, $15,540.
Austin-Hastings Co. Inc., Cambridge, Mass., planer and shaper, $6506.90.
Autocar Co., Ardmore, Pa., trucks, tractors and semitrailers, $36,630.
Bendix Aviation Corp., Julien P. Friez & Sons division, Baltimore, mercurial, marine barometers, $14,434.
Carnegie-Illinois Steel Corp., Pittsburgh, corrosion-resisting steel, $12,809.69.
Carpenter Steel Co., Reading, Pa., corrosion-resisting steel, $14,330.32.
Caswell, Strauss & Co. Inc., New York, pig tin, $411,931.52.
Cone Automatic Machine Co. Inc., Windsor, Conn., automatic screw machine, $8466.60.
Delaware Tool Steel Corp., Wilmington, Del., machinists' chisels, $28,568.16.
Dusman, J. F., Baltimore, motion picture equipment, $21,966.17.
Electric Storage Battery Co., Philadelphia, submarine main storage battery jars, $7145.
Fargo Motor Corp., Detroit, tractor type trucks, $20,833.20.
Fruehauf Trailer Co., Detroit, trailers, $58,374.
General Time Instruments Corp., Thomaston, Conn., boat clocks, $97,217.50.
General Motors Corp., Chevrolet division, Detroit, motor trucks, $6324.94.
Gisholt Machine Co., Madison, Wis., turret lathes, $53,619.10.
G. M. Corp., Harrison Radiator division, Lockport, N. Y., oil and fresh water coolers, $7520.
Hebard, W. F., & Co., Chicago, gasoline tractors, $7934.
Hendey Machine Co., Torrington, Conn., horizontal, high speed shapers, $8464.
Herring-Hall-Marvin Safe Co., Hamilton, O., burglar resisting safes, $16,593.52.
Holmes Projector Co., Chicago, motion picture and sound equipment, $88,-626.02.
Illinois Pure Aluminum Co., Lemont, Ill., aluminum handle water pitchers, $21,-480.
International Minerals & Metals Corp., New York, slab zinc, $48,579.20.
International Nickel Co. Inc., New York, nickel-copper-alloy, $336,432.31.
Intertype Corp., Brooklyn, N. Y., typesetting machine, $5296.46.
Johnson, Almon A., New York, electric driven winches, $27,240.
Keystone Drawn Steel Co., Spring City, Pa., cold-rolled steel, $6010.20.
Leeds & Northrup Co., Philadelphia, electric furnace, $6200.
Lidgerwood Mfg. Co., Elizabeth, N. J., electric driven winches, $35,950.
Lodge & Shipley Machine Tool Co., Cincinnati, engine lathes, $13,521.
Maclane Hardware Co., New York, end cutting nippers, $9149.50.
McGraw Electric Co., Elgin, Ill., electric toasters, $65,569.50.
Midvale Co., Philadelphia, racks, pinions, idler gears, keys, etc., $255,360.

PURCHASES UNDER

(In Week Ended Dec. 28)

Iron and Steel Products	Commodity	Amount
American Locomotive Co., Railway Steel-Spring division, New York	Rod springs	$25,782.24
Babcock & Wilcox Co., New York	Boilers	181,349.50
Bay State Tool & Machine Co., Springfield, Mass.	Rifle parts	26,982.05
Benn Supply Co., Jersey City, N. J.	Steel pipe	12,613.40
Bethlehem Steel Export Corp., New York	Switches	19,014.56
Budd Wheel Co., Detroit	Shells	2,415,000.00
Crane Co., Chicago	Steam valves	40,013.00
Duplex Mfg. Corp., Sherman, N. Y.	Steel chests	13,879.32
Gilbert & Barker Mfg. Co., Springfield, Mass.	Bushings, water chests	187,296.95
Great Eastern Construction Co. Inc., New York	Steel buildings	19,935.00
Heller Bros. Co., Newark, N. J.	Files	14,442.80
Hendy, Joshua, Iron Works, San Francisco	Seal gate ring	28,638.00
Linde Air Products Co., New York	Torches	17,004.00
MacWhyte Co., Kenosha, Wis.	Steel cable	81,810.00
Munkel Heating Co., Columbus, O.	Furnaces	10,067.50
National Forge & Ordnance Co., Irvine, Pa.	Crankshafts	12,250.00
National Supply Co., Spang Chalfant division, Ambridge, Pa.	Forgings	1,221,500.00
National Tube Co., Pittsburgh	Boiler tubes	57,722.99
North & Judd Mfg. Co., New Britain, Conn.	Slides, clasps	32,003.77
Oliver Farm Equipment Co., Chicago	Projectors	13,086.25
Pettibone-Mulliken Corp., Chicago	Steel frogs	15,865.00
Prentice, G. E., Mfg. Co., New Britain, Conn.	Fasteners	26,445.00
Republic Steel Corp., Cleveland	Blanks, alloy steel	107,002.15
Roebling's, John A., Sons Co., Trenton, N. J.	Steel wire	13,333.84
Ryerson, Joseph T., & Son Inc., Jersey City, N. J.	Reinforcing steel	10,869.14
Savage Arms Corp., J. Stevens Arms Co. division, Chicopee Falls, Mass.	Shotguns	42,100.00
Sheffield Steel Corp., Kansas City, Mo.	Reinforcement bars	*20,055.09
Struthers Wells-Titusville Corp., Titusville-Forge division, Titusville, Pa.	Forgings	238,306.00
Timken Roller Bearing Co., Steel & Tube division, Canton, O.	Steel, nickel	38,661.00
Truscon Steel Co., Youngstown, O.	Reinforcing steel	11,307.20
Westinghouse Air Brake Co., Wilmerding, Pa.	Booster parts	416,355.00

*Estimated.

Nonferrous Metals and Alloys		
American Metal Co. Ltd., New York	Antimonial lead, pig lead, pig tin	$295,384.06
American Smelting & Refining Co., Federated Metals division, San Francisco	Pig lead	28,673.50
Bers, E., & Co., Philadelphia	Antimonial lead	125,200.00
Flemm Lead Co. Inc., Long Island City, New York	Sheet lead	13,139.18
International Nickel Co. Inc., New York	Nickel-copper alloy, alloys	57,402.79
International Silver Co., New York	Tableware	162,750.00
Kennecott Sales Corp., New York	Ingot copper	225,439.52
Landis Machine Co., St. Louis	Fuse parts	777,690.00

Mine Safety Appliances Co., Pittsburgh, oxygen transfer apparatus equipment, $21,362.10.

New Jersey Zinc Sales Co. Inc., New York, plate, sheet, strip and slab zinc, $43,258.50.

Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., precision tool room lathes, $48,543.

Noland Co. Inc., Washington, band saws, $23,535.75.

Northern Pump Co., Minneapolis, pumps, $174,312.

Northill Co. Inc., Glendale, Calif., power operated shears, $15,281.91.

Norton Co., Worcester, Mass., abrasive wheels, $35,000.

Ohio Seamless Tube Co., Shelby, O., steel tubing, $5037.63.

Pacific Car & Foundry Co., Seattle, railroad box cars, $16,500.

Paving Supply & Equipment Co., Washington, full diesel powered tractors, $8848.

R. C. A. Mfg. Co. Inc., Camden, N. J., motion picture equipment, $12,562.56.

Rustless Iron & Steel Corp., Baltimore, corrosion-resisting steel, $38,632.42.

Shipley, W. E., Machinery Co., Philadelphia, vertical boring mills, $50,434.

Steel Conversion & Supply Co., Castle Shannon, Pa., chisels and chisel-blanks, $22,680.62.

St. Joseph Lead Co., New York, slab zinc, $8250.

Sullivan Mining Co., Kellogg, Idaho, slab zinc, $8250.

Swartzbaugh Mfg. Co., Toledo, O., aluminumware, $34,669.40.

Vanadium Corp. of America, New York, ferrosilicon, $5752.

White, David, Co., Milwaukee, sextants, $123,168.

Youngstown Sheet & Tube Co., Youngstown, O., nickel steel, $18,848.50.

Bureau of Yards and Docks Awards

Atlantic Elevator Co., Philadelphia, modernization of elevators at navy yard, Philadelphia, $8414.

Brown, Emil, & Co., Los Angeles, galley equipment at naval supply depot, Oakland, Calif., $11,963.30.

Carolina Industries, Walterboro, S. C., refrigerating rooms and addition to building No. 13 at naval hospital, Parris Island, South Carolina, $7037.16.

International Derrick & Equipment Co., Torrence, Calif., steel radio towers at naval radio station, Eureka, Calif., $16,969.

Kaufman Construction Co., Philadelphia, crane track and turret slab, navy yard, Philadelphia, $148,900.

Kenworthy & Taylor Inc., Everett, Mass., improvements to outside power connection, navy yard, Portsmouth, N. H., $20,753.

Merando Co. Inc., additions and alterations to quarters at marine barracks, Washington, $2790.

Merrill Co. Inc., Boston, fire protection system, buildings No. 4 and 97, navy yard, Boston, $1327.

Nicholson Co. Inc., New York, construction of coal-handling equipment at naval torpedo station, Newport, R. I., $45,000.

Public Improvements Inc., New York, renewal of electrical systems at naval hospital, Brooklyn, N. Y., $2868.

Rockwood Sprinkler Co., San Francisco, sprinkler system for mold loft, building No. 390, at navy yard, Mare Island, California, $15,500.

Stanley Inc., Oscar M., New York, marine barracks at experimental basin, Carderock, Md., $56,485.

Walker Moody Construction Co., Honolulu, T. H., elevator for signal tower, navy yard, Pearl Harbor, T. H., $20,-638.70.

Young Jr., John, Elmhurst, New York, telephone line at naval proving ground, Dahlgren, Va., $11,180.

Ordnance Awards

Bethlehem Steel Co., Bethlehem, Pa., gun forgings, $7,275,484.10.

Kelsey Hayes Wheel Co., Detroit, projectiles, $1,239,000.

WALSH-HEALEY ACT

Nonferrous Metals and Alloys	Commodity	Amount
National Lead Co., Baltimore	Sheet lead	$30,569.39
Reynolds Metals Co., Richmond, Va.	Aluminum alloy	80,262.74
Scovill Mfg. Co., Waterbury, Conn.	Uniform buttons	59,843.78
Somerville Machine & Foundry Co., Somerville, Mass.	Castings	53,437.36
Veit & Young, Philadelphia	Ejecting stems	36,176.00
Whitehead Metal Products Co. Inc., Philadelphia	Aluminum alloy	16,044.29

Machinery and Other Equipment		
Acme Machine Tool Co., Cincinnati	Turret lathes	$82,480.30
Alban Tractor Co. Inc., Baltimore	Crane	13,758.00
American Tool Works Co., Cincinnati	Engine lathes	40,496.00
Austin-Hastings Co. Inc., Cambridge, Mass.	Radial drills	58,500.00
Bertsch & Co. Inc., Cambridge City, Ind.	Bending roll	13,198.00
Brown & Sharpe Mfg. Co., Providence, R. I.	Screw and milling machines	63,069.00
Bullard Co., Bridgeport, Conn.	Boring machine, turret lathes	48,305.41
Caterpillar Tractor Co., Peoria, Ill.	Tractors	54,777.40
Chicago Flexible Shaft Co., Chicago	Clipping machines	11,795.44
Cleveland Tractor Co., Cleveland	Tractors	12,670.00
Crucible Steel Co. of America, New York	Tool bits	12,273.23
Denison Engineering Co., Columbus, O.	Test stand assemblies	127,952.00
Derbyshire Machine & Tool Co., Philadelphia	Punch holder blanks	12,255.00
Excello Corp., Continental Tool Works division, Detroit	Broaches	14,925.00
Fidelity Machine Co., Philadelphia	Dies	19,110.00
Foote-Burt Co., Cleveland	Broaching machines	14,755.00
Hydro-Blast Corp., Chicago	Blast cleaning room	92,604.00
Industrial Brownhoist Corp., Bay City, Mich.	Crane	33,800.00
Industrial Equipment Co., Oakland, Calif.	Locomotive crane	11,150.00
Ingersoll-Rand Co., New York	Air compressors	96,846.00
Jones & Lamson Machine Co., Springfield, Vt.	Lathes	76,583.36
Lamson Corp., Syracuse, N. Y.	Gun mount parts	18,125.00
Landis Tool Co., Waynesboro, Pa.	Grinding machines	14,687.00
Lees-Bradner Co., Cleveland	Milling machines	11,730.00
Lloyd & Arms Inc., Philadelphia	Lathes	78,474.80
Lodge & Shipley Machine Tool Co., Cincinnati	Engine lathes	27,738.00
Maddock & Co., Philadelphia	Twist drills	10,928.43
Motch & Merryweather Machinery Co., Cleveland	Grinders	107,833.00
Motley, James M., & Co. Inc., New York	Rotary shear	20,995.00
Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn.	Chambering and drilling machines	63,493.00
Philadelphia Drying Machinery Co., Philadelphia	Dryer units	17,862.00
Rockford Machine Tool Co., Rockford, Ill.	Planer	30,521.60
Seifreat-Elstad Machinery Co., Dayton, O.	Tinners machines	42,397.99
Singer Sewing Machine Co., New York	Sewing machines	17,399.10
Standard Shannon Supply Co., Philadelphia	Twist drills	12,227.31
Stevens Walden Inc., Worcester, Mass.	Die blanks, dies	33,321.00
Stone Heating & Ventilating Co., Washington	Ventilating and centrifugal fans	57,837.44
Veit & Young, Philadelphia	Punches and dies	25,108.80
York Ice Machinery Corp., York, Pa.	Refrigeration unit	12,371.00

Canada's Crown Plant Expansions, $280,000,000

TORONTO, ONT.

■ Construction and expansion of government-owned plants in Canada, some already in production and the rest to be completed this year, total $280,000,000, according to Angus L. Macdonald, acting minister of munitions and supply. Financial commitments for construction of these plants include: Shellmaking, $31,000,000; armaments, $96,000,000; aircraft, $15,000,000; automotive, $6,000,000; chemicals and explosives, $87,000,000; machine tools, $11,000,000; and miscellaneous, $34,000,000.

New contract awards, totaling 1407 and with aggregate of $7,751,803, were reported last week by the munitions and supply department. Latest awards include:

Shipbuilding: British Admiralty, England, $9000; Pictou Foundry & Machine Co. Ltd., Pictou, N. S., $153,191; Halifax Shipyards Ltd., Halifax, N. S., $100,000; Canadian Power Boat Co. Ltd., Montreal, Que., $2,724,717.

Mechanical transport: Arlington Cycle & Sports Ltd., Montreal, $31,806; International Harvester Co. of Canada Ltd., Ottawa, Ont., $9527; Ross Cycle & Sports, Toronto, $14,542; Dominion Truck Equipment Co. Ltd., Kitchener, Ont., $15,104.

Aircraft: Canadian Pratt & Whitney Aircraft Co., Longueuil, Que., $979,414.

Electrical equipment: Canadian Marconi Co., Montreal, $23,043; Northern Electric Co. Ltd., Ottawa, $99,706; Outboard Marine & Mfg. Co. of Canada Ltd., Peterborough, Ont., $178,266; Amalgamated Electric Corp. Ltd., Toronto, $17,531; Canadian Telephone & Supplies Ltd., Toronto, $6531; Taylor Electric Mfg. Co. Ltd., London, Ont., $5212.

Machinery: Pleasisville Foundry Co., Pleasisville, Que., $13,631; Kelsey Wheel Co. Ltd., Windsor, Ont., $8000; Vivian Engine Works Ltd., Vancouver, B. C., $84,608.

Tools: Exide Batteries of Canada Ltd., Toronto, $5313.

Miscellaneous: Dominion Merchants Co. Ltd., Montreal, $94,600; MacIntosh Plumbing & Heating Co., Lethbridge, Alta., $15,185; Waterman, Waterbury Mfg. Co., Regina, Sask., $30,000; Randall & Co., Winnipeg, Man., $8000; Waterous Ltd., Brantford, Ont., $8000; Barr & Anderson Ltd., Vancouver, B. C., $7000; Canadian

Comstock Co. Ltd., Toronto, $13,000; Mathews Conveyer Co. Ltd., Port Hope, Ont., $6000.

Construction projects: Fundy Construction Co., Halifax, N. S., $184,000; Russell Construction Co. Ltd., Toronto, $142,000; General Engineering Co. Ltd., Toronto, $608,835; L. G. Ogilvie & Co. Ltd., Montreal, $358,556; Duranceau & Duranceau, Montreal, $81,932.

Contracts placed week before last aggregated $9,973,238. Awards included:

Instruments: Imperial Optical Co., Toronto, $8100.

Mechanical transport: Metallic Roofing Co. of Canada Ltd., Toronto, $34,201; E. Leonard & Sons Ltd., London, Ont., $18,652; Ford Motor Co. of Canada Ltd., Windsor, Ont., $77,695.

Aircraft: Macdonald Bros. Aircraft Ltd., Ottawa, Ont., $25,901; Fleet Aircraft Ltd., Ft. Erie, Ont., $2,900,000.

Electrical equipment: Canadian General Electric Co. Ltd., Ottawa $7655; Canadian Westinghouse Co. Ltd., Ottawa, $7150; Canadian Westinghouse Co. Ltd., Hamilton, Ont., $10,612; Taylor Electric Mfg. Co. Ltd., London, $6439.

Machinery: Canadian Fairbanks Morse Co., Ottawa, $5324; Canada Wire & Cable Co. Ltd., Toronto, $9525.

Miscellaneous: Storms Contracting Co. Ltd., Debert, N. S., $25,000; General Steel Wares Ltd., Ottawa, $16,623; R.C.A. Victor Co. Ltd., Ottawa, $22,120; National Steel Car Corp. Ltd., Malton, Ont., $5853.

Construction: Disher Steel Construction Co. Ltd., Toronto, $125,000; Tomlinson Construction Co. Ltd., Toronto, $674,455; Sterling Construction Co. Ltd., Windsor, $181,455.

"Triangle of Industry" Reprints Now Available

■ Reprints of F. C. Crawford's article, "The Triangle of Industry and the Production of Wealth," (STEEL, Dec. 23, p. 13) now are available. They may be obtained at 4 cents each from Readers' Service Department, STEEL, 1213 West Third street, Cleveland.

Youngstown Plants Need Skilled Men To Speed Defense Orders

YOUNGSTOWN, O.

■ EIGHT HUNDRED skilled mechanics, largely machinists and welders, are needed immediately by large and small Mahoning Valley plants engaged in defense work. Steel plants and blast furnaces appear to be fully manned, but, if expectations materialize, special shifts will be employed to increase production.

In addition to each really skilled worker, at least one helper and one laborer could be put to work. The helpers thus would be able to learn the trades and qualify as skilled workers, at jobs that now pay from $1 to $1.25 an hour.

United Engineering & Foundry Co. is working on a $5,250,000 order for howitzers and needs 450 skilled men and more helpers.

Youngstown Welding & Engineering Co., with $2,500,000 in navy orders, could add 250 men.

McKay Machine Co., Youngstown Foundry & Engineering Co., and other machine shops in this area are loaded up with defense orders.

General Fireproofing Co. already has installed a "swing" shift in some departments and within a few months the entire plant is expected to go on a 7-day basis. The fourth shift will be used to make this possible. Employment is expected to increase from the present 2200 to 2500.

Youngstown Welding & Engineering Co. plans to build a 50 x 150-foot addition to its plant at Wickliffe to store material and will use the freed space for manufacturing purposes. Both McKay Machine and Youngstown Foundry & Engineering are making tools to be used in national defense plants; several new lines have been added.

Welders are in high demand and competent men can obtain jobs at will. Youngstown college will open four classes for additional training of men already employed.

Westinghouse Ordnance Tooling, $11,000,000

■ Machine tools and equipment totaling more than $11,000,000 will be required at the new navy ordnance plants to be constructed near Louisville, Ky., and at Canton, O., according to F. D. Newbury, manager, emergency products division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Westinghouse was selected by the navy to build and operate the plants under a leasing arrangement.

Work on jigs and fixtures is under way. Orders for machine tools and equipment total $6,250,000; additional $5,000,000 to $6,000,000 will be let in next few months. General construction contract for major buildings at Louisville has been awarded; work is to start soon, with completion scheduled for July.

One thousand skilled workers will be employed at Louisville, 2000 at Canton. Former plant will operate principally as an assembly unit, receiving parts from other ordnance plants and manufacturers. Completed guns and mounts will be proof-fired nearby and then shipped to naval vessels for installation. Louisville plant's products will include mounts, turret items, gun slides, recoil mechanisms, breech housings and breech blocks. Many of the parts assembled will be manufactured at Canton.

A. P. Craig has been appointed executive assistant in the emergency products division, in charge of construction plants; and H. A. Sauerbrey construction engineer, reporting to Mr. Craig. J. R. Weaver was named manager of the Louisville plant; R. V. Gavert will be manager of the company's ordnance factory at Canton.

Toledo Plants Adopt Longer Work Week

■ Saturday working schedules were resumed last week by Doehler Die Casting Co. and Spicer Mfg. Corp., both of Toledo, O., to increase production in the defense program. Time and a half is paid for Saturday work.

Doehler, which normally makes die castings for automobiles, vacuum cleaners, washing machines, refrigerators, radios and other electrical appliances, employs 2000 in three shifts per day. Current production is largest in the Toledo plant's history.

Saturday work was started by Spicer Mfg. Corp. in departments where production has been held down by various bottlenecks. Spicer's peacetime operations include fabrication of axles, frames, gears, shock absorbers and transmissions for trucks and buses; forgings and air conditioning units for articulated trains; and universal joints and propeller shafts.

Other Toledo plants are also expected to adopt the longer work week this month.

Monarch Machine Tool Output Up 50 Per Cent

■ January production of Monarch Machine Tool Co., Sidney, O., is running 50 per cent over that of January, 1940, and will be increased still further, according to Wendell E. Whipp, president.

Last year's production of Monarch lathes showed an increase of 240 per cent over 1939 output. Since the beginning of the year the plant has been operating 22 out of every 24 hours, Sundays excepted.

Rent Building To Assemble Turret Lathes

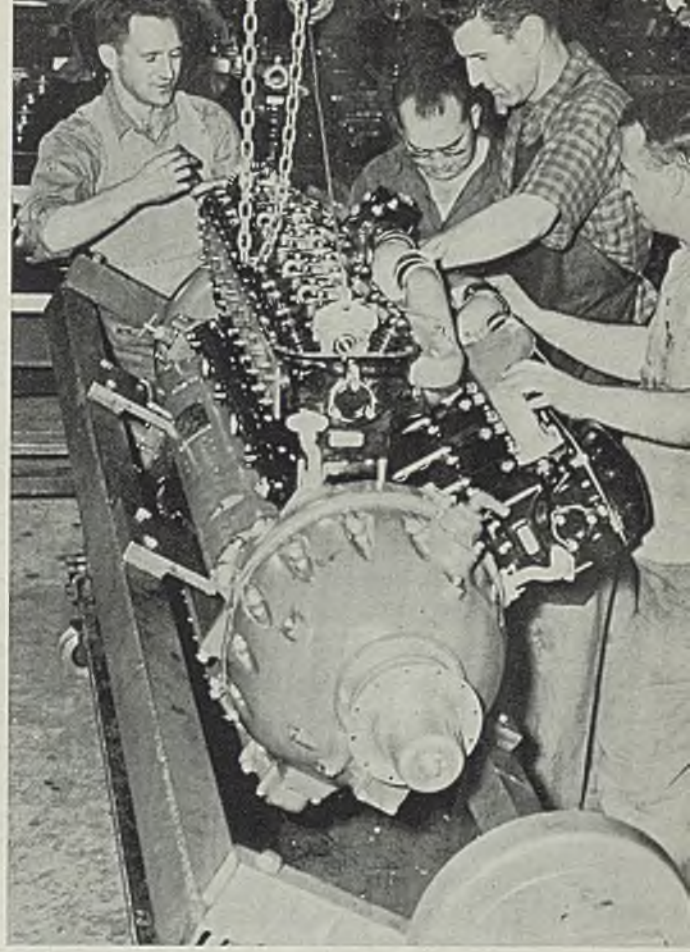
■ Warner & Swasey Co. last week rented the former Mid-town Motors building in the 3700 block, Prospect avenue, Cleveland, to assemble turret lathes for the British government. The building is one-story, occupying 43,000 square feet. It will be in operation in 30 days.

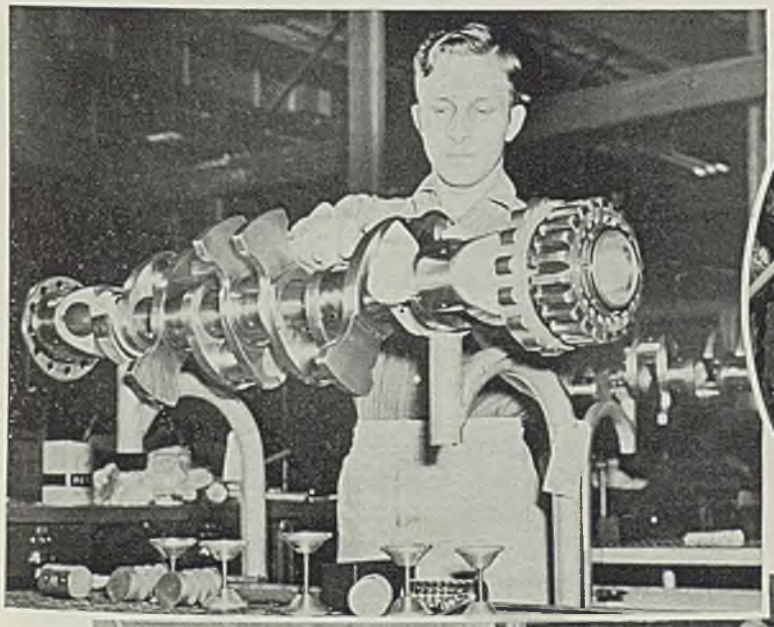
Airplane Engines

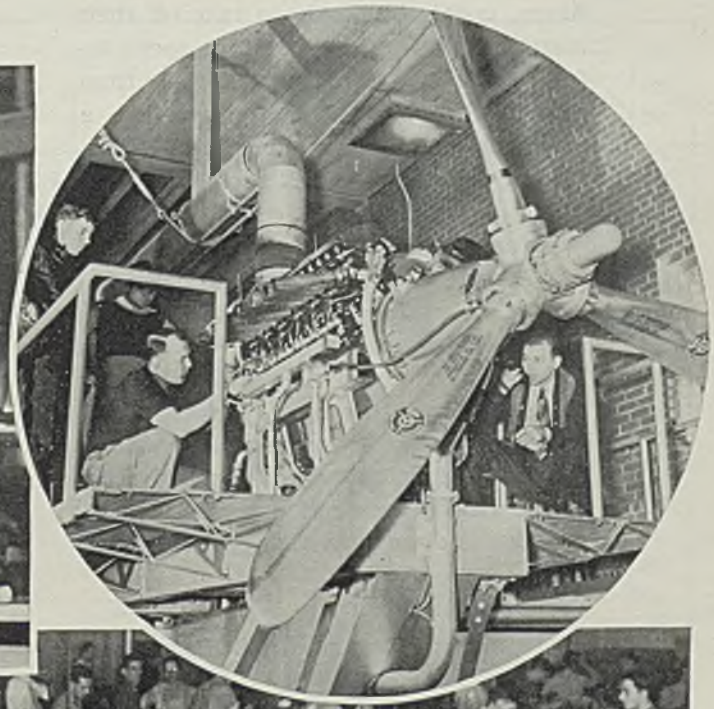
Allison To Produce 1000 Monthly by Year's End

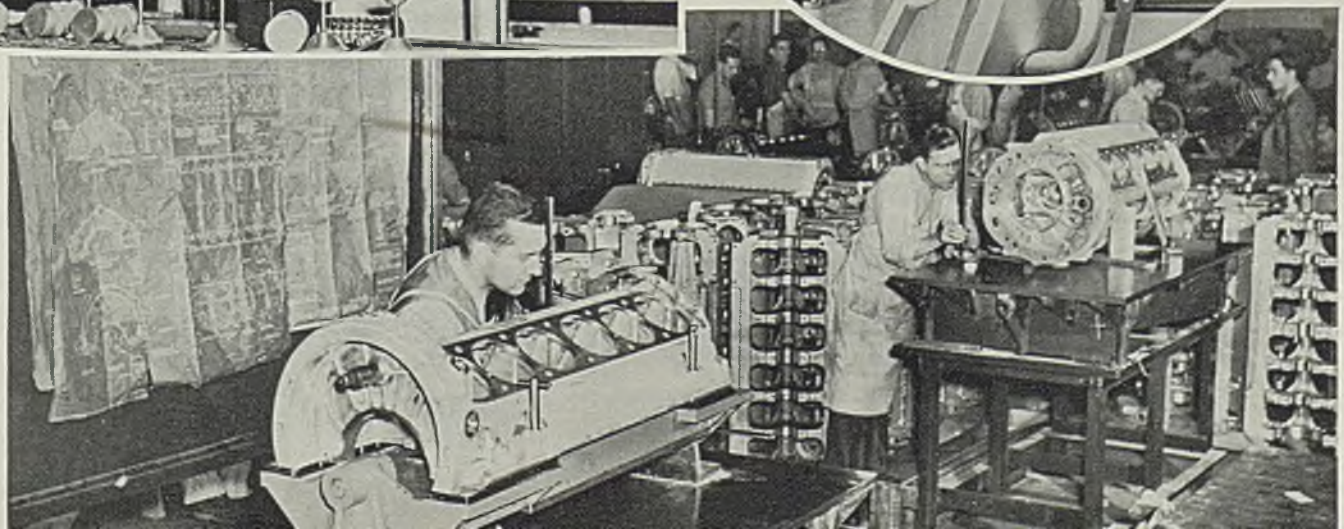
■ GENERAL MOTORS' Allison division, Indianapolis, is turning out 350 liquid-cooled aircraft engines monthly for the army air corps and Britain. By late 1941, output will be 1000 a month. Plant now employs 7200 workers, which will be increased to 10,000 before year ends.

Upper right, an engine is torn down for inspection after test run. Middle left, workman places crank-oil-plug in delicately balanced crankshaft, which will allow entire shaft to be filled with oil under pressure and better absorb the pounding of engine's 12 cylinders. At bottom, inspectors check alignment and dimensions of crankshaft and accessory drive-shaft bores to insure safe operation and long life. Circle, engine passes final acceptance test, gets last-minute currying before shipment.









Now Is Time To Face Realities

■ EVENTS of the past 30 days have changed the outlook, tempo and mood of this nation drastically.

Early in December the public consciousness of the defense problem was one of lukewarm interest. To all outward appearances, preparedness was just another project, superimposed upon others and attended with more than ordinary ballyhoo.

Industrialists were growing impatient over the seeming inability of the defense organization to function effectively. The example set by the highest officials in Washington, excepting those immediately concerned with defense, connoted a strong official leaning toward a business-as-usual policy.

Then William S. Knudsen, speaking before the National Association of Manufacturers, urged the people to take off their coats and roll up their sleeves to speed defense work. The President, returning from a vacation-inspection trip, announced a revamping of the defense board. Later in a fireside chat he cast overboard the philosophy of business-as-usual.

In his first message to the new congress the President re-emphasized the seriousness of the emergency and again called for an "all-out" effort for defense. On Tuesday his executive order, legally establishing OPM and conferring upon it much of the emergency authority congress had previously granted him, furnished climactic proof of the new determination of the administration to cease temporizing with defense.

* * *

The effect of these developments has been salutary. The man in the street who on Dec. 1 was distinctly ahead of Washington officialdom in his zeal for preparedness, is being encouraged and reassured by the new vigor in defense effort.

Management and labor alike in industry now are more hopeful that their desire to participate in defense can be translated into more effective action. Companies already hard pressed to execute government orders on time are heartened by the expectation that the new streamlined set-up will simplify some of their problems.

But these results of the new order are largely psychological. Emotions and convictions which strike closer to the painful realities of this great undertaking must possess all of the people of the nation before our program can be executed satisfactorily. As a nation, we have barely scratched the surface of an effective defense economy.

* * *

A feeble picture of what is ahead was presented in Washington last week. Machine tool builders, who already have performed miracles in expansion and production, were told in no uncertain terms that the ceiling on their effort is to be raised again. They must turn out more machines than contemplated in previous estimates.

At another session in Washington, representatives of the scrap metal industry were told that they must keep prices down and that they must not hoard this precious commodity.

Simultaneously throughout the nation, scores of industrial executives are packing their bags and closing their desks preparatory to going to Washington to remain indefinitely in the nation's service.

In a few days individuals and corporations will be making out 1940 income tax returns. This labor, revealing a shocking increase in tax payments, will bring a new realization defense means sacrifice.

We must steel ourselves to accept the unexpected with good grace. The man who has his house in order and who is in the mood to take what comes in good spirit will be infinitely better off than he who, unprepared in mind and spirit, resists the inevitable step by step.

E. L. Shaner

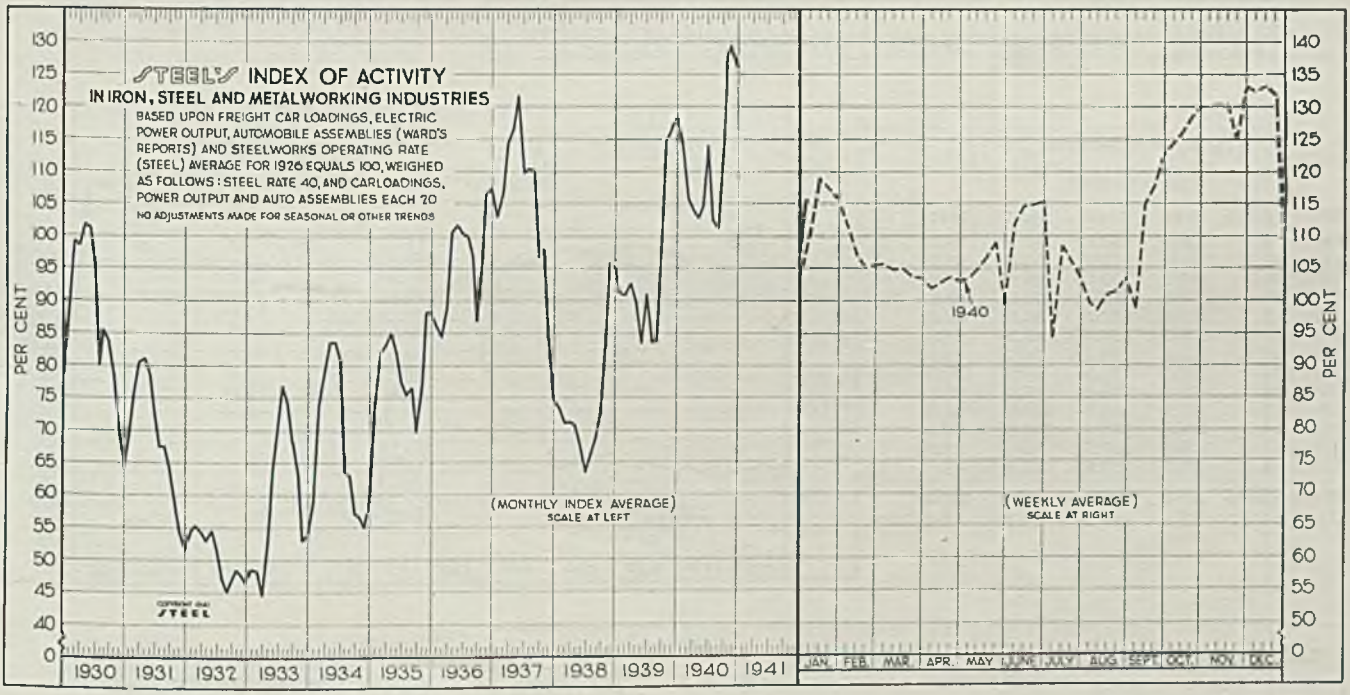
The *BUSINESS TREND*

Industrial Output Starts New Year at Peak Level

■ INDUSTRIAL activity enters the new year at the highest level in history, and there is every indication that the present peak production pace will continue for some months. In those industrial lines directly connected with the defense program output is expected to advance still further as increased production facilities are placed in service. Incoming business is sustained at particularly high levels, despite the extensive forward buying movement during the closing months of last year. Order backlogs are largest on record and in some instances are still mounting.

During the week ended Jan. 4, STEEL'S index of activity regained most of the ground lost during the Christmas holiday week, but failed to reach the pre-Christmas level due to the interruption of activity resulting from observance of New Year's day. The index now stands at 115.7, a gain of 8.2 points from the previous week and compares with 132.4 in the week ended Dec. 21. In the corresponding 1940 period the index stood at 110.3, while in the like week of 1939 it was at the 86.5 level.

During December the weekly index averaged 126.3, off moderately from the November monthly average of 129.5, but remained well above the December 1939 level of 118.9. The decline in the December index average was due almost entirely to the holiday interruptions for which no allowance is made in computing the weekly index figures.



STEEL'S index of activity gained 8.2 points to 115.7 in the week ended Jan. 4:

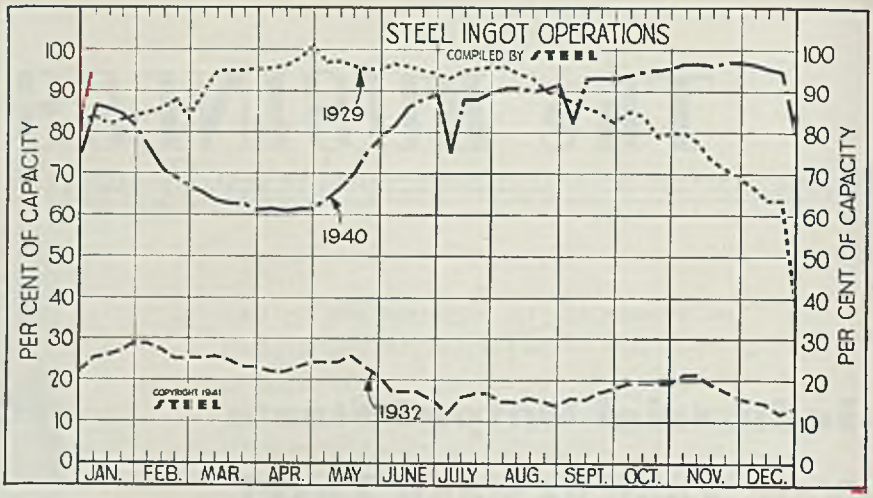
Week Ended	1940	1939
Nov. 2	130.2	117.1
Nov. 9	130.3	117.2
Nov. 16	130.3	117.3
Nov. 23	124.7	111.4
Nov. 30	132.6	117.9
Dec. 7	132.5	123.9
Dec. 14	132.6	124.2
Dec. 21	132.4	123.4
Dec. 28	107.5	104.0
Week Ended	**1941**	**1940**
Jan. 4	115.7	110.3

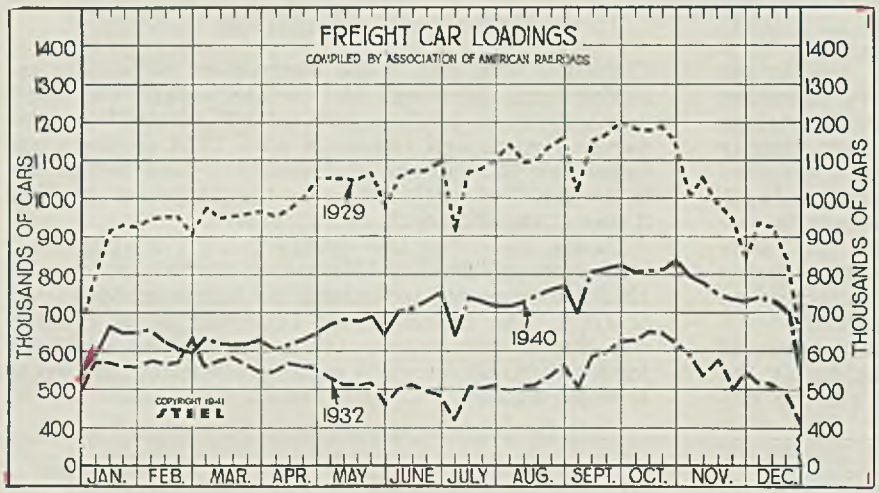
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	102.7	89.8	70.8	116.6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

Steel Ingot Operations

(Per Cent)

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





Freight Car Loadings

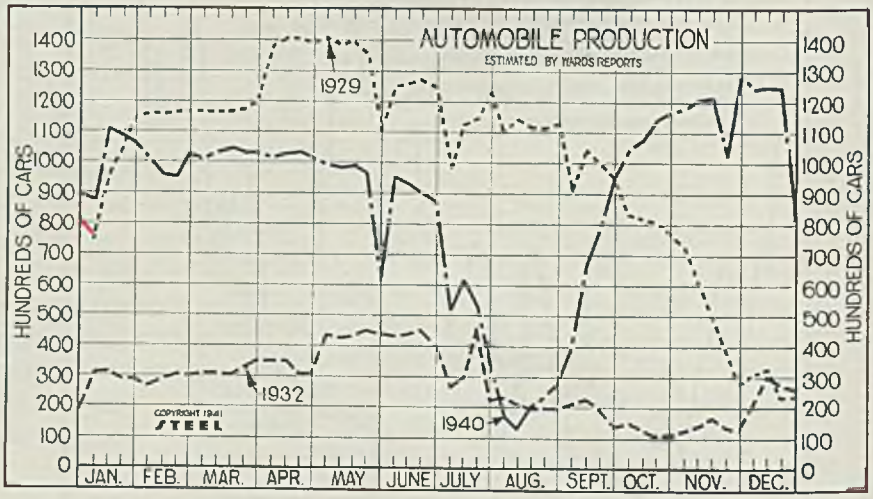
(1000 Cars)

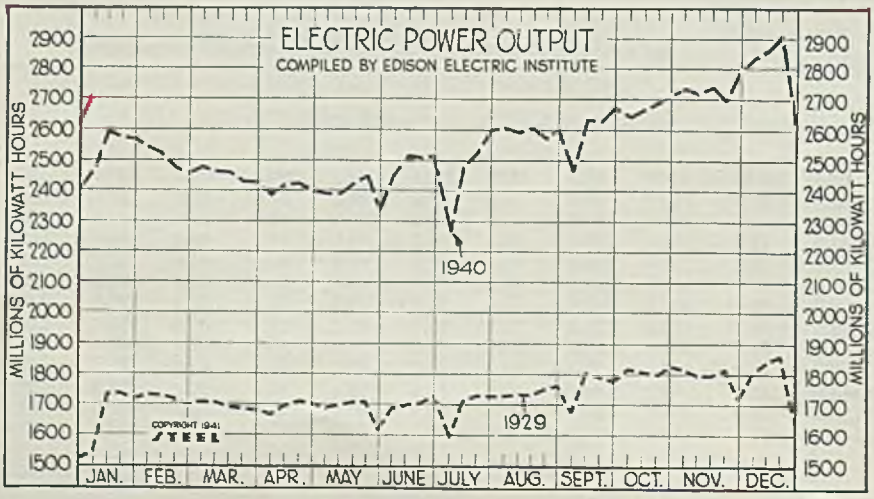
Week ended	1940	1939	1938	1937
Oct. 5.....	806	835	703	815
Oct. 12.....	812	845	727	810
Oct. 19.....	814	861	706	773
Oct. 26.....	838	834	709	772
Nov. 2.....	795	806	673	732
Nov. 9.....	778	786	637	690
Nov. 16.....	745	771	657	647
Nov. 23.....	733	677	562	559
Nov. 30.....	729	689	649	623
Dec. 7.....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

Auto Production

(1000 Units)

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





Electric Power Output

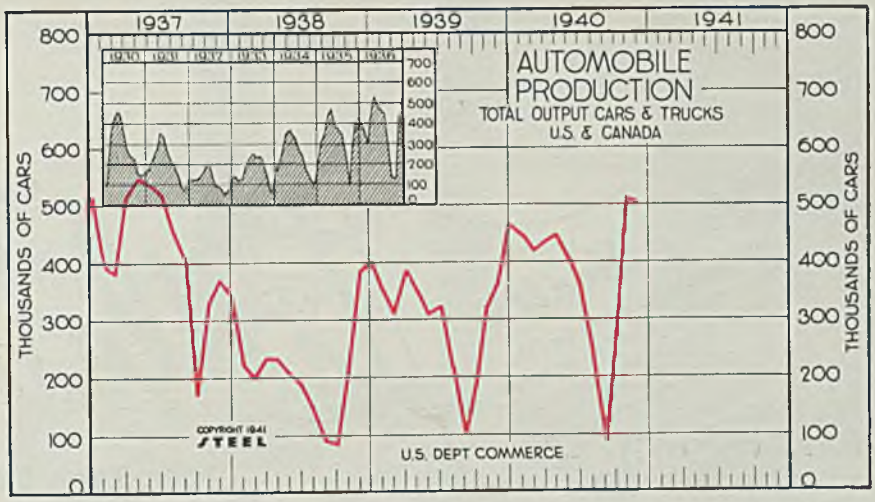
(Million KWH)

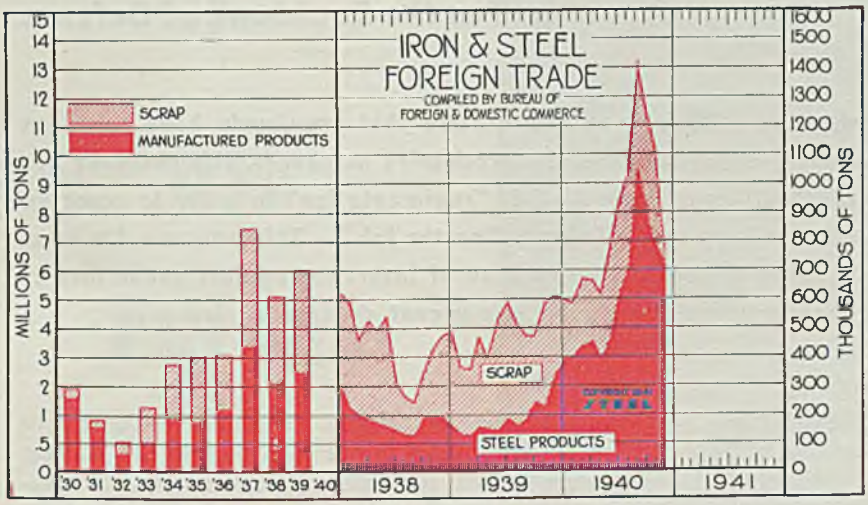
Week ended	1940	1939	1938	1937
Oct. 5...	2,641	2,465	2,154	2,280
Oct. 12...	2,665	2,495	2,183	2,276
Oct. 19...	2,687	2,494	2,214	2,252
Oct. 26...	2,711	2,539	2,226	2,255
Nov. 2...	2,734	2,537	2,207	2,202
Nov. 9...	2,720	2,514	2,209	2,176
Nov. 16...	2,752	2,514	2,270	2,224
Nov. 23...	2,695	2,482	2,184	2,065
Nov. 30...	2,796	2,539	2,285	2,153
Dec. 7...	2,838	2,586	2,319	2,196
Dec. 14...	2,862	2,605	2,333	2,202
Dec. 21...	2,911	2,641	2,363	2,085
Dec. 28...	2,623	2,404	2,121	1,998
Week ended	**1941**	**1940**	**1939**	**1938**
Jan. 8...	2,705	2,169	1,998	2,069

Automobile Production

(Unit: 1000 Cars)

	1940	1939	1938	1937	1936
Jan.	449.3	357.0	227.1	399.2	377.2
Feb.	421.8	317.5	202.6	383.9	300.8
March	440.2	389.5	238.6	519.0	438.9
April	452.4	354.3	238.1	553.4	527.6
May	412.5	313.2	210.2	540.4	480.5
June	362.6	324.2	189.4	521.1	469.4
July	246.2	218.5	150.4	456.9	451.2
Aug.	89.9	103.3	96.9	405.1	275.9
Sept.	284.6	192.7	89.6	175.6	139.8
Oct.	514.4	323.0	215.3	338.0	230.0
Nov.	511.0	370.2	390.4	376.6	405.8
Dec.	.....	469.0	407.0	346.9	519.1
Ave.	.....	311.0	221.3	418.0	384.7





Iron and Steel Exports

(Thousands of Gross Tons)

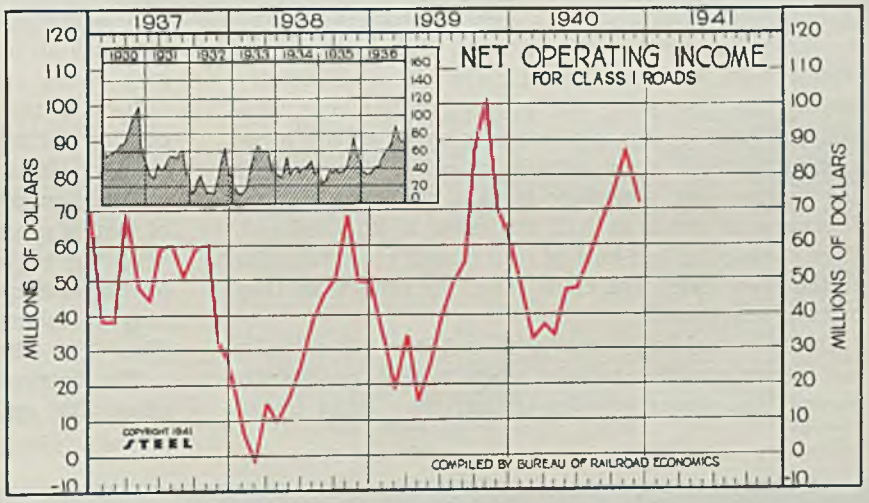
	Steel Products		Scrap		Total
	1940	1939	1940	1939	1940
Jan.	396.1	134.8	187.5	227.9	583.5
Feb.	436.6	134.8	234.7	224.9	671.3
Mar.	457.1	162.1	206.9	312.3	664.0
April	391.8	153.9	221.2	240.1	612.9
May	471.5	147.8	312.5	384.9	784.0
June	617.7	190.0	318.4	398.9	936.0
July	707.8	163.6	327.1	350.1	1034.9
Aug.	1046.1	185.2	346.1	291.9	1402.1
Sept.	965.4	244.9	251.1	330.7	1221.1
Oct.	846.6	255.1	258.5	336.8	1105.5
Nov.	713.8	332.9	74.3	272.7	788.2
Dec.	.....	394.0	.....	206.4	.....
Total	.....	2,499.0	.....	3,577.4	.....

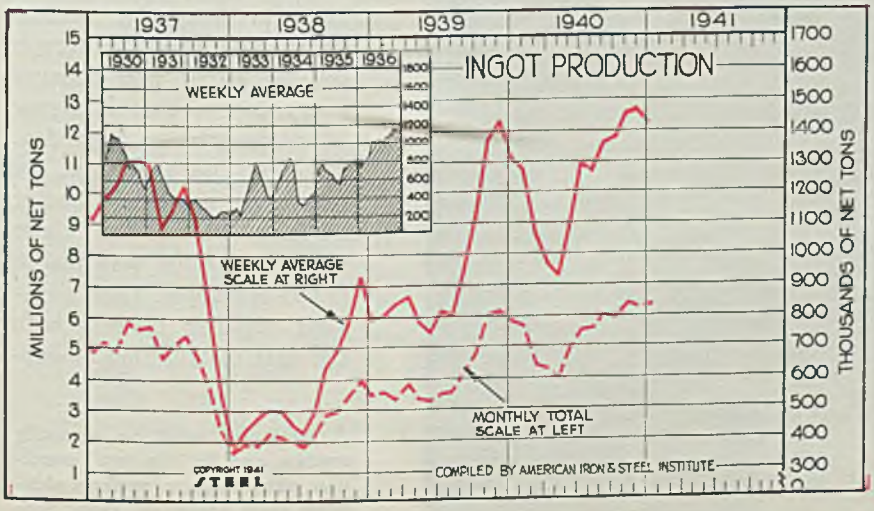
Class I Railroads Net Operating Income

(Unit: $1,000,000)

	1940	1939	1938	1937
Jan.	$45.57	$32.89	$7.14	$38.87
Feb.	32.62	18.59	1.91*	38.78
Mar.	36.73	34.32	14.73	69.88
April	33.82	15.32	9.40	48.36
May	47.08	25.10	16.67	44.24
June	47.42	39.10	25.16	59.35
July	57.08	49.01	38.43	60.99
Aug.	66.01	54.59	45.42	50.76
Sept.	74.19	86.43	50.36	59.62
Oct.	86.99	101.62	68.57	60.86
Nov.	71.10	70.35	49.67	32.44
Dec.	.....	60.95	49.37	25.99
Average	.....	$49.02	$31.02	$49.18

*Indicates deficit.





Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1940	1939	1940	1939
Jan.	5,655.3	3,578.9	1,276.6	807.9
Feb.	4,409.0	3,368.9	1,065.0	842.2
Mar.	4,264.8	3,839.1	962.7	866.6
Apr.	3,974.7	3,352.8	926.5	781.5
May	4,841.4	3,295.2	1,092.9	743.8
June	5,532.9	3,523.9	1,289.7	821.4
July	5,595.1	3,564.8	1,265.9	806.5
Aug.	6,033.0	4,242.0	1,361.9	957.6
Sept.	5,895.2	4,769.5	1,377.4	1,114.4
Oct.	6,461.9	6,080.2	1,458.7	1,372.5
Nov.	6,282.8	6,147.8	1,464.5	1,433.0
Dec.	6,300.8	5,822.0	1,425.5	1,317.2
Total	65,247.0	51,585.0	1,248.0†	989.4†

†Weekly average.

Little Vitamin (A) (D) (B1)

..... Keep Skilled Manpower on the Job
..... Stiffen the Backbone of Defense

Confronted with long severe winters that previously have taken an extremely heavy toll from its productive manhours, this company has worked out a particular kind of "regimentation" in order to conserve health and keep its skilled men "on the job." This program has been undertaken to provide a new kind of insurance against undue loss of manpower especially during this urgent defense period

■ RECENTLY we inaugurated a unique "health conservation" program designed to keep our available man hours as near as possible to the theoretical maximum during this urgent defense period.

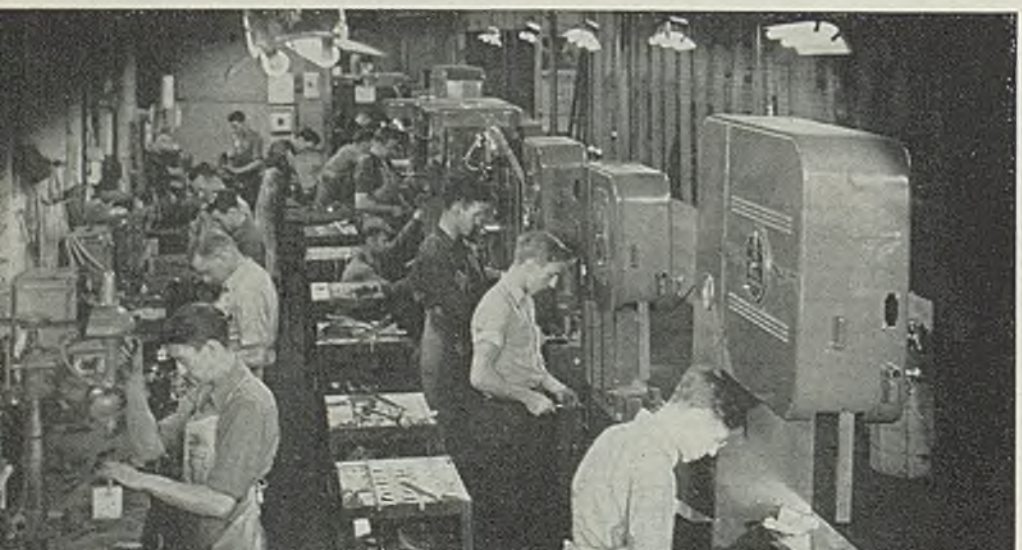
Minneapolis has such a long severe winter that by the time February comes around there is a mass exodus from work because of colds. Every February for the past five years our production has been seriously affected by the absence of altogether too large a portion of our crew because of colds. The way it has worked out generally is that the first half of February as much as half the crew is knocked out. Then during the last half of that month the remainder of the crew catch the colds from the others, so they in turn are home.

Our personal experience with cod liver oil capsules and other vitamin tablets when taken consistently during the winter months is that they build up an effective resistance to colds. Recently we decided to ration these capsules to our men so that this coming February we will not lose any such number of manhours. We never heard of anyone else carrying out this particular kind of "regimentation" by making this into an interesting project and "selling" it to the men as we are.

Here is the idea. We purchased a large quantity of flat folding paper cups on which we have had printed, "Your Health." Under this heading appears a short, snappy paragraph on some important phase of health preservation and cultivation.

At the bottom of the paper cup is printed the following statement: "This contains one capsule which may be taken internally to add essential vitamins to diet. The Management."

We distribute one of these prepared cups to each of our 350 employes at 10:30 each morning. That is a convenient time because then there is the 10-minute relaxation period which has been in force for several years. The short paragraph on the paper cup changes every day so that is a new attention-arrester each day. To start the thing off, we had our company doctor write a bullein on these vitamins, which was placed in pay envelopes. Then we issued another bulletin with the first distribution of cap-



A workman must be mentally awake and in "tip top" condition physically to perform skill-

Pills Do Big Things

By LEIGHTON WILKIE
President
Continental Machines Inc.
Minneapolis

sules. Here are some of the slogans which we have prepared for use on our "Vitamin Cups," and which as previously mentioned will change from day to day in order to keep interest in the program constantly at a high pitch. We submit these with the thought in mind that they may be of general interest throughout industry during these critical days.

If you can walk to and from work, leave the car in the garage and you will both last longer.

The difference between natural and emotional fatigue is that a good night's sleep will take care of the former.

The mouth and throat are real storehouses for germs; in addition to brushing the teeth daily and using dental floss between the teeth, frequent use of gargles and mouthwash solutions cannot be overlooked.

Bad cases of pimples are not always due to skin trouble; more often the cause is eating too much pastry and greasy foods.

When eyes are inflamed from a bad head cold, bathing them with a weak solution of boric acid will help.

If you can expand your chest at least two inches and hold your breath for 75 seconds, don't worry about your lungs.

Most drugs work like a blowout patch on a tire; the trouble is twice as bad when it reappears.

Smoking, especially of cigarettes, aggravates a cold because it increases the irritation of the respiratory tract. Therefore it is a good idea to let up on or quit smoking at the first sign of a cold.

Midnight suppers cause more digestive complications than all other meals of the eating cycle put together—anything from catarrh to appendicitis.

Drinking too much cold milk is likely to cause constipation because it forms casein in the bowels.

You will feel more comfortable after eating and you will live longer if you can leave the table and take in your belt rather than have to let it out.

Even though the climate is much milder at our DesPlaines, Ill., saw plant, we are putting the same program in effect for the 50 employes there. The cost of the whole project will run around $500 for a period of 90 days for a force of 400 men. We think that it will pay for itself several times over in greater productivity from more alert men and through reduced absence due to sickness of urgently needed men.

All of this does not mean that we subscribe to any such philosophy as that of "whipping the tired horse." On the contrary, we agree with Herbert Hoover's contention that machines rather than men should be called upon to bear the brunt of the physical efforts required to meet present tremendous demands for production.

By F. G. SCHRANZ
General Manager
Baldwin Southwark division
The Baldwin Locomotive Works
Philadelphia

SOME TYPICAL SHELL FORGING

How to forge shells is a subject of intense interest at this time so the explanation of some shell-forging methods and equipment presented here is timely. It will aid the reader to understand some of the problems involved and will show how improved methods are making possible faster, more efficient shell production

THE ONSET of the first World war found few men in America who knew anything about shell forging. A flow of orders from the belligerents, plus the assistance of their technical men helped us through the educational stage so that equipment for making various sized shells had become standardized by the time we entered the war ourselves. The table on page 50 shows the sizes and types of presses used for this work.

Our needs today are basically the same as they were then. But the educational period will either be considerably shortened this time or eliminated altogether because of our accumulated experience in shell forging. Today's presses are fundamentally similar in sizes and types but improvements have been made to speed up production, reduce rejects and prolong die life. A new mechanical shell forging press is arousing a great deal of interest because of its high rate of production of shells up to 6-inch diameter. Billet heating furnaces and billet handling technique have undergone considerable improvement.

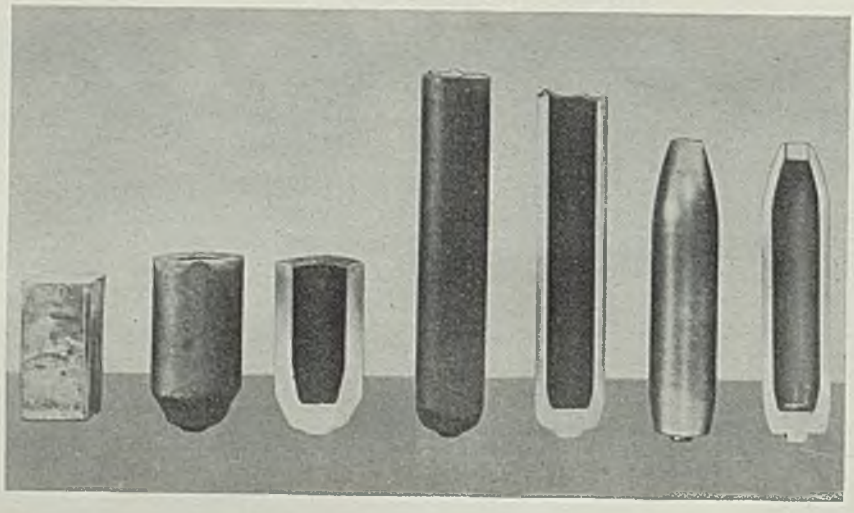
The square section billet is taking the place of the round billets formerly used. The circular section billet in a piercing pot was more or less extruded over the piercing mandrel—a condition which caused excessive wear on both the piercing pot liner and the mandrel. When a square section billet slightly longer than the pierced billet desired is placed in a piercing pot the mandrel expands the billet to the diameter of the pot, thus producing a round body—an improvement which saves wear on the tools and requires less press capacity. For this reason and because square section stock is cheaper on a pound basis, the new mechanical shell forging machine dies have been especially designed to handle them.

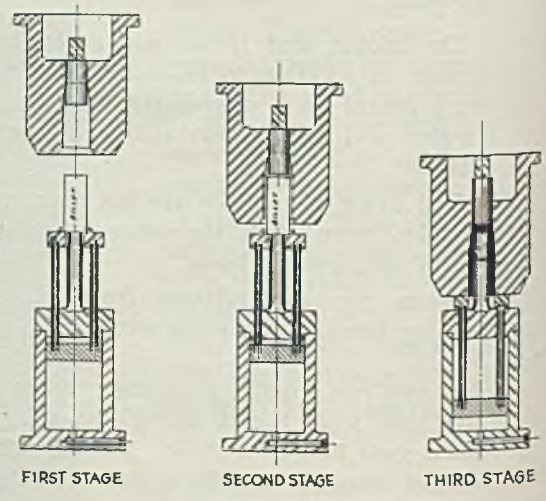
Billets up to 8 inches square are now gas cut or gas nicked. Power or hydraulic presses ranging from 100 to 250 tons capacity are used for breaking billets.

Two types of presses are used to convert the rough billet into a semifinished shell body. The first operation is carried out on piercing presses. A billet, heated to 2300 degrees Fahr. is placed in the piercing pot, which in one process is affixed to the lower or stationary platen of a vertical hydraulic press. The

Fig. 1—Schematic step-by-step diagram, right below, of new shell-forging dies used in 700-ton press shown in Fig. 7

Fig. 2—Stages in shell forging from square billet, extreme left, to pierced piece, through drawing and nosing operations—the last three stages being illustrated by sectionalized pieces to show how wall thickness and shape are changed





METHODS

This article is the first of a series on armament and munition manufacture being presented to readers of STEEL. Next week W. Trinks, professor of mechanical engineering, Carnegie Institute of Technology, Pittsburgh, will present latest recommendations for heating billets to be forged into shells. That will be followed by an outstanding authority on munition manufacture who will present an exclusive series of articles that you will not want to miss. For other articles already published, see STEEL, Dec. 30, 1940, p. 38, on Naval Torpedoes; also Modern Shell Production Methods—making shrapnel shell, STEEL, March 11, 1940, p. 38; Mobile Repair Shops for the Army, STEEL, Nov. 11, 1940, p. 46; Technical Progress Aids Defense, STEEL, Oct. 14, 1940, p. 160 and Jan. 6, 1941, p. 219; Bofors Anti-Aircraft guns, STEEL, Dec. 2, 1940, p. 50.

piercing mandrel is attached to the moving platen. A slugging mandrel, whose function it is to force the billet into the pot to form a conical shell bottom and provide a depression to guide the piercing mandrel, may be employed. If so, it is carried on a sliding mandrel holder.

For large shells the piercing mandrel and pot are moved laterally on the press platen. This arrangement permits the use of two piercing mandrels, one mandrel doing the piercing while the second is immersed and cooled in an oil bath by the downward movement of the press. An arrangement of two piercing pots attached to a laterally sliding table will allow one piercing pot to be moved outside the columns of the press where the pierced billet can be ejected and the pot refilled. This setup requires a shorter press stroke as the distance between the nose of the punch and the top of the pot can be small.

A second process uses a more recent die development in which the piercing pot is attached to the down-moving platen of the press in an inverted position, while the piercing mandrel is stationary on the bottom platen where it projects through a stripper plate. This arrangement, shown in Fig. 1, allows the pierced shell to be stripped from the mandrel on the upstroke of the press and to be removed from the piercing pot when the moving press platen reaches its top position.

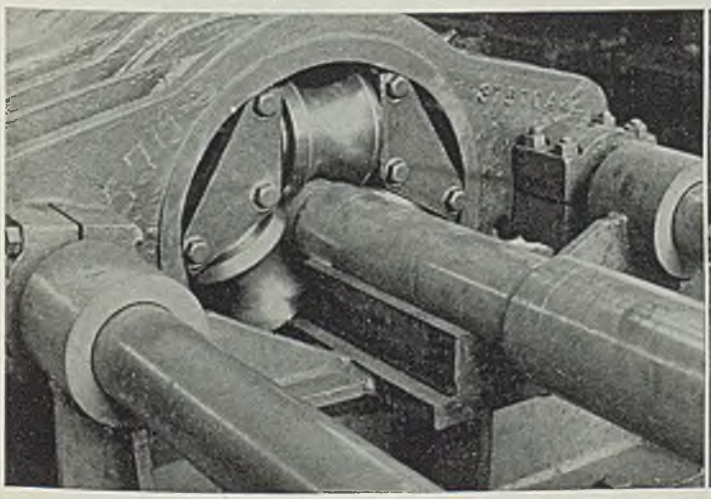
After the shell is ejected from the inverted pot, any scale which may have lodged in the pot will automatically fall out. The stripper plate and the lower face of the piercing pot are provided with tongue and recess so that they will center themselves. The heated billet is placed on this stripper plate and when it is covered by the down-moving piercing pot, the piercing operation is started. By this method the mandrel is guided and held central with the pot to produce a concentrically forged billet. This is important as an eccentrically pierced forging can never be corrected in the drawing operation.

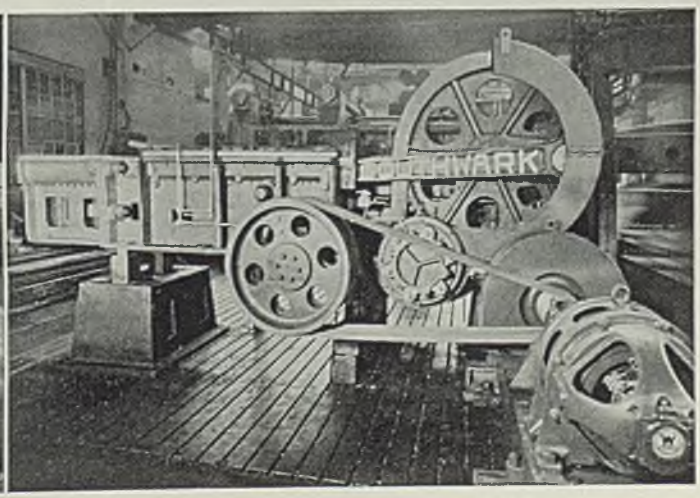
Hydraulic shell drawing presses are generally of the horizontal type, although a vertical press may be used on small diameter shells. These have a multiple arrangement of drawing ring die heads.

A few years ago a new type of drawing die was introduced. This die, of the roller type, is shown in Fig. 3. Each die head carries three rollers—the con-

Fig. 3—Roller-type die heads for shell-drawing work—a new development in drawing technique

Fig. 4—A Baldwin-Omes mechanical shell-forging machine for rapid production of smaller size shells, right, below





Size of Shell	Operation	Capacity of Press	Type of Press	Based on 1500-lb W.P.		Stroke	Daylight Opening	Clearance Between Columns	Diameter of Columns
				Main Ram	Pull Back Rams				
3″	Piercing	150 Ton	Vertical	18″	2—5″	30″	5′0″	25″	5″
3″	Drawing	100 Ton	Vertical	16″	2—6½″	48″	7′0″	25″	5″
4.5″	Piercing	300 Ton	Vertical	25″	2—7½″	36″	7′0″	29½″ Sq.	6½″
4.5″	Drawing	150 Ton	Vertical	20″	2—8″	54″	8′0″	29½″ Sq.	6″
6″	Piercing	500 Ton	Vertical	32″	2—9″	50″	9′0″	34½″ Sq.	7½″
6″	Drawing	200 Ton	Horizontal	18½″ by 13½″		9′6″	15′0″	2-col. 36″	8″
8″	Piercing	700 Ton	Vertical	38′	2—10″	48″	8′0″	38″ Sq.	8½″
8″	Drawing	260 Ton	Horizontal	21″ by 14″		10′2″	17′0″	2-col. 40″	8″
9.2″	Piercing	1000 Ton	Vertical	45″	2—11″	60″	11′6″	39″ Sq.	10″
9.2″	Drawing	260 Ton	Horizontal	21″ by 14″		12′2″	19′0″	2-col. 40″	8″
12″	Piercing	1500 Ton	Vertical	54″	2—14″	72″	13′0″	60″ Sq.	12″
12″	Drawing	340 Ton	Horizontal	24″ by 18″		20′0″	24′0″	2-col. 43″	10″

tact point of the rollers being shifted 120 degrees on every other head. In other words, the shell is handled by a process similar to that used by the steel mill in rolling the original bar from which the billet was made. The only difference is that in this press the rollers are revolved by pushing the shell through the roller die heads. The number of heads on the horizontal roller type drawing press ranges from three in number for 3-inch shells up to nine heads for larger shells.

This is considered an improvement over the original ring-type press which used annular rings, as it produces a smoother inside finish in the shell and also rolls the material over the drawing mandrel instead of forcing it through the solid rings. This rolling action also improves the quality of steel in the shell.

A new type of shell-drawing machine has recently been developed in which the pierced shell is passed through a set of three rollers which are driven in a manner similar to the cross rolls used in tube mills. After the shell passes the roll stand it is put on a drawing mandrel and pushed through a die head with three stationary rollers similar to that used on the new type horizontal roller drawing presses already described.

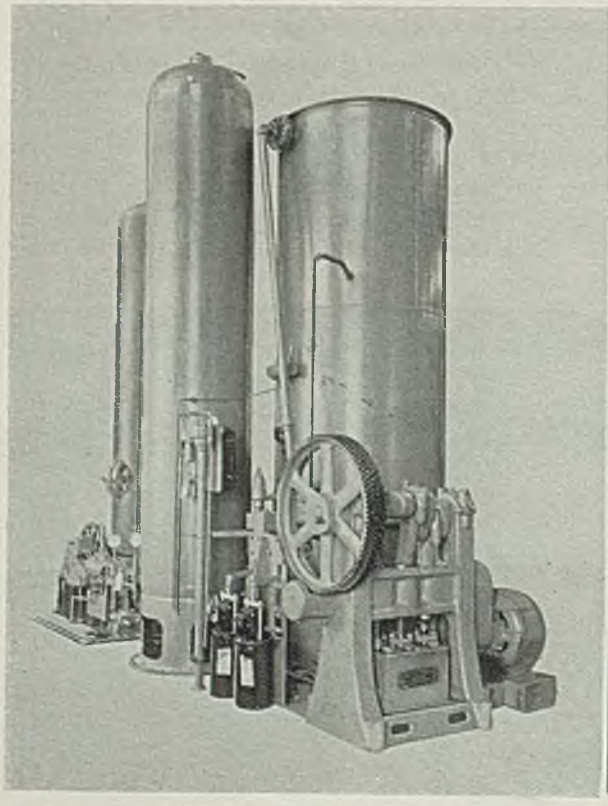
Mechanically operated presses or shell forging machines are coming into use for producing small size shells. One type of forging machine uses round billets cut in lengths so as to make two shells from a single billet. In this press each end of the billet is passed in a progressing die arrangement in five or six stages, then the other end of the billet is reheaded and pierced in the same manner. Afterward the two shells are cut apart. This method of forging shells is based on the principle of the conventional forging or upsetting machine.

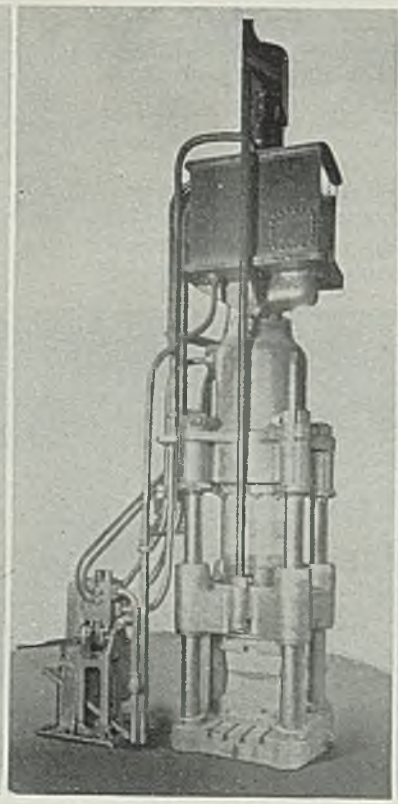
A new development, a combined mechanical piercing and drawing machine is being used in England, where it is known as the "Omes" shell forging machine. The piercing operation on this unit starts with a square billet heated and placed in one of two open split dies. The billet rests on a lower surface of the die which is closed in laterally when the operator depresses a foot pedal. The piercing punch is operated by the machine's crankshaft, following closing of the die. The piercing punch enters through a steel guide bushing and expands the billet toward the walls of the die as it performs the piercing operation. The punch then is retracted, the die opened and the

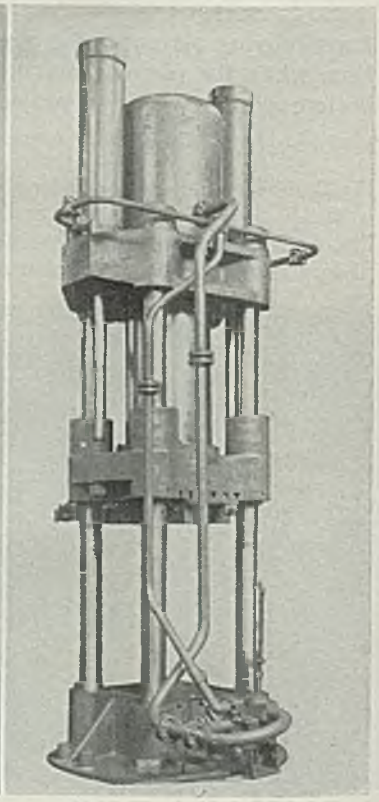
Fig. 5—Hydropneumatic accumulators eliminate line shocks, offer a flexible source of hydraulic power

Fig. 6—Piercing, the first stage in shell forging as shown in Fig. 2, is performed on presses like this Southwark 350-ton unit shown at center, below

Fig. 7—Billets are concentrically forged in presses similar to this 700-ton unit when equipped with the new-type dies shown in Fig. 1







HERE'S HOW TO GET MORE OUT OF MACHINE TOOLS...

. . . and gain extra tool room time in the bargain

A.

Suppose each tool you make could be made to produce more pieces—in fewer days—with less attention in service.

Would that give you the extra plant capacity and the extra man-hours of tool room time you need to meet today's conditions? It might not provide *everything* you desire, but it would prevent excessive interruptions to production—and it *would* reduce time spent in the tool room on the repair or replacement of worn or broken tools. Over a period, you could save enough time to account for substantial increases in plant and tool room output.

But how can you assure a better average of tool performance? More than a thousand plants are doing it by simplifying the selection and heat treatment of tool steel—by systematically pre-analyzing tools to determine the right steels and the right hardening procedures. They are using Carpenter's Matched Set Method of Tool Steel Selection to do the job—and Carpenter's Matched Tool Steels to insure consistently good results.

B.

With the literature shown on this page, you can easily put this method to work in your own tool room—and chances are that some of this literature is already on file in your tool room. If so, check into it now. You will be surprised at the way this system for simplifying tool room procedure fits into present needs—at the opportunity it offers for improving tools, relieving pressure on the tool room, and increasing machine output.

D

C.

THE CARPENTER STEEL COMPANY, READING, PA.
139 BERN STREET

Carpenter MATCHED TOOL STEELS

A. Wall Chart Tool Steel Selector

B. Carpenter Matched Tool Steel Manual

C. Booklet, "How To Get More Out Of Your Present Production Set-Up"

(Above literature *Free* to Tool Steel users in the U. S. A.)

D. Apprentice Training Book "Tool Steel Simplified" 315 Pages price $1.00 in U. S. A.

pierced billet falls clear to be picked up and placed on one of the two drawing mandrels or the drawing bench part of this machine. The machine has double tooling so one set of dies is cooled while the other is in operation.

The drawing mandrels' cross head is connected to the machine's crankshaft so as to operate these drawing mandrels in unison with the piercing operation. They tilt upward at the back of the stroke to receive a pierced shell, then move down to the horizontal to push the shell through three drawing rings for ejection at the front of the machine.

No machining is required inside the shells.

Capable of producing more than twice as many forgings an hour as other type presses, the new and patented Baldwin-Omes mechanical shell-forging press offers many operating economies. By working with square billets, savings in material and consequently in weight and cost are realized. Wall thicknesses of shell forgings are uniform, reducing outside machining to a minimum. Rejects are few. In all cases provision must be made for cooling and lubricating the piercing and drawing dies.

Owing to the high speed required in piercing and in drawing, a great quantity of high-pressure water must be available. On piercing presses some saving can be made by the use of a low-pressure or overhead filling tank. On a piercing press equipped with an overhead tank, the press cylinder can be filled during the down stroke before the piercing mandrel enters the billet.

Where several piercing and drawing presses are installed in one shell, a hydraulic accumulator system is generally used. The capacity of the accumulator should be equal to the total ram displacement of all presses. For instance, for six 60-ton piercing press rams with 24-inch stroke, each displacing 50 gallons per press stroke, will require 300 gallons of 1500-pound pressure water. Six 200-ton drawing presses with 6-foot stroke will each displace 85 gallons per press stroke or 510 gallons. This makes the total accumulator capacity 810 gallons. However, as all presses are not making strokes at the same time, it is safe to figure that 700 gallons of accumulator capacity will be sufficient. This might well be two 350-gallon accumulators which can be either 24-inch diameter ram, 15-foot stroke weighted accumulators of the type shown in Fig. 10, or two air-bottle type accumulators, 40 inches in diameter and 30 feet high or similar equipment.

Pump capacity is based on the average number of strokes each press makes per hour. If 80 shells per hour are produced in this shop on each press, the pump requirement would be about 900 gallons per minute. This would call for two 450-gallon pumps, each with 450-horsepower motor. A pump which is widely used for this service is shown in Fig. 9.

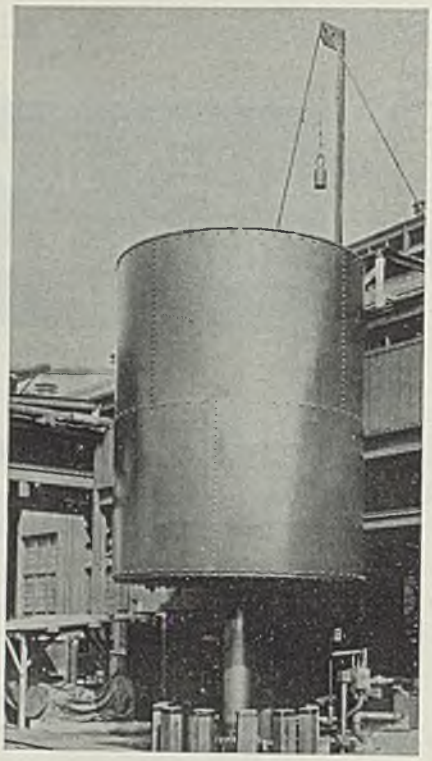
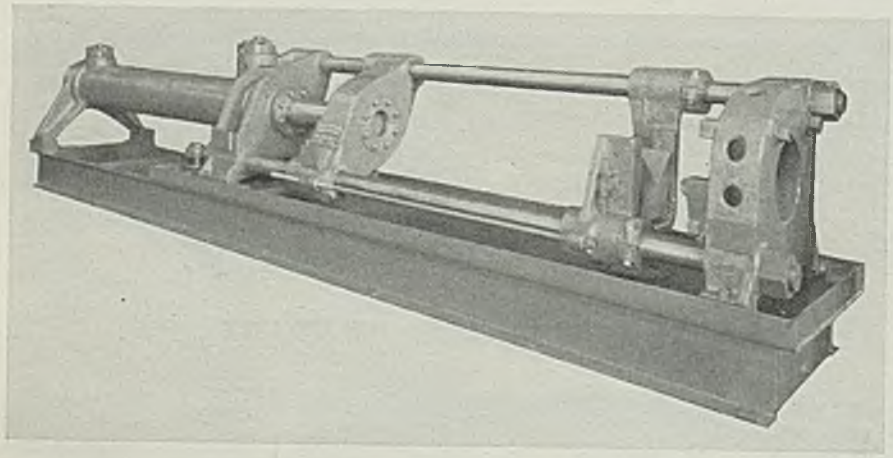
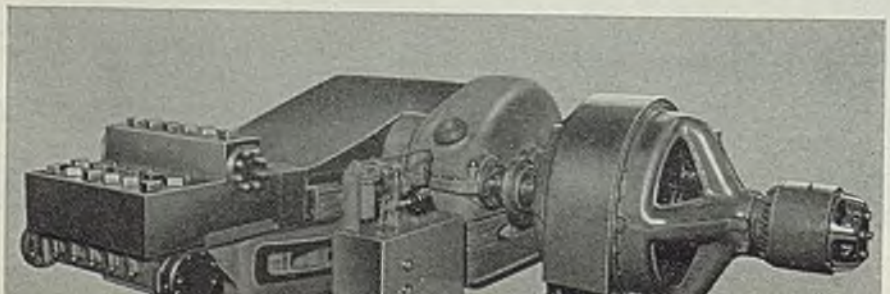


Fig. 10—Weighted accumulators also are used widely to supply the water at high pressure

Fig. 8—Horizontal draw benches of this type are used to draw the pierced shell, the first step after piercing as shown in Fig. 2. The unit is hydraulically powered

Fig. 9—Horizontal triplex pumps like this one below are being installed in new forge shops to supply the large volumes of water needed at high pressure for the hydraudic presses





Dewey Process Developed By Steel & Tubes

■ Inadvertently, the article describing the new Dewey process for shaping tubes, STEEL, Dec. 30, 1940, p. 40, did not mention that the method was a development of Steel & Tubes division of Republic Steel Corp., 224 East 131 street, Cleveland. Steel & Tubes is now ready to accept orders for job lots of tubing shaped by this method.

Includes Useful Manual With Every Tool Order

■ A 12-page manual for operators, containing complete information on cutting tools is now being included in every carton of the individually packaged new low-priced standard tools recently introduced by Carboloy Co. Inc., P. O. box 239-R, Pk. A, Detroit.

Printed in small perfectly legible type, it is profusely illustrated with drawings, measures only slightly over 3 x 4¼ inches, yet contains all information essential to the use and care of the tools.

Prime reason for this extra service is that the introduction of the new tools at low prices permits their use in many shops unacquainted with the technique of using cemented carbide tools, particularly with their increased demand in connection with present defense production.

A Sheet of Paper Makes Steel Flow Properly

■ ON MANY occasions a simple home-made remedy for a puzzling metallurgical ailment, applied on the spur of the moment by steel company engineers, has cured the trouble after more elaborate prescriptions had failed.

Certainly the metallurgical engineer for one large steel company who in an inspired moment used a piece of ordinary brown wrapping-paper to keep steel sheets from breaking under a forming press did not learn that trick from a textbook.

One of the customers of his company had been given an order to produce oil pans for a motor truck. The steel which had been supplied for the job was high quality and perfectly suited for the purpose but, nevertheless, nearly all the oil pans broke at one point during forming.

When the metallurgist arrived at the customer's plant, he quickly found the cause of the defects. The design of the pans called for a rather deep and wide cup at one end of a rectangular sheet of steel.

Like Fitting a Cork

The upper and movable die of the press was supposed to push the steel into a matching depression in the lower stationary die. The top die was also supposed to drag along with it enough metal from that part of the sheet which was to remain flat to form the walls of the cup. The effect was planned to be somewhat like putting a piece of paper over the mouth of a bottle and then pushing the paper into the hole with a tightly fitting cork.

But the steel was not sliding into the cup in the lower die as planned, and consequently the sheet stretched very thin or actually broke at the top edge of the cup. The trouble could have been cured by redesigning the die slightly, but the order for the oil pans was marked "rush", and no time could be lost in altering dies.

The metallurgist tried all sorts of remedies. He lubricated the dies, and then the steel itself with a number of different oils and greases. Yet none of these ordinary expedients seemed to work satisfactorily.

Finally, in desperation, he called for a sheet of wrapping paper, soaked it in oil and laid it on the lower die. He then put the sheet of steel on top of it and started the press. When he examined the oil pan formed that way, he found that his makeshift remedy had worked. The oil-soaked paper had slipped along with the steel and allowed the sheet to feed properly into the die.

It was later found that from 12 to 15 sheets of steel could be formed with the same sheet of paper. The finished oil pans, without defects, were delivered on schedule.

From *Steel Facts*, published by American Iron and Steel institute, 350 Fifth avenue, New York.

New Safety Lens Has High Shock Resistance

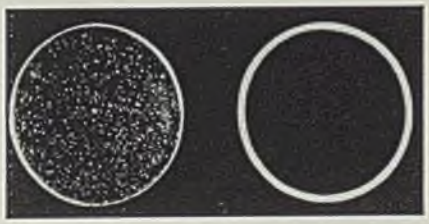
■ A product growing out of the increased emphasis on safety in industries engaged in the expanding defense program is the new Tulca safety goggle lens, developed by Univis Lens Co., Dayton, O.

Made of special nonshattering material, they are not to be confused with old type plastic or laminated safety lenses, since they are produced under a special process from a newly developed material.

Each lens is less than half the weight of a tempered glass lens, of equal dimensions and thickness, and processing does not affect its optical qualities. It is said to stand up under shock, abrasion, the thermal shock of molten metal and offers great all-around safety.

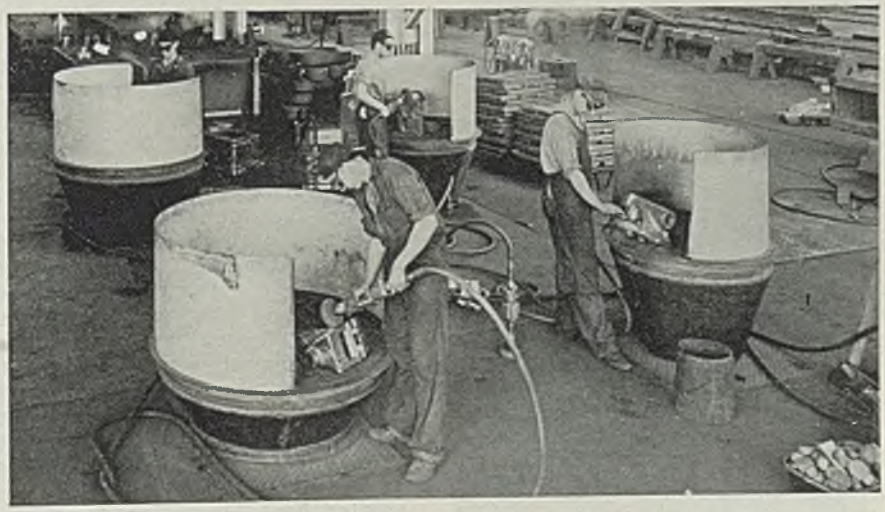
Recently in a flash welding service test conducted by one of the nation's leading manufacturing plants, it was found to be still serviceable after 84 hours of use. Under regulation tests, it was found that the shock resistance of Tulca lenses is three to four times that demanded by ASA and United States bureau of standards requirements. Moreover, the resistance is more uniform.

The surface of the lenses is 20 times more resistant to grit and hot metallic particles driven from an emery wheel than other lenses. Molten metal, splashed on the lenses, had no effect whatever, while flying particles of hot metal and sparks made no impression. Under the Polariscope, the strain pattern was found to be so slight as to be almost negligible. The new lenses are available in Toric (curved) or Plano (flat) styles, and are made to fit safety goggles and spectacles of any style or shape.

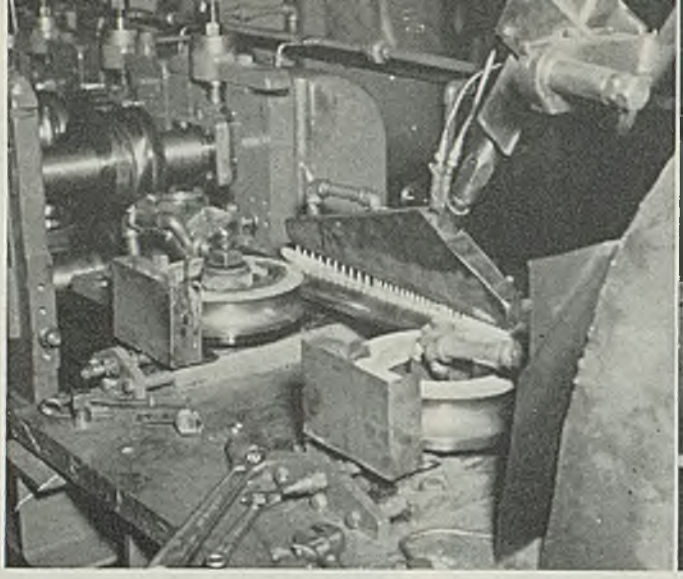


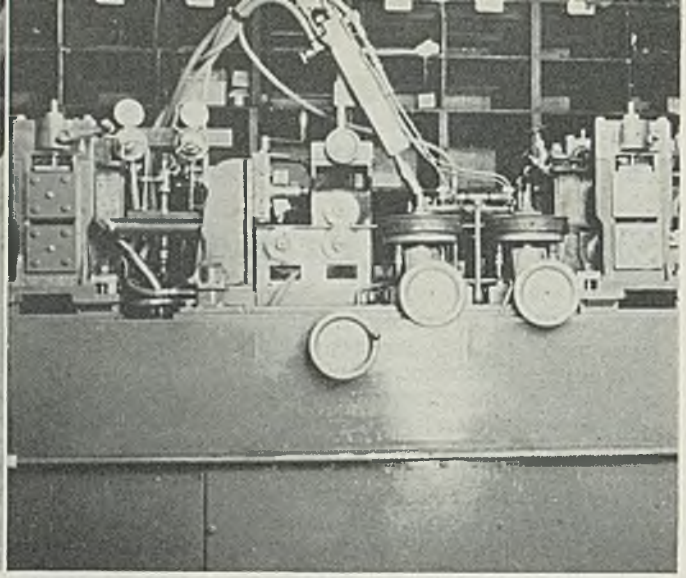
In an actual flash welding service test, the Tulca lens shown at right was unaffected by flying particles of hot metal and sparks after 84 hours of service. The ordinary lens at left was so pitted after 16 hours that it was unfit for further use

"Drafting" Dust Out of the Shop



■ **Grinding bucks in the new castings cleaning department at Monarch Machine Tool Co., Sidney, O. Here fine particles which ordinarily would fill the air are now exhausted through down-draft grilles on which the work is placed. The circular sheet-metal guards catch and drop into the grilles the heavy abrasive particles which ordinarily would shoot off on the floor**





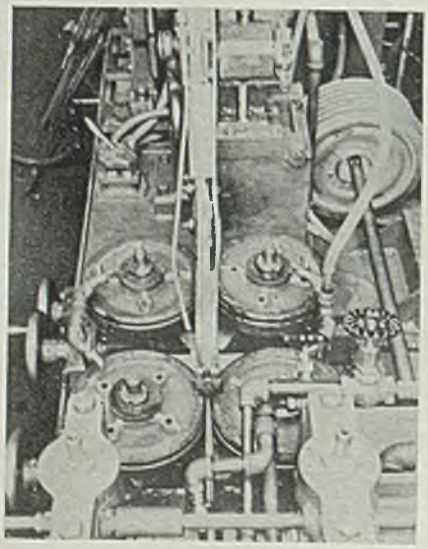
Welding speeds as high as 100 feet per minute are obtained on continuous tube-welding machines of the type shown at left above. This side view of a tube-welding machine shows the welding station and weld-trimming tool. The welded tubing is used for conduit to carry electric wiring

High-Speed Mechanized Gas Welding

■ FOR PURPOSES of discussion, mechanized oxyacetylene welding can be divided into two broad methods. One might be called the "continuous" method, since by this method the part is completely welded in one continuous operation such as is practiced in tube welding. The other might be called the "discontinuous" method, where the part is welded with a series of welds, or with two or more welds simultaneously made. This latter method is utilized in making washing-machine tub joints and container seams.

In the continuous type of operation, the material is carried through the welding machine by a system of rolls and past a stationary welding blowpipe. In the discontinuous method, the preformed stock is placed in a jig and rotated past a stationary welding head, or the jig and material may remain stationary while the welding head travels along the seam on a track. As to the technical differences in the welding procedures of the two methods, in the continuous method the material is guided by rolls and the spacing of the edges to be welded can be changed by varying the pressure that the rolls exert. By this means, a gap can be maintained between the edges during preheat, and closed by proper location and pressure of the rolls during the welding.

This top view of a tube-welding machine shows the four horizontal rolls which position the tube during welding

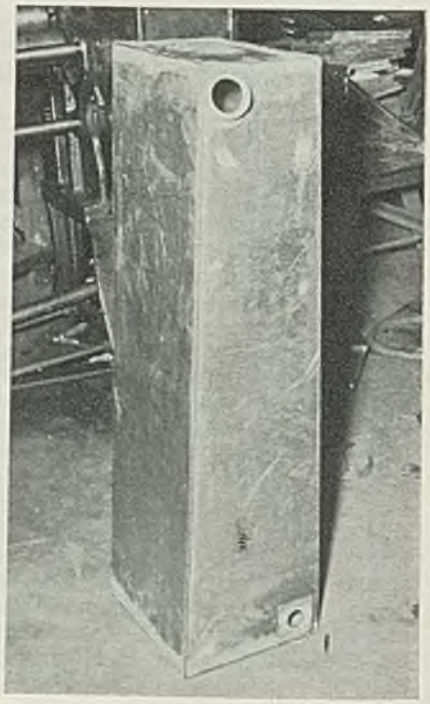


In contrast to this procedure the discontinuous method, which is applied to irregularly shaped pieces, requires that the edges be placed in abuttment within the welding jig. In this method all of the heating is done from the top surface of the material and the bottom surface must be heated by conduction, whereas separation of the edges in the continuous method allows direct heating of the entire surface of the edges themselves. This difference in the method of heating the edges for welding, together with the greater heat absorption from stationary clamping jigs used in the discontinuous method, results in a 40 per cent lower gas consumption with the continuous method.

In general the continuous method is limited to straight welds on material of uniform section. The greatest fields of application for this method, therefore, are longitudinal seam welding of barrels and the tube welding.

In barrel welding, variations in stock thickness make necessary automatic control of heat input to the steel. This is accomplished by

This view shows the completed gasoline tank. Note the neat appearance of the mechanically welded joints

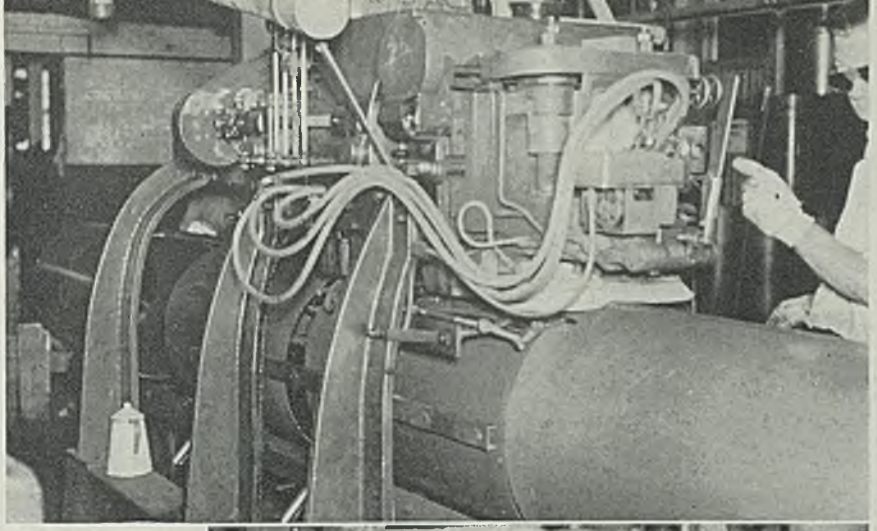


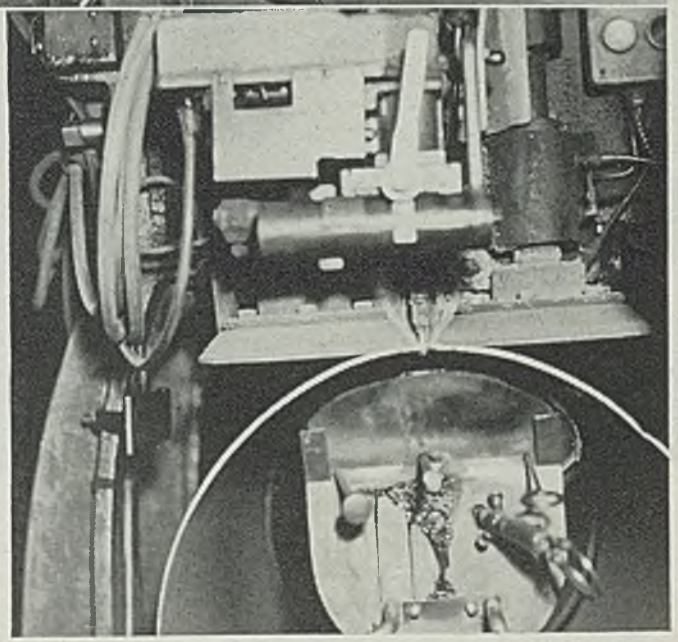
By H. T. HERBST

Development Engineer
The Linde Air Products Co.
Newark, N. J.

Now Is Feasible

As is explained here, it is not difficult to construct a machine to handle automatically such operations as welding, brazing and hard surfacing. Preheating the work, feeding material to the joint and actually making the joint are done automatically at high speed. Not only is production increased and costs lowered but better and more uniform work results





Barrels with a 3-foot longitudinal weld can be turned out at the rate of 75 to 100 per hour in this welding setup. This end view of the barrel-welding machine shows the automatic control as well as the relation between the squeeze rolls, welding head and work, bottom view

means of a photoelectric cell unit which picks up light radiation from the bottom of the weld. This variation also limits the maximum practical welding rates to less than 6 feet per minute. In tube welding of coiled strip stock, these variations do not occur and welding rates in general are limited only by the capacity of the acetylene generator.

The usual practice is to have dual acetylene generators installed for continuous service. With a generator installation capable of delivering 600 cubic feet per hour, tube welding rates of from 75 feet per minute on 16-gage to over 160 feet per minute on 20-gage are obtainable. At these rates the coiled stock is fed into a roll-type forming machine with roll forms of a design to give the shape desired. Numerous shapes, such as rectangular, oval or teardrop, can be welded by this method.

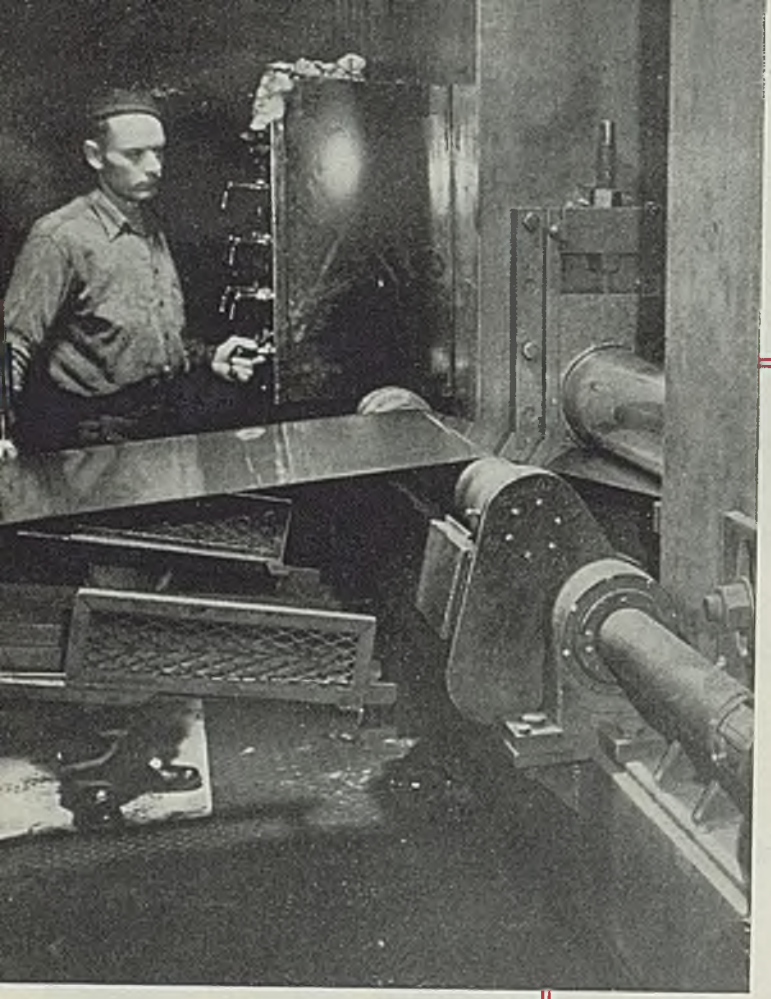
From the forming unit, the material passes to the welding unit which usually is close coupled to the forming mill. The welding stand generally consists of at least two sets of horizontally and vertically adjustable, watercooled, side guide rolls. Preheating and welding take place between these two roll sets. With proper side-pressure control from these rolls, the weld reinforcement can be built up or reduced as desired on either the outside or the inside, depending upon the use for which the tube is intended. Where perfectly flush inside and outside surfaces are desired, scarfing tools are employed to trim the weld.

After passing through the welding and scarfing stands, the tube is cooled in a water spray or bath and sized and straightened in rolls provided for this purpose. Then it is cut off to length in an automatic unit that travels with the tube as the cut is being made and returns to its starting position for the next cut.

Discontinuous Welding, Non-Rod Feed: In the discontinuous method of welding with no welding rod, the square-sheared edges of the material are placed in abutment. Since no rod is added, it is important that the edges be sheared correctly and placed so that the two edges to be joined are in contact. Failure of the edges to make contact will result in a weld section thinner than the base metal. In some cases, this condition results in burning or falling through of the metal. To avoid deformation due to contraction stress, jigs and clamps used to hold the parts in position should be sufficiently heavy to absorb heat from the workpiece quite rapidly. At high

(*Please turn to Page* 69)

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



Automatic regulating tensiometers are being used on many skin-pass strip mills to control operation of mill and tension roll device motors so as to maintain constant tension on strip. This assures more uniform processing

Electrical Developments

Most steel plant construction projects completed last year and still underway are in the nature of rehabilitation of existing primary production facilities, with installation of some new finishing mills and processing lines to round out overall producing capacity. Mr. Kenyon points out the importance of the many improvements in cold rolling mills and auxiliary equipment

By A. F. KENYON

Steel Mill Engineer
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

NOTABLE improvements have been made in rotating machines and variable voltage control equipment for cold strip mills, to enable faster acceleration and higher rolling speeds, with resultant increased output and higher percentage of on-gage strip.

Fast acceleration without exceeding reasonable limits of accelerating torque requires low WR^2 of the rotating parts of the mill and reel motors. In some cases the desired low WR^2 can be obtained by special design to make the motor armatures of small diameter and long core, and in some cases it has been necessary to resort to double armature construction. Mill speeds frequently are high enough to permit direct connection of the motors to some of the mill stands, and the lower motor speeds and elimination of the reduction gearing result in lower WR^2, referred to the mill shaft, than is posible with geared drives.

A system of control has been developed comprising a series booster generator in the armature circuit of each mill motor, and an auxiliary exciter driven by each mill motor, to automatically compensate for the varying effects of motor IR drop and armature demagnetization, and thus cause the motor speeds to change in almost exact proportion to the bus voltage, independently of the motor load or shunt field setting, and hence maintain the same speed relations throughout the threading, accelerating, running and decelerating cycle. This system of control has been applied to three new high-speed tandem cold reduction strip mills put into service during the year, and equipment for additional tandem mills is being built. A similar system of control has been applied to seven skin pass cold strip mills, and to seven high-speed electrolytic strip cleaning lines.

At the plant of one large tin plate producer, a 38-inch 4-stand tandem mill which originally had been installed to operate at about 600 FPM maximum, and later was rebuilt to increase the delivery speed to 1000 FPM, was moved to a new location and complete new electrical drive equipment installed to enable operation at speeds up to 2500 FPM. The mill normally operates at strip delivery speeds between 2000 and 2500 FPM, normal accelerating time from threading to running speed is less than eight seconds, and the maximum output of 32-gage tin plate strip has reached nearly 500 net tons in an 8-hour turn.

At another plant there was put into service a 55-inch 4-stand tandem cold reduction strip mill using tensiometers, geared for a maximum rolling speed of about 2000 FPM, and intended to produce intermediate and heavy gage strip for enameling and galvanizing stock, automobile sheets, etc. Tensiometers are installed between stands to indicate the tension in

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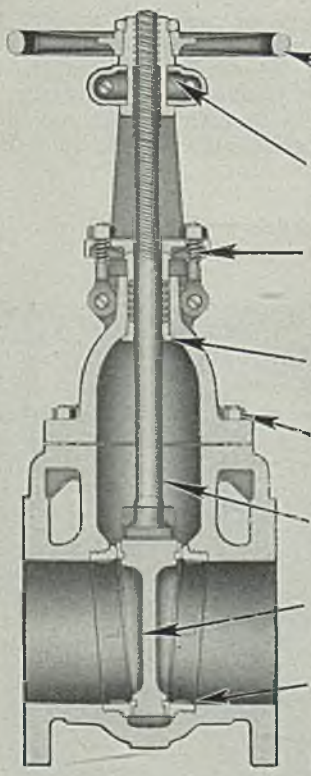

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- Easy lubrication fitting in yoke sleeve.
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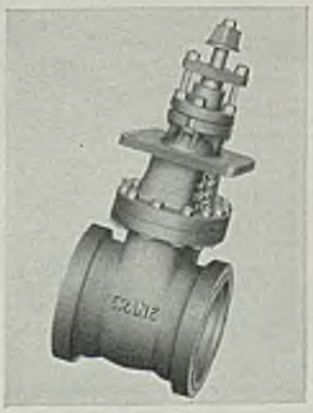
Screwed, flanged, hub ends

MARINE CARGO SYSTEM VALVES
Flanged ends

QUICK-OPENING TYPE
Screwed and flanged ends



UNDERWRITERS' PATTERNS
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the strip, and thus enable more intelligent control of the mill operation by the operators.

A new 54-inch 4-stand tandem mill at a southern Ohio plant is expected to roll intermediate to heavy gage strip, and the motor speeds are selected to provide rolling speeds up to about 2100 FPM maximum.

One of the smaller Chicago district plants has installed a 22-inch 4-stand tandem cold reduction mill. Mill motors were selected with wide speed range by shunt field control to provide maximum flexibility and make the mill suitable for rolling strip of a wide variety of sizes and grades. At normal voltage the mill delivery speed range is 700/2100 FPM. Indications of the tensions in the strip between stands are provided by indicating tensiometers. The control of the mill differs from that of most tandem mills in that the master control of the mill and reel motors is from a control benchboard located in an elevated pulpit, instead of from control stations on the mill housing.

To keep pace with the greater output of the higher speed cold reduction mills, the newer skin pass mills also are being designed to operate at higher rolling speeds. Last year one large tin plate producer completed the installation of three 42-inch 2-stand skin pass mills, laid out for normal operating speed of about 2500 FPM, and incorporating a number of novel features in the electrical drive equipment.

Each mill consists of two working roll stands, with unwinding reel and tension roll device at the entry side to exert back tension on the strip entering the mill, and a second tension roll device and winding reel at the delivery side to exert forward tension on the strip leaving the mill. All of the mill, reel, and tension device motors and drag generators are designed to operate at the mill speed, and are direct coupled, thus eliminating all reduction gearing, and reducing the WR^2 to a minimum. The upper and lower rolls of the entry tension device and of the delivery tension device are individually coupled to separate motors (drag generators) making up twin-motor drives, thus enabling the use of rolls of slightly different diameter and assuring better equalization of the tensions developed by the two rolls than was possible where the upper and lower rolls were connected together and to the same drive motor.

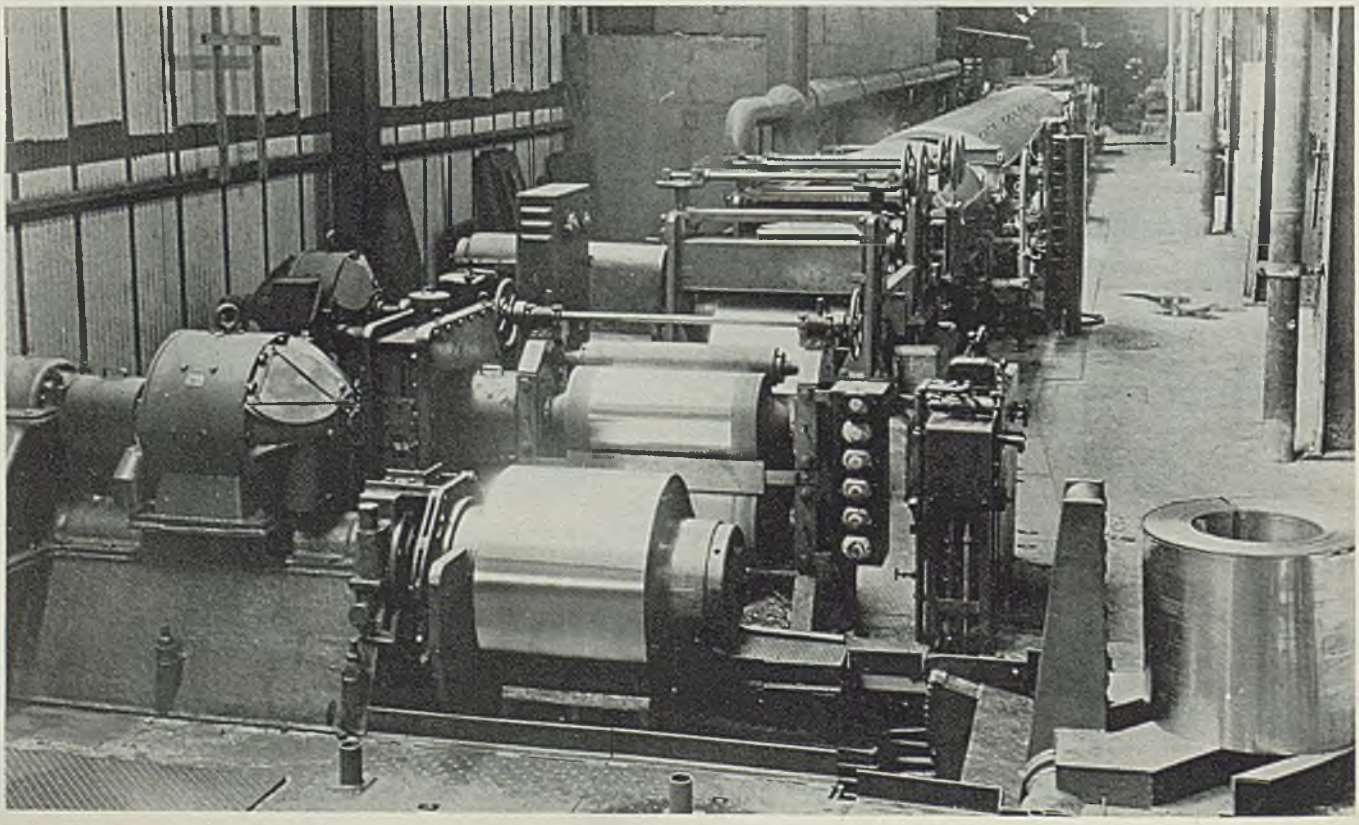
A tin plate producer has installed a 42-inch skin pass mill with individual drive of the upper and lower rolls of the entry and delivery tension roll devices. The upper and lower roll motors are controlled by separate constant current tension regulators, enabling control of the relative loads over a wide range.

Investigations of the operation of several large arc furnaces by means of the Klydonograph have shown surge voltages several times the normal voltage of the power system to which the furnace is connected, and in some cases these surge voltages were high enough to endanger the insulation of the transformer and switchgear equipment. Surge capacitors may be installed to partially absorb the surges and thus reduce the maximum voltage, and it is further considered desirable to provide additional insulation of the transformer windings and switchgear equipment, in order to afford complete protection.

Extremely large volumes of ventilating air are required to carry away the heat losses from the electrical equipment installed for large mill drives, and this ventilating air must be thoroughly cleaned to avoid carrying dirt into the machines. For this purpose there has been developed an electrostatic air cleaner, termed the "Precipitron", which is much more effective in removing fine sooty particles than the previously used mechanical air filters. Installations totaling approximately 1,500,000 cubic feet of air per minute have been made in steel plants to clean ventilating air for hot and cold strip mill motors and motor-generators sets, auxiliary substations, mill office buildings, etc.

Large output from modern high-speed cold strip mills has stimulated the development of the associated cleaning lines, shearing lines, etc. so that they also may be operated at high speeds in order to

Exit end of electrolytic strip cleaning line with delivery pinch rolls, 3-roll drag tension device and winding reel in foreground



keep pace with the production of the rolling mills.

Until recently most electrolytic cleaning lines were operated at speeds not exceeding about 1000 feet per minute.

Improvements in the mechanical and electrical equipment have shown the feasibility of operating such lines at much higher speeds, and there are now being installed three cleaning lines with special variable voltage control to operate at 2000 to 2500 feet per minute.

Co-ordination of the speeds of the various component drives is necessary during the threading, accelerating, running, and decelerating cycle, and IR drop compensation control, as described in connection with tandem cold strip mill drives, was adopted to assure this necessary coordination. IR drop compensation control is also being applied to several other existing strip cleaning lines which are being modified and rearranged at the present time for operation at somewhat higher speed.

Announces Sound-Proof Metal Trim for Doors

■ Noise from the slamming of doors and windows is muffled by the use of a new metal trim incorporating Insulmat sound-proofing, developed by Milcor Steel Co., South Forty-first and West Burnham streets, Milwaukee. Actual laboratory tests show it has a 55 per cent reduction in sound volume under impact and a 73 per cent reduction in sound decay time.

Motor Designs Change To Meet New Trends

■ MANY new methods in motor manufacturing were developed to handle production of the Tri-Clad motor line recently announced by General Electric Co., Schenectady, N. Y. These motors, available in integral horsepower sizes, conform with latest industrial trends, processes and practices.

Featuring a "modernistic" appearance and more protection, each motor incorporates major advances in the insulation of current-carrying parts, improved bearing design and lubricating arrangements. In place of the conventional open frame, the motor utilizes a cast iron frame of the box type. Its end shields are designed to match the frame and are enclosed above the centerline. This combination minimizes contact of vital motor parts with foreign material such as lubricants, chips, etc., while also protecting it against accidental blows in handling.

As the external form of any motor is closely interwoven with the provision made in suitable openings for the circulation of cooling air, the openings in this unit are located to give a greater degree of protection against the entrance of falling liquids or particles without interfering with ventilation. This was done by improving the thermal capacity of the motor without reducing the space available for active materials. The use of Formex magnet wire, a material with good insulating properties having a high resistance to heat and solvents, achieved the desired results. Also, improved air deflectors and fan designs in conjunction with double-end ventilation contributed materially to lower motor temperatures.

The new magnet wire, developed after some 10 years' research on the part of General Electric, eliminates largely the older type paper, cotton coverings and other materials which absorb moisture and deteriorate. The motor windings are further protected by the application of an improved synthetic resin varnish and a covering coat of Glyptal red. Tests have demonstrated that this varnish, when exposed to the concentrated action of oil for 19 months, shows no softening. Applied on the varnish, the Glyptal red assures the coils acid, moisture and oil-resistant surface.

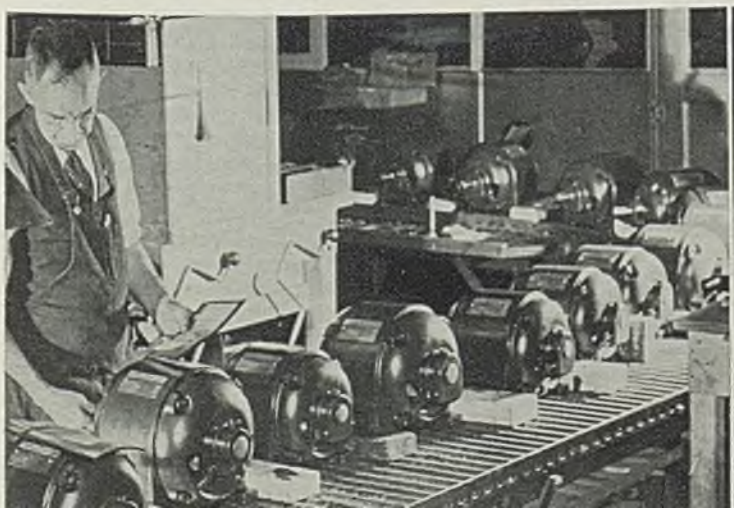
The basic changes made in the sleeve bearings, in some cases, more than double their capacity. It was found that by using bearings with the proper proportion of length to diameter, the deflections of the shaft inside the bearing can be maintained at a value less than the thickness of the oil film.

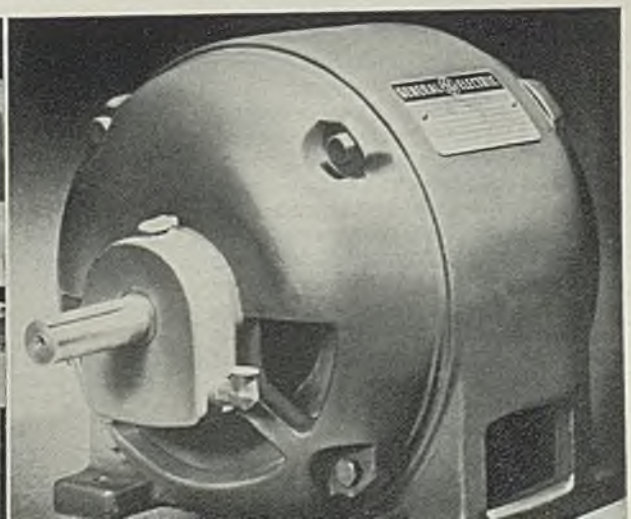
The spiral-type grooving developed for the new sleeve bearing maintains an oil film over all parts of the bearing linings under any loading condition, giving assurance of thorough oil distribution. The bearing utilizes hard-tin babbitt centrifugally cast into a steel shell. It is rigidly supported through 360 degrees and is locked in a dust and oil-tight enclosure.

A wider conduit box, mountable in four different positions, simplifies installation in close quarters. The stator is reversible and allows the conduit box to be located on either side and up or down on side wall mounting.

The same assembly of shaft and rotor is used on many popular sizes of both sleeve and ball-bearing motors. Thus, many sleeve-bearing motors may be converted to ball-bearing by changing only the end shields, bearings and caps, or vice versa, if precautions are taken to prevent damaging the journals when removing ball bearings.

Left, view showing final check of the Tri-Clad motors as they come off the production line. Right, side view of one of the new motors





When Metal Finishing . . . . . .

Should Loose Films Be Removed After "Rustproofing"?

Phosphate treatments for rustproofing usually leave a loose residue on the metal surface, which may or may not be detrimental to subquent finishes. The mechanism of formation of these deposits, under what conditions they may be harmful, and what to do about it . . . . are discussed here in one of the first presentations on this somewhat controversial subject

By E. E. HALLS

■ WHEN iron or steel work is "rust-proofed" by phosphate solution processes such as parkerizing, bonderizing, granodizing, etc., it acquires a loose powdery superficial deposit which may vary in intensity from an almost imperceptible coating to one which is distinctly objectionable, according to the processing conditions.

Much doubt or difference of opinion exists on the technical and practical disadvantages of this nonadherent film. In many instances it is obviously a disadvantage and must be removed by an appropriate additional operation, such as scouring. In others the shortcoming, if not too severe, is of little obvious consequence. So it is a moot point as to whether it should or should not be removed. Consequently, under approximately similar circumstances, scratch brushing or "wiping" is applied in one enamelling shop, while in another the deposit is ignored.

No published technical matter appears to be available on this subject, so the following views and test results are considered important. Perhaps it is best first to give a brief resume of the commercial phosphate processes and the probable origin of the loose film, and then to give durability test results to demonstrate its influence.

The phosphate "rust-proofing" processes are closely similar in basic principles, methods of operation and objectives. They may or may not differ widely in processing details of solution composition, operating temperatures and times, efficiency of result, and production costs. To treat iron and steel work efficiently, it must be clean, free from oil, grease, swarf, dirt, rust and scale. Degreasing is an essential. Cleaning free from other extraneous items also is highly desirable.

In immersion-type phospate processes, the solution itself can in effect be made a cleaner and can be made to float loose solid matter off the work and to remove light rust. In these circumstances the solution is being made to handle more than its normal load so the practice is not recommended. Also there is the danger of the dirt being carried out on the work, or of improper phosphatization beneath such dirt. Also rusted areas are bound to be more rough than if they had been first removed mechanically or chemically. As for scale, phosphatization can convert this into a paint or enamel receptive base, but there is always the hazard of this becoming flaked away later with the complete loss of the benefit intended from phosphate treatment.

Regarding the actual phosphate process, modern treatments are of two principal types. The most universally applicable is the immersion process which uses three vats for phosphate solution and two rinses, all operated hot. The cleaned work is immersed in the phosphate solution, prepared and maintained by proprietary chemicals for a period varying from 3 minutes to about half an hour, according to the nature of the base material and the type of coating required. The rinses are agitated water washes sufficiently extended to serve their purpose. Actually the second water rinse is nowadays almost invariably replaced by very weak chromic acid, in which work is immersed for a controlled brief period and then dried off. From experience with this and exposure tests on samples, this modification is to be highly commended as it adds appreciably to the rustproofing properties of the coating.

Drying-off may be achieved in air by virtue of heat retained in the work, or preferably by oven drying, the latter being particularly advocated for articles having recesses or seams.

The second method of phosphatizing is a spray process in which work is carried rapidly through a series of zones in which are batteries of sprays, continuously fed with weak alkali; water; phosphate solution; water; weak chromic acid, and finally an oven section for drying. It should be noted that the first zone is not a cleaning section and is intended to wet the work thoroughly and to remove grease from handling—for example, finger marks and light dust only. This process demands clean work in all senses, and necessitates a sufficient output of work of suitable contour to make it both practicable and economic. The time of exposure in the phosphate zone is about 1 minute with a similar period for other sections.

As a result of researches extending over many years, phosphate solutions are of a complex nature. Briefly, they may be considered as acid phosphates containing accelerators, designed for uniform, rapid pretreatment of iron and steel surfaces under continuous working

From October, 1940 *Sheet Metal Industries.*

conditions. It must be emphasized that their formulation is very sound and that not only do they achieve their direct objective of chemical pretreatment, but also they are very readily controlled by elementary routine analytical methods with corresponding additions of replenishment chemicals. The solution attacks the work surface to produce in a predetermined manner a uniform coating of iron phosphate.

It is immediately apparent that by-products must be formed, some of which are precipitated, forming in part a scale on tank and heating coils, and in part a sludge. It is the latter that largely accounts for the loose deposit on the treated work. Additionally, hard water may contribute, as also will loose dirt carried in with the articles.

The defect, if it can correctly be classed as such, will be more marked with improperly controlled processes. They would signify laxity in checking solution composition, maintaining working temperature and immersion times, as well as negligence in keeping tanks free from scale and sludge.

The extent of the coating will also vary with specific types of process, the cleanliness of work entering with regard to rust as well as loose dirt, and in relation to immersion time. Immersions up to 5 minutes should give superior results from this angle alone than those requiring from 10 minutes to half an hour. It is noted the ultra-rapid spray methods give an almost imperceptible film. Thus time appears an important factor.

The first unfavorable feature of the loose film is its psychological effect. The enameler naturally resents "finishing" work having a loose dusty coating as it suggests both bad adhesion and a "bitty" finish. This, of course, can be overruled if the premonition of faulty finish is proved incorrect. Experience, however, shows that the latter cannot be achieved in every case.

Adverse influence on finish can conceivably arise from the following causes:

1. Direct influence of the loose deposit on adhesion because it prevents the first coating material from completely wetting or contacting the phosphated metal surface.

2. Flotation of the loose deposit in the paint or enamel surface with a resultant "bitty" finish, or an irregular influence on the degree of gloss.

3. The production of points of weakness in the enamel or paint finish either because of greater porosity, greater moisture absorptiveness or greater corrodibility.

These will be dealt with separately.

Light loose coatings obtained with spray or short-time immersion processes appear to have no effect on adhesion of the finish but do tend to give a "bitty" surface and promote porosity. These and other appearance defects disappear when additional coats are applied in multicoat work, however

1. Adhesion of Finish: In practice, adhesion of finish coatings by scratch and bend tests, both before and after aging by numerous types of accelerated service conditions tests, has been carefully measured and any adverse influence of a reasonable amount of the loose deposit has not been revealed. The expression "reasonable amount" is intended to indicate the degree of contamination obtained from properly conducted spray or short-time immersion processes. It does not include the medium to heavy loose coatings occurring with oversludged solutions, or with the longer immersion processes. Such heavy coatings are perceptibly bad enough to warrant removal by wiping in any case.

2. Appearance of Finish: The loose coating will tend to merge into the first coating medium and float to its surface, giving a specky or "bitty" finish. This applies to dip or spray coatings. If the spray coating is applied relatively "dry" as distinct from a full coat, the particles of powder may be evident in the finish as points of weakness, promoting porosity. With cellulose finishes, the defect generally passes through to the second coat. These drawbacks are reported from practice with even the almost imperceptible films resulting from spray phosphatizing.

However, with built-up cellulose finishes (those primed, filled and surfaced, followed by flatting prior to applying the finish coats) the disadvantageous feature is eliminated in these intermediate operations. Likewise with finishes comprising two or more coats, the powdery film ceases to be important from the angle of appearance.

3. Durability: The suggestion of points of weakness with consequent lessened rustproofing power has been investigated by tests conducted on a range of specimens. The samples comprised a number of deep-drawing quality, mild-steel boxes having spot-welded seams, which were first thoroughly degreased and then phosphatized with a 5-minute immersion time in a regular

TABLE I—Test Results of Enameled Mild Steel Cabinets Subjected to Salt Spray
All Samples Scratched Through to Base Metal by Two Lines Along Opposite Faces

Period of exposure in days	No. 1 No chemical pretreatment. Two coats white synthetic enamel	No. 2 Phosphatized and wiped over with steel wool. Two coats white synthetic enamel	No. 3 Phosphatized—*not* wiped. Two coats white synthetic enamel
3	Rusting at all seams, edges, and scratches.	Rusting along scratches.	Rusting along scratches.
10	Heavy rusting at all seams, edges and scratches.	No change.	No change.
20	Enamel blistering from edges, seams and scratches.	Slight rusting along all seams.	Slight rusting along all seams.
30	Enamel peeling back from edges, general adhesion very poor.	Very slight extension of rusting from seams and scratches.	Very slight spreading of rusting from seams and scratches.
50	Extent of blistering and peeling considerable with corresponding rusting heavy. Test discontinued.	Slight rusting from edges. General enamelling unaffected.	Slight rusting from edges. General enameling unaffected.
100	.....	Rusting at seams, edges and scratches fairly heavy, but not spreading markedly. Slight blistering of enamel from edges.	Rusting at seams, edges and scratches fairly heavy, rather more than sample No. 2. Slight lifting of enamel from edges.
150	.....	Fairly heavy rusting from seams, edges and scratches but spreading from ⅛ to ¼-inch only. Adhesion of enamel very good. Markedly superior to sample. No. 3.	Very heavy rusting near seams, scratches and edges, spreading from ½ to 1½ inches. Adhesion of enamel otherwise unaffected.

phosphatizing solution, finishing with water swill, chromate rinse and oven bake. Half of the specimens were lightly "wiped" over with soft steel wool to remove the powdery film. The samples were then all finished with two coats of white synthetic baking enamel, baked 30 minutes at 250 degrees Fahr. for each coat. The enamel had the following characteristics:

Type: Modified glyptal synthetic.	
Specific gravity at 25 degrees Cent	1220
Viscosity at 25 degrees Cent	500
Volatile spirit (3 hours at 110 degrees Cent)	48.5%
Total solids.....	51.5%

The samples were cut through to the base metal on opposite faces with a broad scratch and subjected to one of the standard forms of salt-spray test. This comprised exposure to the spray from 20 per cent salt solution, atomized with moist clean compressed air in a cabinet fitted with baffle plates to eliminate heavy particles. The atomizer functioned for the 8-hour working day and not during the night period. Specimens were examined daily, rinsing in cold water and drying before examination. Special observations were made at the scratches, edges and seams for any rust formation or spreading of rust. From the detailed results in Table I it will be seen that wiping after bonderizing is beneficial. The influence of it upon adhesion or upon rusting is not evident at the beginning of the test, but exerts itself in the later stages, in this case after about 100 days. Even then adhesion proper is not shown to be impaired, but rust spread from bared metal or discontinuities becomes easier with consequent lifting of the enamel at the areas affected.

Consequently it is considered that while the job is satisfactory without wiping from the rustproofing point of view, the improvement from wiping is an additional safeguard for the more severe conditions such as tropical, excessively humid, marine or open-weather requirements. The comparatively rapid failure under test of the specimens having no phosphate pretreatment but two coats of the same enamel and included for comparison serves to emphasize the relatively small deteriorating influence of the powdery film.

Since loose coating appears to affect rustproofing qualities little, Mr. Halls recommends that light films be completely ignored, that heavy deposits be wiped off in all cases, that intermediate deposits be disregarded for multi-coat finishes but wiped off for single-coat work

The writer's views on the loose powdery deposit which up to date is inseparable from phosphatizing processes are summarised below, although it is pointed out that these are not necessarily agreed to by all technicians:

1. With properly controlled spray phosphatizing processes and with the very rapid immersion methods (of the order of 3 minutes), the imperceptible film can be ignored for all purposes.

2. With lengthy immersion processes giving relatively heavy deposits, wipe before finishing in all cases.

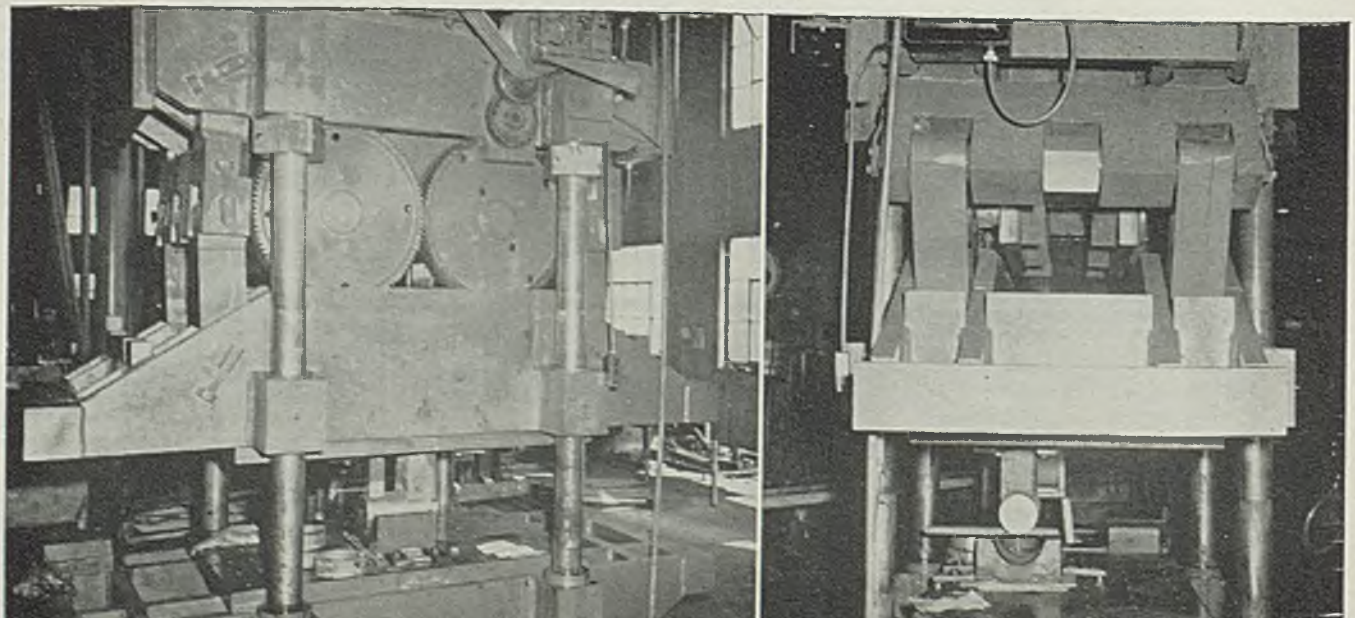
3. With the medium period (5 to 10 minutes) immersion periods, ignore the film for built-up or multi-coat finishes, but wipe for single-coat applications, both dip and spray.

The above treatment of the subject is practical in nature, and conveys an individual's views based on experiences. Phosphatizing processes have been so markedly improved during the last few years that their adoption has become much more general. The sheet steel work employed in motor car, refrigerator, furniture, radio and other spheres that is subjected to chemical pretreatment is rapidly increasing in quantity, and the fields of engineering interested in the subject dealt with are wide. Consequently the matter presented is regarded as informative, if somewhat controversial.

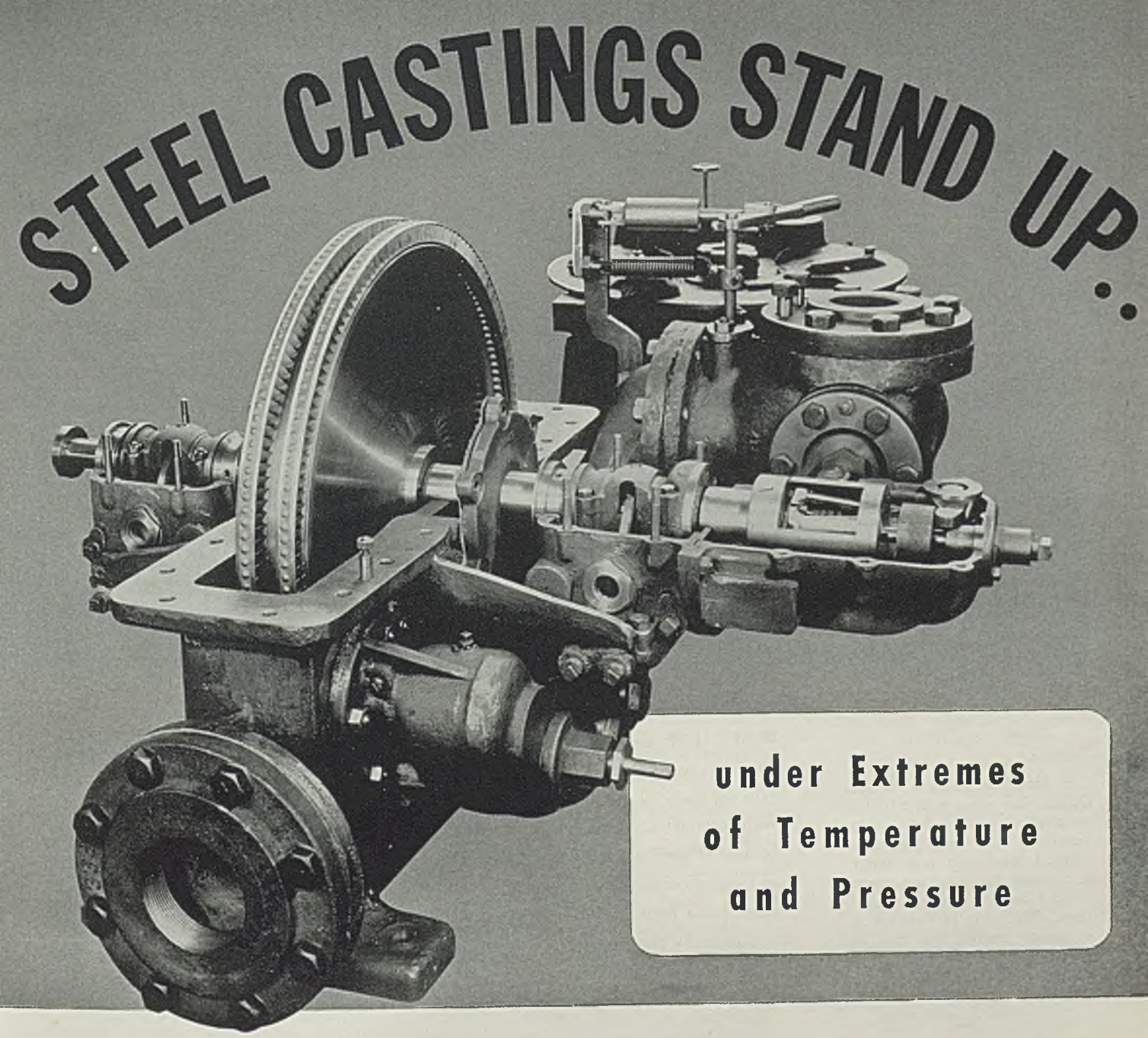
"On the Job" In 35 Days

■ Arc-welded steel construction permitted R. G. LeTourneau Inc., Toccoa, Ga., to build a 700-ton metal-forming press in only 35 days from conception of the idea to completion. The entire press structure of this massive machine, seen in the accompanying illustration, was welded in 3½ days by four welders and one set-up man. Utilized to fabricate 4 x 8-foot panels for all-steel houses, an idea of its size can be obtained by examining the huge slabs and massive parts in the connecting rods. In the base construction, billets used for slide guides are 8 inches thick with 3-inch plate in the balance of the structure.

Photos courtesy Lincoln Electric Co., 12818 Coit road, Cleveland



STEEL CASTINGS STAND UP...



under Extremes of Temperature and Pressure

A leading manufacturer of steam turbines tells us: "Modern requirements of higher pressure, higher temperature and shock-withstanding qualities have brought us to the very considerable use of steel castings."

That is not an unusual comment. Many industries have met increasingly severe conditions with steel castings. Invariably they provide greater strength and safety than materials formerly used.

Steel castings bring you other advantages as well. They save on machining, fitting and assembly time, permit scientific, streamlined weight distribution, often save on over-all weight, and afford a wide selection of mechanical properties.

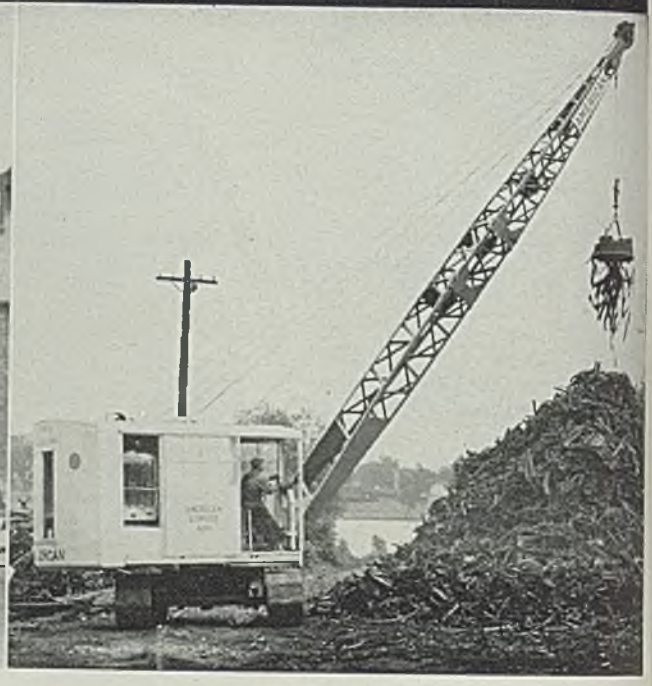
Whatever you build out of metal, where strength and stability are vital, consider using more steel castings. Your product will be a better one, and often you'll broaden your market through lower costs.

For details and recommendations, consult your local foundryman. He knows your problems, and will gladly work with you. Or, you may freely consult Steel Founders' Society, 920 Midland Building, Cleveland, Ohio, where broad experience is ready to serve you.

MODERNIZE YOUR PRODUCT WITH

STEEL CASTINGS

Don't Pass Up the Crawler Crane



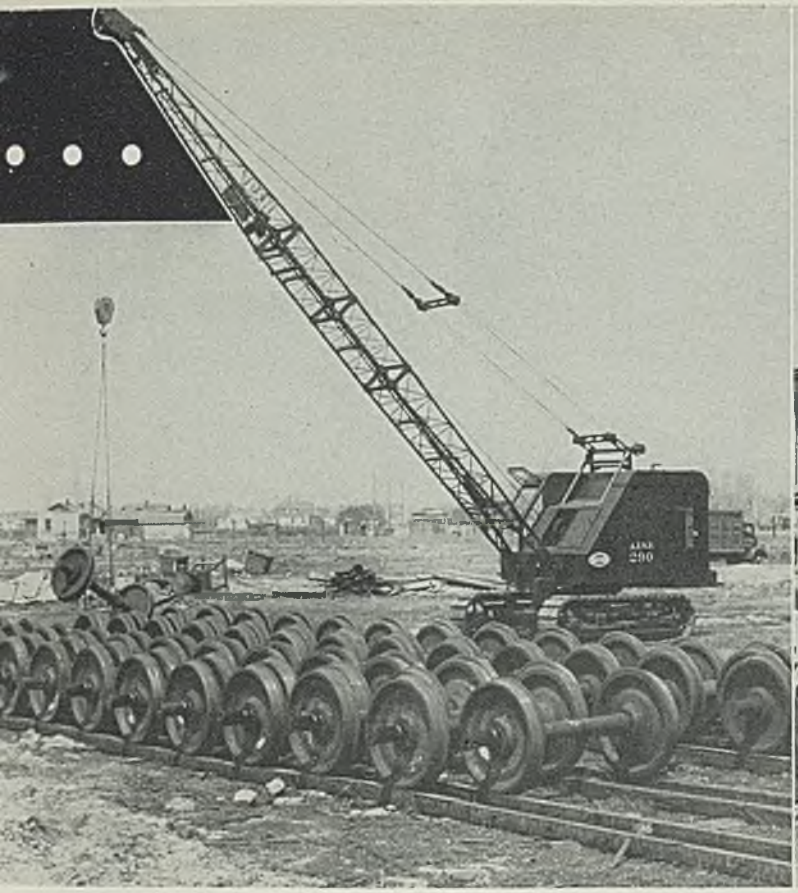
This American Hoist & Derrick Co. crawler crane with a lifting magnet, at right above, can handle a wide variety of odd-shaped steel and iron parts. It is ideal for handling scrap to and from storage as shown here. This unit, powered with a diesel engine has run 30 hours on 35 gallons of fuel oil costing less than 7 cents a gallon—typical of high economy of such equipment

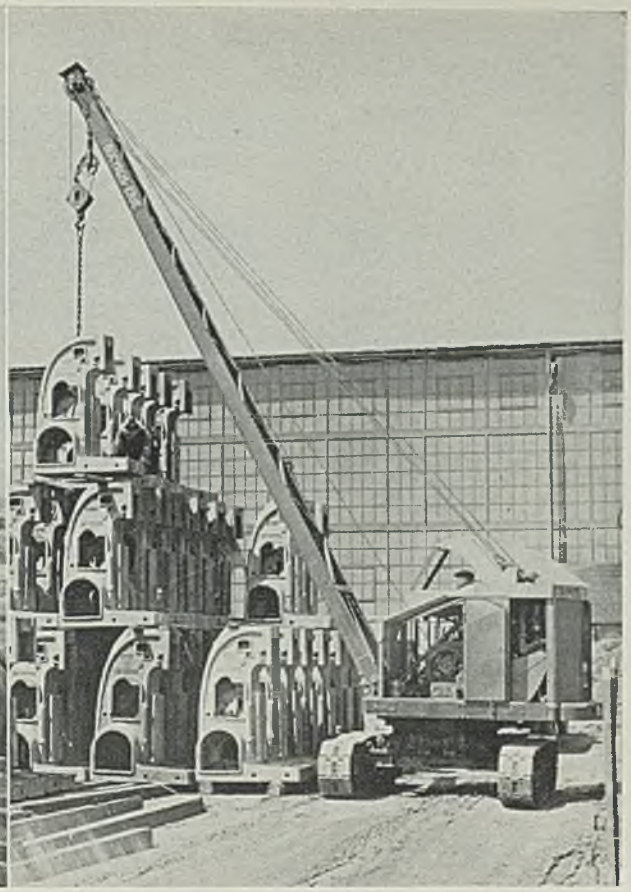
BECAUSE crawler cranes have been employed so long in the structural erecting and construction field, many industrial engineers do not realize the many uses that exist for them in industrial plants. The possibilities offered by crawler cranes compared with locomotive cranes and other handling methods are unusually important—not only because of their increased efficiency and greater economy but also because of their ability to travel anywhere on the grounds without needing rails, runways or roads. A crawler crane has a large and expanding number of uses because of its great mobility.

In every plant today in which a crawler crane is being used, it probably was originally purchased for one particular job. However, it subsequently was found so widely

Left above, a smelter finds this Harnischfeger crawler crane an exceptionally handy unit for much general work. Look how easily it handles large sheet. This might be an awkward job if done some other way

Right, around any power plant, stock piles of coal are easily handled by a crawler crane such as this Bay City unit fitted with a 1½-yard bucket. This unit moves 140 tons of coal per hour. Cost is low . . . 50 gallons of gasoline moves 2000 tons of coal





Left above, railroad axle and wheel assemblies, an awkward type of thing to handle, are easily moved in and out of storage by this Harnischfeger crawler crane

usable that now it is being employed full time on a wide variety of jobs, a few typical ones being shown in accompanying illustrations.

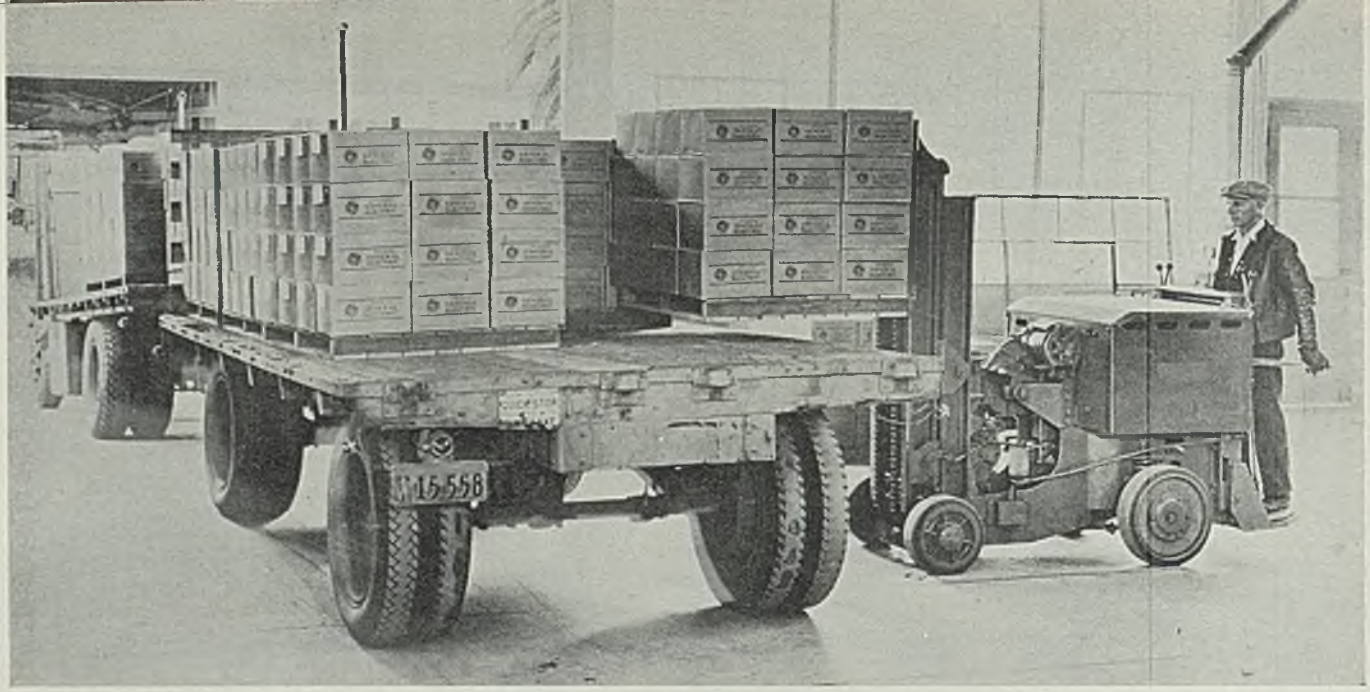
There are many unrecognized applications of crawler cranes in industrial plants. Perhaps some of these illustrations will suggest some in your own plant. These crawler cranes—available in a full range of sizes from small units to exceptionally large ones—are capable of taking care of an immense variety of handling jobs. As an efficient mechanical handling unit, they merit more consideration than they are getting today.

Advantages of crawler cranes powered with modern diesel, gasoline or electric units include: Instant availability . . . can start or stop operation anytime without delay or expense; quickly convertible to dragline, clamshell, shovel or drag-shovel; travel anywhere without rails, runways or roads being needed; can reach into a car and swing 180 degrees to pick up or place a load just twice as far out as a track crane of equal boom length. Remember . . . a crawler crane makes every foot of yard space available for storage because it can pick up, carry and place work anywhere.

Right above, Kearney & Trecker Corp., machine tool builder in Milwaukee, uses this crawler crane made by Bucyrus-Erie to handle such difficult shapes as the large castings shown here. They permit every square foot of yard area to be utilized effectively. Crane can lift 8200 pounds with a 28-foot boom at a 10-foot radius

Almost any crawler crane is quickly convertible to a dragline as shown by the Austin-Western unit below. It is this versatility that makes the crawler crane so useful in many plants . . . in addition to its high efficiency as a mechanical handling device

The American Die & Forge Co., Swissvale, Pa., originally purchased the 7-ton Northwest crawler crane, shown below, to handle billets from the storage yard but found it advantageous for many other uses also. Its idle time now is occupied by handling coal and ashes and other odd jobs



Many American industrial enterprises produce in multibuilding plants, units of which may be hundreds of miles apart. Highway trailers furnish efficient transportation between separate manufacturing units. As shown here, a fork-truck pallet system affords an integrating medium to key such shipments into production

How to Organize . . . . . .

A HANDLING SYSTEM

What information do you need to lay out the most efficient handling system for your plant? What types of handling best fit what operations? . . . . These and other important factors are explained here in this third of a series of two, see STEEL Dec. 23, p. 72, 1940 and Dec. 30, p. 54, 1940

■ WHEN the handling manager has familiarized himself with the advantages and limitations of various handling systems and has all available information on the present handling costs and details of handling operations as now performed, he is ready to attack the problem of determining what handling systems are best adapted to his work and how the handling methods of the plant can be brought to highest practical level of efficiency.

A logical way to start is to compile the following information for each of the routes over which material moves between successive points of manufacture and storage: Kind of material, origin, destination, tonnage, distance, number of employes required, time per trip, weights and dimensions of unit loads.

As an aid in comparing one route with another, it may be useful to compute the ton-feet for each route from the above information. The number of employes will permit computation of the direct cost per route. The time per trip together with weights and dimensions of unit loads will assist in determining how efficiently production is being served.

Then, considering the ton-feet and production needs, should unit loads be smaller or larger? Should trips be more frequent or less frequent?

Other information of value in selecting the handling system best adapted to the route includes: Are unit loads uniform in weights or dimensions; does material collect at the origin at the same rate as it is consumed at the destination; does this rate vary at either the origin or destination or is it likely to vary; is there cross traffic because of intersecting routes; will the location of the route vary or is it likely to vary; does the route lie wholly within one building or bay or does it extend through more than one?

Considering the fundamental characteristics of the principal mechanical handling systems — conveyors, overhead traveling cranes, industrial trucks—and their relation to the foregoing information, the handling manager may tentatively select conveyors if the unit loads are uniform and move continuously or can be arranged to move continuously to advantage; if unit loads, rate of movement and location of route do not vary or are unlikely to vary; and if the route does not intersect others forming excessive cross traffic. Of course this latter point of cross traffic does not enter into consideration with chain conveyors, which can travel at several levels.

Overhead traveling cranes may tentatively be selected for intermittent movements anywhere within the limits of one building or bay and

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

Guide for Materials-Handling Analysis Production:

Are materials delivered from operation to operation without manual handling?
Are they placed directly in the machine?
If they must be hand fed, are they placed so that the machine operator need make no unnecessary motions?
Are materials always delivered as rapidly as they are used?
Is set-up time at an irreducible minimum? Are tools changed as rapidly as possible? Is material delivered in units large enough to get the longest possible runs per set-up?
Is the plant laid out primarily for "straight-line" sequence or for process efficiency? If the latter is preferable, would more flexible handling methods permit its adoption?
Has manual handling been eliminated from millwright work?
Is scrap disposed of without manual handling?

Receiving and Storage:

Are incoming materials (other than bulk commodities) received in unit packages suitable for power handling?
Are they unloaded and delivered to the store-room without manual handling?
Are they stored to the roof whenever desired, without manual handling?

Packing and Shipping:

Are finished products packed in unit loads suitable for power handling?
Are they stored to the roof whenever desired, without manual handling?
Are they stowed in outgoing carriers without manual handling?

Costs:

How many men are engaged in handling materials full time? Part time?
Is any skilled labor ever required to do ordinary handling work?
What proportion of the direct labor payroll is represented by handling?
What is the cost per ton-foot of handling materials between departments? Within each department?
What is the cost of defective material and spoiled work? What proportion arises from present handling methods?
What is the cost of lost time? What proportion arises from present handling methods?
What are the present compensation rates and to what extent can they be reduced by elimination of handling injuries?
What proportion of lost-time accidents are a result of manual handling?

Handling Systems:

If handling has been mechanized, are the systems in use in each case best adapted for the work?
Have they been obsoleted and replaced as rapidly as a net gain in efficiency could thereby be obtained?
Have they been supplemented by all improved auxiliary equipment capable of effecting further net gains?
Has everything possible been done to assist suppliers to ship in unit packages suitable for power handling?
Have customers been informed that their shipments will be made in unit packages on request wherever practical?

regardless of uniformity of loads and rates or cross traffic.

Industrial trucks may be selected for intermittent movements, regardless of limits of any one building or bay and regardless of uniformity of loads, rates or cross traffic.

Continuous movement of uniform loads as well as intermittent movement of uniform loads at uniform intervals are practical in serving single, unrelated sequences of manufacturing processes laid out so all processes are performed at the same rate. This condition, considered by itself, favors use of conveyors.

On the other hand, where a number of sequences are carried on and they must be related to one another, it is fairly practical to lay out the processes for continuous movement or for intermittent movement of uniform loads at uniform intervals. Rate of assembly fixes the rate at which the parts are needed, but other considerations such as the economical quantity to run for each machine setup may make it desirable to produce some of the parts intermittently at a much higher rate than others and to store them temporarily. Such a condition, considered by itself, favors use of overhead traveling cranes or industrial trucks.

As another example, conveyors may be tentatively chosen in departments which perform the same kind of work day in and day out. Overhead traveling cranes or industrial trucks may be chosen for departments performing variable kinds of work at different times.

Only in rare instances do maximum weights of loads influence the choice of handling system as maximum loads of the majority of industries are well within the range of any mechanical handling system.

Flow charts afford a supplementary means of analyzing routes which may be doubtful. They may be drawn for each route with stopping points marked and with the lines connecting these stopping points varying in width in proportion to the tonnage handled and the length in proportion to the distances.

Sometimes the flow of materials through processes may consist of streams of material so small that they are below the practical minimum for power trucking. If so, the choice may be conveyors or hand trucks. In general, the power-truck system is likely to be selected for shipping and receiving in the majority of instances, the choice for other operations depending upon the character of the work performed.

Where a power-truck system is to be used, the following information should be available: Distances, tons per trip, trips per shift, number and height of tiering operations in storerooms and stockrooms.

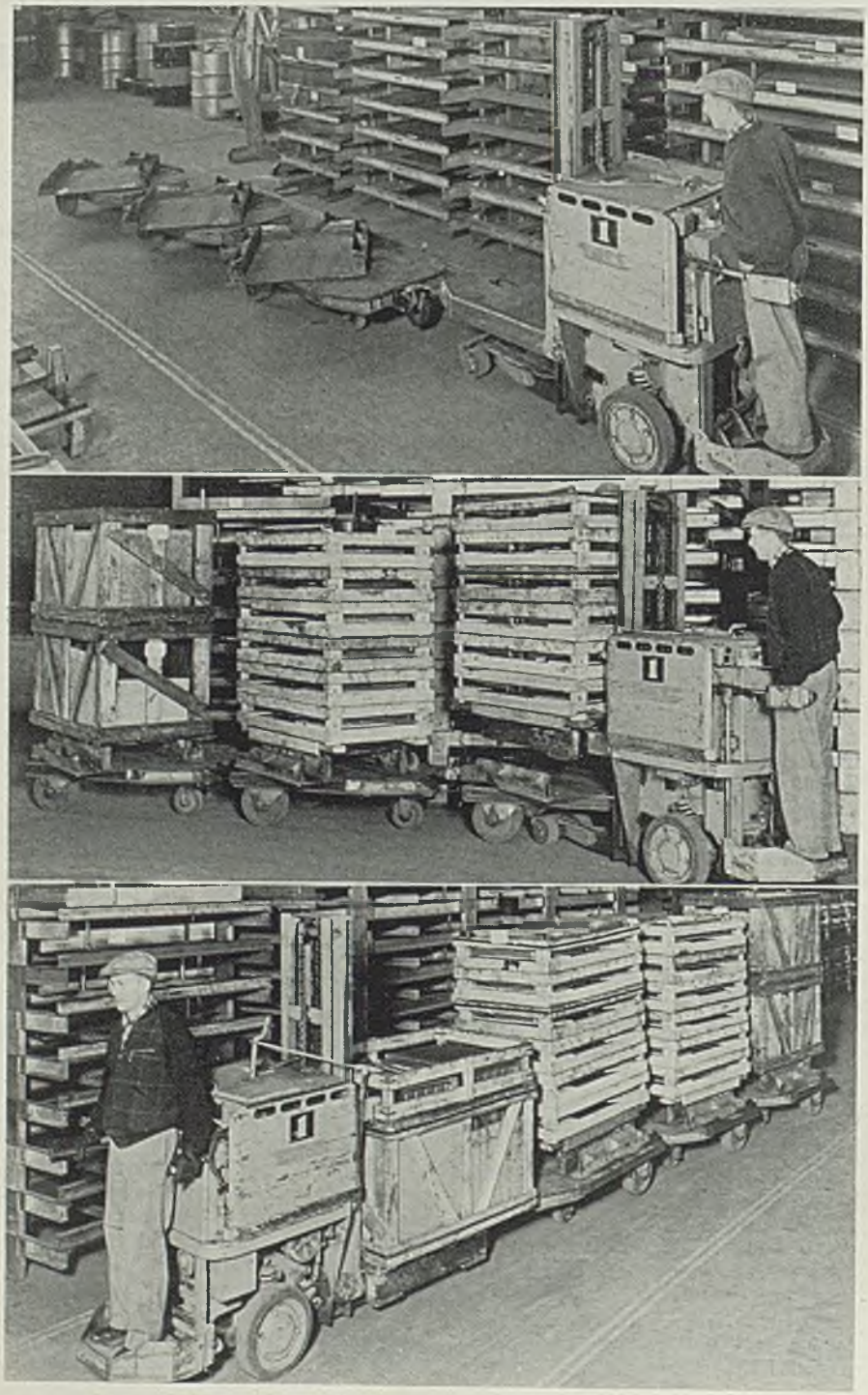
The tons per trip or size of unit loads automatically determines the required size or capacity of trucks. The number of trucks required to handle the work involves a practical engineering computation in which the truck manufacturer can be of help. First, however, the best suited type of truck must be determined —influenced mainly by distances and tiering if required. Of course, many other considerations enter this selection as well.

An ideal handling system contains no lost motions and requires no manual handling. This ideal is most nearly approached in the fork-truck-pallet and lift-truck-skid systems. The former is most applicable as practically any type of material can be handled with it. It is generally best for tiering and carloading.

When loads are heavy and tiering is unimportant, low-lift trucks and skids have advantages over the fork-truck-pallet system in that loads are not carried in an outboard position and no counterweight is needed. As a result, less dead weight need be moved about for a given load. The first system, however, is not so well adapted to carloading because skids require too much under-clearance for the lowest cost packaging.

The volume of work may warrant use of both systems. Where distances are a factor, routes 500 feet or longer, the tractor-trailer system has advantages in that the loads may be narrower and more may be hauled in one trip. Cost per ton-foot is less. However, these advantages may be outweighed by the cost of loading and unloading the trailers. Integration with a fork-truck-pallet system is one solution. As one example, a low-lift truck may carry a load itself while pulling other loads on trailers which it picks up and puts on the trailers one at a time and then removes at destination.

Tractor-trailer system also is practical for movement of materials from operation to operation. Trailer loads, however, cannot be coupled as quickly as skid and pallet loads can be picked up, but trailers can be built to handle extremely heavy loads. Therefore if the loads are heavier than can be handled practically on skids or pallets and production operation is such that the pieces of material can conveniently be picked up from one trailer and piled on another, the system may be found useful. Such an instance is found in the final trimming of sheet steel. However, trailers are too expensive to use as a basis for storage units and do not lend themselves to tiering.



Exceptionally efficient combination of lift-truck-skid and tractor-trailer systems is shown here. A lift truck acts as tractor. Trailers have swiveling platforms, top, actuated by the truck operator for easy placement of skid loads, center view. Lower view shows the train proceeding with trailer platforms loaded and in the travel position, the truck also carrying a skid load

Conveyors Sometimes Best

Plants in which numerous small parts are produced and then assembled, resulting in a series of small production lines, may be served best by some form of light conveyor. In other cases, skid boxes moved by hand-lift truck or live skid boxes moved by hand may be the best selection.

In all these cases the pieces of material usually must be handled by the production operator to put them through the process. The main requirement is to arrange delivery and removal of the pieces so no additional motions are necessary. For example, delivery may be by skid box arranged to bring the pieces within easy reach so the operator merely takes them from the skid box and puts them into the operation with one motion. Similarly, he should be able to remove the piece from the operation and drop it into the outgoing skid box in one motion. Likewise the same motion saving should be possible in using a conveyor.

Finally, when the point of assembly is reached, the ideal arrangement again is one which requires no motions for handling which are not already necessary for purposes of production.

Sometimes, due to plant layout, a haul is necessary from the end of one series of processes to another bay or another building. Here the power truck may be found best suited. Its use often may influence the choice of handling through the subsequent series of operations. Good practice is the use of skid boxes or live skids which can be picked up at the end of the series one, two or three at a time by lift or fork truck.

If the finished product has to be stowed in outgoing carriers in less-than-power-handling units, the best that can be done is to take the skid

or pallet loads as close as possible to the stowing point and then unload by hand. Right here lies one of the best opportunities for increasing handling efficiency — as was pointed out previously. This is the scene in the handling picture in which the actual arrangement is usually furthest from the ideal. The introduction of unit packaging methods will always be found to introduce economies in handling that will pay for their cost quickly and show surprising added savings in a great many cases.

Accompanying illustrations show but a few typical examples.

♦

Mechanized Welding

(*Concluded from Page* 55)

production rates or on small items, it is advisable to provide water-cooling in the jigs for this purpose.

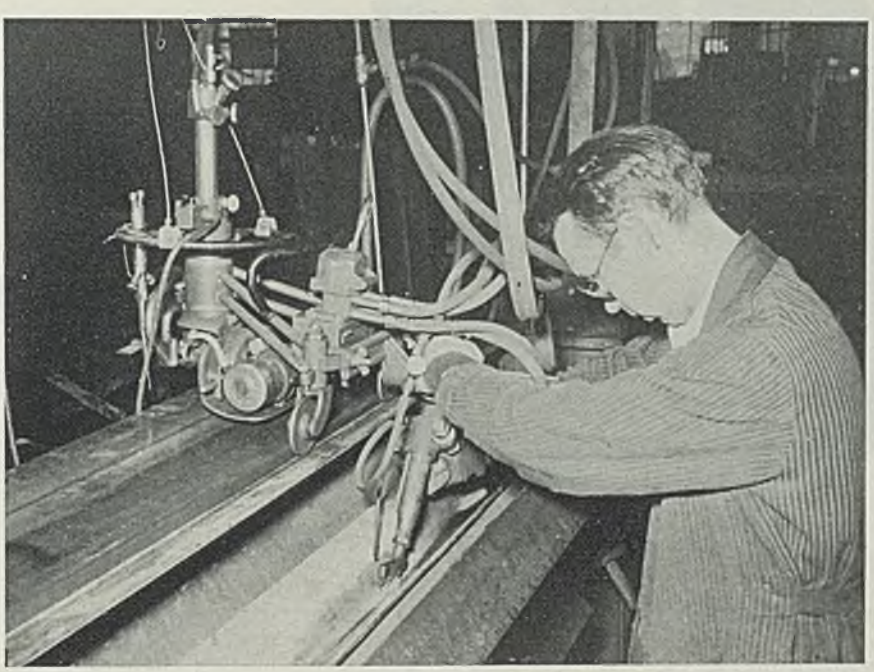
The two most common types of welds made by this method are the vertical and girth seam welds on round or rectangular vessels. When the vertical seams are made, the rolled or formed sheet is placed in a clamp with the edges butted together. The weld can be made from either the inside or the outside, depending upon requirements of finish of the completed article. In making this weld, it is preferable to move the welding heat with respect to the work. The ends of the container are welded in place next. On round shapes, this girth weld is performed best by revolving the jigs and materials beneath the welding head, thereby making a flat weld. On rectangular or irregular shapes, the welding head moves around the shape at a uniform rate. This type of operation provides a flush weld with a minimum of reinforcement.

A typical example of this type of weld is found in the manufacture of washing-machine tubs. The tubs consist of two parts, the side wall and the bottom. The side is formed by accurately shearing, rolling and welding a flat metal sheet into a cylinder. In one operation the bottom is stamped from sheet stock and such openings as are required are punched. As the deformation is very slight, wrinkling or stretching of the sheet is avoided. This is of extreme importance in the later enameling operation and has an advantage over deep-drawing methods necessary for one-piece construction. It is the tendency of the deep-drawing operation to produce wrinkled surfaces or thin sections which cause rejections after enameling.

The seamed side and stamped and trimmed bottom are joined by a circumferential weld. The welds are then given a vibrating hammer operation to relieve any strain present and to remove oxide scale. A light grind follows. The tubs are then ready for corrugation and edge-rolling.

A slight variation of this method is applicable to shapes with curved sides that cannot be made by rolling or bending flat sheets. These parts may be stamped or drawn in two halves. These then are placed together in a jig and positioned so that seams are in the same horizontal plane. The joints are then welded simultaneously with two welding heads moved by a common carriage. It should be borne in mind that this method of necessity will proceed at a slower rate than the previously described method, as the horizontal-vertical position of the weld requires a smaller weld puddle.

Strip Welding: There are numerous applications of strip welding to which automatic oxyacetylene welding is well suited. The softness of the weld lends itself to double or triple-lengthening of hot-rolled coils before the initial pass in the cold-reduction mill. In this case, a weld zone that is not appreciably harder than the base metal is required to avoid marring the surface of the cold-working rolls. In addition to this, the weld strength and reliability must be such as to preclude breakage while welding of coils together in steel going through the cold mill under tension. By means of special rolls and clamping arrangements, welds are made on 10-gage material with full penetration and strength without the use of welding rod. To further advantages of this weld are the elimination of necessity for flash-stripping or grinding after the weld is made, and a speed of operation suitable for a recoiling or processing line.



Leakproof welds are economically made in gasoline tanks by mechanical welding

Another application is for the mills to meet customer demands for coils of greater length. Here the further advantages of low-cost installation and great flexibility in handling wide ranges of gages and widths are obtained.

(*Concluded Next Week*)

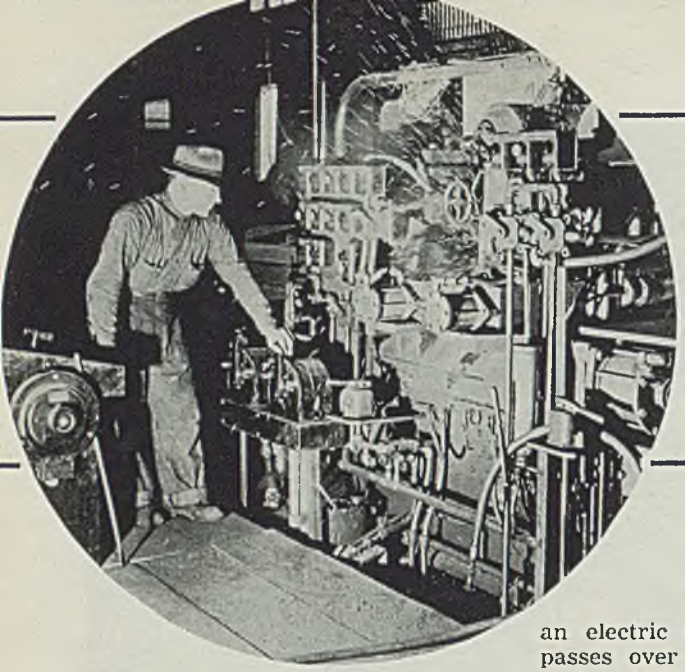
Text on Metallurgy As Applied to Welding

■ *Welding Metallurgy,* by O. H. Henry and G. E. Claussen; fabrikoid, 359 pages, 5¼ x 8¾ inches; published by American Welding Society, 33 West Thirty-ninth street, New York, for $1.50.

Recognizing need for a textbook on the ABC of metallurgy to give an understanding of metallurgical problems in welding the New York section of the American Welding society sponsored a series of lectures to familiarize members of the industry with composition and structure of metals commonly used, effects of varied conditions of heat and stress in welding, explain heat treating and illustrate how the knowledge of metallurgy can be used to control the welding processes.

The lectures then were made into a book, Vol. I, the series last year and Vol. II the series to be given this year. The lectures were prepared by Professor O. H. Henry, of the Polytechnic institute of Brooklyn, N. Y., and Dr. G. E. Claussen of the same school.

The volume is well illustrated and each section is followed by questions aimed to test the knowledge of the reader.



Bethlehem Adds Second Unit to its Continuous Butt-Welding Mill

■ A SECOND unit has been added recently to the continuous butt-welding mill at the Maryland plant of Bethlehem Steel Co., at Sparrows Point, Md. Designed for production of pipe in sizes from 1 to 4 inches normal diameter, in standard and extra heavy weights, it rolls skelp from 6 to 16 inches wide, up to 0.380-inch thick. Based on 4-inch pipe its maximum rated capacity is 25 tons of skelp per hour. The skelp is supplied in coils from 30 to 44 inches in diameter, weighing approximately 900 to 2500 pounds each.

Except for minor variations in design and differences in size, the new unit is essentially identical with the first unit recently described, STEEL, June 24, p. 47, 1940.

The skelp is uncoiled and fed to an electric flash welder. It then passes over a double looping bed, with a 150-foot primary and a 35-foot secondary loop, to a heating furnace which is 157 feet long. This has a heating chamber 2 feet 7 inches wide at the top and 22½ inches wide at the bottom. The furnace is equipped with 334 nozzle-mixing burners spaced at 9 inches, centers the full length of the furnace, except for a 15-foot preheating zone at the charging end. The burners are arranged in groups of eleven, connected to a common header.

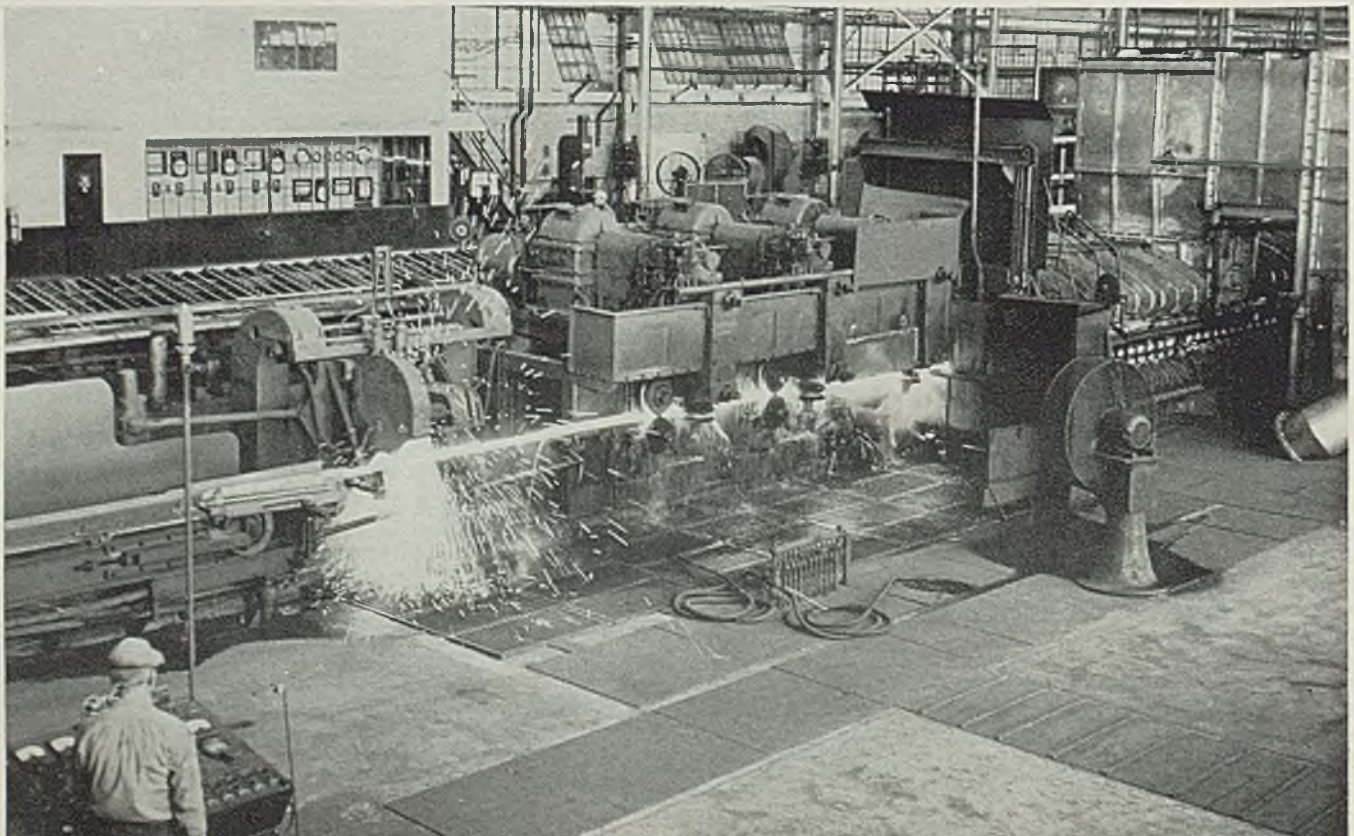
The total capacity of the burner is about 140,000 cubic feet of 500 Btu. mixed gas per hour, delivered at 4 to 8-ounce pressure.

The combustion air is preheated to 900 degrees Fahr. in six silicon carbide tubular recuperators, two for each heating zone.

The heated skelp is drawn through a series of six roll passes, consisting of three pairs of horizontal and three pairs of vertical rolls. This is followed by a flying hot saw where the pipe is cut into predetermined lengths — up to 50 feet. These cut lengths then pass over a cooling rack and are conveyed to a descaling and sizing mill. After passing over a second cooling rack the pipe is ready for the regular finishing operations.

With the new unit in operation the mill is producing continuously butt-welded pipe in all standard sizes ranging from ⅜ to 4 inches nominal diameter.

Uncoiled skelp is fed to an electric flash welder, closeup of which is shown above. Below, discharge end of heating furnace, with forming and welding rolls—note the flying hot saw



BETWEEN HEATS WITH Shorty

■ Say Fellers:

At a meetin' at the plant the other day we did a lotta talkin' 'bout cuttin' down maintenance costs over at the open-hearth shop. We've been havin' plenty of trouble keepin' the floor in shape in front of the chargin' doors, 'n the boys have been tryin' to find somethin' that'll prevent the brick from being gouged out.

"If the chargin' machine operator would watch his stuff, he wouldn't spill so much scrap in front of the furnaces," sez Red Owens. "Anyway, scrap belongs in the furnace—not all over the floor of the shop. That's how we get all the holes in the floor. You know that as well as I do."

"Sure I know it," Pop Morris replied. "But, fellers, it's a wonder the chargin' machine operator gets as much stuff in the furnace as he does. Didja ever charge a furnace? Didja ever pull the levers on a chargin' machine? Well, I have. Try rackin' some boxes of scrap in and out of the furnace some day 'n jus' see what happens . . ."

Rarin' To Go

"Nix on that stuff, Pop," sez Red Owens. "What we wanta know is how we can keep the floor in front of the doors level."

"Alright, let's try puttin' down some steel plate between the chargin' rail and the furnace," Pop sez.

"Steel plates, me eye," Red sez with the snap of his finger. "They're not so hot. 'Bout the time slag starts boilin' outa the doors a few times the plates will start bucklin' on y'. Naw, that's no good."

Ol' Pop turns to the superintendent, 'n he sez, "Boss, y' mind if I take a day off so as to run down 'n see how Bill Denton has his shop fixed up? He's been spendin' some money in 'is melt shop 'n mebbe he's gotta idea or so."

"It's alright with me, Pop, anytime y' say," the Boss sez.

'N in a couple of days or so Pop Morris 'n Bill Denton were chinnin' away in Bill's office at one end of 'is melt shop.

"Bill, y' got some archless door frames in the frontwalls of some of your furnaces out there. Do y' notice any change in the time of heats?"

"Naw, there's not much difference, Pop. We get some slight loss of heat but don't 'mount to much," sez Bill.

"Y' like 'em then, huh?" inquired Pop.

"Ah, they're alright—I'll tellya, Pop. Archless door frames are no good unless y' 'ave a skewback."

"Yeh, I understand so. Take at our plant, fer instance. We started usin' larger chargin' boxes for gettin' our scrap into the furnace and we've cut down on our chargin' time quite a bit. Y' doin' anything at your shop like this?" asked Pop.

"Yeh, Pop, we've increased the size of our chargin' boxes 40 per cent and it's made a whale of a difference in our chargin' time," Bill sez. "Come on out on the floor 'n I'll show y' what I mean.

'N walkin' around a buncha stirrin' rods and a pile of magnesite they came to a halt near a chargin' buggy loaded with over-size boxes. Pop sez they were the cat's meow. The chargin' machine operator handled them in and outta the doors quicker than y' can get underway when the trouble whistle starts tootin'. Boy, he had all the scrap on the hearth in no time, 'n fore y' knew it, accordin' to Pop, the engineer on the little dinky was backin' 'is drag of empty boxes out the end of the melt shop and blowin' for a throw of the switch down at the foot of the trestle.

Don't Amount to Much

"Y' haven't much spillage of scrap in front of the doors with these boxes, jus' as y' say, Bill, have y'?", Pop remarked.

"Naw. We used to have a lot more when we were usin' the small boxes. But since the changeover we don't notice it nearly so much. Then, too, y'll notice our floor is in good condition."

"Yeh," sez Pop, "I see it is."

"Course we put this kind of a floor down when we were usin' the smaller boxes. We were nickin' the floor brick at a pretty good rate then, for try as he would, the chargin' machine operator would always dump some light scrap overboard 'n then the craneman would have to come along with 'is magnet and load 'er into the boxes ag'in. Whataya think of our floor, Pop?"

"I like it, Bill. I've heard a lotta 'bout it 'n I'm glad I came down to have a look at 'er. We've been havin' a lotta trouble at our place cuttin' our floor in front of the furnace 'n I think I can see an end to it," sez Pop. "What sorta construction did y' use in your floor here, Bill?"

"Well, I'll tellya, Pop. We went out and bought some second-hand rails and when we ripped up the old brick, we laid the rails 9 inches apart, 'n then we took some 9-inch brick and laid in between the rails. We grouted up the cracks, 'n there she is. Not bad, heh?"

"Naw, I should say not, Bill. I'm goin' to give 'er a trial myself 'n I'm thinkin' our troubles are done up at our place," sez Pop.

'N sure 'nough, fellers, they were. Pop laid down a floor in front of his furnaces such as he had seen at Bill's shop. Y' wanta know what he found? Well, let me tellya. He found he got triple life out of 'is floor by usin' old rails and 9-inch brick instead of regular paving brick.

I'll tellya. It's not a bad idea to let some of your gang visit their friends. Lottsa times they can pick up some tricks that'll blow your troubles higher than a bessemer working a heat of soft carbon steel.

Well fellers, so long, I'll be seein' ya!

"Shorty" Long

Publishes Pocket-Size Directory of Materials

■ *Directory of Machines, Apparatus and Tools*; pocket size; published by Office for Industrial Information, 5 Rue du Rhone, Geneva, Switzerland, for 10 Swiss *francs* ($2.50), when prepaid.

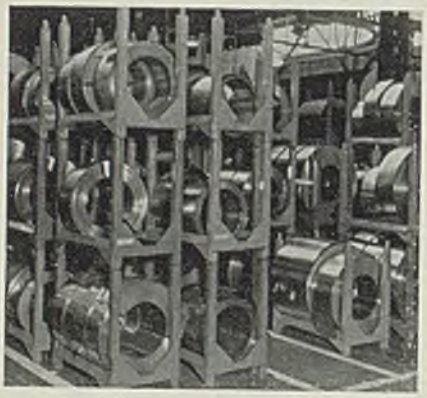
This publication covers the Swiss industry and various lines connected with it, such as electro-technics, high-precision mechanics, instruments, etc.

The volume is the result of long and exhaustive study of the whole Swiss industry. It is systematically arranged in four indexes to classifications, in English, French, Spanish and German, showing about 1000 partially illustrated categories. In effect it is a technical dictionary for the metal industry.

Industrial Equipment

Coil Stock Rack

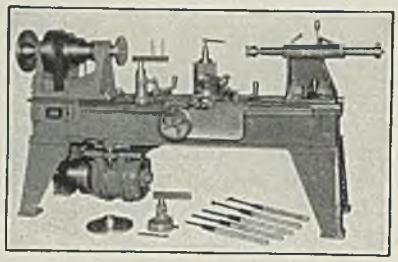
■ Mechanical Handling Systems, 4600 Nancy avenue, Detroit, has placed on the market a new all-steel MHS coil stock rack for plants handling quantities of strip stock in coils. It eliminates manual lifting, loading, unloading and moving of heavy coils of strip metal, since each unit of the rack, with its load, may be handled with an electric truck equipped with forked



cradle and hoisting mast. The rack is manufactured in units approximately 2 feet wide, 3 feet long, and 3 feet high. All consist of square tubular steel sections, electrically welded and rigidly braced. The vertical members are open at the bottom and fit nesting plugs at the top, so that rigid tiers of racks may be built to ceiling height. Each rack unit is designed to carry a load of 3000 to 5000 pounds.

Metal Spinning Lathe

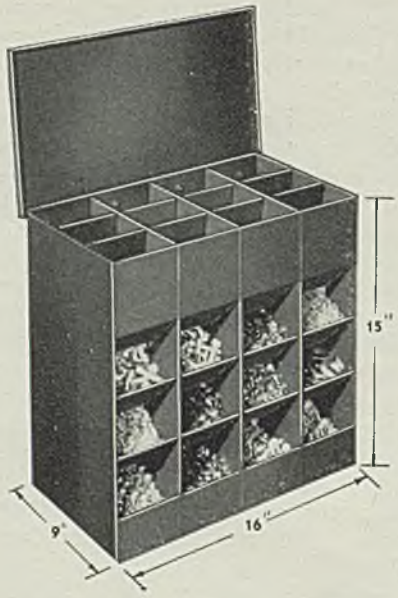
■ Oliver Machinery Co., Grand Rapids, Mich., announces a new large size metal spinning lathe which can be furnished in 16, 20, 24 and 30-inch sizes. With the exception of the 30-inch size, all are equipped with a 3-horsepower, 1200 revolutions per minute motor. The 30-inch lathe requires a 5-horsepower motor. Illustrated is the 24-inch machine with the various step cones. Its spindle speeds are approximately 1200, 2000, 1600 and 2400 revolutions per minute. The headstock spindle is made with taper roller bearings with large thrust capacity. As shown, this machine is offered with a plain bed or with a hand feeding carriage with compound swivel rest and tool holder. It also is available with various types of tailstock, such as plain, setover or special heavy duty production types. Equipment includes pin rest and extra heavy tool rest socket, ball bearing live tail center and set of five general



purpose spinning tools—6 and 8-inch face plates. Control of the push button magnetic type is incorporated.

Assembler's Bench Bin

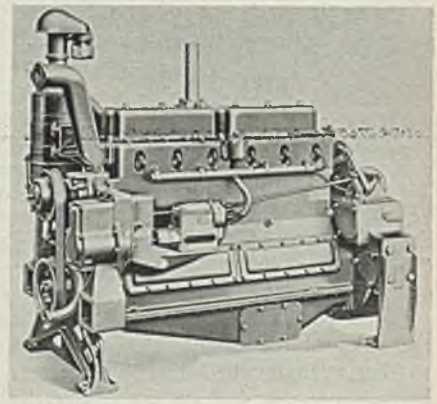
■ Lyon Metal Products Inc., Aurora, Ill., has introduced an assembler's bench bin which concentrates a large supply of 12 different small parts, such as nuts, bolts, screws, cotter pins, springs and washers, on a bench space of only 16 x 9 inches. Its 12 compartments are arranged in 3-capacity groups of four compartments each, affording larger capacities for the bigger or more frequently used parts. The loading compartment openings at the top of the bin are each 4 inches wide by 3 inches deep, and the hopper front openings are 4 inches wide by 3 inches high. Of bolted and welded construction, the bin



has a cover which is attached to the unit with a strong continuous piano hinge. The back flange of the cover is formed to act as a stop, which holds the cover open for loading. The bin's overall dimensions are 16¼ inches wide by 9¼ inches deep by 15 inches high.

Natural Gas Engines

■ Caterpillar Tractor Co., Peoria, Ill., has introduced three models of heavy-duty natural gas engines for industrial use. They are built in 2-cylinder sizes. The Model 4600G is a 6-cylinder unit and the 4400G is a four. Both have a bore of 4¾ inches and a 5½-inch stroke, and develop 74 and 48 horsepower respectively at 1600 maximum governed revolutions per minute. A small four, the Model 3400G with a bore and stroke of 3¾ x 5 inches develops 34 horsepower at 1650 revolutions per minute. All three valve-in-head engines have heat resistant alloy valve seat inserts. They have superfinished crankshafts with Hi-Electro hardened journals. Their lubricating systems provide ef-



ficient filtering and full pressure lubrication to all engine parts. In addition, an upper-cylinder lubricator on each provides extra valve lubrication for use with dry natural gas fuel. A combination gas-gasoline carburetor is standard equipment, and though the engine will satisfactorily burn gasoline for short periods such as for starting purposes, the fuel system is set for combustion of natural gas. The system includes a filter to clean the gas, with a regulator to handle gas pressures as high as 150 pounds at the supply. All three models are available as a complete power unit with enclosed clutch and radiator.

Hobbing Machine

■ Barber-Colman Co., Rockford, Ill., announces a new type T hobbing machine available with several new attachments. Although designed primarily for hobbing taper splines on shafts it also has a wide application for standard hobbing work including such parts as spur gears, spiral gears, straight splines, worms, worm wheels and miscellaneous special hobbed forms. The machine

< < HELPFUL LITERATURE > >

1. Welded Die Sections

Forgings & Castings Corp.—6-page illustrated engineering data on electric welded composite steel die sections gives weights, ordering instructions, prices, and construction details. Thirty-six standard die sections are shown in blueprint form and 4000 die shapes can be made from these sections.

2. Quenching Machine

Hanniffin Manufacturing Co.—4-page illustrated bulletin No. 55 is descriptive of centrifugal quenching machine which is claimed to provide accurate and controlled quenching of circular parts of all kinds. Rapid operating cycle is said to save 80 per cent of quenching time.

3. Combustion Furnace

Hevi Duty Electric Co.—4-page illustrated bulletin No. HD 1040 is descriptive of "Sobers" vertical combustion furnace which is designed for readily determining carbon content of materials by direct combustion method. Details of design and operation are included.

4. Power Transmission

W. A. Jones Foundry & Machine Co.—24-page illustrated bulletin No. 61 covers complete line of power transmission equipment. Specifications and list prices are given for hangers, pillow blocks, bearing units, base plates, bearing boxes, flexible couplings, collars, shafting and gear reducers.

5. Electric Products

BullDog Electric Products Co.—96-page illustrated catalog No. 405 presents specifications and list prices on controlling and distributing apparatus for electric light and power. Included are safety switches, service equipment, lighting panels, circuit breaker and fuse panels, duct, and miscellaneous devices.

6. Machine Parts

Boston Gear Works, Inc.—8-page illustrated catalog, "Hardware Products Machine Parts," gives specifications and list prices on crown face pulleys, groove pulleys, cone pulleys, cast iron pillow blocks, "Oilite" equipped pillow blocks, ball bearing pillow blocks, shaft supports, and couplings.

7. Flexible Coupling

Bartlett Hayward Co.—40-page illustrated bulletin on "Fast's" self aligning coupling includes complete ratings for various types of these units which provide mechanical compensation for misalignment in shafts. Details of design and typical applications are included.

8. Casting Cleaning

Hydro-Blast Corp.—16-page illustrated booklet, "Let's Take a Look at Hydro-Blast," outlines features and explains operation of this dustless castings cleaning system which removes hardest and most complicated cores, does all sand chipping, cleans all surfaces, and recovers practically all formerly wasted sand. Diagram shows flow through system.

9. Automatic Lathe

Jones & Lamson Machine Co.—16-page illustrated spiral bound bulletin No. 40-187 gives complete details on 12-inch "Fay" automatic lathe. Features of this unit are shown and described. Typical set-ups are shown for various machining operations.

10. Organic Chemicals

Carbide & Carbon Chemicals Corp.—96-page illustrated reference book, "Synthetic Organic Chemicals," contains data on properties and uses of 142 industrial organic chemicals. Information on applications of 66 new products is included. Tables give physical properties.

11. Automatic Regulation

Askania Regulator Co.—12-page picture book No. 100 shows installation views of jet pipe regulator in use for furnace control in iron and steel industry, power plants, glass melting tanks and process plants.

12. Hobbing Machine

Barber-Colman Co.—4-page illustrated bulletin No. F812-4 is descriptive of No. 3 hobbing machine for generating spur and spiral gears, spline shafts, and other hobbed forms. Features of this general purpose machine, as well as dimensions and specifications are given.

13. Multiple Retort Stoker

Combustion Engineering Co.—16-page illustrated bulletin No. MR-4 gives details of most recent design of "C-E" multiple retort stoker. Engineering background, operation and principal features of unit are described. Illustrations show cutaway sections and typical installations.

14. Rubber Products

Hewitt Rubber Corp.—36-page illustrated catalog, "Rubber Products for Industry," describes rubber hose for all types of applications, couplings, packing, and other industrial rubber products. Engineering data given includes iron pipe sizes, list of materials affecting rubber, and properties of steam.

15. Metal Fabrication

Williams, White & Co.—56-page illustrated spiral-bound catalog "Machinery," suggests types of machinery for bending, forming, forging and rolling of metals. Descriptions and specifications are given for tube benders, bulldozers, presses, punches, angle and plate rolls, shears, and various types of hammers.

16. Feedwater Conditioning

Hagan Corp.—12-page illustrated bul-8 page illustrated bulletin No. 2005-A combustion control and feedwater conditioning in maintaining power plants in highest state of efficiency for present preparedness program.

17. Materials Handling

Cleveland Crane & Engineering Co.—8-page illustrated bulletin No. 2005-A describes cab controlled motor driven and standard grabs and lifts for materials handling. Typical applications and installation views are given for various types of equipment.

18. Die Steels

Jessop Steel Co.—12-page illustrated booklet, "Die Steels," gives forging, annealing, hardening and tempering data on 3C high carbon, high chrome die steel. Applications and physical properties of this material are also covered.

19. Colloidal Graphite

Acheson Colloids Corp.—42-page catalog defines uses of "Dag" colloidal graphite in industry. Physical and chemical properties of product are listed and various applications are fully discussed. Material is presented in alphabetical arrangement, and index of available literature is included.

20. Cutting and Grinding Oil

Sun Oil Co.—60-page illustrated bulletin, "Cutting and Grinding Facts," covers advantages in application of Sunoco emulsifying cutting oil. Machining methods shown and described include lathe work, milling, grinding, pipe threading, lubrication, and cold rolling.

21. Electrode Selector Chart

Air Reduction—Spirally bound electrode selector chart is designed to be hung either on welding machine or on adjacent wall within easy reach of arc welding operators. Under separate guides, listed according to metal to be welded, chart enumerates welding procedure, recommended voltage and current values, and other valuable recommendations.

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22. Metal Parts Cleaning

Pangborn Corp.—28-page illustrated bulletin No. 218 describes rocker barrels and cleaning operation for miscellaneous items of gray iron, steel, semisteel malleables, forgings, plate, bronze, brass, alloy and other castings, heat treated and metal parts by the airless "Roto-blast" method.

23. Multiple Disc Clutches

Carlyle Johnson Machine Co.—Three illustrated dimension sheets, series No. 1, give dimensions, design details, and specifications on "Maxitorq" single multi-disc clutches in capacities of 1, 1¾, and 3 horsepower at 100 revolutions per minute.

24. Spindle Bearing

Cincinnati Grinders, Inc.—8-page illustrated bulletin, "Filmatic," gives features of this multiple-shoe spindle bearing with wedge-shaped oil film constantly renewed, which is said to give rigid support. Design is incorporated in grinders.

25. Compressors

Chicago Pneumatic Tool Co.—30-page illustrated bulletin No. 726 describes horizontal duplex air and gas compressors for continuous, heavy duty operation. Details of machines are illustrated and described. Also described are intake filters, receivers, and aftercoolers.

26. Alloy Steels

Crucible Steel Co.—48-page illustrated data and stock list No. AS100 contains tables of analyses, physical properties and stock information on alloy and machinery steels available from stock. Diagrams provide ready analyses of properties.

27. Compressor Motors

Burke Electric Co.—4-page illustrated bulletin No. 215 describes alternating current synchronous motors for compressors. Pictured with analysis of construction are the stator and the rotor. Cross sections of stator and rotor are included.

28. Stamping Presses

Junkin Safety Appliance Co.—16-page booklet contains information on maintenance and operation of stamping presses, prepared as a guide for safety engineers, insurance inspectors, factory inspectors, plant superintendents, shop foremen and others responsible for safety of press operations.

29. Cut-Off Wheels

Norton Co.—28-page illustrated booklet No. 517 gives complete data on "Alundum" and "Crystolon" cut-off wheels. Features, applications, recommended speeds, and general wheel recommendations for metals to be cut are given.

30. Electrical Insulations

Owens-Corning Fiberglas Corp.—20-page illustrated bulletin on "Fiberglas" electrical insulations gives electrical properties of this material. Specifications and descriptions of insulating tapes, electrical cordage, braided sleeving, and varnished or impregnated materials with cloth base are given.

31. Bearings

Link-Belt Co.—88-page illustrated data book No. 1775 presents details of "Friction Fighter" bearings for aid of all who use bearings and power transmission equipment. Complete tables of sizes, dimensions, weights and list prices are given as well as selection guidance, and other data.

32. Nibbling Machine

Andrew C. Campbell Div., American Chain & Cable Co.—8-page illustrated bulletin "Why Not Nibble It" presents concise information on No. 250 wide range nibbling machine for handling wide stock. Pictured are various other models with applications for each, as well as specifications.

33. High Speed Steel

Latrobe Electric Steel Co.—8-page illustrated bulletin on "Electrite No. 1" includes typical analysis, recommendations for working, and drawing data for this tool steel which is available in bars, forgings, drill rod, tool bits, and roll turning tool forms.

34. Floor Resurfacer

Flexrock Co.—4-page illustrated bulletin on "Ruggedwear Resurfacer" shows applications of this floor resurfacing material which is said to be waterproof, acid resistant and fireproof. Product may be used to repair concrete to a "feather edge."

35. Cranes

Euclid Crane & Hoist Co.—20-page illustrated catalog, "Euclid Cranes," includes details of bridges, trolleys, controls, and other features of these cranes which are available in sizes ranging from ½ to 100 tons capacity, and for spans up to 100 feet.

36. Speed Control

Reeves Pulley Co.—8-page illustrated bulletin on "Reeves Speed Control for Machine Tools" discusses typical examples of modernization of machine tools through application of variable speed control. Actual cases are shown and described.

37. Water Filters

R. P. Adams Co., Inc.—4-page illustrated bulletin No. 901 describes and pictures automatic water filter for removal of solids. Discussion includes purpose, operation, capacity, filtration and accessibility. Table of dimensions is also included.

38. Metal Machining

Ampco Metal, Inc.—4-page engineering data sheets Nos. 47 & 48, for maintenance engineers and machine tool foremen, are illustrated with diagrams showing methods for drilling, reaming, tapping, milling and grinding this aluminum bronze alloy.

39. Swaging Machine

Etna Machine Co.—4-page illustrated bulletin is descriptive of series 150 swaging machines. Specifications are given for 2 and 4-die machines. Features are explained of units for tapering, sizing, and reducing round solids and tubing of any reasonable ductile material.

40. Electric Motors

The Dumore Co.—10-page illustrated bulletin entitled "Speaking of Endurance" pictures and describes performance of fractional horsepower electric motors designed to give greater speed, economy and safety in aircraft operation.

41. Leather Belting

Alexander Brothers—34-page illustrated bulletin describes construction, use, and installation of "Monobelt" leather belting for operation of regular or high speed drives. Information is included on various products comprising line of leather goods.

42. Gear Finisher

Michigan Tool Co.—4-page illustrated bulletin No. 859 describes duplex No. 859 gear finisher which may be used for finishing two gears at one time, particularly where there are close shoulders. Specifications for these machines are given.

43. Pneumatic Die Cushions

Dayton Rogers Mfg. Co.—20-page illustrated bulletin gives tabulated facts, specifications, standard size and capacities and other engineering data for models A, C, CC, and H pneumatic die cushions. Description of air tanks and accessories is included.

TEEL

eaders' Service Dept.
213 West Third St.,
leveland, Ohio

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FIRST CLASS
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BUSINESS REPLY CARD
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STEEL
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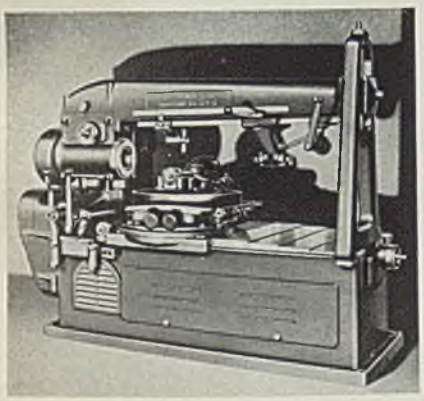
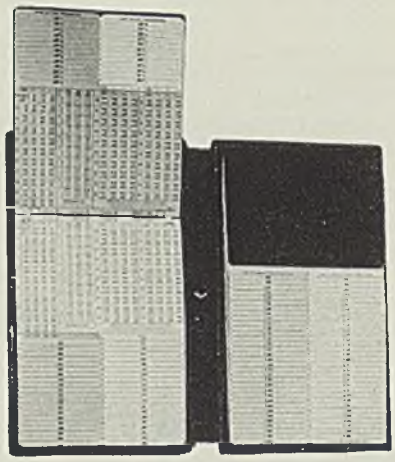
provides a means to traverse the hob not only longitudinally but also laterally at the same time. The hob spindle shoulder now accommodates standard hobs up to 4-inch diameter by 4-inch length. An additional feed screw in the lower hob swivel slide gives the hob its longitudinal traverse. A special micrometer dial on the work slide permits reading the exact height of the center line of the work spindle above the center line of the hob spindle. A similar dial on the main feed screw shows the exact number of inches and thousandths between the spindle nose and the center line of the hob carriage unit. A scale, mounted on the overarm, positions a fixed stop for loading work into the machine properly, and a large gear box on the left side of the machine contains all change gear trains. All controls are at the left hand front of the machine. The machine's overarm is of heavier construction. The covers are over the middle of the work spindle, over the back of the upright housing, and over the change gears. Chromium plated telescoping way guards are provided for the bed ways and the hob slide ways. An



additional safety switch is provided to prevent any over run of the hob slide. A spindle nose adapter is provided with each machine. This permits interchangeability of work arbors between this machine and the No. 12 and type A hobbing machines. The hob slide can be swiveled through 360 degrees, and may be set at any angle for hobbing. Tapered hob spindles may be furnished when it is desired to obtain extra fine finish. Hollow type hob spindles can be furnished for accommodating shank type hobs or interchangeable hob arbors.

Payroll Calculator

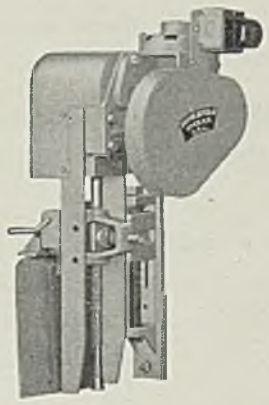
■ Acme Visible Records Inc., 122 South Michigan, Chicago, has perfected a Payroll calculator that eliminates all figuring with its chance for error, and all machine work with its need for verification. It reveals at a glance the total amount due any wage earner in regular and in overtime pay based on the requirement of time-and-a-half for all hours worked over forty in any week. The calculator is a compact, visible card record book which may be placed within



easy eye-range of the clerk while in service, and slipped into any desk drawer when not in use. It contains 261 individual wage rate tables covering every period of service from ¼ hour to 60 hours. The wage rates from 30 cents to $1.50 are in ½-cent steps and those from $1.50 to $2, in 2½ cent steps. Wages are shown for ¼, ½, ¾ and full hour periods. Simple in operation, the entire system is designed for clarity, speed and accuracy. The rate indexes are all visible, and the type is clear. Rules and 2-color printing facilitate reading and avoid confusion and the cards turn on metal hinges. Their visible margins have a transparent protective covering.

Composition Applicator

■ Divine Bros. Co., Utica, N. Y., announce a model AK composition applicator which automatically and mechanically applies compound to



the face of buffing wheels, in an exact controlled amount and frequency. It can be used in conjunction with lathes for hand buffing, and on all types of automatic and semiautomatic buffing machines. Easily moved from one machine to another—the applicator is a self-contained unit. It is very flexible in its mountability on various machines. Its open construction permits dissipation of heat which might melt the bars. The unit is electrically driven by a small motor. Adjustments are provided to control the amount of composition applied at each stroke, and the number of strokes per minute. The motor is protected by thermal elements in the switch. This same machine can be used to automatically apply a grease stick to polishing wheels.

Speed Reducer

■ American Pulley Co., 4200 Wissahickon, Philadelphia, has introduced a new type of speed reducer. It consists of two major elements—a helical-gear reduction unit which mounts directly on the shaft of the driven machine, and a standard belt

drive between the motor and the input shaft of the reduction unit. The unit itself has a standard, fixed ratio of 13:1, greater or lesser ratios being accomplished by the primary belt drive. Five reduction units, each with the same 13:1 ratio, cover all applications from ½ to 30 horsepower. For speeds lower than 11 revolutions per minute special reduction units can be assembled. Because this speed reducer mounts directly on the shaft, no space or expense for special foundations is required. The shock-absorbing action of the primary belt drive protects the gears from any shock loads. Necessary maintenance attention is confined to infrequent lubrication.

Honing, Lapping Machine

■ W. H. Simmons & Co., 208 Lawrence street, Cincinnati, has developed a large Hy-Speed capacity honing and lapping machine which has unusual capacity and extreme simplicity of operation. Its construction allows much faster production on large cylinders.

Fast material removal is possible in the honing operation. An example of the machine's high material removal is shown in the removal of 0.007-inch on the diameter of a 10½-inch bore alloy diesel engine

liner 30 inches long, in the actual honing time of 8 minutes. Accuracy was maintained with 0.00025-inch for roundness and 0.0005-inch for straightness in a length of 30 inches. The machine is available in three sizes.

Photometer

■ General Electric Co., Schenectady, N. Y., has introduced a new photometer for transmission measurements. It is especially valuable in such work as quantitative spectographic analysis.

The photometer features compactness, mechanical simplicity, ease of operation and flexibility necessary to give good results. The arrangement of the instrument allows the operator to see a magnified portion of the exact field which is being measured. Several apertures are provided in the screen, but these may be easily changed by changing the position of the diaphragm. The slit diaphragm can be rotated to align closely the image of the spectral line with the slit aperture, with provision for special conditions of measurement.

After adjustment, the optical parts remain fixed and require no further movement for focusing.

Other conveniences include; horizontal plane mounting, vernier adjustment of the plane in the direction of the wave length axis, focusing by the up and down movement of the stage, convenient location of light control devices directly in front of the operator and convenient location of the stage, screen and galvanometer scale.

Last Call for Exhibitors

1941

MACHINE & TOOL PROGRESS EXHIBITION

CONVENTION HALL, DETROIT
MARCH 25 TO 29 INCLUSIVE

If you are producing machines, tools or equipment needed for the defense program, you can bring them directly to the attention of the men who will buy and use them—at the 1941 Machine & Tool Progress Exhibition. Being held concurrently with the annual convention of the A.S.T.E., the timely theme of both exhibition and convention is "Education for National Defense."

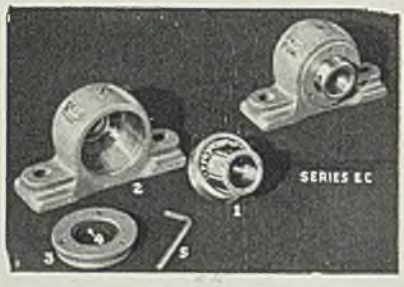
At the last exhibition, more than 27,000 production executives and engineers were officially registered. Total attendance exceeded 75,000.

To date more than three-fourths of all available floor space has been reserved. However, a few booths of various sizes are still available. Booths are 10x10, 10x20, 15x20, 20x20 and 20x30 feet. If you have not already reserved space, write or wire today.

AMERICAN SOCIETY OF TOOL ENGINEERS
Ford R. Lamb, *Exec. Secretary*
2567 W. Grand Blvd. **Detroit, Michigan**

Improved Pillow Blocks

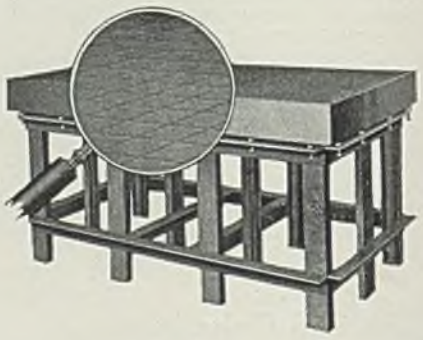
■ Ahlberg Bearing Co., 3058 West Forty-seventh street, Chicago, announces the incorporation of Neoprene seals in its Series EC pillow blocks to protect the bearings and retain their lubricant. These turn with the shaft and float in the housing. The seals are of the labyrinth type, frictionless and longwearing. Complete units consist of full self-aligning, precision ball bearings,



mounted in one-piece housings. Compact and simple, the design lends itself to light and normal service. The illustration shows; (1) self-aligning ball bearing, (2) one-piece housing, (3) removable end cap, (4) no-drag labyrinth seals, (5) simple mounting wrench.

Lapping Plate

■ Challenge Machinery Co., Grand Haven, Mich., is marketing a semi-steel lapping plate which has 1/16-inch grooves, spaced ½-inch apart, running the full length and width of the surface. It is stated to pro-



vide a means for accurate lapping of delicate joints. The lapping plates are of high-grade semisteel, specially heat-treated and machined. They are used on crank cases, cylinder heads, end bells, gear housings and other parts that must be lapped to avoid oil leaks. A specially-designed, all-steel stand is

available with these plates. It is arc-welded for rigidity and is equipped with closely-spaced lock leveling screws that enable the user to keep the lapping plate level at all times.

Unit Heaters

■ Reznor Mfg. Co., 186 James street, Mercer, Pa., has introduced a new line of gas-fired unit heaters, for offices, factories, storerooms and similar places. The heaters need no water or steam for operation, are scientifically constructed to throw heat evenly over large areas. Three types, each available in five sizes to provide from 55,000 to 200,000 Btu, are included in the line. The fan type heater is equipped with

a 4-blade, electrically-driven propeller fan. This is situated behind the heater cabinet, driving cool air of the room over the streamlined heat exchanger and thence into the room, the air being heated in the process. Products of combustion are carried from the combustion chamber into the flue chamber and then to the chimney. The blower and duct type heaters correspond in design and operation to the fan type unit except that the blower type is equipped with a blower instead of a fan and the duct type is equipped with neither blower nor fan. The blower type is for installation in a duct system. The duct type heater is for use in a system where the air is supplied by a remotely situated blower. All of the heaters can be furnished to burn natural, manufactured or liquefied petroleum gas, and are completely equipped with automatic controls.

Fluorescent Lamp

■ Hygrade Sylvania Corp., Salem, Mass., has introduced a new 100 watt fluorescent lamp for general illumination in larger areas. It is 60 inches long and 2⅛ inches in diameter. Available now in white, it will soon be available in daylight. The lamp's base is Mogul Bi-Pin, similar to present fluorescent lamp bases, but larger.

Rated at an average life of 2000 hours, the unit has an initial lumen output of 44 lumens per watt.

Pressure Meter

■ Thomson-Gibb Electric Welding Co., Lynn, Mass., has placed on the market recently, an improved resistance welding pressure meter which insures more accurate readings.

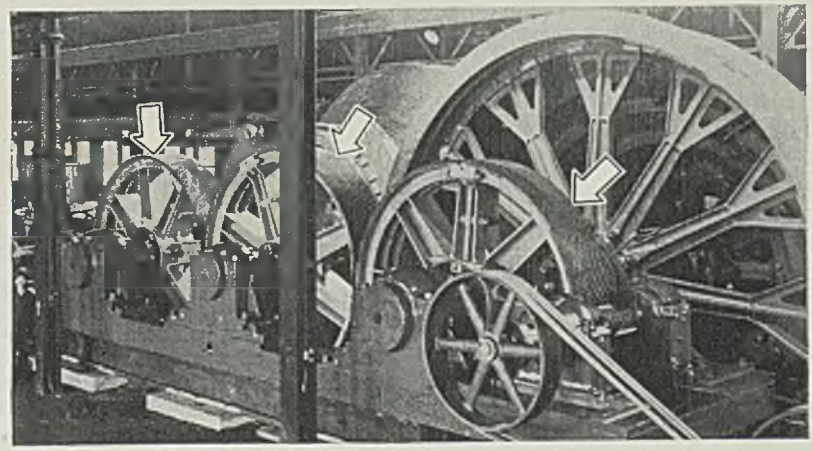
It consists chiefly of an oil-filled diaphragm connected to a gage made with a bronze bushed movement. The dial is calibrated to read directly in pounds.

A plunger tube plug stabilizer in the stem protects the gage against damage from sudden application of pressure and eliminates danger of the needle being forced off the scale or turned on its shaft.

The diaphragm unit is resistance welded throughout, the pads being welded to the diaphragm plates which are seam welded together, and the stud into which the gage is screwed is welded to the diaphragm.

The gage is available in the following ranges: 0-350, 0-550, 0-800, 0-1600, 0-2500, 0-4000, 0-5000, and 0-8000 pounds.

FARREL-SYKES GEARS



Increase The Load-Carrying Capacity Of Canadian Allis-Chalmers Hoist

Because the greater bearing surface of their continuous herringbone teeth makes them stronger and able to carry heavier loads, Farrel-Sykes Gears are used in this double conical drum mine hoist built by Canadian Allis-Chalmers, Ltd.

The idler and drum shaft gears of this hoist are split in halves for easy assembly and disassembly. The driving pinions are solid and each is coupled to a 1200 HP, 400 RPM motor, reducing to 38.2 RPM on the drums.

In addition to increased strength and high load-carrying capacity, Farrel-Sykes Gears offer the advantages of reduced weight and size and exceptionally quiet, smooth operation.

Owing to the interlacing of their teeth, their creeping engagement and inclined line of pressure, Farrel-Sykes Gears withstand wear better, and involute profile and correct tooth action are maintained as long as the gears last. Opposed helices balance and absorb axial thrust within the gear member, which eliminates harmful thrust loads and resultant stresses on other parts of the machinery. These features account for the long-lived, economical performance of Farrel-Sykes Gears.

There are Farrel-Sykes Gears and Gear Units for every type of service. Special units are designed and built to order. Farrel engineers are available for consultation on gear problems.

FARREL SYKES GEARS

FARREL - BIRMINGHAM COMPANY, Inc.
322 VULCAN STREET - - - - - - - - BUFFALO, N. Y.
The Gear with a Backbone

Steel Corp. Shipments Up; Set December Record

■ December shipments of finished steel by the United States Steel Corp. totaled 1,544,623 net tons, an increase of 119,271 tons over November shipments of 1,425,352 tons and an increase of 100,654 tons over 1,443,969 tons in December, 1939. This was the highest December total in the history of the Corporation.

For the year ended Dec. 31, 1940, total shipments, exclusive of year-end adjustments, totaled 14,976,110 tons, compared with 11,707,251 tons after adjustments in 1939.

U. S. Steel's Shipments

(Inter-company shipments not included)

	Net Tons			
	1940	1939	1938	1937
Jan.	1,145,592	870,866	570,264	1,268,403
Feb.	1,009,256	747,427	522,395	1,252,845
March	931,905	845,108	627,047	1,563,113
April	907,904	771,752	550,551	1,485,231
May	1,084,057	795,689	509,811	1,443,477
June	1,209,684	807,562	524,994	1,405,078
July	1,296,887	745,364	484,611	1,315,353
Aug.	1,455,604	885,636	615,521	1,225,907
Sept.	1,392,838	1,086,683	635,645	1,161,113
Oct.	1,572,408	1,345,855	730,312	875,972
Nov.	1,425,352	1,406,205	749,328	648,727
Dec.	1,544,623	1,443,969	765,868	539,553
Total, by Mos	14,976,110	11,752,116	7,286,347	14,184,772
Adjustment		*44,865	†29,159	*87,106
Total		11,707,251	7,315,506	14,097,666

†Increase. *Decrease.

Autobuilders Cancel National Fall Show

DETROIT

■ While proceeding with plans for new models, automobile manufacturers have almost unanimously decided to call off the national automobile show in New York this fall, due to the urgency of the defense program.

President Asks "Greatly Increased" Appropriation

(*Concluded from page* 24)

for greatly increased new appropriations and authorizations to carry on what we have begun.

"I also ask this congress for authority and for funds sufficient to manufacture additional munitions and war supplies of many kinds, to be turned over to those nations which are now in actual war with aggressor nations.

"Our most useful and immediate role is to act as an arsenal for them as well as for ourselves. They do not need man power. They do need billions of dollars' worth of the weapons of defense.

"The time is near when they will not be able to pay for them in ready cash. We cannot, and will not, tell them they must surrender, merely because of present inability to pay for the weapons which we know they must have.

"I do not recommend that we make them a loan of dollars with which to pay for these weapons—a loan to be repaid in dollars.

"I recommend that we make it possible for those nations to continue to obtain war materials in the United States, fitting their orders into our own program. Nearly all of their materiel would, if the time ever came, be useful for our own defense."

Sloss-Sheffield To Rehabilitate Old Ovens

■ Sloss-Sheffield Steel & Iron Co. will rehabilitate part of its old beehive coke oven equipment on the Lewisburg highway adjacent to Birmingham, to produce about 90,000 tons of coke annually. Ovens, idle 20 years, had to be dug from accumulation of rubbish. Expenditure will involve about $30,000.

Cemented Carbide Tools Sales Service Extended

■ Extensive plant improvements, adoption of new processes and consolidation of sales engineering forces is announced jointly by Vascoloy-Ramet Corp., North Chicago, Ill., Fansteel Metallurgical Corp., North Chicago, and Vanadium-Alloys Steel Co., Latrobe, Pa.

To meet national defense requirements for cemented carbide tools the companies have been working to improve quality, expedite deliveries, and to give more engineering assistance to users.

This service, says the announcement, "is being extended by organization of a direct sales engineering force under management of Vascoloy-Ramet Corp. Factory owned branches have been established in Detroit, Cleveland, Cincinnati, Pittsburgh, Providence, R. I., Hartford, Conn., Jersey City, N. J., Philadelphia and Milwaukee. Each will be managed by a trained sales engineer experienced in the application of Vascoloy-Ramet tools . . . . Traveling engineers are available for consultation on special applications.

"Effective Jan. 1, 1941, orders for Vascoloy-Ramet tools, blanks, dies or wear resisting parts should be placed with the general offices at North Chicago or Jersey City, with any of the factory owned branches, or with any of the authorized Vascoloy-Ramet agents, with equal assurance of prompt and careful attention."

Direct sales and service facilities of Vanadium-Alloys Steel Co. for Vascoloy-Ramet products have been consolidated with those of Vascoloy-Ramet Corp.

Among carbide tool engineers transferred to the sales organization are: Wilfred Pulver and Clarence J. Busch, located at Milwaukee; C. W. Blade, Hartford; F. B. Sturm, Detroit; Sam A. Minien and John Lee, North Chicago.

DIED:

Fred R. Davis, 64, a founder of the Audit Bureau of Circulations and for 35 years advertising space buyer for General Electric Co., Schenectady, N. Y., Dec. 26, at his home in Schenectady. He was a pioneer advocate of accurate measurement in advertising and helped found the Audit Bureau in 1914. He served as a director from that date until his death, and also was first vice president of the organization since 1927.

♦

Irving J. Knudson, 49, head of the refrigerator division, Detroit Lubricator Co., with headquarters in Chicago, in Tucson, Ariz., Jan. 7.

♦

Gordon J. Ratzow, 38, assistant purchasing agent, National Screw & Mfg. Co., Cleveland, in that city, Jan. 7.

♦

Harry H. Alexander, 74, consulting metallurgist and plant manager, American Smelting & Refining Co., New York, Jan. 5, at his home in Westfield, N. J.

♦

William G. Zapf, 71, for many years chief chemist, Hanna Furnace Co., Delray, Mich., until his retirement a year ago, Jan. 2, at his home in Detroit.

♦

Ethan E. Ames, 59, associated with the Cleveland sales department of John A. Roebling's Sons Co., Trenton, N. J., at his home in Cleveland, Jan. 2. He had been associated with Roebling's 39 years.

♦

William C. Minier, 61, former sales manager of the Cleveland-Cincinnati-Detroit district for Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y., Jan. 1, at his home in Cleveland Heights, O.

♦

Elmer E. Woodward, 78, president, Woodward Governor Co., Rockford, Ill., in Rockford, Dec. 31. An authority on speed control, and an inventor, he began his career as an apprentice in his father's factory at the age of 14. He had been president of the company 22 years.

♦

John S. Scott, 81, vice president, Patterson Foundry & Machine Co., East Liverpool, O., Dec. 30.

Second Quarter Prices Becoming Live Topic

Pressure to lower scrap price may mean unchanged steel levels. Bulk of orders now for second quarter.

MARKET IN TABLOID ★

Demand
Continues brisk.

Prices
Strong.

Production
Up 1½ points to 97.

■ BULK of current steel sales is for second quarter at prices prevailing at time of shipment, with April most popular month. Producers are virtually sold out for first quarter, many making the gesture of withdrawing from the market on that position. Wide plates have been sold as far ahead as August. Sales volume usually holds up to recent high levels, though with more exceptions than usual reported and deliveries lag farther behind. Thus steel sheets average 12 weeks as against 10 weeks before the holidays.

If Washington is successful in forcing steel scrap prices down to the basis of $20 for Pittsburgh heavy melting steel, the leading reason for higher finished steel prices for second quarter will have been removed. Some figure that two-thirds of the increased cost of steel making since April lies in scrap. Steelmakers will probably delay naming new prices as long as possible, possibly until mid-March, to give them more time to size up costs. Since most producers book at prices prevailing for second period there will be no urgent need for speed.

Most consumers now turn in exact specifications as to quality, quantity and date of delivery with the issuing of an inquiry, in contrast to blanket inquiries of other years, exigencies of the times forcing this more precise action.

News of governmental price pressure on scrap resulted in a flood of offers on part of dealers to sell at below prices prevailing previously, though usually not as low as the $20 base. What seemed scarcity of scrap supplies now for the moment appears as moderate plenty. Lower scrap prices would relieve pressure on pig iron consumption. The proposed $20 scrap quotation would re-establish a normal differential between iron and scrap and tend to re-establish the usual 50-50 ratio charged in open hearths.

Should a base price for scrap be agreed upon complicated work would follow in establishing prices on other descriptions and in various centers, it being suggested that a determination of average differentials over a period of years may finally decide the matter.

A list of significant steels, compiled by leading metallurgists after months of study, is expected to be announced within a few weeks. It will include some 200 specifications aimed to meet practically all requirements now covered by many thousands. If it is adopted generally the effect should be to speed up the defense program by making it a simpler matter for the steel industry to produce steel for varying requirements.

The situation with reference to the steel supply for current needs is encouraging. Steps now are being taken to eliminate the bottleneck in plates—a bottleneck that has not yet become really acute. One 100-inch mill is being widened to enable it to produce 120-inch plates. Plans are in process for similar changes or for installation of accessory equipment at other mills so as to increase output of needed material. Then, there is capacity for producing a vast tonnage of plates, up to 1-inch thick and up to 94 inches wide, on continuous strip mills. The 140-inch mill to be built by Tennessee Coal, Iron & Railroad Co., incidentally, is expected to be in production before the end of 1941.

The recently acute situation in electric furnace steel has been considerably relieved as a result of placing new furnaces in production. It is expected that when additional furnaces now under construction go into production in March or April there will be no further concern here.

Galvanizers have bid as high as 9½ cents for zinc, as against official quotation of 7¼ cents.

Automobile production is scheduled to recover from the holidays by 39,245 units to 115,935 for the week of Jan. 11, comparing with 111,330 for the same week of 1940.

Steel ingot production last week gained 1½ points to 97 per cent of capacity. Advances took place in six districts: Chicago by ½ point to 100 per cent, Cleveland by ½ point to 84½, New England by 1 point to 86, Cincinnati by 1½ points to 88½, Detroit by 4 points to 94, Youngstown by 2 points to 94. Declines were at Wheeling, off 5 points to 91, and Buffalo, off 2½ points to 90½. Unchanged were: Pittsburgh at 95½, eastern Pennsylvania at 95, Birmingham at 100 and St. Louis at 87½ per cent.

Composite price of steelworks scrap reversed its recent trends, declining 71 cents to $21. Iron and steel was nominally unchanged at $38.47 and finished steel remained the same at $56.60.

COMPOSITE MARKET AVERAGES

	Jan. 11	Jan. 4	Dec. 28	One Month Ago Dec., 1940	Three Months Ago Oct., 1940	One Year Ago Jan., 1940	Five Years Ago Jan., 1936
Iron and Steel....	$38.47	$38.47	$38.43	$38.30	$38.07	$37.33	$33.34
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	53.70
Steelworks Scrap..	21.00	21.71	21.46	21.37	20.56	17.48	13.15

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Jan. 11, 1941	Dec. 1940	Oct. 1940	Jan. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Jan. 11, 1941	Dec. 1940	Oct. 1940	Jan. 1940
Bessemer, del. Pittsburgh	$25.34	$24.95	$24.34	$24.34
Basic, Valley	23.50	23.10	22.50	22.50
Basic, eastern, del. Philadelphia	25.34	24.84	24.34	24.34
No. 2 foundry, Pittsburgh	25.21	24.80	24.21	24.21
No. 2 foundry, Chicago	24.00	23.75	23.00	23.22
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2, del. Cincinnati	23.06	23.06	23.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	25.715	25.215	25.215
Malleable, Valley	24.00	23.60	23.00	23.00
Malleable, Chicago	24.00	23.75	23.00	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.17	23.35	23.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt. steel, Pitts.	$21.75	$22.75	$21.30	$18.15
Heavy melt. steel, No. 2, E. Pa.	19.75	19.75	19.75	16.81
Heavy melting steel, Chicago	20.75	20.70	19.85	16.45
Rails for rolling, Chicago	25.25	25.00	24.05	19.05
Railroad steel specialties, Chicago	24.25	23.95	23.25	18.50

Coke

Connellsville, furnace, ovens	$5.50	$5.50	$4.75	$4.75
Connellsville, foundry, ovens	6.00	6.00	5.75	5.75
Chicago, by-product fdry., del.	11.75	11.75	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

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

Steel Plate

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

Steel Floor Plates

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

Structural Shapes

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

Tin and Terne Plate

Tin Plate, Coke (base box)

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

Mfg. Terne Plate (base box)

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

Bars

Soft Steel

(*Base, 20 tons or over*)

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

Rail Steel

(*Base, 5 tons or over*)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55

(Per Pound)

Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

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

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

Cut Nails

Carload, Pittsburgh, keg..$3.85

Cold-Finished Bars

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

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

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

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.20
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-Inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68 off
Do., ⅝ and 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 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅛-inch and less.	66	70
⅛-1-inch	63	65
1⅛-1⅛-inch	61	62
1⅛ and larger	60	..

Hexagon Cap Screws

Upset 1-in., smaller	68 off

Square Head Set Screws

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

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

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

Structural	3.40c
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.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

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

Iron

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

Line Pipe

Steel

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

Iron

	Blk.	Galv.
¼ 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 ⅜-inch incl. (per 100 lbs.)	$2.00
Do., over ⅜ to 47/64-in. incl.	2.15

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

Skelp

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

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.75
Connellsville, fdry.	5.25- 6.00
Connell, prem. fdry	6.00- 6.60
New River fdry.	6.50- 7.00
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del.	11.25
Milwaukee, ovens	11.75
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birmingham, Ala.‡	19.38		18.38	
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00			
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

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

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	24.78		23.66	
Boston from Birmingham	24.12			
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brookyln, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.24	25.11	24.61	.....
Cincinnati from Birmingham	23.06		22.06	
Cleveland from Birmingham	23.32		22.82	
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	25.15			
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	....	23.96	
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†23.12		22.62	
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

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

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

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

Ladle Brick

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

Dry press	$28.00
Wire cut	26.00

Magnesite

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

Basic Brick

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

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

Fluorspar

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

Ferroalloy Prices

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

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

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

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

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

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

Ferrophosphorus, gr. ton, c.l., 17-18%' Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. i., 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 is 10c higher

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

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

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

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

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c 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	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.40	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	...	5.05	..	4.05	.	
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.62	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	....	4.65	....	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	3.25	4.10	4.60	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.30	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	6.53
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	3.45	....	4.76	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	..
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	3.99	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.50	5.95	5.95	3.85	3.85	5.50	4.20	.	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.50	4.00	6.00	3.50	3.50	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	..
Philadelphia	4.10	7.31	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; 400-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

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

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

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1 11 4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6 8 0(a)
Basic pig iron	24.28	6 0 6(a)
Furnace coke, f.o.t. ovens	7.15	1 15 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0††

(a) del. Middlesbrough. 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

IRON AND STEEL SCRAP PRICES

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

Scrap quotations are largely nominal in absence of trading, the market being indefinite for the present until results of the government effort for lower prices has been clarified. At Pittsburgh, Cleveland, Detroit, New York and Philadelphia brokers have lowered prices $1 to $1.50 but no consumer buying has resulted.

HEAVY MELTING STEEL

Birmingham, No. 1	19.00
Bos. dock No. 1 exp.	17.00-17.25
New Eng. del. No. 1	18.25-18.50
Buffalo, No. 1	23.00-23.50
Buffalo, No. 2	21.00-21.50
Chicago, No. 1	20.50-21.00
Chicago, auto, no alloy	19.50-20.00
Cincinnati, dealers	19.50-20.00
Cleveland, No. 1	21.00-21.50
Cleveland, No. 2	20.00-20.50
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	17.75-18.25
Granite City, R. R. No. 1	18.75-19.25
Granite City, No. 2	17.75-18.25
Los Ang., No. 1 net	14.00-14.50
Los Ang., No. 2 net	13.00-13.50
N. Y. dock No. 1 exp.	†17.00
Pitts., No. 1 (R. R.)	23.50-24.00
Pittsburgh, No. 1	21.50-22.00
Pittsburgh, No. 2	20.50-21.00
St. Louis, No. 1	18.75-19.25
St. Louis, No. 2	17.75-18.25
San Fran., No. 1 net	14.50-15.00
San Fran., No. 2 net	13.50-14.00
Seattle, No. 1	15.00
Toronto, dlrs., No. 1	11.00-11.25
Valleys, No. 1	22.00-22.50

COMPRESSED SHEETS

Buffalo	21.00-21.50
Chicago, factory	20.00-20.50
Chicago, dealers	18.50-19.00
Cincinnati, dealers	18.50-19.00
Cleveland	21.00-21.50
Detroit	†19.00-19.50
E. Pa., new mat.	20.50-21.00
E. Pa., old mat.	17.50-18.00
Los Angeles, net	10.25-10.75
Pittsburgh	21.50-22.00
St. Louis	15.50-16.00
San Francisco, net	10.50-11.00
Valleys	20.50-21.00

BUNDLED SHEETS

Buffalo, No. 1	21.00-21.50
Buffalo, No. 2	19.50-20.00
Cleveland	16.00-16.50
Pittsburgh	20.50-21.00
St. Louis	14.00-14.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	15.00-15.50
Cincinnati, dealers	14.00-14.50
Detroit	†15.50-16.00
St. Louis	13.50-14.00
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1	17.00
Buffalo, No. 1	21.00-21.50
Chicago, No. 1	19.50-20.00
Cincin., No. 1 deal.	16.00-16.50
Cincin., No. 2 deal.	9.00- 9.50
Cleveland, No. 2	14.50-15.00
Detroit, No. 1 new	†18.50-19.00
Valleys, new, No. 1	21.00-21.50
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	8.50
Buffalo	15.00-15.50
Chicago	15.00-15.50
Cincinnati, dealers	11.50-12.00
Cleveland, no alloy	13.50-14.00
Detroit	†11.75-12.25
Eastern Pa.	15.00-15.50
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	15.00-15.50
St. Louis	12.25-12.75
San Francisco	5.00
Toronto, dealers	7.25- 7.50
Valleys	15.00-15.50

SHOVELING TURNINGS

Buffalo	16.00-16.50
Cleveland	14.50-15.00
Chicago	14.75-15.25
Chicago, spcl, anal.	15.50-16.00
Detroit	†12.75-13.25
Pitts., alloy-free	16.00-16.50

AXLE TURNINGS

Buffalo	18.00-18.50
Boston district	†12.50-13.00
Chicago, elec. fur.	20.50-21.00
East. Pa. elec. fur.	19.50-20.00
St. Louis	15.00-15.50
Toronto	7.25- 7.50

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†11.00-11.25
Buffalo	15.00-15.50
Chicago	14.50-15.00
Cincinnati, dealers	10.75-11.25
Cleveland	14.50-15.00
Detroit	†12.50-13.00
E. Pa., chemical	15.50-16.00
New York	†11.50-12.00
St. Louis	12.00-12.50
Toronto, dealers	7.25- 7.50

RAILROAD SPECIALTIES

Chicago	24.00-24.50

ANGLE BARS—STEEL

Chicago	23.75-24.25
St. Louis	22.25-22.75

SPRINGS

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

STEEL, RAILS, SHORT

Birmingham	21.00
Buffalo	26.50-27.00
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	26.00-26.50
St. L. 2 ft. & less	24.50-25.00

STEEL RAILS, SCRAP

Birmingham	19.00
Boston district	†16.50-17.50
Buffalo	23.50-24.00
Chicago	20.50-21.00
Cleveland	24.00-24.50
Pittsburgh	23.00-23.50
St. Louis	22.00-22.50
Seattle	18.00-18.50

RAILROAD WROUGHT

Birmingham	17.00
Boston district	†11.75-12.25
Eastern Pa., No. 1	20.50-21.00
St. Louis, No. 1	16.00-16.50
St. Louis, No. 2	17.50-18.00

FORGE FLASHINGS

Boston district	†14.25-14.50
Buffalo	21.00-21.50
Cleveland	19.00-19.50
Detroit	†17.75-18.25
Pittsburgh	20.00-20.50

FORGE SCRAP

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

LOW PHOSPHORUS

Buffalo, plates	28.00-28.50
Cleveland, crops	27.00-27.50
Eastern Pa., crops	25.00-25.50
Pitts., billet, bloom, slab crops	27.00-27.50

LOW PHOS. PUNCHINGS

Buffalo	26.50-27.00
Chicago	25.00-25.50
Cleveland	22.00-22.50
Detroit	†20.50-21.00
Eastern Pa.	25.00-25.50
Pittsburgh	26.00-26.50
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	20.00
Boston	†18.50-19.00
Chicago	25.00-25.50
New York	†19.50-20.00
Eastern Pa.	26.00-26.50
St. Louis	24.50-25.00

STEEL CAR AXLES

Birmingham	19.00
Boston district	†20.00-21.00
Chicago, net	26.25-26.75
Eastern Pa.	27.50-28.00
St. Louis	26.00-26.50

LOCOMOTIVE TIRES

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

SHAFTING

Boston district	†19.75-20.00
New York	†21.00-21.50
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"	20.00-20.50

CAR WHEELS

Birmingham, iron	20.00
Boston dist., iron	†16.00-16.50
Buffalo, steel	26.50-27.00
Chicago, iron	21.50-22.00
Chicago, rolled steel	24.50-25.00
Cincin., iron deal.	21.00-21.50
Eastern Pa., iron	23.00-23.50
Eastern Pa., steel	26.00-26.50
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	26.50-27.00
St. Louis, iron	22.00-22.50
St. Louis, steel	23.50-24.00

NO. 1 CAST SCRAP

Birmingham	18.50
Boston, No. 1 mach.	†17.50-18.00
N. Eng., del. No. 2	18.25-18.75
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.	22.00-22.50
Chicago, agri. net	16.50-17.00
Chicago, auto net	19.50-20.00
Chicago, railr'd net	18.00-18.50
Chicago, mach. net	19.50-20.00
Cincin., mach. deal.	22.75-23.25
Cleveland, mach.	24.00-24.50
Detroit, cupola, net	†17.50-18.00
Eastern Pa., cupola	24.00-24.50
E. Pa., No. 2	20.00-20.50
E. Pa., yard fdry.	20.00
Los Angeles	16.50-17.00
Pittsburgh, cupola	21.50-22.00
San Francisco	14.50-15.00
Seattle	14.00-15.00
St. L., agri. mach.	19.50-20.00
St. L., No. 1 mach.	20.75-21.75
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.	19.50-20.00
Cleveland, break, net	18.50-19.00
Detroit, auto net	†18.00-18.50
Detroit, break.	†16.00-16.50
Eastern Pa.	22.00-22.50
Los Ang., auto, net	13.00-14.00
New York break	†17.00

STOVE PLATE

Birmingham	12.00-13.00
Boston district	†16.00-16.50
Buffalo	18.00-18.50
Chicago, net	14.00-14.50
Cincinnati, dealers	14.25-14.75
Detroit, net	†12.00-12.50
Eastern Pa.	18.00-18.50
New York fdry.	†15.00-15.50
St. Louis	15.25-15.75
Toronto dealers, net	12.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	24.50-25.00
Chicago, R. R.	24.50-25.00
Cincin. agri., deal.	19.00-19.50
Cleveland, rail	25.00-25.50
Eastern Pa., R. R.	22.50-23.00
Los Angeles	12.50
Pittsburgh, rail	25.50-26.00
St. Louis, R. R.	22.50-23.00

Ores

Lake Superior Iron Ore

Gross ton, 51½ %

Lower Lake Ports

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

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos	nom.
Spanish, No. African basic, 50 to 60%	nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c
F.O.B. Rio Janeiro.	
Scheelite, imp.	$25.00
Chrome ore, Indian, 48% gross ton, cif.	$28.00-30.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	.....
So. African, 50-52%	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 80, 81

Pittsburgh—Automotive specifications continue good. Backlogs are fairly high, although deliveries are being met in almost every instance. Reclassification of certain thickness specifications in the strip list results in a maximum thickness of strip six inches wide and under of 0.202-inch, which provides a definite line of demarcation between the strip and bar lists.

Cleveland — Deliveries are now usually 12 weeks behind on most grades as against ten weeks before the holidays. Sheets are among the three most active items for some well diversified companies. Few producers report slight let-up in buying. Most current sales are for second quarter at prices then prevailing. Deliveries on hot-rolled sheets are more extended than cold-rolled because of brisk defense demand, the situation being reversed from six weeks ago.

Chicago—Sheet and strip sales were slightly easier the past week, but still at a level which increases backlogs and lengthens deliveries. Consumer demand remains good, with manufacturers of metal products, such as steel furniture and household appliances operating at high levels.

Boston—Narrow cold strip shipments thus far this month are heavy, but volume of incoming tonnage maintains large backlogs, and, while rerolling operations are at capacity, more orders are being taken for second quarter at open prices. Priorities are appearing, but to date have been mostly confined to stainless and alloys, demand for which is brisk, with stainless deliveries 12 to 16 weeks. Hot strip deliveries are gradually being extended on some finishes, but re-rolling schedules as yet are not seriously affected.

New York — While some leading sellers can still work in tonnage for delivery in nine to ten weeks, the majority are sold out for the quarter. Partly as a result of this and partly because of the desire of consumers to cover anticipated needs for delivery at time required, placing of orders for second quarter at prices ruling at time of delivery is becoming general.

Heavier consumption of cold strip, plus efforts of buyers to build inventories, maintains new purchases well above current shipments with mills operating at capacity in most instances. Pressure for deliveries by fabricators of consumer goods is notably strong, including the automotive and accessory trade.

Philadelphia — Producers of hot-rolled sheets generally are out of the market for first quarter, al-

Yours for better Wiring

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CONDULETS
(CONDUIT FITTINGS)

When you're wiring the plant for uninterrupted production, remember that conduit fittings have an importance all out of proportion to their cost.

CONDULETS have been accepted as the top-quality line since 1906. They cut installation time, assure a rigid joint with permanent ground continuity.

Long-lasting is assured by three protective coats:

- Cast Feraloy
- Cadmium Plated
- Zinc Plated
- Aluminum Lacquered

Taper-Tapping, another outstanding CONDULET feature, assures that every thread on the conduit bears against every thread on the hub, extra assurance of metal to metal contact that won't loosen under vibration.

There are over 15,000 types of CONDULETS . . . one to meet every wiring requirement exactly.

THOMAS & BETTS
"WEDGE-ON"
CONNECTORS

These pressure (solderless) connectors will speed up installation on all types of electrical circuits, both in the plant and on equipment for resale.

"Wedge-On" Wire Splicers are particularly adapted to line, junction box, motor lead, outlet box and service entrance splices. For wire sizes from No. 16 through No. 4, and for combinations within that range.

"Wedge-On" Lugs are ideal for control wire installations and for use on terminal blocks. Wire is held under great pressure, with barrel supporting insulation so that vibration cannot break strands. Available for wire sizes No. 22 to No. 4, solid and stranded.

The T & B catalog of pressure connectors has 100 pages of these modern devices engineered especially for fast, firm connections of wire, cable, rod, tubing or bus bar. Write GRAYBAR for your copy.

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In Over 80 Principal Cities
Executive Offices:
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GRAYBAR offers action-service in emergencies on all types of electrical equipment and supplies.

GraybaR QUALITY Since 1869
Everything Electrical
GraybaR ELECTRIC COMPANY

though some capacity in other grades still is available for delivery late in this period. Bookings continue active in forward positions, the volume so far this month being steady or heavier compared with December.

Cincinnati—Sheet mills seek to keep their position on first quarter deliveries as elastic as possible, to allow for any urgent national defense tonnage which may be demanded with short warning. Some tonnage is being accepted if it can be rolled in first quarter, delivery when possible. Priority demands for defense tonnage tend to increase.

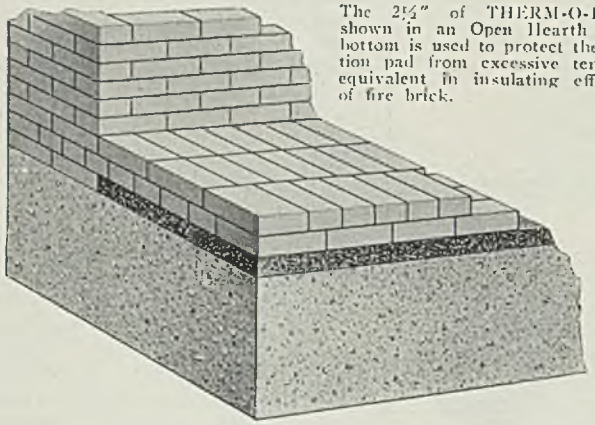
St. Louis — Demand for sheets and strip continues active, with sellers offering little encouragement for deliveries under 8 to 12 weeks. Backlogs show no reduction despite heavy shipments and prospective production for first quarter has been engaged.

Youngstown, O. — Both modern wide mills and the hand mills in this area are producing sheets at capacity. Cold-rolled mills are booked well through March, and the hot-rolled into April, for a wide diversity of consuming interests.

Birmingham, Ala.—Mills are comfortably booked on manufacturers' and roofing sheets, and production is holding at an unofficially estimated 80 to 85 per cent, with some room for improvement.

Therm-O-flake
INSULATING CONCRETE

A Light Weight High Temperature Concrete with Double Insulating Value



The 2½" of THERM-O-FLAKE Concrete shown in an Open Hearth checker chamber bottom is used to protect the concrete foundation pad from excessive temperatures. It is equivalent in insulating effect to about 15" of fire brick.

Reduces usual insulating concrete thickness by about half.

Increases effective depths of flues and checkers in Open Hearth furnace construction.

Protects concrete foundation pads from excessive heat.

Allows increased magnesite thickness in Open Hearth bottoms.

Smooths surface irregularities on Open Hearth bottom pans.

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Other **Therm-O-flake** Products

Made from Exfoliated Vermiculite

Granules - Coating - Brick - Block

Illinois Clay Products Company

JOLIET, ILL.

Plates

Plate Prices, Page 80

Pittsburgh—No change is reported in the plate situation. Orders are still heavier than shipments and all production capacity is in operation. Tonnage of light plates being rolled on continuous strip mills here is larger than normal. Facilities for heat treatment of alloy plate, including principally armor plate items, are being rushed to completion and are expected to be ready shortly.

Cleveland—Wide plates have been sold ahead as far as August, though with 20 weeks usually mentioned as average. Many plates are being rolled on sheet mills where feasible. Demand shows no let-up and with shipbuilding one of the briskest phases of defense no relief for months or even years is expected.

Chicago—Plate sales are steady. Greatest difficulty is in obtaining mill shipments as plate producing facilities are fully engaged and backlogs extend through first quarter.

New York — Rapidly expanding ship tonnage looms ahead in plates. Initial navy requirements for the 200 ships placed last September are soon to be released and in some quarters it is believed the government's program for construction of prefabricated ships will materialize in orders for some eastern fabricating shops within possibly a month.

Philadelphia — Continued heavy plate bookings leave deliveries far extended, particularly on larger sizes of sheared material. Some producers offer universal plates in four to five weeks and sheared plates in eight weeks, but this is exceptional, since ten weeks is the more common minimum delivery promised on any grade. One mill is asking 18 to 25 weeks on wide plates.

Birmingham, Ala.—As for several months, production of plates is being pushed to capacity, and even above rated capacity. A large tonnage was carried over from last year, and there is reason to believe additional heavy bookings will materialize before first quarter has advanced very far.

Toronto, Ont. — Recent placing of large orders for ship construction is reflected in greater demand for plates. Large purchases also have been made recently by companies engaged in war tank construction, and further large business of this nature is pending. Canada's present output of plate has been contracted for the entire year.

Plate Contracts Placed

2000 tons, two fuel oil barges, Mare Island navy yard, Calif., to Basalt

Rock Co., Napa, Calif.

100 tons or more, 500,000-gallon elevated water tank, Fort Dix, N. J., to Pittsburgh-Des Moines Steel Co., Pittsburgh, $52,885; bids Dec. 30, constructing quartermaster.

100 tons or more, 300,000-gallon elevated steel water tank, Scott Field, Ill., to Chicago Bridge & Iron Co., Chicago, $28,850; bids Jan. 3 to United States engineer, St. Louis, Inv. 72.

100 tons or more, tanks, TNT producing plant to be operated by Humble Oil Co., Baytown, Tex., to Wyatt Boiler Works, Houston, Tex., and Chicago Bridge & Iron Co. Chicago; E. B. Badger & Sons Co., Boston, engineer and contractor.

Plate Contracts Pending

6760 tons, four penstocks, specification 941, Shasta dam, Central Valley project, Coram, Calif.; only bid was combination by Western Pipe & Steel Co., San Francisco and Chicago Bridge & Iron Co., Chicago.

1998 to 7992 tons, one to four C-2 type cargo vessels for United States maritime commission; bids Jan. 13.

315 tons, penstock gates, specification 942, Parker dam, Earp, Calif.; bids opened.

Unstated tonnage, two hulls only for welded steel terminal barges, 285 x 75 feet, Federal Barge Lines, Inland Waterways Corp., New Orleans; bids Feb. 4.

Bars

Bar Prices, Page 80

Pittsburgh—Carnegie-Illinois Steel Corp. has released new lists of extras on hot-rolled carbon steel bars, effective Jan. 6, changing the minimum thickness of bar flats 6 inches and narrower from ¼-inch to 13/64-inch. This clarifies the distinction between bars and strip in some instances where overlapping specifications had been occurring. Specifications continue heavy on merchant bars and little mill time is not already scheduled during first quarter.

Cleveland—Bars are among the three most active products in this area. Producers are sold out for first quarter, though occasional prompt delivery is possible where the order is timed favorably with a rolling schedule. Purchasing is well diversified. Much second quarter business being placed.

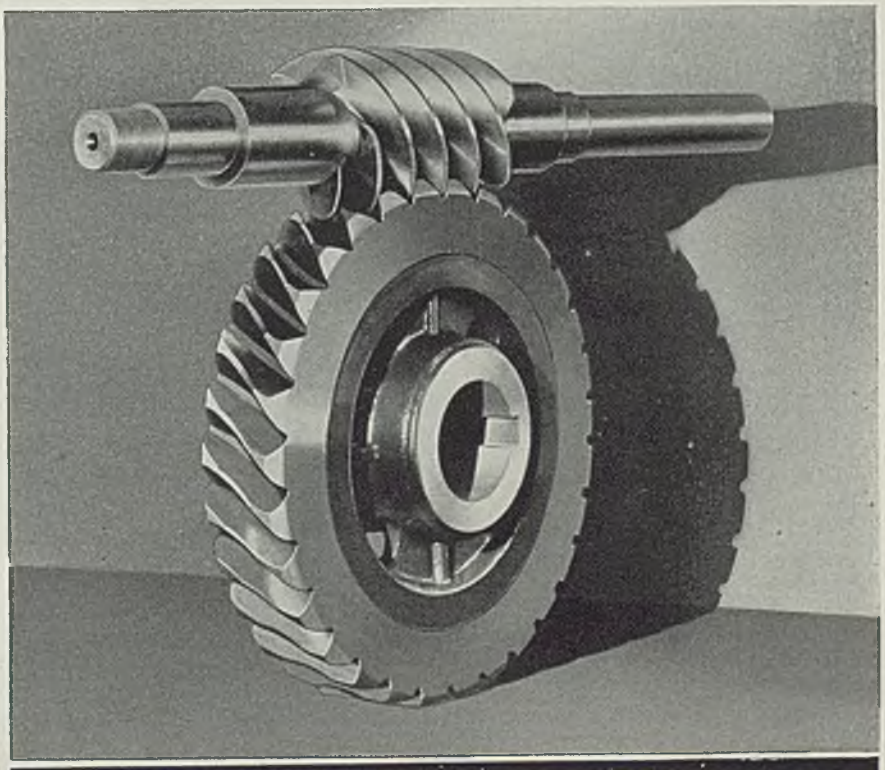
Chicago — Widespread demand holds bar sales relatively steady, although some slackening is noted. Most producers are booked solidly through first quarter, and now are accepting business only for second quarter. Alloy grades are in strongest demand.

Boston—Carbon and alloy steel bar demand continues brisk with consumption broadening. Deliveries on carbon stock can be made in 10 to 12 weeks in a few instances, but alloy and heat-treated material shipments are indefinite and extend into next quarter. Forge shops are working off steel in heavier volume, but with a substantial part of activity devoted to defense contracts, preferential rating as to shipment appears likely. This also applies to greater needs for other defense inquiries which are now expanding while machine tool builders rate near the top.

New York—Only in fairly rare instances are carbon bars available for delivery this quarter. The general average is around 13 weeks, with cold-drawn bar shipments running a week or so behind that. Hot alloy bars from open hearth can still be done in some cases in 19 to 20 weeks, but most producers appear unable to do this well. On hot electric steel alloy bars deliveries generally are far more extended than on open hearth alloys.

Philadelphia—Steel bar sales generally are steady, with somewhat lighter demand noted in some directions. Buying consists largely of future coverage against estimated requirements during March and later. In an attempt to facilitate rolling schedules some producers refuse to accept carbon bar orders for less than three tons of a size.

Toronto, Ont.—Orders for bars are heavier and backlogs are increasing rapidly. Mills now are car-



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★ When action is demanded for transmitting power, here's accuracy to better than one-thousandth of an inch . . . precision is one feature of all Horsburgh & Scott Worms and Worm Gears. There are seven outstanding features that make Horsburgh & Scott Worms and Worm Gears the finest obtainable . . . it will pay you to learn about these advantages.

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

rying large orders for delivery to the end of June, and there is no indication of demand decreasing.

Youngstown, O.—A flood of orders for steel bars is pouring into mills. Deliveries now are the prime consideration and shipments currently are being deferred several months.

Pipe

Pipe Prices, Page 81

Pittsburgh — Shipments to consigned stocks of standard pipe have dropped for year-end inventory period, and oil country business is at a standstill. Production is going ahead as rapidly as physically possible on mechanical tubing, particularly on aircraft specifications.

Cleveland—Good export demand for merchant pipe has backed up here, until permits are received from Washington. With domestic December shipments largest in history, demand has not abated, January to be much on the same level. Lull in oil country goods, line pipe and casings is noted.

Boston—Merchant pipe buying has slackened slightly, but is somewhat above normal with construction requirements, mostly in small individual lots, accounting for most tonnage. The lift is due largely to specified work with routine industrial demand level. Cast pipe buying centers in numerous miscellaneous orders for prompt delivery.

New York—Merchant pipe, while showing some rebound from the holiday season, is moving only moderately well. This is usually the case in the middle of winter as building operations are considerably restricted. In boiler and mechanical tubing, however, specifications continue active.

With some cast pipe foundries experiencing more difficulty in securing pig iron requirements, rush orders for water line installations at army cantonments are substantial. A New Jersey foundry booked 9000 tons for an ordnance plant at Elwood, Ill., part of the cast pipe needed, the remainder now being bought. Utilities are also buying, placing orders in some instances for forward and estimated needs.

San Francisco — Awards of cast iron pipe during 1940 exceeded by 6000 tons the total booked in 1939. The aggregate for 1940 was 49,769 tons, compared with 43,133 tons the previous year. Bookings during the first week of this year totaled 1389 tons while a year ago a blank was drawn.

Cast Pipe Placed

9000 tons, 24-inch and under, partial requirements, ordnance plant, shell-loading unit, Elwood, Ill., to United States Pipe & Foundry Co., Burlington, N. J., through Stone & Webster Engineering Corp., Boston; Sanderson & Porter Co., New York, buying additional tonnage.

850 tons, 2 to 8-inch, east bay municipal utility district, Oakland, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

525 tons, 6 to 10-inch, Augusta, Me., to R. D. Wood & Co., Florence, N. J.

350 tons, various sizes, additional requiremens, Forts Edwards and Devens, Mass., to Warren Pipe Co., Everett, Mass.

225 tons, 8 and 10-inch, Burbank, Calif., to National Cast Iron Pipe Co., Birmingham, Ala.

200 tons, 6 to 12-inch, Auburn, Me., to R. D. Wood & Co., Florence, N. J.

175 tons, procurement division, treasury department, Boston, for Beverly, Mass., to Warren Pipe Co., Everett, Mass.

128 tons, 6 and 8-inch, Sacramento, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

128 tons, 8 and 10-inch, Sacramento, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

1960 tons, cast pipe, 48-inch, and 120 tons, 36-inch steel pipe, Queens, inquiry soon from Department of Water Supply, New York.

1175 tons, 4 to 16-inch, San Francisco; United States Pipe & Foundry Co., Burlington, N. J., low on 800 tons. Central Foundry Co., Holt, Ala., low on 295 tons and Pacific States Cast

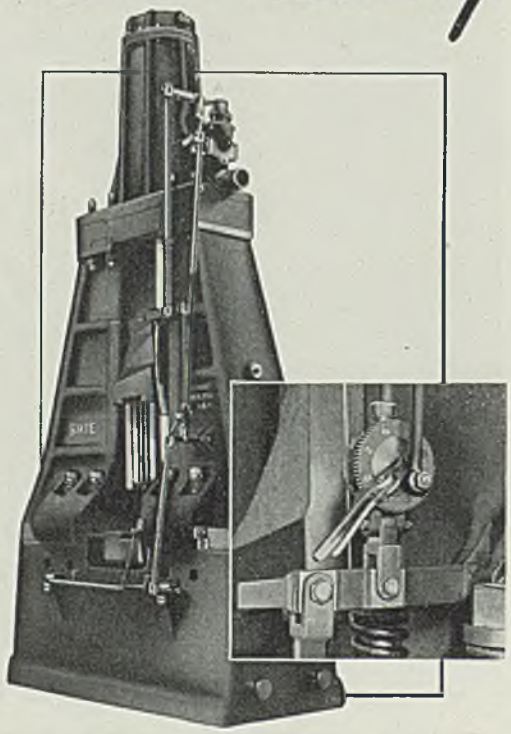
ERIE controllability

IMMEDIATE RESPONSE TO THE OPERATOR'S SLIGHTEST COMMAND

The accuracy with which Erie Steam Hammers can be controlled makes the fullest use of the operator's skill in producing quality forgings. He can easily adjust the force of the blow and extent of the swing of the ram to a fine degree, and can treadle to obtain anything from the lightest touch to the maximum blow.

In the design and construction of Erie Steam Hammers every detail has been considered to make the control as accurate and efficient as possible. The low ratio of the cylinder area to the valve port areas increases the sensitivity and response. All valve gearing is made of durable forged steel and connections are of rigid tubing to eliminate whip. All the connecting pins are in double shear, to prevent lost motion in the valve gearing.

Controllability is especially important today when maximum production must be obtained without sacrificing quality. Bulletin No. 333 describes these and other features of Erie Steam Hammers. Write for your copy.



The throttle control is conveniently located within easy reach of the operator. With one hand he can quickly select the desired setting of the valve ranging from complete shut off to maximum opening. All wearing parts are hardened to minimize wear and consequent lost motion. On large Erie Hammers, instead of throttle control and treadle, separate hand levers for the throttle valve and motion valve can be furnished.

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ERIE BUILDS Dependable HAMMERS

Iron Pipe Co., Provo, Utah, low on 80 tons.

556 tons, 4 to 12-inch, Bishop, Calif.; bids Jan. 13.

830 tons, 10-inch, municipal airport, Oklahoma City, Okla.; general contract bids in to United States engineer, Tulsa, Okla., Jan. 6.

370 tons, 6 and 8-inch, Newton, Mass.; bids in.

200 tons, small sizes, procurement division, treasury department, New York, for Staten Island, Ossining, N. Y., and other deliveries, bids Jan. 14.

100 tons, 6-inch, cement-lined, Picatinny, N. J., arsenal; bids Jan. 13, pro. 1244.

Rails, Cars

Track Material Prices, Page 81

Placing of 4500 freight cars, five electric passenger locomotives and some miscellaneous rolling stock by the Pennsylvania, to be built in its own shops, leads the railroad market. Recent car and locomotive orders have given car builders a better backlog and operations are assured at a high rate for some time. Several car inquiries are still pending. Some difficulty is being met in obtaining plate shipments but this has not caused serious delay so far.

Car Orders Placed

Illinois Central, 115 covered hoppers, to General American Transportation Corp., Chicago.

Pennsylvania, 4500 freight cars, including 2000 box cars and 2500 gondolas, also 200 cabin cars and 600 bulk freight containers, to be built in own shops.

Pittsburgh & Lake Erie, 1000 fifty-ton box cars, to Pressed Steel Car Co., Pittsburgh, through New York Central; in addition to 1000 box cars placed last month by the New York Central with its subsidiary shops in East Rochester, N. Y.

Car Orders Pending

South African Railroads, 1000 gondolas; bids asked.

Locomotives Placed

Pennsylvania, five electric passenger locomotives and 20 locomotive tenders, to own shops.

Locomotives Pending

Delaware & Hudson, 5 mountain-type locomotives.

Denver & Rio Grande Western, 5 to 10 locomotives.

Panama, schedule 4620, three oil-burning steam locomotives, five-foot gage; H. K. Porter Co., Pittsburgh, low, $132,750.

Wire

Wire Prices, Page 81

Chicago — Orders and inquiries for wire and wire products, which have been at a good rate for some time, are increasing moderately. National defense requirements are a strong influence. Wire is being drawn and processed as rapidly as the supplies of semifinished steel will permit.

Boston—Incoming wire tonnage, still ahead of shipments, maintains heavy mill backlogs, the latter in some instances increasing. Production is near capacity, some finishing departments being limited only by rod supplies and equipment facilities.

Pittsburgh—With the beginning of the heavy merchant wire season now only a few weeks off, preliminary indications of jobber buying are that tonnage will be heavier than anticipated, with most going directly into consumption. Jobber stocks are being built up in some instances. Specifications on manufacturers' wire items are also heavy and releases on previously placed tonnage are active.

New York—Wire mills continue to book tonnage in excess of heavy shipments and backlogs grow. While in spots delivery of plain wire can be made in six weeks, the average is nearer eight. Buying is widely diversified with an improvement in demand for spring material from the furniture trade expected shortly.

WHAT IS THE KESTER SOLDER-PRESCRIPTION SERVICE?

Here is a sound approach to a basic production problem—one that may be causing difficulty in your business right now!

The problem is to find the right solder for each metal-joining operation.

This means the solder alloy must be right for the metals or alloys with which it unites; the solder-flux must be the right type, right strength and right amount to clean the work thoroughly without damaging it; and, finally, the solder strand-size and core-size must be conveniently proportioned for easy handling.

These four elements, underscored above, must be scientifically determined by someone who *knows the answers.* The men who operate the Kester Solder-Prescription Service are qualified. They draw on 44 years of soldering experience. At their disposal are:

100 different solder alloys
10 different solder fluxes
80 different solder strand sizes
4 different solder core sizes

The combinations are almost endless—so if you're after the *best possible* soldering results, let Kester prescribe the solders.

Mail a detailed description of your metal-working problems to the address below, and you will promptly receive your Kester Solder Prescription.

You incur no obligation in making use of this service.

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KESTER CORED SOLDERS
STANDARD FOR INDUSTRY

Behind the Scenes with STEEL

On The Spot

■ A few days ago we sent a recent copy of STEEL to the Department of National Revenue at Ottawa, Canada and have since been searching the mails frantically each morning for their reply and decision. A new budget resolution up in the north country took effect December 16 and calls for the "prohibition of the importation of certain periodical publications, consisting largely of fiction or printed matter of a similar character, including detective, sex, western, and alleged true or confession stories, and those commonly known as comics." We weren't worried at all until someone pointed out those Crane Co. mystery ads and those Bower Roller Bearing cuties, and now we're not so sure we'll pass muster.

ASCAP Or BMI?

■ Macy O. Teetor, in charge of Research Engineering for Perfect Circle Piston Ring, is author of "Load Carrying Capacity Phenomena of Bearing Surfaces" and also the author of *I Saw You First*. The latter is a song recently picked by the Song Hit Guild as one of the best tunes of 1940. Mr. Teetor is, himself, one of those rare phenomena—a man who is good both at his work and his hobbies. But, like all good song-writers, we understand he makes anything but "perfect circles" for notes on his musical scores.

Skeptics

■ We see in the papers that science is often just a little behind achievement. As an example, back in 1836—a long time after a locomotive called the *George Washington* had climbed a six per cent grade—mathematical geniuses, in all seriousness, proved that it had NOT because it was definitely a mathematical impossibility.

Faster By A Dam Site

■ Speaking of geniuses these dam engineers are smart gents, but more practical. Take the problem of earth slides and cave-ins for example. During the excavation of dams, the tons of mother earth, thrown up at a goodly cost per sq. yd., wants to seek its level again and spoil the whole works. But, not content with the "WPA method" of "undo, do, redo," they invented a way to keep the earth in place. It's all done with the aid of a huge compressor, several hundred yards of good steel pipe, and plenty of ammonia. The earth above the site is simply frozen in place, and the dam excavation stays excavated.

Assignment For Youth

■ Merle Thorpe's magazine outlines these romantic jobs for far-visioned young inventors: Transparent Steel; Vest Pocket Air-Conditioners; An Insecticide that will Bring Down Airplanes; and a Lighter-Than-Air Metal. We certainly want to be on hand when they fly one of those transparent airplanes, made out of lighter-than-air metal, and watch them bring it down with that tricky insecticide.

Coute Que Coute

■ The proof room and two or three editors tangled with us tooth and nail last week for spelling those lengthy boudoir chairs, *chaise lounges*. Groping back to our college French we vaguely remember *chaises longues* meaning "long chairs" but we still stand pat on the opinion of the head of the top local furniture store who says that by usage they're now lounges. At least they sound a lot more comfortable that way.

Slogans

■ These turret lathe people have swell slogans. This week on page 2 Gisholt says: *Look Ahead—Keep Ahead—With Gisholt*, and on page 5: *Turn it Better, Faster, for Less—With a Warner & Swasey*.

Easier On The Eyes

■ And incidentally, do you like that slightly different touch of typography up front in the news section this week?

SHRDLU.

Shapes

Structural Shape Prices, Page 80

Pittsburgh—There is little apparent let-up in production of structural mills, although inquiries and awards were somewhat lighter over the past two weeks. Some believe the peak is passed. Backlogs have shown little tendency to recede.

Cleveland — Slight recession in jobs is noted, but apparently not for long, judging by new work among architects. Several plants which had been deemed large enough are planning additions. Some fabricators turn down business because of labor shortage. Largest contract involved 1600 tons for inert storage buildings at Ravenna, O.

Chicago—Bookings are lighter but one fabricator took good tonnage for a railroad's 1941 bridge needs. Most orders are small and involve defense. Mills are heavily booked for standard sections and unable to give prompt delivery.

Boston—First steel for the naval air base, Newfoundland, is being placed by Merritt-Chapman & Scott. Part of this tonnage will be transshipped through Quonset Point, R. I. Contracts are up slightly and inquiry continues substantial, with much defense tonnage being estimated.

New York—At least one Pennsylvania producer has raised plain structural material prices $2 a ton on available tonnage for shipment this quarter and is not quoting fixed prices for second quarter. Eight weeks delivery is possible on some sizes, but the average is up to ten weeks.

Philadelphia—Structural inquiries are at the reduced volume prevailing the past 30 days, though pending work is fairly heavy. Piling is moderately active, most prospective business being for construction by private interests for defense purposes. No appreciable improvement has occurred in plain shape deliveries.

Shape Contracts Placed

4000 tons, seven shipways and facilities. Todd-Bath Iron Shipbuilding Co., South Portland, Me., to American Bridge Co.,

Shape Awards Compared

	Tons
Week ended Jan. 11	24,480
Week ended Jan. 4	55,382
Week ended Dec. 28	44,039
This week, 1940	17,013
Weekly average, 1941	39,931
Weekly average, 1940	28,414
Weekly average, Dec.	31,516
Total to date, 1940	29,034
Total to date, 1941	79,862

Includes awards of 100 tons or more.

Pittsburgh, through Charles T. Main Inc., Boston engineers.

3000 tons, 1941 bridge requirements, various locations, Chicago, Rock Island & Pacific railroad, to American Bridge Co., Pittsburgh.

1600 tons, inert storage buildings, ordnance plant, Ravenna, O., to Pittsburgh-Des Moines Co., Pittsburgh.

1300 tons, building No. 1, Lima Locomotive Works, Lima, O., to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, sheet piling, Bethlehem Shipbuilding Corp. plant, Terminal Island, Los Angeles, to Bethlehem Steel Co., San Francisco.

1000 tons, additions to buildings No. 106, 108, 110 and 112, Aluminum Company of America, Vernon, Calif., to Minneapolis-Moline Power Implement Co., Minneapolis.

680 tons, state bridge, grade elimination, Pennsylvania-Reading Seashore lines, Berlin, N. J., to American Bridge Co., Pittsburgh, through Eisenberg Construction Co., Camden, N. J.

550 tons, buildings 32 and 33, Willowbrook state hospital, Staten Island, N. Y., to Harris Structural Steel Co., Plainfield, N. J.; Arthur Gallow Inc., Bronx, N. Y., contractor.

513 tons, with 970 feet bridge railing, highway bridge, Texas state highway department, to North Texas Iron & Steel Co., Fort Worth, Tex.

500 tons, assembly shop, Lockheed Aircraft Co., Burbank, Calif., to Pennsylvania Iron & Steel Co., Los Angeles.

480 tons, widening of Touhy avenue underpass under Chicago & Northwestern railroad tracks, Park Ridge, Ill., for Cook county, to American Bridge Co.; bids Dec. 17.

450 tons, plant building, E. I. du Pont de Nemours & Co., Niagara Falls, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

450 tons, synagogue, West 68th street, New York, to Lehigh Structural Steel Co., Allentown, Pa.

450 tons, reconstruction north footwalk, Williamsburg bridge, New York, for treasury department, to American Bridge Co., Pittsburgh.

450 tons, cradle, submarine base, New London, Conn., to American Bridge Co., Pittsburgh, through F. H. McGraw & Co., Hartford, Conn.

430 tons, state highway bridge, Wayne county, Missouri, to Illinois Steel Bridge Co., Jacksonville, Ill.; bids Nov. 29.

420 tons, state bridge, route 25, section 33 A, Middlesex county, New Jersey, to American Bridge Co., Pittsburgh, through George M. Brewster & Son Inc., Bogota, N. J.

380 tons, bridge work, Chesapeake & Ohio railroad, at Cincinnati, to American Bridge Co., Pittsburgh.

375 tons, Ohio state project, Trumbull county, to Bethlehem Steel Co., Bethlehem, Pa.

370 tons, hangar, army air base, Anchorage, Alaska, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

325 tons, extension, hot metal building, A. M. Byers Co., Ambridge, Pa., to American Bridge Co., Pittsburgh.

311 tons, penstock gates, specification 942, Parker dam, Earp, Calif., to Consolidated Steel Corp., Los Angeles.

300 tons, sheet piling, seaplane landing, naval academy, Annapolis, Md., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, warehouse, Bethlehem Shipbuilding Corp., Terminal Island, Los Angeles, to Bethlehem Steel Co., Los Angeles.

300 tons, building, Harlem Savings bank, New York, to Jones & Laughlin Steel Corp., through George A. Fuller Co., New York.

280 tons, 2-story addition, Aero Supply Mfg. Co., Corry, Pa., to Rogers Steel Construction Co., Corry, Pa.; J. M. Benzinger Inc., Jamestown, N. Y., contractor; Bethlehem Steel Co., Bethlehem, Pa., awarded 60 tons, reinforcing bars.

277 tons, requirements placed to Jan. 1 with additional contracts pending, TNT plant, Humble Oil Co., Baytown, Tex. as follows: (140) Austin Bros., Dallas; (107) Mosher Steel Co., Houston, (30) Patterson Steel Co., Tulsa, Okla.; E. B. Badger & Sons Co., Boston, engineers and contractors.

275 tons, army warehouse, Mines Field, Los Angeles, to Consolidated Steel Corp., Los Angeles.

260 tons, state bridge, route SA-5, section 36-F, Murphysboro, Ill., to Hansell-Elcock Co., Chicago.

225 tons, addition, F. W. Woolworth Store, 725 South Broadway, Los Angeles, to Consolidated Steel Corp., Los Angeles

225 tons, mold loft, Bethlehem Shipbuilding Corp., Terminal Island, Los Angeles, to Bethlehem Steel Co., Los Angeles.

210 tons, plant building, Doehler Die Casting Co., Pottstown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, power house, project 21, Quonset point, R. I., to Harris Structural Steel Co, Plainfield, N. J.; Merritt-Chapman & Scott and George A. Fuller Co., New York, joint contractors.

185 tons, shop building, navy, South Boston, Mass., to American Bridge Co., Pittsburgh.

185 tons, Chicago subway, section S-10E 120 tons and section S-10D 65 tons, Kenny Construction Co., Chicago, contractor, to Wendnagel & Co., Chicago; bids Nov. 20 and Oct. 24, respectively.

180 tons, Ohio state project, Portage county, to Bethlehem Steel Co., Bethlehem, Pa.

170 tons, highway bridge, Chenango County, New York, to American Bridge Co., Pittsburgh.

165 tons, warehouse, Procter & Gamble, Staten Island, N. Y., to Ingalls Iron Works, Pittsburgh.

160 tons, addition, branch plant, Johns-Manville Corp., Nashua, N. H., to Lyons Iron Works Inc., Manchester, N. H.; S. Belanger & Son Inc., Nashua, contractor; bars to Concrete Steel Co., Boston.

156 tons, alundum mill building, Norton Company, Worcester, Mass., to Eastern

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Bridge Co., Worcester; E. J. Cross Co., Worcester, contractor. Joseph T. Ryerson & Son Inc., Cambridge, awarded reinforcing bars.

150 tons, warehouse, Sears-Roebuck & Co., Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, storage building, Corning Glass Co., Wellsboro, N. Y., to American Bridge Co.

150 tons, state viaduct FAGH-143-G (3), Fairmont, Nebr., to American Bridge Co., Pittsburgh.

140 tons, coaling station, Melville, R. I., to John E. Cox & Co., Fall River, Mass.

140 tons, Tower road grade separation, Winnetka, Ill., for Cook county, to American Bridge Co., Pittsburgh.

130 tons, monorail support beams, Ravenna, O., for government, to American Bridge Co., Pittsburgh.

125 tons, addition, Austin-Western Road Machinery Co., Aurora, Ill., Algot B. Larson & Co., Chicago, contractor, to A. F. Anderson Iron Works, Chicago.

104 tons, state bridge, contract 2097, Frankfort, Ind., to Midland Structural Steel Co., Cicero, Ill.

104 tons, state bridge, contract 2098, Cambria, Ind., to Central States Bridge & Structural Co., Indianapolis.

100 tons, state bridge, route FA-5, section 22-X1-VF-1, Lincoln, Logan county, Illinois, to Illinois Steel Bridge Co., Jacksonville, Ill.; bids Nov. 29.

100 tons or more, intake gates and guide gates, Wilson dam, units 9, 10, 11 and 12, Tennessee Valley Authority, Knoxville, to Phillips & Davies Inc., Kenton, O.; bids Dec. 26.

Unstated tonnage, one mitering lock gate complete, Panama, schedule 4665, to Bethlehem Steel Export Co., New York, $439,800; bids Dec. 30, Washington.

Shape Contracts Pending

2700 tons, transmission towers, Bonneville dam to Oregon City, Oreg.; Bethlehem Steel Co., Bethlehem, Pa., low, at $280,380.84.

1900 tons, H piling, government arsenal, Raritan, N. J.

1800 tons, six 200-foot temporary hangears, various locations, for war department.

1600 tons, boiler houses, Buffalo, N. Y., Columbus, O., and Robertson, Mo., for Curtiss-Wright Corp.

1500 tons, buildings, Mare Island navy yard, Calif.; bids in.

1500 tons, building, supercharger production, General Electric Co., Everett, Mass.; bids in.

1288 tons, also 24,900 feet steel H-beam piles, Martin Point bridge, Presumpscot river, Falmouth-Portland, Me.; Wyman & Simpson Inc., Augusta, low at $762,691; Phoenix Bridge Co., Phoenixville, Pa., low on bascule section.

1250 tons, 15 storage buildings, La Porte, Ind., for government.

1000 tons, buildings, Puget Sound navy yard, Wash.; bids Jan. 15.

850 tons, addition high school, Berkeley, Calif.; Bethlehem Steel Co., San Francisco, low.

800 tons, U. S. project dam, Norfork, Ark.; bids Feb. 20.

740 tons, Watts Bar hydro plant, Tennessee Valley Authority, Knoxville; bids Jan. 13.

550 tons, spillway bridge, Marshall Ford dam, Rutledge, Tex., for bureau of reclamation.

526 tons, under-crossing, Santa Fe tracks, Azusa, Calif.; bids opened.

500 tons, boiler house, Curtiss-Wright plant, Cheektowaga, N. Y.

500 tons, grade separation, contract B-10, Brooklyn, N. Y., for Triboro Bridge authority.

500 tons, viaduct, 11th avenue, New York, Elmhurst Construction Co., New York, contractor.

500 tons, crane runways, Cramp Shipbuilding Co., Philadelphia; bids closed Jan. 10.

500 tons, contract B-10, Brooklyn; bids Jan. 14 to Triborough Bridge Authority, N. Y.

500 tons, storehouse, specification 10240, navy yard, Bremerton, Wash.; general contract to H. R. Olson, 4040 Pacific avenue, Tacoma, Wash., at $208,185.

500 tons, four buildings, invitation 6813-41-186, Alaska Air Base, Anchorage, Alaska; general contract to S. S. Mullen Inc., Seattle, Wash., at $587,331.

418 tons, bridge, route 25, section 33A, Middlesex county, New Jersey; George M. Brewster & Son Inc., Bogota, N. J., low.

400 tons, state highway bridge, Erie county, New York; bids Jan. 30, Albany.

350 tons, bank building, Harlem Savings Bank, New York; George A. Fuller Co., New York, contractor.

300 tons, bridge, Bowmansville, N. Y.; bids Jan. 22, state highway department, Albany.

275 tons, department store, The Mather Co., Utica, N. Y.

250 tons, reconditioning shipbuilding slips, Philadelphia, for government.

235 tons, bridges and radio towers, Brooklyn, navy department.

210 tons, mill building, Stevens Paper Co., Westfield, Mass.

180 tons, bridge, Lackawanna county, Pennsylvania; bids to county, Jan. 14.

170 tons, two highway bridges, Arkansas Highway Commission; bids Jan. 8.

165 tons, ordnance shop, Camp Edwards, Falmouth, Mass., for government.

125 tons, railroad bridge over Coachella canal, specification 1461-D, Iris, Calif., for bureau of reclamation.

115 tons, shop building, Remington Arms Co., Bridgeport, Conn.

Unstated, 300 transmission towers and other items for Bonneville Project, Portland, Oreg.; bids in.

Unstated, gate frames and erection struts, Minidoka power plant, Acequia, Idaho; Valley Iron Works, Denver, low.

Unstated, two gates for penstock inlets, Minidoka power plant, Acequia, Idaho; bids to Denver Jan. 17; Spec. 1462-D.

Unstated, gate hoists, Minidoka power plant, Acequia, Idaho; bids to Denver Jan. 20; Spec. 1463-D.

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PITTSBURGH, PA.

Tin Plate

Tin Plate Prices, Page 80

Pittsburgh — Operations of tin mills remain virtually unchanged at about 50 per cent of capacity. However, there is a definite movement on foot to realign actual tonnage capacity to place more emphasis on cold mills. It is apparent that only in extreme emergency will some present hot mills listed as active capacity ever run again. It is probable that some producers will drop these mills from the active list, which may result in an artificial rate increase. Activity of cold mills has been running virtually double the total production rate and currently is at 80 per cent.

Reinforcing

Reinforcing Bar Prices, Page 81

Pittsburgh—After a lull, inquiries and placements are heavy in spite of the off season. Sellers here expect no decline in tonnage during first half. Prices are good, although rail bar prices are not being maintained at the same level as new billet steel.

Cleveland—Placing of Ohio state highway work in some half dozen counties occupies producers, inquiries for which came out three weeks ago. Largest job in a long time involved 1700 tons for hangars for Curtiss Wright at Columbus, O. Much work is still being figured.

Chicago—Considerable slackening in reinforcing steel activity has taken place in the past week. Few new jobs have come out and orders have been small and light. Much construction is in sight in connection with the national defense program so that the current lull is regarded as only temporary. Mill deliveries on reinforcing bars is less extended than for other products, and most producers are able to handle new tonnage.

New York—Demand is active with bridges and highways best in several months. Much continues to be bought for naval bases outside continental United States.

Reinforcing Steel Awards

8230 tons, shell loading plant, war department, Burlington, Iowa, A. Guthrie & Co., St. Paul, and Al Johnson Construction Co., Minneapolis, joint contractors, includes 8000 tons of bars to Paper-Colmenson Co., Minneapolis, of which 1500 tons will be supplied by Inland Steel Co., Chicago, and 230 tons of wire mesh to Ceco Steel Products Corp., Chicago.

1700 tons, warehouse, Philadelphia navy yard, to Bethlehem Steel Co., Bethlehem, Pa.

590 tons, elevated highway, contract B-9, Brooklyn, N. Y., to Igoe Bros., Newark, N. J., through Turecamo Construction Co., New York.

555 tons, elevated highway, contract B-16, to Brooklyn Fireproof Co., Brooklyn, N. Y., through Corbetta Construction Co., New York.

500 tons, Adair street overpass, Louisville, Ky., to Laclede Steel Co., St. Louis; Ruby Lumber Co., contractor.

480 tons, bureau of reclamation, invitation A-44,201-A, Earp, Calif., to Columbia Steel Co., San Francisco.

450 tons, Chicago subway, section S-10E, Kenny Construction Co., Chicago, contractor, to Olney J. Dean Steel Co., Chicago; bids Nov. 20.

424 tons, Lindberg boulevard bridge, St. Louis, to Sheffield Steel Corp., Kansas City, Mo.

400 tons, building, Republic Aviation Corp., Farmingdale, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., New York.

370 tons, highway, route 4, section 42 A, Cheesequake - Browntown, Middlesex county, New Jersey, to Igoe Bros., Newark, N. J., through Jannarone Contracting Co., Belleville, N. J.

300 tons, Norton housing, Barberton, O., to Franklin Steel Co.; Weinstein Construction Co., contractor.

287 tons, Wisconsin-Minnesota highway bridge over main channel Mississippi river, Winona, Minn., Industrial Contracting Co., Minneapolis, contractor, 157 tons, to Paper-Colmenson Co., Minneapolis, and 130 tons, to Truscon Steel Co., Youngstown, O.; Wisconsin bids Dec. 10 and Minnesota Dec. 13.

275 tons, barracks, invitation 6812-41-26, Hickam Field, T. H., to Columbia Steel Co., San Francisco.

270 tons, Ohio state project 333, Muskingum county, to Pittsburgh Steel Co., Pittsburgh, through Bellefontaine Development Co., Bellefontaine, O.

270 tons, highway, route S-41, sections 3 B and 4 A, Burlington and Camden counties, New Jersey, to Truscon Steel Co., Youngstown, O., through Francis A. Conuso & Son, Philadelphia.

230 tons, Farmers & Mechanics bank, Minneapolis, Minn., to Truscon Steel Co., Youngstown, O.; Madsen Construction Co., contractor.

226 tons, Ohio state project, Clark and Greene counties; 55 tons, to Pollak Steel Co., Cincinnati, 171 tons to Pittsburgh Steel Co., Pittsburgh; Hinton & Smalley, Celina, O., contractors.

200 tons, Chicago subway, section S-10-D, Kenny Construction Co., Chicago, to Olney J. Dean Steel Co., Chicago; bids Oct. 24.

190 tons, Ohio state project 330, Summit county, to Bethlehem Steel Co., A. J. Baltes, contractor.

175 tons, grade elimination, Long Island railroad, Woodhaven boulevard, Queens, N. Y., to Truscon Steel Co., Youngstown, O.; Poirier & McLane Corp., New York, contractor.

163 tons, coal handling machine foundation, Loomis station, Commonwealth Edison Co., Chicago, Paschen Bros. Construction Co., contractor, to Bethlehem Steel Co., Bethlehem, Pa.; bids Dec. 17.

160 tons, apartment building, Shaker boulevard, Cleveland, to Republic Steel Corp., Cleveland, through Builders Structural Steel Co.; Robert E. Nixon Co., contractor.

150 tons, structural shop, navy yard Charlestown (Boston), to Concrete Steel Co., Boston; Sawyer Construction Co., Boston, contractor.

150 tons, TNT plant, operated by Humble Oil Co., Baytown, Tex., to Jones & Laughlin Steel Corp., Pittsburgh; E. B. Badger & Sons Co., Boston, engineers and contractors.

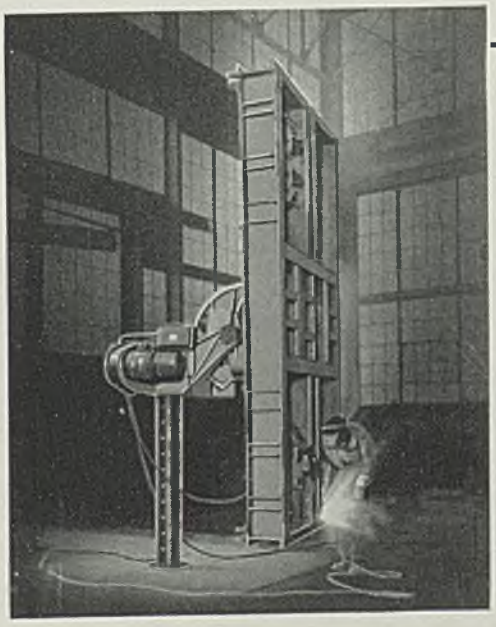
126 tons, under-crossing, Sunol, Alameda county, Calif., for state, to San Jose Steel Co., San Jose, Calif.

125 tons, building and other projects, Puget Sound navy yard, to Northwest Steel Rolling Mills, Seattle.

Concrete Bars Compared

	Tons
Week ended Jan. 11	17,400
Week ended Jan. 4	5,406
Week ended Dec. 28	1,174
This week, 1940	8,125
Weekly average, 1941	11,403
Weekly average, 1940	9,661
Weekly average, Dec.	7,204
Total to date, 1940	20,274
Total to date, 1941	22,806

Includes awards of 100 tons or more.



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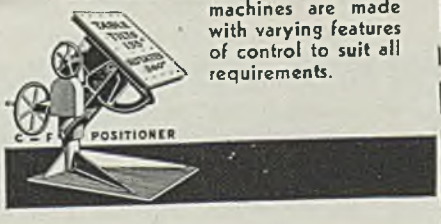

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104 tons, highway bridge, Texas state highway department, to North Texas Iron & Steel Co., Fort Worth, Tex.

100 tons, Panama canal schedule 4596, to Sheffield Steel Corp., Kansas City, Mo.

100 tons, plant, Hydraulic Race Co., Lockport, N. Y., to Truscon Steel Co., Youngstown, O.

100 tons, inquiry 3237, Norfolk & Western railway, Roanoke, Va., to Truscon Steel Co., Youngstown, O.

Reinforcing Steel Pending

15,000 tons, ammunition dump, Martin county, Indiana; Maxon Construction Co., contractor.

5000 tons, ordnance storage depot, Portage county, Ohio; Hunkin-Conkey, contractor.

1800 tons for U. S. dam project, Norfork, Ark., bids Feb. 20.

1700 tons, hangars, Curtiss-Wright Corp., at Columbus, O.; bids Jan. 9.

1018 tons, bureau of reclamation, invitation A-33,109-A, Coram, Calif.; bids rejected.

1000 tons, flood wall, army engineers, Huntington, W. Va.

798 tons, mesh and bars, highway bridge route 25, section 33A, Middlesex county, New Jersey; George M. Brewster & Son Inc., Bogota, N. J., low; bids Dec. 30, Trenton.

607 tons, underpass, Burbank, Calif., for state; bids opened.

460 tons, substructure, State street bridge, Chicago.

401 tons, bureau of reclamation, invitation A-33,109-A-1, Coram, Calif.; bids opened.

300 tons, highway commission, Brockton, Mass.

297 tons, grade separation, contract B-10, Prospect avenue, Brooklyn, N. Y.; bids Jan. 14.

270 tons, mesh, highway project, route S-41, sections 3B and 4A, Burlington-Camden counties, New Jersey; Francis A. Canuso & Son, Philadelphia, low, $431,095.94.

230 tons, station, Fisk street, Chicago, Commonwealth Edison Co.; Herlihy-Midcontinent Construction Co., contractor.

250 tons, pier, Maryland Dry Dock Co., Baltimore, Md.; Empire Construction Co., contractor.

200 tons, highway bridge 2093, Marion county, Indiana.

200 tons, igloos, Kankakee ordnance, Wilmington, Ill.

180 tons, warehouse, army engineers, Jeffersonville, Ind.

160 tons, viaduct, 11th avenue New York, New York Central railroad; bids in.

155 tons, state hospital Deer Park, N. Y.; Amsterdam Building Corp., New York, contractor.

150 tons, Yakima county, Wash., courthouse; bids in.

150 tons, store building, Sears & Roebuck Co., St. Louis.

150 tons, bowling alleys, San Diego, Calif.; bids soon.

150 tons, theatre, Leimert Park, Los Angeles; bids soon.

144 tons, invitation 699-41-140, army engineers, Pt. Judith, R. I.; bids Jan. 7.

114 tons, Deschutes irrigation project, Oregon state; bids to Reclamation bureau, Bend, Oreg., Jan. 17.

100 tons, naval armory, Milwaukee.

100 tons, Sinclair Refining Co., East Chicago, Ind.

100 tons, grade elimination PSCC 6582, Erie county, New York.

100 tons, engine propeller test house, National Advisory Committee of Aeronautics, Cleveland.

100 tons, city hall, South Gate, Calif.; bids Jan. 20.

100 tons, aircraft laboratory and shop building, Wright Field, Ohio; bids Jan. 16.

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Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 81

Cleveland—Orders this month are conspicuously ahead of the same time in December, though December orders and shipments exceeded November. Defense orders, direct and indirect, figure strongly. So far makers are in good position with plenty of raw material, good equipment and satisfied labor.

Pig Iron

Pig Iron Prices, Page 82

Pittsburgh—In the absence of a formal price announcement, the $1 increase in price must be inferred in most cases. Some iron buyers here report they have bought iron and have received delivery, but have not been told what the price will be. Others have bought at the $1 per ton increase, and there have been some reports of higher prices, although none of these has actually been produced.

Cleveland—Business is moderate as consumers are covered on first quarter needs. Tendency is to sell at prices prevailing at time of shipment. Second quarter buying is expected soon, some forecasting only gradual gain and others somewhat concerted buying wave by mid-February. Efforts to lower scrap prices may relieve some pressure on pig iron consumption. Several iron producers have not yet announced conformity to the higher price.

Chicago—Pig iron price situation is somewhat clarified and most sellers are offering what tonnage is available at the $1 a ton higher level announced by one large interest a month ago. Within the last week, southern No. 2 foundry iron was advanced $1, bringing the Chicago price for Birmingham iron to $24.22. It is the opinion that iron bookings in December were extremely heavy, so that current orders consist mostly of fill-in tonnages. Some furnaces have not opened their books for first quarter, being well sold out. Coke situation remains tight, with deliveries still running behind schedule.

Boston—Pig iron consumers, even those with larger stocks, are attempting heavier purchases for first quarter at the advance of $1 a ton, but are being restrained by sellers, with the view of keeping all foundries supplied for high operations ahead. Shops having contracts for castings entering directly into defense needs, such as machine tool parts, are less concerned as to the future than those operating on civilian requirements. Foundry melt is high and based on a 40-hour week is near capacity with many shops. Suppliers of castings for the machine tool trade are heavily booked.

Philadelphia—Pig iron buying is limited both by inability of sellers to obtain additional tonnage for first quarter and by the fact consumers generally are well covered for this period. Some furnace interests are unable to accept additional business from either regular customers or others.

Buffalo—While no official price announcement is expected on cur-

rent quarter business, a leading seller of merchant iron has permitted regular customers to cover at old prices, but will enforce a $1 increase on new orders for first quarter.

Cincinnati — Shipments of pig iron are holding to former levels but most furnace interests are serving only established customers. The price situation will be clarified when an Armco furnace at Hamilton is shifted to merchant iron, tentatively set for Feb. 1. Melters' needs are covered for about 60 days.

St. Louis — Pig iron sales are light, mainly because the principal melters are covered for the next two or three months and a disposition to await price clarification and other developments. Shipments continue high and order books are being cleaned up.

Youngstown, O. — Some blast furnace managers are confining currently their pig iron sales strictly to regular customers. Prices continue at the recently announced levels but in some particular cases partial freight absorptions are a part of the consideration.

Scrap

Scrap Prices, Page 84

Uncertainty in the scrap market has virtually stopped trading until results of the government's effort for a price reduction have been clarified. Present quotations are nominal and uncertainty exists as to what level will be reached as a result of conferences between trade representatives and government officials. In some centers brokers prices have been reduced $1 to $1.50 but in absence of mill buying the situation is not clear.

Pittsburgh — Practically all quotations in Pittsburgh at present are nominal, awaiting reaction of the trade to recommendations of a $20 level in No. 1 steel made in Washington last week. Because of the absence of most local brokers, who were attending the Baltimore convention, trading was virtually suspended last week and will be resumed this week with the closing of the Pennsylvania railroad list, probably a key indicator, Jan. 15. It is known several mills are in the market and will buy as soon as a price has been agreed upon.

Cleveland—Iron and steel scrap quotations have been marked down by 50 cents to $1.50 a ton both in Cleveland and Youngstown, depending upon the grade. The new quotations in both instances are regarded as nominal since neither sales nor purchases being in evidence as yet.

Chicago—Effort of the government to bring about a reduction in iron and steel scrap prices, through co-operation of brokers and dealers thus far has produced only confusion and a virtual standstill. Prices are unchanged, and no mill sales are being made. Some brokers have ceased buying, while others are purchasing supplies judiciously. As low as $19.50 is being offered without takers, but $20 is attracting tonnage. Scrap interests are in agreement that prices will be brought down to approximately the level sought by the government, but that the drop will be arranged slowly.

New York—With consumers practically out of market iron and steel scrap prices are mostly nominal and on what small volume of new buying is being done quotations are from $1 to $2 lower. Scattered shipments against old orders are being made at prices prevailing at time of purchase. Offerings to brokers are more free but business is mostly turned down until mill and foundry buyers return to the market and prices are further clarified.

Philadelphia—Scrap prices are easier, with material coming out more freely in expectation of further posible declines. In compliance with Washington's wishes for a lower scrap market, leading brokers are reducing buying prices on leading grades of steel scrap $1 a ton and while no important purchases have been made by consumers there is every indication they will be able to benefit accordingly.

Buffalo—No sales have been reported so far to indicate any voluntary reductions. The trade is confused over the government's urging action toward lower prices. Uncertainty is shown over what prices might prevail on orders still to be filled. One consumer alone has more than 100,000 tons outstanding, which was contracted for above the $20 maximum price suggested by the defense commission. Not all of this tonnage is on local dealers' books.

Detroit — Sudden reversal followed government effort to reduce prices on steelmaking grades of scrap and weakness developed in an uncertain situation. The general level is probably $1 below published quotations with expectation of another drop of equal size within a short timee.

Cincinnati — Iron and steel scrap, although maintaining underlying strength, hesitated in the upward climb to await developments at the institute convention at Baltimore and conferences in Washington.

Birmingham, Ala. — Large tonnages in virtually all specifications in scrap are in demand and scarcity is reported in some items, particularly heavy melting. No further price increase has been made.

San Francisco — Prices on most grades of iron and steel scrap have been advanced 50 cents a net ton and No. 1 heavy melting steel in the San Francisco metropolitan area holds at $14.50 to $15.00 a net ton f.o.b. cars with No. 2 quoted at $13.50 to $14.00 a net ton. Movement continues strong and considerable tonnage is moving into the San Francisco area from the Los Angeles district, in spite of high rail rates.

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Warehouse

Warehouse Prices, Page 83

Cleveland—Shipments continue at a faster rate than receipts from mills and stocks are becoming depleted. Business is brisk and would be larger if stocks were better rounded. Raising of sheet prices to correspond with mill quotations is expected here soon, mills having advanced last spring.

Chicago — Warehouse steel sales show a slight improvement over the level of late December and first week of the new year. Reflecting an increase in mill prices last summer, warehouse prices on hot-rolled black sheets were advanced $4 a ton, effective Jan. 2. Base price on black sheets moved from 3.05 to 3.25 cents a pound, pickled and oiled from 3.80 to 4.00 cents, and uniform blue from 3.45 to 3.65 cents.

Boston—Demand for steel from warehouses is active and widely distributed as to products. In addition to heavy inquiry from regular warehouse customers, increasing tonnage offered jobbers is due to heavily sold position of mills and lengthening deliveries.

New York—Hot-rolled annealed sheets have been advanced $4 a ton to 3.58c, delivered metropolitan district, New York jobbers; also hot-rolled strip to 3.96c. The sheet quotation is base for No. 10 gage, the advance applying to Nos. 8 to 30 gage with these sizes included in the hot-rolled quantity differential plan. Hot-rolled sheets 3/16 x 14 to 48-inch, inclusive are also 3.58c. For outside delivery sheets are 3.25c, Sparrows Point, Md., and hot strip, hoops and bands, 3.50c, Pittsburgh.

Philadelphia—Business continues brisk, with heavy sales indicated for an extended period. Warehouses report receiving no large orders from buyers who normally are mill customers, although purchases by regular customers are larger than usual as a consequence of increased consumption.

Buffalo — Although heavy buying continues, warehouses report all demands are being filled. Increased apprehension, however, is expressed over further delays in mill shipments. Although talk of price changes is heard, no alterations have been made.

Cincinnati — Warehouse sales have rebounded from the holiday dip. Prices are unchanged but hardly a factor in the rush for material. Some jobbers find the difficulty in maintaining stocks of heavy building items is aggravated.

Seattle—Announcement of price increases Jan. 1 on plates, structurals and hot-rolled sheets resulted in a heavy volume of sales. Business continues steady. Jobbers report 1940 the best year in the last five and prospects for 1941 are exceptionally promising.

Steel in Europe

Foreign Steel Prices, Page 83

London—(*By Cable*)—Except for some tightness in hematite grades the pig iron situation in Great Britain is satisfactory and coke supplies are abundant. Some high grade ores are difficult to obtain in sufficient volume. Iron and steel producers start the year with full order books, tin plate makers being especially well booked. Export trade is fair. Sheets and galvanized sheets are active, principally on defense work.

Semifinished Steel

Semifinished Prices, Page 81

Pittsburgh — Specifications from nonintegrated mills continue heavier than the share of productive facilities allotted to their use. Tonnage going to Britain is virtually unchanged, and although specifications have been slow for the past 30 days, new releases are expected shortly. Local producers are forcing capacity to raise tonnage output.

Ferroalloys

Ferroalloy Prices, Page 82

New York—A further gain in the movement of ferroalloys is expected this month, and apparently the only factor standing in the way of a still further increase in February is the shortness of the month. Prices are strong but unchanged, with ferromanganese $120, duty paid, Atlantic and Gulf ports, and domestic spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

No Advance in Sulphur

Freeport Sulphur Co., New York, Langbourne M. Williams Jr., president, has notified the national defense advisory commission that there will be "no increase in the base price of its product with respect to an amount of sulphur sufficient to meet demands of customers for one year at the current rate of sales." The hope is expressed that there will be no necessity for increased price after this tonnage has been sold, taking into consideration material, labor and taxes.

New Bar, Strip Extras

Pittsburgh — Carnegie-Illinois Steel Corp. has released new hot rolled carbon steel bar and strip lists of extras effective Jan. 6, 1941, changing the minimum thickness on bar flats of 6-inch width and narrower from ¼ inch to 13/64 inch, with adjustments in the strip list resulting in a maximum thickness on such widths of .202 inch. The revision will more properly classify materials rolled on bar and strip mills.

Fluorescent Lamps Cut

Westinghouse lamp division announces 10 to 15 per cent reductions on fluorescent mazda lamps, making reductions of about 50 per cent in the past two years. Representative reductions in daylight and white lamps include: Fifteen-watt

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from 95 to 85 cents; 30-watt from $1.25 to $1.10; 100-watt from $3.75 to $3.50. Colored lamps are also reduced.

Nonferrous Metals

New York—Copper, brass, bronze, zinc, nickel and potash were placed under an export licensing system, effective Feb. 3, by Presidential proclamation. This action had been anticipated and, coupled with the fact that there have been no exports of strictly domestic duty-free ingot copper for three months, had no outward effect on the markets. Prices held unchanged throughout the week at 12.00c for producers' and 12.50c for smelters' and brokers' electrolytic copper; 50.10c for Straits spot tin; 5.35c, East St. Louis, for lead; 14.00c, New York, for American spot antimony; and 7.25c, East St. Louis, for prime western zinc.

Copper—Demand continued insistent but orderly. Sales increased around midweek with custom smelters offering more freely.

Lead—Consumers are covered 95 per cent on their January and about 40 per cent on their February requirements, based on monthly shipments of 60,000 tons. Including foreign refined lead which is being shipped to domestic consumers, shipments are at a monthly rate of about 66,000 tons.

Zinc—Stocks of slab zinc, all grades, dropped to the lowest level since 1937, or to only 12,884 tons, giving further evidence of the extreme tightness of supplies. December shipments totaled 65,385 tons, while production aggregated 59,883 tons. Consumption increased last week with the average rate passing the 80 per cent mark.

Tin—Due to the narrow trading margin between domestic and Far Eastern tin prices, sellers restricted their offerings. At the same time consumers are well covered and are relying on the large reserve stocks which are being accumulated to draw on should an emergency develop in the future.

Chinese Tungsten Ore Shipments Are Resumed

New York—Resumption of wolframite shipments from China promises to ease a tight situation in tungsten ore. For some time the market on Chinese wolframite has been nominally unchanged, but there has been an increasingly strong undertone, beginning particularly with the shifting of the Chinese "life-line" from Heiphong, Indo-China, to Rangoon, Burma, and becoming more pronounced with the closing of the Burma road, of which Rangoon was the port of outlet, for a period of three months.

Domestic scheelite prices have been nominally unchanged, but stronger in tone as domestic production became well sold ahead. Meanwhile, contributing to strength of both ores has been a sharply advancing market in South America, where Japan has been a heavy buyer of local ores, contracting almost regardless of price.

Nonferrous Metal Prices

	Copper			Straits Tin, New York		Lead	Lead	Zinc	Aluminum	Antimony Amer.	Nickel
Jan.	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures	N. Y.	East St. L.	St. L.	99%	Spot, N.Y.	Cathodes
3	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
4	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
6	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
7	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
8	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
9	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00
10	12.00	12.00	12.12½	50.10	50.05	5.50	5.35	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.00-8.25
Cleveland	9.50-9.75
Chicago	8.25-8.50
St. Louis	8.37½-8.50

Heavy Copper and Wire

New York, No. 1	9.62½-9.87½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	9.62½-9.87½
St. Louis	9.62½-9.75

Composition Brass Turnings

New York	7.62½-7.87½

Light Copper

New York	7.62½-7.87½
Cleveland	8.00-8.25
Chicago	7.62½-7.87½
St. Louis	7.62½-7.75

Light Brass

Cleveland	5.00-5.50
Chicago	5.50-5.75
St. Louis	5.00-5.25

Lead

New York	4.60-4.70
Cleveland	4.50-4.75
Chicago	4.50-5.00
St. Louis	4.25-4.50

Zinc

New York	5.50-5.75
Cleveland	5.00
St. Louis	4.50-4.75

Aluminum

Mis., cast, Cleveland	11.00-12.00
Borings, Cleveland	8.00
Clips, soft, Cleveland	14.75-15.00
Misc. cast, St. Louis	11.00-11.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.25
Standard No. 12 aluminum	16.50-17.00

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Construction and Enterprise

Ohio

CINCINNATI — Rahn-Larmon Co., 2941 Spring Grove avenue, has changed its name to Nebel Machine Tool Co., Fred T. Nebel, president, and will build a new plant on a site 150 x 350 feet at Central Parkway and Sassafrass street, for manufacture of heavy duty lathes.

CLEVELAND—Bloch Co., 12216 Euclid avenue, manufacturer of plumbing supplies, has incorporated as Bloch Brass Co. with $25,000 capital and will increase operations, adding about 8000 square feet floor space to plant.

CLEVELAND—Pierce Die Co., 1395 East Forty-ninth street, Eugene Pierce, president, will build a one-story brick plant 40 x 80 feet, equipped with five-ton crane.

CLEVELAND—Hertner Electric Co., 12690 Elmwood avenue, John H. Hertner, president, will expand manufacturing facilities by erection of one-story addition 60 x 240 feet. Bids will be taken soon by Walter Caldwell, architect, Engineers building.

CLEVELAND — Schirmer Dornbirer Pump Co., 1719 East Thirty-ninth street, will start shortly on its second plant addition, to add about 2250 square feet. H. M. Morse Co., 1500 Superior avenue, is architect.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 92 and Reinforcing Bars Pending on page 94 of this issue.

CLEVELAND—Power Flow Inc., care Raymond C. Renaud, attorney, 725 Society for Savings building, Cleveland, recently organized, will manufacture a gearless hydraulic transmission for power machinery and automotive applications.

CLEVELAND — Walters-Wilcox Co., 10006 Carnegie avenue, Henry B. Johnson, attorney, Standard building, will start production of prefabricated home building material as soon as space is obtained.

CLEVELAND—Ohio Crankshaft Inc., subsidiary of Ohio Crankshaft Co., will build $5,000,000 plant here at East forty-second street and Harvard avenue. Financing is by Defense Plant Corp. Equipment will cost about $4,000,000. Airplane engine crankshafts will be manufactured, about 1000 per month.

CLEVELAND—Kinzig Tool Co., 1966 East Sixty-sixth street, C. H. Kinzig, president, will increase capacity about 25 per cent by addition to equipment, to provide for increased production of materials in defense work.

CLEVELAND—Otis Steel Co., 3341 Jennings road, will increase capacity of various departments in $750,000 expansion program. Includes additional soaking pits at blooming mill, improvements to coke plant, turbo blowers and high pressure boilers at blast furnaces and additional sheet and strip rolling facilities.

CLEVELAND—Special Screw Products Co., 5445 Dunham road, is building a brick and steel addition of 2100 square feet.

DAYTON, O.—Inland Mfg. division of General Motors Corp., 2727 Inland avenue, manufacturer of plastic products, will build a two-story addition 120 x 150 feet, to cost about $175,000. Argonaut Realty division of General Motors Corp., General Motors building, Detroit, is engineer. (Noted Dec. 16.)

ELYRIA, O.—Bendix Westinghouse Automotive Air Brake Co. has let contract to National Concrete Fireproofing Co., Citizens building, Cleveland, for $235,000 factory, office building and gate house at Elyria.

SANDUSKY, O.—G. & C. Foundry Co., West Monroe street, John E. Carroll, president, will build one-story addition, 24 x 54 feet, to enlarge facilities.

TOLEDO, O.—Doehler Die Casting Co. plans additions immediately to its plants at Pottstown, Pa., and Batavia, N. Y., to meet defense needs for die castings. Additions to its main plant at Toledo were recently completed.

Connecticut

BRANFORD, CONN.—Nutmeg Crucible Steel Co. is building a one-story foundry addition 70 x 130 feet, costing about $40,000.

BRIDGEPORT, CONN.—Ruleta Co. of Connecticut Inc., 380 Mountain Grove street, will build a one-story 50 x 170-foot unit for the manufacture of metal products in Andover street, costing about $40,000. P. F. Petrofsky, 955 Main street, is engineer.

BRIDGEPORT, CONN.—Apex Tool Co. is having plans made for a one-story 60 x 130-foot brick and steel addition to cost about $60,000.

BRIDGEPORT, CONN.—Peerless Aluminum Castings Co. is building a one-story 50 x 152-foot plant estimated to cost about $40,000.

MERIDEN, CONN.—C. P. Pravin, engineer, city hall, will take bids soon for garbage and rubbish incinerator at cost of about $25,000.

NEW HAVEN, CONN.—American Tube Bending Co. Inc. is having plans prepared for extensive plant alterations.

NORWALK, CONN.—Bronzavia Co., a French concern, is installing $250,000 worth of equipment in a plant here to manufacture airplane parts. Company had large business in France before German occupation.

Massachusetts

BOSTON—Meisel Press Mfg. Co., Dorchester, Mass., is building a two-story plant addition costing about $50,000.

CAMBRIDGE, MASS.—United Shoe Machinery Corp. is building a one-story research laboratory 110 x 112 feet, costing about $75,000.

GREENFIELD, MASS. — Production Machine Co., Wells street, William S. Howe, president, is doubling its manufacturing space and installing additional equipment for production of lathes and abrasive machinery.

PITTSFIELD, MASS.—General Electric Co. will expand its plastics department at cost of $400,000, at Pittsfield and Meriden, Conn., 75 per cent of money to be spent here.

New Hampshire

ASHLAND, N. H.—L. W. Packard & Co. Inc. will soon let contract for two-story, 55 x 114-foot mill addition to cost $40,000. N. P. Randlett, 614 Main street, Laconia, N. H., engineer.

Vermont

SPRINGFIELD, VT.—Bryant Chucking Grinder Co. is considering expanding facilities by erection of plant.

New York

BUFFALO—Donner-Hanna Coke Corp. is considering construction of a $2,000,000 plant extension, including 55 coke ovens. Application has been filed with war department for five-year amortization.

BUFFALO—Buffalo Arms Corp. has been formed as subsidiary of Houdaille-Hershey Corp. to build $1,000,000 plant in Cheektowaga to manufacture armament materials.

SYRACUSE, N. Y.—Central New York Power Co., J. L. Haley, president, West Erie boulevard, will build a water-gas plant on Hiawatha boulevard, to cost about $1,100,000.

SYRACUSE, N. Y.—Crucible Steel Co of America, 104 Magnolia street, will make plant improvements and extensions to cost over $100,000.

New Jersey

IRVINGTON, N. J.—Irvington Smelting & Refining Works, 374 Nye avenue, will let contract soon for a one-story 109 x 152-foot metal smelting plant addition. Epple & Kahrs, 17 Washington street, Newark, N. J., are architects.

Pennsylvania

ALLENTOWN, PA.—McClave Co., R. B. McClave, president, 936 Hamilton street, will build a one-story 40 x 100-foot foundry and machine shop on Mill street, to cost over $40,000, with equipment.

BETHLEHEM, PA.—Air Reduction Co., C. E. Adams, president, 60 East Forty-second street, New York, has let general contract to E. C. Machin Co., Commonwealth building, Allentown, Pa., for a two-story 140 x 200-foot oxygen plant and garage.

BLAWKNOX, Pa.—Blaw-Knox Co. will make additions and improvements to the plant of the Lewis Foundry & Machine division at Groveton, Pa., by an addition to the machine shop and installation of new equipment.

Michigan

ADRIAN, MICH.—Magnesium Fabricators Inc. has awarded general contract for a plant addition to Krieghoff Co., Detroit. Buckheit & Stuchell, Detroit, are architects.

DETROIT—National Products Co. has given a general contract to Bennage & McKinstrie, Detroit, for a plant addition costing about $40,000. Hugh T. Miller, Detroit, is architect.

DETROIT—Kelsey-Hayes Wheel Co., Detroit, has given general contract to W. E. Wood Co., Detroit, for a factory and boiler plant at Plymouth, Mich. Giffels & Vallet, Detroit, are architects.

DETROIT—Ryan Tool & Die Co. has been incorporated with $25,000 capital to manufacture small tools, by Peter Magyari, 13598 Ryan road, Detroit.

DETROIT—Hawke Tool & Engine Co., 7431 West Chicago boulevard, has plans by W. Lorenz, 7427 Fenskell avenue for a one-story 60 x 80-foot tool and machine shop and a two-story office, to cost about $40,000.

MUSKEGON, MICH.—Muskegon Motor Specialties Co. has given general contract to Peter Ramberg, Muskegon, for a plant addition costing about $30,000.

SCOTTSVILLE, MICH.—City has selected General Engineering Corp., Minneapolis, as engineers to plan and construct a $250,000 diesel power station.

WYANDOTTE, MICH.—Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., has been chosen to prepare plans for an ex-

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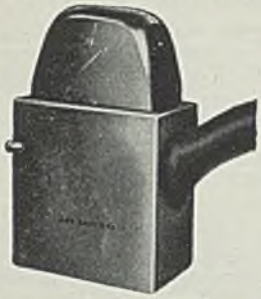

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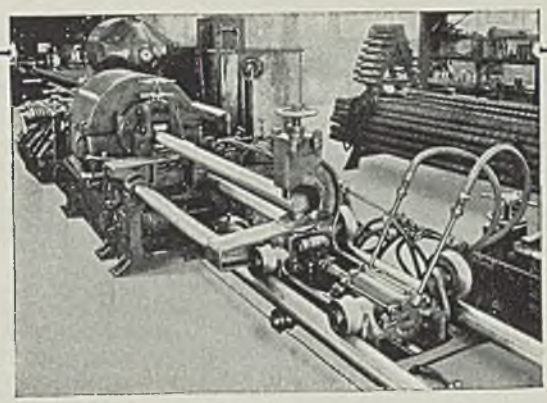

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tension to municipal power plant, to cost about $560,000.

Illinois

CHICAGO—Appleton Electric Co., 1713 West Wellington avenue, will increase capacity 30 per cent by addition of a four-story building, costing about $250,000. Will add about 110,000 square feet.

CHICAGO — Clearing Machine Corp., 6499 West Sixty-fifth street, manufacturer of hydraulic presses and die cushions, will build an addition of 25,000 square feet and install three cranes, two of 50-ton capacity and one of 150 tons.

CHICAGO—Elcor Co. Inc., 515 South Laflin street, manufacturer of dynamos for aircraft, tanks and farm lighting plants and motors for industrial use, is moving to 1060 West Adams street, where 32,000 square feet of floor space has been leased, to provide additional space for defense production.

CHICAGO—Precision Grinder Inc., 1520 North Fremont avenue, recently organized, is building a plant costing about $35,000 for grinding and screw machine work.

CHICAGO—Crane Packing Co., 1800 West Cuyler street, manufacturer of packings for oil refinery and marine trade, is building a two-story office at 1800 West Belle Plaine avenue, costing about $15,000.

CHICAGO—Danly Machine Specialties Inc., R. C. Danly, president, 2104 South Fifty-second avenue, is building a one-story addition 350 x 640 feet. Burnham & Hammond, 160 North LaSalle street, are architects. Building will cost about $750,000 and equipment about $1,000,000.

ROCK ISLAND, ILL.—Bear Mfg. Co. plans a factory addition to cost about $40,000, with equipment.

WAUKEGAN, ILL. — North Shore Foundry Co., Eleventh street and Greenfield avenue, is building a $4000 addition to its gray iron foundry.

WOOD RIVER, ILL.—Shell Oil Co. Inc. has awarded general contract to E. B. Badger & Sons Co., 75 Pitts street, Boston, for construction of solvent extraction plant in the Wood River-Roxana district. Estimated cost of $555,000.

Indiana

CONNERSVILLE, IND.—Auburn Central Corp. is remodeling and re-equipping buildings for manufacturing airplane parts, at cost of $100,000, including equipment.

INDIANAPOLIS—Curtiss-Wright Corp., Caldwell, N. J., is remodeling and equipping buildings for manufacture of airplane propellers on West Morris street at cost of about $500,000, including equipment.

INDIANAPOLIS — Marmon-Herrington Co., 1511 West Washington street, has let general contract for a one-story 102 x 252 and 26 x 115-foot machine shop to H. K. Ferguson Co., Hanna building, Cleveland, at cost of about $110,000. F. W. Daniels, Hanna building, Cleveland, is architect.

LOGANSPORT, IND.—Logansport Machine Co., manufacturer of air and hydraulic chucks, cylinders, valves and presses is expanding its plant at cost of about $100,000 in addition to considerable expansion a year ago.

Alabama

HOLT, ALA.—Debardeleben Coal Corp. will build a loading and unloading plant on Warrior river, to handle coal between cars and barges, to cost about $50,000.

Delaware

MARSHALLTON, DEL.—Continental Diamond Fibre Co. awarded contract to Austin Co., 19 Rector street, New York, for design and construction of one-story, 45 x 126-foot factory. Cost over $40,000.

Maryland

BALTIMORE — National Brewery, Conklin and O'Donnell streets, will soon let contract for two-story, 75 x 195-foot steel bottle storage building. Cost estimated at $75,000. P. W. Backhus, 339 St. Paul place, engineer.

DENTON, MD.—REA has allotted additional funds amounting to $572,000 to Choptank Co-operative Inc. for construction of 635 miles of electric lines.

WILLIAMSPORT, MD.—Potomac Edison Co. will install equipment for additional 5000 kilowatts and make other improvements to generating plant at cost of about $55,000.

Kentucky

HAZARD, KY. — Kentucky-West Virginia Power Co., Ashland, Ky., will let contract soon for three-story and basement concrete, brick and steel office building costing about $150,000. P. Sporn, 30 Church street, New York, is consulting engineer.

HENDERSON, KY.—REA has allotted $120,000 to Henderson-Union rural electric co-operative, J. R. Hardin, superintendent, for 129 miles rural electric lines.

North Carolina

FRANKLIN, N. C.—Nantahala Power & Light Co. will start construction soon on its power plant and dam on Nantahala river. General contract has been awarded to Utah Construction Co., 1 Montgomery street, San Francisco.

RALEIGH, N. C.—Carolina Power & Light Co., Raleigh, plans erection of 40,000-horsepower steam electric generating plant costing $3,000,000. Generator unit has been ordered and orders will be placed soon for boilers, condensers and other equipment.

Missouri

ROBERTSON, MO.—Bureau of yards and docks, care Captain R. D. Spalding, district public works officer, Great Lakes Ill., will build steel hangar 212 x 360 feet, assembly and repair shops building 103 x 160 feet, steam heating plant building 38 x 40 feet for naval reserve aviation base at Robertson, adjacent to Lambert-St. Louis municipal airport at Bridgeton, Mo.

ST. LOUIS—Monsanto Chemical Co., 1700 South Second street, will build a five-story warehouse addition to its chemical plant at 101 West Soulard street, 120 x 160 feet, costing about $300,000 with equipment. General contract has been awarded to Fruin-Conlon Construction Co., 502 Merchants Laclede building, St. Louis.

Oklahoma

TULSA, OKLA.—War department will erect plant here to assemble long-range four-motored bombers at cost of $10,000,000. Will be operated by Douglas Aircraft Corp., Santa Monica, Calif.

Minnesota

MINNEAPOLIS—Pioneer Engine Works, L. W. York, president, 1515 Central avenue, will let contract soon for a one-story 60 x 160-foot plant addition to cost over $40,000. (Noted Dec. 23.)

Texas

FORT WORTH, TEX.—War department will build bomber plant to be operated by Consolidated Aircraft Corp., San Diego, Calif., for manufacture of four-motored long-range bombers. Cost estimated at about $10,000,000.

Kansas

CLAY CENTER, KANS.—C. & W. rural electrification co-operative, I. H. Smith, superintendent, plans 175 miles rural electric lines.

STERLING, KANS.—Arkansas valley electric co-operative, A. B. Davis, superintendent, plans 407 miles rural electric lines. REA has allotted $335,000.

Iowa

ANAMOSA, IOWA—REA has allotted $264,000 to Maquoketa valley electric co-operative for 344 miles rural transmission lines. E. D. Beach, Anamosa, is manager.

FAIRFIELD, IOWA — Prairie public power co-operative will take bids in February for construction of 115 miles rural electric lines, at cost of about $86,000. H. S. Nixon, Grain Exchange building, Omaha, is consulting engineer.

GLENWOOD, IOWA—State board of control, Des Moines, plans additions and new equipment for power plant at Glenwood state hospital, to cost about $65,000. H. J. Liebbe, state capitol, Des Moines, is architect.

MARION, IOWA—REA has allotted $133,000 to Linn county rural electric co-operative for about 239 miles of rural electric lines.

California

BURBANK, CALIF. — Burbank Aero Tool Co., 231 Olive street, has been organized by Lester Deutsch to manufacture aircraft manufacturing tools.

LOS ANGELES—North American Aviation Inc., Los Angeles municipal airport, Inglewood, Calif., will build an airplane manufacturing and assembly plant at Fairfax airport, Kansas City, Mo., covering 1,000,000 square feet floor space. Company has plant of similar size under construction at Hensley field, Dallas, Tex.

LOS ANGELES—Steel Forming Corp. has been organized with $200,000 capital. Is represented by Dunn & Crutcher, 634 South Spring street, Los Angeles.

LOS ANGELES—Aero-Crafts Corp. has been organized with $1,000,000 and is represented by H. B. Murchison, 620 West Olympic boulevard, Los Angeles.

LOS ANGELES—Wells Aircraft Parts Co., has obtained permit for erection of machine shop at 4140 Whiteside avenue, 43 x 150 feet, to cost about $17,000.

LOS ANGELES—Continental Can Co., 3820 Union Pacific avenue, will build an addition 140 x 200 feet, two stories, costing about $160,000.

TORRANCE, CALIF.—National Supply Co. has obtained permit for erection of steel welding shop and office building at 1524 Border avenue, Torrance, at cost of about $66,000.

WILMINGTON, CALIF.—Los Angeles bureau of power and light, Second street and Broadway, Los Angeles, is preparing plans for a steam plant in Wilmington, to cost about $2,065,000, equipment to cost an estimated $2,100,000.

Washington

SEATTLE—Western Steel Casting Co., 145 Horton street, will build a foundry extension 20 x 70 feet.

Canada

TORONTO, ONT.—Way Sagless Spring Co. Ltd. is having plans prepared for a new plant to cost about $175,000.

TORONTO, ONT.—Canada Cycle & Motor Co. is having plans made for doubling heat-treating capacity at its Weston plant.

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