STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, NO. 19 NOV. 5, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Electrostatic Spraying of Porcelain Enamels

High-Speed Press for Making Small Parts

Descaling Stainless Steel by Sodium Hydroxide Process

Producing Sponge Iron in a Rotary Kiln

Molten Flux-Bath Brazing of Aluminum Parts

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THE B. A. WESCHE ELECTRIC COMPANY

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STEEL
November 5, 1945

Lamentable Error

Persons who listened to President Truman last Tuesday evening hoping that he would say something new about the administration's policy on wages and prices were disappointed. For the most part, his address was simply a restatement of the problem as it had been outlined many times before.

He said that wages must be increased enough to prevent a too-drastic reduction in purchasing power, declared emphatically that government must hold the line on prices, presented five reasons why he thinks most companies can grant wage increases without raising prices, explained that there are some exceptions especially among smaller companies, stated that labor must recognize these exceptions and refrain from making unreasonable demands, announced that he had issued three amendments to the Aug. 14 Executive Order giving more relief on prices in these exceptional cases, stated that the administration of these orders will continue under the wartime agencies, stressed the importance of the management-labor conference which convenes today and asked for a spirit of give-and-take on the part of employer and employee to industry.

The most disquieting aspect of this address is that it calls for a continuation of controls so complex that they are bound to slow reconversion. Every price increase attributable to wage increases must be approved. If this could be done fairly and promptly, perhaps no one would object. However, automobiles are coming off assembly lines at a rate of several thousand a day and OPA has not yet acted upon the price at which they can be sold. Scores of peacetime products are ready for the retailers but the manufacturers still are waiting for the government's word on prices. This log jam will become much worse as OPA tries to handle cases which come up under the "exceptions" covered by Mr. Truman's amendments.

The President also took occasion to slap Congress in a manner reminiscent of the Rooseveltian technique. He scolded the legislators for their inaction on unemployment benefits, "full employment" and the United States Employment Service. All of this indicates that Mr. Truman has been sold the old New Deal bill of goods: Give out liberal lip service to private enterprise, but hamstring it at every turn.

His error is lamentable, because just a bit more emphasis on production and a little less concern about labor's votes would net the nation quick prosperity and the workers better jobs at higher wages than will be possible under the present impractical policy.

FACE BIG HANDICAP: Today eighteen representatives of management, eighteen of labor and three of the public meet in an effort to find a key to industrial peace. Everybody hopes they will succeed. An early end of conflict in labor relations would mean much to the nation in establishing a sound postwar economy.

However, if the conferees are to attain their objective they must overcome difficult handicaps of timing and bias. Senator Vandenberg suggested the conference last July. Had it been held early in September, its members could have tackled the problem before lines of antagonism had formed. Now they must seek harmony after disputes have reached an acute stage and after the President has announced certain not too sound principles.

Judge Stacy, public representative who will preside, is experienced in arbitration and seems to be acceptable to both sides. Secretary of Labor Schwellenbach, another public representative, by his action in the refinery case showed himself as definitely favoring the unions. The third agent of the public,

(OVER)

Secretary of Commerce Wallace, should be expected to understand industry's problem. But can he? He is closely allied with CIO's PAC.

Unless there is a surprising and much to be hoped for reversal of form, the conference will get under way with the cards stacked against management.

—p. 95

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COUNT ON THE METALLURGIST: When a complete history of engine developments is written, the chapter on power plants for aircraft no doubt will make full acknowledgment of the work of engine designers and mechanical engineers. Their combined genius produced a galaxy of names synonymous with great horsepower, speed and endurance. Wright, Pratt & Whitney, Allison, Rolls-Royce, Lycoming and others in World War II earned the respect of all who rode and fought behind their propellers.

However, no history of airplane engine progress will be complete unless it gives full credit to the metallurgist for developing the materials, processes and tests which made possible such vast strides between the two world wars.

Into making flight a fact for huge four-motored transport and bomber aircraft went 27 new metallurgical materials and such processes as nitriding, induction hardening, shot blasting, and many tests to insure that only the perfect metallic components would be included. —p. 128

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SCORE ONE FOR BOMB: Regardless of the outcome of present discussions by scientists, economists and government officials as to the future of atomic energy, the fact remains that the mere knowledge of the destructive power of the three bombs already exploded will influence man's planning in many ways.

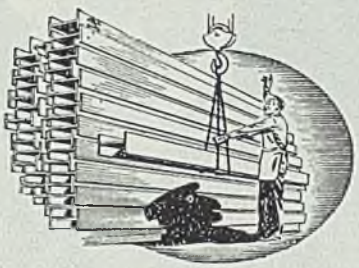
For one thing, the advent of the bomb is likely to give impetus to the already accelerated tendency on the part of industry to decentralize its plants. Many of the new plants' research centers and other postwar projects of industrial corporations are being located in rural or semi-rural communities instead of in crowded areas adjacent to large cities. The incentive in most cases is to avoid the evils of congestion and to make it easier for employees to live in more attactive residential districts and still be close to their places of employment.

This migration from crowded rundown urban sections to spacious country sites is desirable from many angles. If consideration of the atomic bomb hastens the process, so much the better not only for the workers but for industry as well.

POSTWAR POSTSCRIPTS: Third quarter earnings of corporations reflect the lower rate of activity following V-J Day. Bethlehem Steel reported an operating deficit which was offset by tax adjustments (p. 101) and United States Steel's quarter earnings were down to $11.6 million from $16.9 million in the comparable quarter last year. . . . Decision of OPA and WPB not to ration new automobiles is good news in itself (p. 97) but it would mean more if the uncertainties of wages and prices could be cleared away promptly. . . . A study of the technical features of German military planes, engines and armament completed by British and American Air Intelligence teams (p. 118), shows that the Nazis were far ahead of the United States in the development of jet and rocket aircraft. . . . A spokesman of the National Housing Agency predicts that many of the millions of new housing units to be built during the next few years will be equipped with improved heating and cooling apparatus (p. 106) which may obsolete conventional types of heating and cooling equipment. Radiant heating from floors and walls and compact heaters, adapted from those used on military aircraft, may figure prominently in the development of postwar homes. . . . At long last the House Military Affairs Committee has approved a bill to repeal the strike vote and plant seizure provisions of the Connally-Smith War Labor Disputes Act. It is a farce and needless waste of taxpayers' money that the current strike votes including that of 600,000 steelworkers scheduled for Nov. 28 (p. 97), involve the question as to whether the voting employees wish to permit an interruption of war production in wartime as a result of present disputes. Existing strikes have nothing to do with war production and NLRB, if not Congress, should have abandoned the strike vote feature of the Connally-Smith law immediately after V-J Day. . . . During the first seven months of 1945 government orders accounted for 47.8 per cent of structural steel bookings reported to the American Institute of Steel Construction Inc. This figure is in sharp contrast with that of 1942 (p. 102) when 79.8 per cent of structural work was for government account. . . . Tomorrow numerous local elections will he held. Left-wing labor is working hard to seat its candidates in city governments and school boards. Your vote for good candidates will be sorely needed.

E. L. Shaner

EDITOR-IN-CHIEF



Short Cut to Steel

Management and operating and purchasing executives need all the short cuts they can find in these days of product changes and renewed competitive selling. The necessity of providing jobs demands greater production. New products and new markets require a ready supply of a wide variety of material for manufacturing and maintenance.

One easily-found short cut is Ryerson Steel-Service, which offers the nation's largest steel stocks from eleven conveniently located plants.

These plants carry everything in steel—more than 10,000 different kinds, shapes and sizes. Deliveries are generally prompt—a piece, a few pounds or many tons.

And where a wanted item isn't available because of the difficulty of keeping sizes always in balance, a practical alternate can usually be recommended.

Ryerson facilities for cutting, punching, riveting or otherwise preparing steel to exact specification are another time-saver. Special hardenability reports furnished with all alloy shipments help you get desired heat-treatment results easily, quickly.

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Forming pockets in Inland sheets is the first operation in making heads for 5-gal. contai

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There is one way to prove the true worth of a steel—watch its workability and economy as it goes through your manufacturing operations.

Steel produced by Inland has a remarkable record of performance. You can always count on its being true to specifications and of uniform quality, which assures an even flow of production at the planned rate.

In the photograph above, the operator is performing the first operation in making heads for 5-gal. containers. Pockets are being formed at the rate of 1400 per hour in 24 gauge Inland cold rolled sheets. Each pocket, formed by one press stroke, is $3\frac{1}{4}$ in. in diameter, $\frac{9}{16}$ in. deep, with a pierced $\frac{1}{2}$ in. hole. These 26-in. by 26-in. sheets are coated by lithography before forming. Wax applied to the coated side, which is placed on the lower die, serves as a lubricant as well as to protect the coating. Breakage of these Inland sheets is negligible.

Inland engineers are ready to study your products and manufacturing methods, and recommend steels that will prove their true worth in your shop.

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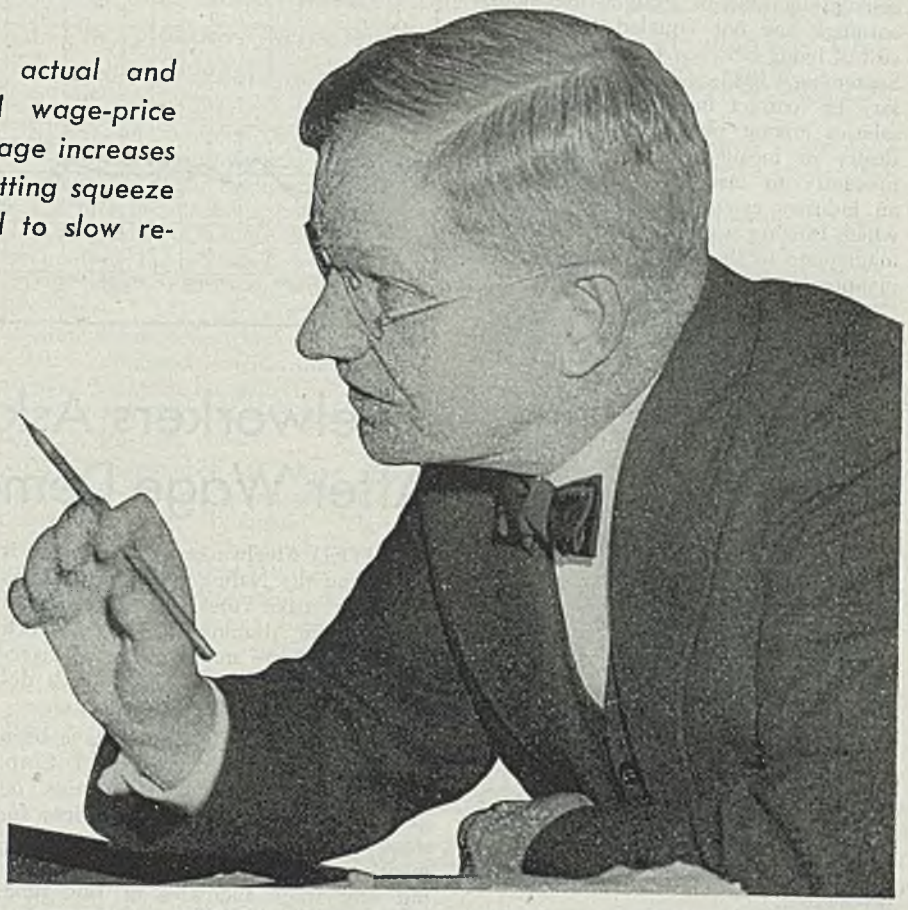
INLAND SHEETS

Labor-Management Conference Seeks Means To Minimize Disputes

Task complicated by strikes, actual and authorized, and by muddled wage-price policy. President's stand for wage increases without price advances seen putting squeeze on industrial profits. Expected to slow reconversion

STEEL
November 5, 1945



Chief Justice Walter P. Stacy of the North Carolina Supreme Court is chairman of the national labor-management conference opening today in Washington. He has served as a labor mediator under three former Presidents, was a member of the National Defense Mediation Board and the National Railway Labor Panel

OMINOUS clouds portending widespread industrial strife hover over the opening today of the national Labor-Management Conference, which is seeking means by which industrial disputes can be minimized.

As the management and labor delegates, 18 of each and a like number of alternates, gather in the Department of Labor building in Washington, along with a few representatives of government, they will have this situation to consider:

Strikes: More than a quarter of a million workers are idle due to strikes. This is the highest number of strike-idle since Oct. 21 when 450,000 were away from their jobs. At times since V-J Day, more than a half million workers have been on strike. Practically all stoppages have resulted from union demands for wage increases to maintain weekly take-home pay at wartime levels.

Strike Votes: Work stoppages by hundreds of thousands of other workers have been authorized in strike votes taken by the National Labor Relations Board. These include a large number of automobile workers asking a flat 30 per cent wage increase. Similar votes have been polled by the United Steelworkers for an estimated 900,000 members seeking a $2-a-day increase. Meanwhile, the House Military Affairs Committee has recommended repeal of the War Labor Disputes (Smith-Connally) Act, which provides for the strike votes, and suggested the substitution of legislation which would provide rigorous penalties for work stoppages during the lifetime of an agreement which contains a no-strike clause.

Wages and Prices: President Truman's enunciation of the government policy on reconversion wages and prices —substantial increases in wage rates without corresponding increase in prices —has done little to clarify a muddled situation. The declaration encouraged unions to strike out immediately for whatever increases they can get without mentioning any specific limit. It placed business in a price purgatory from which no escape is in sight. In the opinion of many observers, the wages and prices declaration is more likely to increase than to decrease industrial disputes which are delaying reconversion.

In effect the President asked that industry not only absorb the substantial increases in straight-time rates granted during the war, in many cases 30 per cent or more, but also another substantial increase to compensate for the loss of wartime overtime. If the wage increases now being asked by the unions were granted, wage costs would be boosted by about 70 per cent over rates at the beginning of the war.

Meanwhile prices of peacetime heavy goods, such as steel, have been held at near prewar levels. Most steel products now are being produced at a loss and one large producer estimates that if the union's wage demand were granted an increase of about $14 a ton would be necessitated. A similar situation prevails in the automotive, electrical equipment and other metals industries.

Most observers view the administration's policy as contradictory. On the one hand it is creating inflation by deficit financing and pushing up wages while

trying to combat it on the other by holding down prices. The result, they say, can only be to wipe out profit margins and slow down production.

President Truman issued an amendment to his Aug. 18 directive on wage-price policy which authorizes three kinds of wage increases: (1) Where the percentage increase in straight-time hourly earnings has not equaled that of the cost of living between January, 1941, and September, 1945; (2) increases necessary to "correct inequities in wages or salaries among plants in the same industry or locality"; and (3) increases necessary to insure full production in an industry essential to reconversion in which existing wage rates or salaries are inadequate to the recruitment of needed manpower.

As an inducement to industry the executive order states employers may ask for price readjustment six months after they have increased wages assuming they have been unable to absorb wage increases out of profits or savings.

In reaching his conclusion that wages can be increased in most industries without resulting price increases, President Truman relied to a large extent on conclusions of administration economists from a study of prospects in the automotive industry.

Under the expected higher level of operations, the economists believe the automotive industry can grant a substantial wage increase and still make high profits. In reporting their findings they explained that the picture for the automobile industry is not necessarily accurate for industry in general but they said it is fairly illustrative for industries that have high earning power at volume production.

Assumption was made as to the volume of automobile business to be expected over the next three years, and the effect on profits of certain percentage wage increases. The economists based their study on the following figures:

Year	Production (Millions of Cars)	Wage Rates (Percentage in rates over 1945)	Material Costs
1946	3.5	15%	0
1947	5.5	25%	3%
1948	6.0	25%	5%

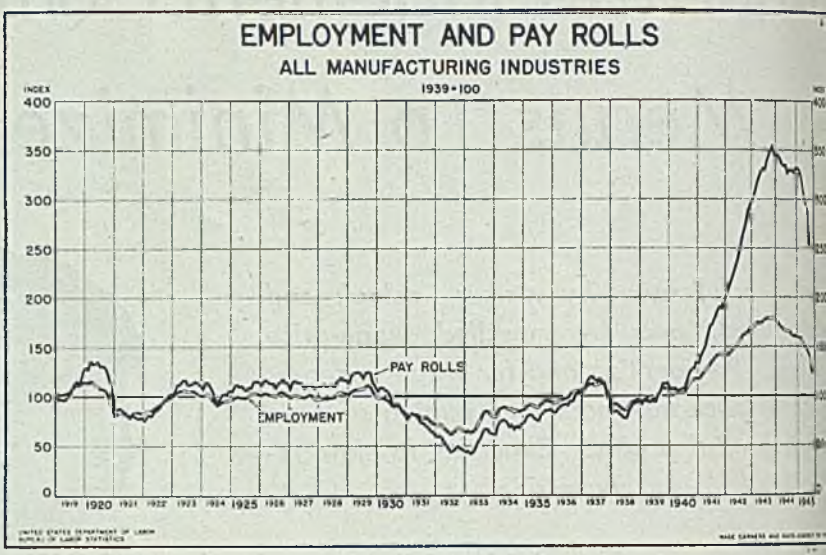
The sales volume in dollars, and the profits before federal taxes on the basis of the above figures they calculated as follows, using 1942 passenger car prices:

Year	Sales (In billions of dollars)	Profits
1946	4.9	.65
1947	7.0	1.00
1948	8.0	1.20

The calculation assumes that the rate of hourly increase in productivity per worker will be about the same as the average during the period 1919-1941, but does not take into consideration any effect of production levels on productivity.

The profit and sales indexes for the

(*Please turn to Page* 221)



Steelworkers Ask for Strike Vote After Wage Demands Are Rejecte

UNITED Steelworkers of America is petitioning the National Labor Relations Board for strike votes in the basic steel industry, the Aluminum Co. of America and the iron ore mines following rejection by the industry of the union's demands for a $2-a-day wage increase.

The wage demands already have been refused by United States Steel Corp. and several major independents on grounds that existing ceiling prices for steel products, together with the government's stabilization policy, do not permit any wage increases at this time. Other producers are expected to reply to the union's demands in similar vein.

The wage-policy committee of the union authorized its officers to take "whatever action they deemed necessary" toward getting the increase. President Philip Murray then announced the NLRB would be asked to poll the union's members (claimed to total 900,000) on the strike issue. First votes will be sought in the 86 steel producing companies, the aluminum company and the ore mines, he said. Steel fabricating and other companies with which the union has contracts may be polled later.

Mr. Murray cautioned the union's membership not to start any strikes until the vote had been taken.

The steel producers pointed out to the union that many peacetime products now are being produced at a loss and that the industry has been endeavoring to obtain an increase in prices to cover increased operating costs to date. They also listed wage and cost of living data to show that steelworkers' wages have advanced more than the cost of living.

"Further increases in the already high wage rates of the employees," said Bethlehem Steel Co., "could not be granted without substantial increases the prices of steel products. Moreo the company believes that a gen wage increase would have inflation effects which would be harmful to national economy and would thre the standard of living of the nation.

The company pointed out that strai time hourly rates have advanced 39 cent since January, 1939, and that increase now being asked would rates to more than 70 per cent over January, 1939, level. Meanwhile, continued, the cost of living has up only 29.6 per cent.

Bethlehem estimates the increase being asked would raise its steelmak and manufacturing costs by $50 mi a year. United States Steel figured increase would amount to $128 mi annually. Should the increase be gi to all of the union's claimed 900,0 members, the total payroll increase wo amount to nearly a half billion dollars.

Bethlehem, in summarizing for union the reasons why the increase co not be granted, pointed out that increase in direct labor costs to the companies would inevitably be accom panied by similar wage increases in o industries and that the cost of steel pr duction would be increased still furt by increased prices for raw materi supplies and services which the companies purchase.

"Even if Bethlehem could increase prices for its products to an extent w would enable it to grant the wage in crease that the union demands, Beth hem believes that it would be harmf to the national economy. The standa of living of the nation can be maintain at a high level only by maintaining high level of production at costs wh will permit the goods produced to

sold at reasonable prices. The only way to have more is to produce more.

"The standard of living of the nation cannot be raised by increasing costs of production without increasing the volume of production. Increasing wage rates in order that the workers shall receive the same amount of pay for less work cannot add to the volume of goods produced. It can only result in producing a smaller amount of goods at increased costs. The end result is to decrease rather than increase the standard of living.

"The steelworkers are among the highest paid workers in the nation. The increases in their wage rates since the beginning of the war have more than maintained their prewar standard of living. Further increases in their wage rates at this time can result in only temporary and illusory advantage to them and will in the end prove harmful to the national economy and to millions of people in this country."

Youngstown Sheet & Tube Co., in addition to stressing the inflationary and price angles, warned the union that any adjustment in wages must take into account the efficiency and productivity of the working forces.

Says Productivity Declined

"We find that efficiency and productivity have declined during the war period. A prosperous industry and continuous employment must be based upon a willingness to render a full day's work for a full day's pay.

"Your union must accept the responsibility and obligation to require from its members a realization of and respect for their contractual obligations. All employees have a duty to work efficiently and honestly, to give a full hour's work for an hour's pay, and otherwise to increase production and to improve quality. The employer must not be restricted in his right to control his operations and to take proper disciplinary action in cases of infractions of efficiency regulations. Today the employer expects to be held to any agreement he may sign, but a group of employees by walkouts or refusals to work may and do violate or breach with impunity the provisions of an agreement which they have signed, and the union protects such employees against disciplinary action."

Republic Steel Corp., Cleveland, told the union that granting of the wage demands, which it estimated would cost Republic $30 million annually, would inevitably lead to closing the corporation's plants.

Pointing out that most of the products made by the company show a loss on every ton produced, Republic said:

"In order to compensate for wage increases granted during the past five years, a price increase of $7 a ton would be required. To meet your new exorbitant wage demands an additional increase of between $6 and $7 a ton would be necessary—or a total of nearly $14 a ton."

Futile, Expensive Strike Votes Monopolize NLRB's Time, Funds

Move underway to repeal section of Smith-Connally Act requiring elections on interruptions of "war production." Petitions for votes have increased sharply since end of shooting war. Continuation would necessitate larger appropriations for board

NEED for complete overhauling of the government's philosophy and setup in relation to labor disputes is reflected in the present untenable position of the National Labor Relations Board. Since the end of the shooting war and the end of labor's wartime no-strike pledge, this agency has virtually abandoned its normal function, which is to resolve questions concerning representation so as to pave the way for collective bargaining. Its full time, instead, has had to be spent on strike votes.

During September 307 strike notices were filed, 79 were withdrawn, and 81 strike votes were conducted. That is, the strike notices in the single month of September were about 10 per cent of the total strike notices received in more than two years. During the period of July, 1943, through September, 1945, 3016 strike notices were filed, 1846 withdrawn, and 851 strike votes were held. Cases pending as of Oct. 1, 1945, numbered 319.

The above figures indicate the current trend, which is gaining in momentum. Strike notices received by the NLRB in October totaled 323 through Oct. 15, and indications on Oct. 30 were that the total for the month would run well in excess of 600—or at least double the total for September. One strike notice alone received since Oct. 17—the strike of teamsters—involves approximately 3200 employers. The United Steelworkers' notice, filed Oct. 29, listed 766 plants on 121 pages.

And, NLRB spokesmen say, this is only the beginning. Unless the present trend is arrested, the number of strike notices is due to increase.

Testifying before the House Military Affairs Committee on Oct. 17, NLRB

Present, Past and Pending

■ OPA TO REMOVE AUTOMOBILES FROM RATIONING

WASHINGTON—Priorities will not be required to buy new automobiles since Office of Price Administration's rationing order 2-B, which requires certificates for purchase of cars produced after July 1, 1945, is being revoked immediately.

■ WIDMER LEAVES OPA; SUCCEEDED BY STERLING

WASHINGTON—F. Russell Widmer terminated his connection with the Office of Price Administration Oct. 31 where he had been serving as head of the Steel Mill Product Section of the Metals Price Branch. He is returning to Republic Steel Corp. and is succeeded in OPA by W. F. Sterling.

■ SIGNAL FIRM TO CONTINUE OPERATIONS AT WAR PLANT

ROCHESTER, N. Y.—General Railway Signal Co. will continue to operate a plant here, which was built for war production, to fill heavy demand for signals. The company also plans to erect a new research laboratory.

■ NASH STARTS FINAL ASSEMBLY OF 1946 MODEL

KENOSHA, WIS.—New 1946 automobiles are now in production at Nash Motors Division's final assembly plant here. First public showings will take place at dealer meetings this month.

■ TITUSVILLE, PA., MADE STAINLESS STEEL BASING POINT

BRIDGEVILLE, PA.—Universal-Cyclops Steel Corp. has established Titusville, Pa., as a basing point on stainless steel forging billets and hot-rolled bars.

■ COMMERCE DEPARTMENT TO TAKE OVER SWPC

WASHINGTON—Smaller War Plants Corp. will be transferred soon to the Department of Commerce.

■ ICC CONTINUES SUSPENSION OF RAIL TARIFF INCREASES

WASHINGTON—Interstate Commerce Commission has ordered that suspension of authorized freight and passenger tariff increases, which would have expired Jan. 1, shall continue until six months after the legal termination of the war.

Member John M. Houston declared: "Conduct of these strike votes by the National Labor Relations Board, or by any other agency in fact, has become administratively impossible. An atomic bomb has fallen on us.

"Consider for a moment just how you would go about voting all of the vessels flying the American flag on a single day," Mr. Houston went on. "Or, how you would vote all the employees on the Greyhound Bus Lines in the territory bound on the west by Minnesota and on the east by the Atlantic Ocean, in one day. Or, how you would vote all the lumberjacks and other employees in the California woods in a single day. Or, the employees of the entire New England textile industry, or all of the employees in the hosiery industry, or all the trucking companies.

NLRB has no exact system for keeping track of the expenses entailed in processing strike notices, but it does know definitely that it is running in the red. NLRB's appropriation for the current fiscal year ending June 30, 1946, was $3,135,430, which included $225,000 for conducting strike votes. It already has spent far more than that figure.

Mr. Houston estimates it cost a bit more than $10,000 to conduct the recent strike vote in the Northwest lumber industry. He estimates it cost in the neighborhood of $100,000 to conduct the strike votes at the 120 plants of of General Motors Corp. and Chrysler Corp. on Oct. 24 and 25. It cost $164,000 to conduct the bituminous coal strike vote in March; 2227 extra workers had to be employed temporarily to conduct that vote. It cost $32,000 to conduct the anthracite strike vote in April. It even costs considerable money to conduct a strike vote by mail; it cost $2310 to conduct the hosiery strike vote by mail.

Cost to NLRB Is High

Altogether the cost runs to a pretty penny since not only all of the approximately 800 employees of the NLRB at Washington and in the field now are spending substantially all of their time on strike notices but, as long as this is the case, it is only fair to allocate a large share of the NLRB overhead expense to that activity.

"If it is the will of Congress that the federal government should continue to conduct strike votes, then Congress has several alternatives before it," Mr. Houston told the House Military Affairs Committee on Oct. 17.

"Congress can specifically authorize the expenditure of hundreds of thousands of dollars for this specific purpose to give the NLRB sufficient manpower to do the job. To really do this job, it would be necessary for Congress to authorize sufficient funds to double several times the current personnel of the NLRB. Or, Congress may find it desirable to establish a new agency with personnel and offices reaching from the Atlantic to the Pacific."

SPECIAL AID TO PRESIDENT: John R. Steelman, right, veteran government labor conciliator, is sworn in as a special assistant to President Truman by Frank K. Sanderson, administrative officer in the executive office of the White House. NEA photo

The third alternative, said Mr. Houston, is to repeal Section 8 of the War Labor Disputes Act and thus once and for all dissipate the prevailing impression that the government is extending its auspices to encourage strikes.

"For," went on Mr. Houston, "in every one of the strike votes which the federal government conducts, each individual employee is asked to vote 'Yes' or 'No' on the strike question. And he is asked to mark his answer on a federal ballot handed him by a government agent. Thus, at the very moment when we should be exerting all our energies to resolve disputes and clear the way to full peacetime production, at the same moment the federal government is asking employees to consider the advisability of going on strike.

"And, the ballot which is handed the American employee contains question—this language from Sec 8 of the War Labor Disputes Act each employee is asked: 'Do you v to permit an interruption of war p duction in wartime as a result of dispute?' Yes, we're still asking question, as dictated by the War L Disputes Act, two months after enemies have bowed to our blows.

The anomaly of this situation, Mr. Houston, caused an employer write to the NLRB recently as follo "We are really very intrigued with procedure and would certainly appre your answer to the following ques How can employees strike and stop production when there is no war and war production?"

Alloy Steel Output Drops in September

PRODUCTION of alloy and hot-top carbon steel ingots in September totaled 1,293,264 net tons, compared with 1,338,712 tons in August, according to the American Iron & Steel Institute, New York. Alloy steels contributed 494 tons to the September total and hot carbon ingots 798,278 tons. Detail output for September and the first months of 1945 follow, in net tons:

	Total Steel		Alloy Steel	
Open-hearth furnaces	Sept.	Per cent capacity	Sept.	Year to date
Ingots	5,421,155	....	354,506	4,704,297
Steel for castings	14,059	....	3,530	34,884
Total	5,435,214	78.7	358,036	4,739,181
Bessemer ingots	352,847	73.2	.....	.....
Electric & crucible furnaces				
Ingots	191,690	....	135,181	2,330,890
Steel for castings	3,469	....	1,769	35,479
Total	195,159	43.5	136,950	2,366,369
Total steel	5,983,220	76.3	494,986	7,105,550

Baltimore Industry Handicapped By Labor and Material Shortages

Skilled and unskilled labor needed. Displaced workers decline jobs paying less than wartime "take-home" pay. Difficulty in obtaining steel and other supplies is hampering resumption of civilian goods production

BALTIMORE

RECONVERSION in the Baltimore metalworking industries is progressing, although handicapped by a shortage of labor and difficulty in getting steel and other supplies.

There have been substantial layoffs at certain plants, particularly shipyards; however, local steel mills and metalworking companies report considerable difficulty in obtaining both skilled and unskilled help. Numerous war workers have left the district, returning to their homes in other areas, but the greatest drawback is said to be the disposition of many unemployed to refuse normal work except at the same "take-home" pay they received during the flush of the war boom. Apparently many are content for the present to go along on unemployment compensation and such savings as they may have.

Although there is a lack of important labor disturbances in the district, strikes in other areas, combined with heavy pent-up civilian demands throughout the country, are retarding shipment of urgently needed manufacturing materials. Thus, with inadequate help and materials business is not going ahead as rapidly as a short time ago.

Shipbuilding Most Severely Cut

The most severely felt cutback in the local metalworking trades has been in shipbuilding. The Bethlehem-Fairfield yard, largest merchant yard in the East, is winding up its program and should be down completely before the year is over. Various repair yards also are experiencing a decline, although the bottom has not dropped completely out of the shipbuilding and ship repair business, for only recently the Bethlehem-Sparrows Point yard closed on a $25 million contract for nine United Fruit cargo and passenger ships and there is considerable repair work still going on. Meanwhile, the yards have been disposing of surplus materials, with the result stocks at certain yards at least are no longer badly out of balance.

Aircraft production at the Glenn L. Martin plant has tapered rapidly although there is still some Navy work in progress. As a matter of fact, a limited amount of Army work is expected to continue for some time being bolstered by at least a limited amount of civilian work.

Manufacturers of aircraft and also maritime accessories are withstanding the shock of transition in good shape, generally speaking, switching over into civilian production with little disruption of operations.

That Baltimore, given sufficient men and materials, will be able to shift into peacetime production without too much difficulty, is confidently expected because of the diversity of her industries. The decline in shipbuilding and aircraft output will long be felt but Baltimore's industry, including metalworking, spreads in various directions.

Most metal workers, while complaining of lack of help, believe they could get more efficient production out of what they have if they could count on a steadier flow of steel and other raw materials. In a number of cases the steel mills have been unable to keep abreast with current commitments and find themselves in position on certain products where they can not make definite delivery promises on new orders. This is especially true in sheets and in lesser degree on bars. Consumers also find shape schedules becoming increasingly extended and this is complicating plans on considerable building construction in the area.

At the moment there are relatively few large structural projects pending; however, there are a number of small jobs, ranging from 25 to 75 tons, which have more than swamped district fabricators, and not only for the reason that they are having difficulty figuring the jobs because of shortage of draftsmen but that they are unable to obtain shapes before well into next year.

The largest single building project now active involves 3000 tons of sheet piling and 600 tons of shapes for a pier and warehouse development for the city, to be leased to the National Gypsum Co., and 2200 tons for a Navy laboratory and research project at White Oak, Md.

Urgent character of pent-up civilian requirements for building is reflected in heavy demands upon the warehouses for shapes.

In general, warehouse business is off about 25 per cent from the average of the first half of this year, but if requirements in the building field could be met at this time the decline in overall bookings would be far less pronounced.

Manufacturers of food cans and other metal containers find their operations still restricted by lack of tin plate and black plate. However, they are receiving enough to keep production at a fairly high rate. Manufacturers of electrical equipment, radar and radios and electrical hand tools have far more business ahead than they can handle under present conditions. This is likewise true of bed spring manufacturers and certain other consumers of wire products.

Plate fabricators are still more or less in the doldrums, now that ship work has subsided; nevertheless, one large tank fabricator reports an increasing amount of new business in gas holders, and, along with certain other important plate fabricators, is developing new lines of production.

Stove and soil pipe manufacturers have far more work than they can handle and for the present are accepting orders on a restricted basis. One manufacturer of soil pipe, for instance, is said to be limiting orders to five tons each.

September Pig Iron Rate Shows Gain

Pig iron production in September totaled 4,226,752 net tons, only slightly less than the 4,248,547 tons produced in August, largely accounted for by the one day less in September, according to compilations of the American Iron & Steel Institute, New York.

In September the tonnage represented 76.5 per cent of capacity against 74.3 per cent in August.

For nine months total production was 42,430,001 tons, at 84.3 per cent of capacity, compared with 46,836,301 tons for the comparable period in 1944.

September total included 55,517 tons of ferromanganese and spiegeleisen, against 67,781 tons in August.

For nine months this year these ferroalloys totaled 587,505 tons and in the like period in 1944 their total was 502,389 tons. Details of September output are as follows, in net tons:

	Pig iron	Ferro, Spiegel	TOTAL September	TOTAL Year to date	Per cent capacity
Eastern	794,224	26,164	820,388	7,743,502	76.9
Pittsburgh-Youngstown	1,634,140	17,713	1,651,853	17,152,901	77.7
Cleveland-Detroit	427,220	.....	427,220	4,241,225	79.0
Chicago	889,403	631	890,034	9,019,655	77.1
Southern	322,058	11,009	333,067	2,943,422	82.4
Western	104,190	.....	104,190	1,329,286	44.8
Total	4,171,235	55,517	4,226,752	42,430,001	76.5

Third Quarter Steel Income Declines

IMPACT of war's end on earnings in the steel industry is strikingly demonstrated in third quarter financial reports now being issued.

In almost every instance companies which to date have issued statements for the period report a decline in net income as compared with the preceding quarter, and in some cases actual net would have been considerably smaller than reported had it not been for allowed tax adjustments.

Consolidated net income of seven primary steel producers representing 65 per cent of the nation's ingot capacity was $24,173,849 for the quarter ended Sept. 30. This was a decline of 27 per cent from consolidated net income of $33,364,089 reported by these same producers for the second quarter of the year, and a drop of 16 per cent compared with consolidated net of $29,038,520 reported by them for the third quarter of 1944.

Consolidated income of seven primary producers representing 65 per cent of nation's ingot capacity shows drop of 27 per cent from second quarter

Net income of these seven producers in the nine months ended Sept. 30 was $88,187,366, an increase of 2 per cent over net of $86,204,747 reported by the same companies in the first nine months of last year.

The decrease in net earnings is a direct reflection of several factors. Among these are cancellation of war orders, costs incident to transition to peacetime production, and changes in the character of demand, peacetime items being less profitable than war products. With higher costs and frozen price ceilings the industry earnings trend turned definitely downward during the third quarter. The trend in income gives convincing proof of the industry's claim of inability to meet higher wage demands now being made by labor.

Indicative of the difficult position which steel producers find themselves Bethlehem Steel Corp. would have closed out the third quarter with a deficit of $27,218,333 had it not been for a federal tax credit of $34,980,000 which raised the company's net income for the period to $7,761,667. In the case of the United States Steel Corp. if provision for federal income taxes had been made during the period on a uniform basis of accrual for the first nine months without credit for the previous over-accruals of taxes, its third quarter earnings would have been $7,800,000 or less than half the net of $16,774,202 reported for the second quarter. The corporation's actual net reported for the period was $11,624,420.

	Third Quarter 1945	Second Quarter 1945	Third Quarter 1944	Nine Months 1945	Nine Months 1944
U. S. Steel Corp.	$11,624,420	$16,774,202	$16,924,356	$43,777,793	$49,306,889
Bethlehem Steel Corp.	7,761,667	8,041,682	6,621,944	23,499,258	19,783,000
Republic Steel Corp.	1,617,675	3,271,703	2,195,526	7,973,927	6,470,000
American Rolling Mill Co.	1,460,795	2,071,925	916,350	5,408,223	3,357,000
Rustless Iron & Steel Corp.	227,430	638,381	369,975	1,314,726	1,394,000
Jones & Laughlin Steel Corp.	1,343,295	2,357,524	1,889,847	5,714,308	5,478,000
Continental Steel Corp.	138,567	208,672	120,522	499,131	453,000
	$24,173,849	$33,364,089	$29,038,520	$88,187,366	$86,240,889

U. S. Steel Earnings Cut Reflects Impact of War's End, Higher Cost

INCOME of the United States Steel Corp. for the third quarter of 1945, after all costs—including estimated federal taxes on income and an adjustment for over-accruals of income taxes in the first two quarters, but before dividends, amounted to $11,624,420, compared with $16,774,202 in the second quarter of 1945, Irving S. Olds, chairman, reported last week.

Reduced volume, cancellation of war orders, and changes in the character of sales, particularly since V-J Day, reduced current earnings substantially, under existing ceiling prices and higher costs. If provision for federal income taxes had been made during the third quarter on a uniform basis of accrual for the first nine months of 1945, without credit for such previous over-accruals of taxes the third quarter earnings would have been $7.8 million or less than half of the earnings reported for the second quarter of 1945, he said.

Income for the first nine months of 1945 was $43,777,793, or $5,529,096 less than the reported income for the first nine months of 1944.

Shipments of finished steel products in the quarter amounted to 4,262,750 net tons and for the first nine months were 14,387,709 net tons, compared with 15,864,466 net tons shipped in the same period of 1944. Production of steel ingots and castings in the third quarter of 1945 averaged 77 per cent of rated capacity.

Net current assets of the Corporation and its subsidiaries at Sept. 30, 1945, after deducting the current dividend declarations, were $628,425,474 compared with $586,631,746 at Sept. 30, 1944.

Total capital expenditures during the quarter for additions to and betterments of fixed assets, were approximately $9,100,000.

The average number of employees in the third quarter was 274,371, compared with 313,277 in the same quarter of 1944—a decrease of 38,906. Total payroll in the quarter was approximately $184,834,000, compared with $257,000 in the same quarter of 1944, a decrease of $35,423,000.

Unexpended balances of the corporation, as of Sept. 30, of $176 million compare with approximately $60 million year previously. Commenting on the sharp increase, Mr. Olds, at his press conference, said that much of this was going into needed rehabilitation and replacements, which could not be had during the war. However, he said the current program included some substantial new work, such as the corporation's $20 million cold reduced tin plate expansion at Pittsburgh, Gary and Birmingham, certain new blast furnaces and developments on the Pacific coast.

He said that the Steel corporation has no active program for the erection of a steel plant in the East. The possibilities of such a project have been under contemplation for years, but he indicated there was nothing new or imminent.

While steel inquiry was heavy and widely diversified, backlogs have shrunk from high wartime levels of around nine months at the rate of 100 per cent operations to about four months at present. Mr. Olds commented on large demands from the container, railroad, construc-

tion, automobile, household appliance and electrical equipment industries in particular, and in response to a question as to exports, said that while inquiry was active, bookings had shown little change from earlier in the year, averaging around 6 per cent of total sales. He said that home needs came first, except where otherwise dictated by government policy.

War cancellations have not been as numerous or disturbing as contemplated, Mr. Olds said. Cancellations reached their peak in September, but in the majority of instances affected work which had not been started. Further, the machinery set up to handle cancellations has exceeded expectations in its effectiveness.

Republic Steel Reports Net Cut

REPUBLIC Steel Corp., Cleveland, last week reported a consolidated net income for third quarter of $1,617,676, after all charges including adjustment of accruals for estimated federal income and excess profit taxes. Third quarter earnings compare with $2,195,526 for the corresponding quarter in 1944.

Earnings before federal income and excess profits taxes dropped from $13,-511,703 for the second quarter of 1945 to $1,292,676 for the third quarter.

The sharp decrease in the third quarter earnings is due to several factors. Among these were abrupt transition from war to peace production and the fact that under ceiling prices, frozen in April, 1941, many of the corporation's regular products are being sold at a loss. There was also a substantial reduction of sales with the termination of war contracts.

The marked drop in earnings in the third quarter emphasizes the fact price increases are imperative to compensate for increased production costs already brought about by past wage increases, the company states.

Inland Steel Reports Drop In Third Quarter Income

Inland Steel Co., Chicago, reports for third quarter net income of $2,016,017, which compares with $2,841,652 in the second quarter and with $2,499,491 in the corresponding quarter of 1944. Earnings for the first nine months were reported at $7,228,617 compared with $7,-976,999 in the like 1944 period.

E. L. Ryerson, chairman, said earnings for the period reflect the strike in August at the company's Indiana Harbor Works. Tonnage shipped showed a decrease of 12.5 per cent compared with the preceding quarter. Fourth quarter showing will be affected by the strike in the coal mines.

Bethlehem's Tax Credit Offsets Deficit for the Third Quarter

BETHLEHEM Steel Corp. reported net income of $7,761,667 for the third quarter of 1945 but if a federal tax credit of $34,980,000 had not been included the company would have had a deficit of $27,-218,333 for the period.

Net income of $7,761,667 for the third quarter compares with $8,041,682 in the preceding quarter, and with $6,621,-944 in the corresponding quarter of 1944. Net income for the first nine months was reported at $23,499,258 which compares with $19,788,325 in the like period of last year.

Reflecting war order cancellations and further progress in working off ship construction, unfilled orders of Bethlehem as of the end of the third quarter amounted to approximately $546 million, President E. G. Grace revealed. This compared with $995 million at the end of the preceding quarter and was the lowest since the second quarter of 1940, when the order backlog amounted to $289 million.

Orders on hand at the end of the last quarter were about equally divided between steel and ship work, the latter shrinking, while steel backlogs remained fairly steady.

Allowing approximately $8 million for the recently announced expansion program at Los Angeles, Mr. Grace said that the corporation's construction now stood at about $86 million. At the end of last quarter authorized expansion amounted to $78 million, against $80 million three months previously, he stated.

Last quarter improvement expenditures amounted to $12 million, but he looked for some acceleration as time went on, with quarterly expenditures possibly running as high as $15 million.

In discussing hourly work week, Mr. Grace pointed out that the average in the third quarter was 39.1 hours, against 44.8 in the preceding quarter and 44.8 in the third quarter of last year. In view of many recent labor demands for a 30 per cent increase to compensate for change from a 48-hour week to a 40-hour week, the average work week during the two war periods mentioned of 44.8 hours attracted special attention.

Mr. Grace said that many Bethlehem employees did work 48 hours and longer, but that despite every effort of the management they couldn't get the average any higher for those periods.

Average number of Bethlehem employees in the third quarter was 195,000, against 221,000 in the preceding quarter and 251,000 in the third period of 1944. Payroll in the third quarter of this year was $142 million, against $181 million in the preceding period and $203 million in the corresponding quarter a year ago. Average hourly earnings were $1.414, against $1.41 and $1.376.

Mr. Grace said that 81,000 Bethlehem men entered the armed services during the war and that the company up to this time had employed 27,000 war veterans, of whom 7700 were former employees.

American Rolling Mill Net Down from Second Quarter

Consolidated net earnings of The American Rolling Mill, Middletown, O., for the third quarter of 1945, were $1,460,795, Charles R. Hook, president, announced last week.

It compares with consolidated earnings for the like quarter in 1944 of $916,350, and with $2,071,925 in the second quarter of this year.

Mr. Hook stated that the company's consolidated net earnings for the first nine months of 1945 total $5,408,223.

Keystone Steel & Wire Net Cut in September Quarter

For the three months ended Sept. 30, the first quarter of the company's fiscal year, Keystone Steel & Wire Co. reports net profit of $285,139, compared with $306,451 for the same quarter of last year.

The slight decrease in earnings is mainly accounted for by the existing manpower shortage, unusual shutdown in July for necessary repairs to war-weary machinery and by falling off of orders for rope wire.

Rustless Iron & Steel's Third Quarter Income Off

Rustless Iron & Steel Corp., Baltimore, earned $227,430 during the third quarter of 1945 after all charges, Calvin Verity, president, reported last week. In comparison, he said that during the third quarter of 1944 Rustless earned $369,-975.

Cumulative earnings for the first nine months of 1945 totaled $1,314,726.

Jones & Laughlin Reports Third Quarter Income Cut

Jones & Laughlin Steel Corp., Pittsburgh, reports for third quarter consolidated net income, including subsidiaries, of $1,343,295, which compares with $2,357,524 in second quarter and with $1,889,847 in the third quarter of 1944. Net for the first nine months this year was $5,714,308 compared with $5,478,034 in the like period of last year.

Structural Fabricators Set To Go

Confidence in industry's ability to meet postwar construction challenge expressed by speakers at Structural Institute convention

MEMBERS of the American Institute of Steel Construction Inc., attending the twenty-third annual convention at French Lick, Ind., last week, reflected pride in the unique and tremendous war job they have just completed and confidence in their ability to meet the challenge of the great construction job that lies ahead.

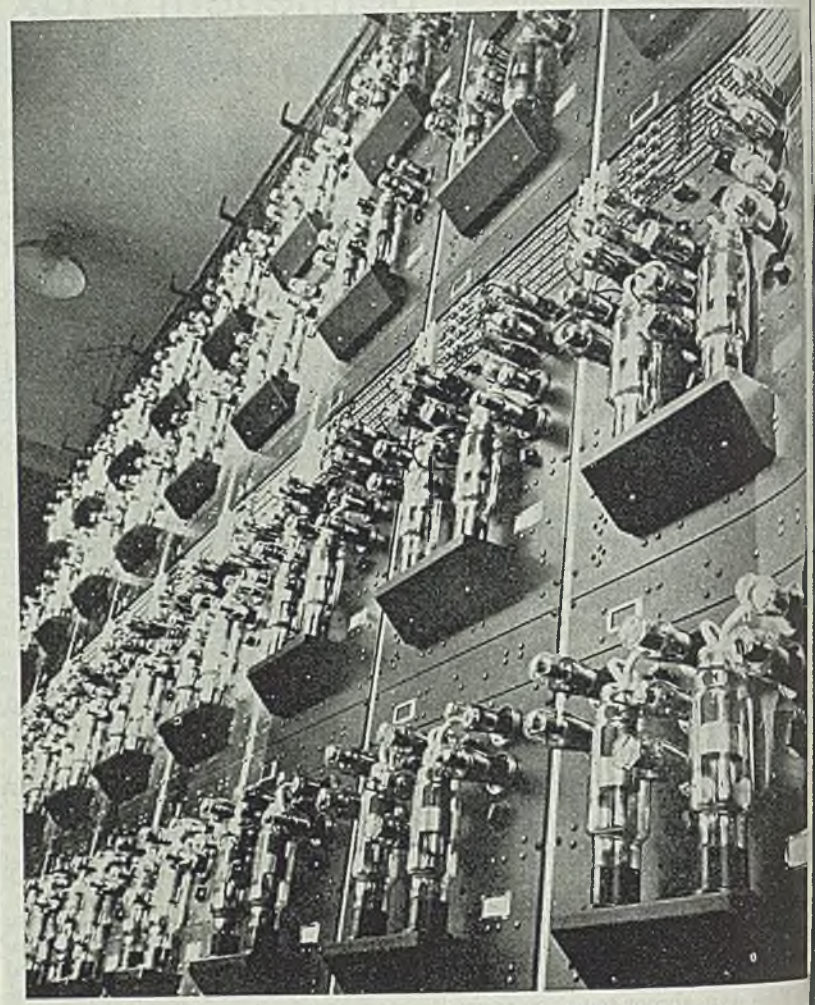
The late war imposed a double assignment upon the structural steel fabricating industry. First was the construction of hundreds of new plants for America's Arsenal of Democracy. Even before this work was completed the Army and Navy turned to the industry for thousands of landing craft, floating drydocks, floating power plants, Bailey bridges, radio towers, wind tunnels and other fabricated steel products.

Although the industry went beyond its former scope of operations in carrying out these war assignments it faces no serious reconversion problems. In the words of Paul Coddington, Lakeside Bridge & Steel Co., Milwaukee, president of the institute, the industry was ready to meet the challenge of its opportunities.

"New construction both public and private may be slow to get under way because of unavoidable problems ahead but our achievements in the next decade should exceed the past record of any previous decade," he said. "Advancement in the science and improvements in the practice of electric arc welding have given architects and engineers a new freedom in the design of structures and machinery.

"In fact," said Mr. Coddington, "we have barely entered the field of improved metals."

Commenting on the pent-up demand for steel construction, Robert T. Brooks, executive vice president of the institute, said that some economists believe that an annual rate of building construction somewhere between $15 and $18 billion can be achieved in the postwar years under favorable circumstances. These figures are exclusive of maintenance and major repair operations and it is the viewpoint of the structural steel fabricating industry that construction at no time in the history of the country has kept abreast of the actual demand for such building work and he said "it is our hope that both private and public demands will be so co-ordinated as to give reasonable assurance for a long prosperous era which can be economically maintained rather than a short term which cannot survive after the first pressing demands are satisfied."



THINKING MACHINE: Many mathematical puzzlers were solved for the United States during the war by the Massachusetts Institute of Technology's differential analyzer, a 100-ton calculating machine which contains 2000 electronic tubes, several thousand relays, 150 motors and 200 miles of wire. Picture shows one of the huge electronic tube panels. NEA photo

The report of T. H. Hendrix, director of statistics for the institute, contained estimates by a number of authorities of the dollar volume of construction expected in postwar years. Using the rates of fabricated structural steel bookings to construction volume from 1936 through 1940 and converting the most conservative estimates of volume into tonnage the institute arrives at annual bookings of 1,653,481 tons in 1946, 2,417,719 tons in 1947, 2,640,889 tons in 1948, 2,735,915 tons in 1949 and 2,693,300 tons in 1950. The average for the five-year period is 2,433,061 tons. These post estimates run close to actual booking some years in the twenties, alth bookings exceeded 3,000,000 tons nually in 1927, 1928 and 1929.

For the first seven months of government work accounted for per cent of structural steel book whereas at the peak of the war effor 1942 and 1943 the government took and 75.6 per cent respectively of total.

Kline Fulmer, architect and planner, New York, stressed the imp tance of strong community leadersh preparing for the evolution of "the of tomorrow." Developments in freight and passenger traffic are vancing so fast that few American are prepared to cope with it, he said.

E. L. Shaner, editor-in-chief STEEL, emphasized the degree to co-operation among nations and the elements within individual nati contributed to the winning of the The recent victory climaxed the gre

co-operative effort in the world's history, he said.

"Despite this proven efficiency of co-operation, there is danger that the people will forget how well it served them in war and will neglect it in the important years ahead," he said. "This would be a serious mistake in industry where co-operation of companies on an unprecedented scale contributed heavily to the nation's remarkable war production record.

"Continued effective co-operation throughout the postwar period is vital. Unless the units of industry continue to function as a team in the solution of many of the new problems confronting us we will fall far short of meeting the challenge of the times."

In an address on "Labor Relations" Albert E. Meder, attorney, Beaumont, Smith & Harris, Detroit, pointed to the need of reforms in the Department of Labor if its agencies are to win the confidence of employers. Its Conciliation division, he said, has fallen down on wage settlements because many of its conciliators have had prior labor union affiliation and because they employ childish methods of attempting to reach settlement. All too often, he declared, conciliators seek merely to chalk up another settlement without proper consideration of the issues involved and then sit back waiting for a pat on the back from their Washington bosses. The remedy, he believes, lies in removing the one-sidedness from arbitration in the department and in choosing conciliators with greater care.

Samuel B. Pettengill, ex-congressman from Indiana, told the convention that hates and unrest are flourishing because Americans are punch drunk after years of war strain and confused economic thinking. He said the country has been exposed to a brand of politics that is rapidly leading us back to a police state instead of developing the initiative of free enterprise.

"We have been sold the foreign ideology that the government can create wealth by taxation," he said. "Nothing could be further from the truth. American voters must be told just what free enterprise means to the country. It will take a powerful selling job and industry must gather its forces to perform this vital selling assignment."

Tool Engineers Plan Show in Cleveland in April

The American Society of Tool Engineers exposition will be held in Cleveland, Apr. 8 to 12, inclusive, directors of the society announced at the semi-annual meeting at Detroit last week. Aside from machines and tools, the show is planned to include all types of materials for fabrication, materials handling equipment, etc.

Small Business Favored in Sale Of Machine Tools and Equipment

All applications screened to give preference to smaller interests. Some large companies complain law places them at disadvantage. New SPB policy seen hastening sale of plants and equipment

DISPOSAL of government-owned machine tools and plants is being hastened appreciably under the new Surplus Property Board policy of permitting the Reconstruction Finance Corp. to offer them on the basis of advance notices from the owning agencies that they are to be declared surplus in the near future. This new policy saves delay, on the average, of four to six weeks which would be occasioned if it were necessary to wait for actual declaration of surplus.

First government-owned plant to be liquidated under this policy is the North American aircraft assembly plant at Kansas City, Kans. The equipment has been sold by the RFC and the plant itself, ex-equipment, has been leased by the Army Corps of Engineers to General Motors Corp. Also liquidated under this policy is the Studebaker aircraft engine plant at Chicago.

In accordance with the wording and spirit of the Surplus Property Act, small business is getting the preference in the sale of equipment in these plants. To insure this result, the RFC regional offices are working with the Smaller War Plants Corp.'s regional offices. All applications are screened and those from the small companies given preference. Where there is competition between small companies, the small company which had its application in first gets the preference.

In a number of cases "large" companies have complained that the law places them at a disadvantage. One large company located certain desired equipment in five government-owned plants and in each case the equipment was sold to small companies in preference. Another large company which applied for 22 pieces of equipment in the Studebaker Chicago plant was able to buy only two pieces, the others going to small interests.

Large companies have the advantage only at plants which they operated for the government; in such cases they have the first refusal under SPB regulations.

Other government-owned plants rapidly are being broken loose under preliminary notification from the owning agencies that they are slated to be declared surplus.

TRANSITION TOPICS

WAGES AND PRICES—Administration policy will be to encourage substantial increase in wages while holding the line on prices. Declaration seen increasing rather than decreasing industrial disputes delaying reconversion. Steel producers reject union demands. Labor-Management Conference seeks means to minimize strife. See pages 95, 96, 111.

EARNINGS—Third quarter reports by steel producers show decline in profits, reflecting cessation of demand for premium-price war products, costs of transition, and the lower rate of operations after V-J Day. See page 100.

GREAT BRITAIN—United Kingdom moves cautiously to relax wartime restrictions. Rebuilding foreign trade a major postwar task. Manpower shortage serious handicap. See page 108.

MESH WITHOUT WEAVING—With waning interest in strictly utilitarian values of a war period, comes renewed emphasis on amenities. High-styled beauty and glass-smooth surfaces in a choice of patterns are found in wire mesh now made by electrolytic deposition of virgin metal on a continuous basis. See page 126.

IMPROVED GALVANIZING—Meeting ever higher standards, wire zinc-coated by novel galvanizing machine is drawn to diameter corresponding to 95 per cent reduction of area, with speeds in some fine sizes of 2000 fpm. See page 136.

Applications for Licenses Under Seized Foreign Patents Increase

Four volumes of abstracts prepared by Alien Property Custodian; fifth in preparation. Nonexclusive, royalty-free licenses being granted to manufacturers. Trade associations helping government authorities separate wheat from chaff

END of the war against Germany and Japan has brought increased interest in seized patents held by the Alien Property Custodian. More applications for licenses are being received than at any time since the Office of Alien Property Custodian was established in the Office for Emergency Management in March, 1942. The custodian is authorized to issue licenses covering seized patents to American industry.

Applications are coming mainly from small business concerns and from veterans who are looking for products to manufacture in the postwar period. A substantial number of companies are looking over the vested patents to get ideas for improving their products. For instance, a calculating machine manufacturer just has obtained a license covering certain parts which represent an improvement over parts he had been putting in his machines.

The custodian has completed preparation of four volumes of patent abstracts. The books can be seen at the custodian's libraries in the National Press Building, Washington; 135 S. LaSalle Street, Chicago; 120 Broadway, New York; the Public Library at Los Angeles; and 1 Court Street, Boston. Or, the complete set of volumes may be purchased at $24 from the Alien Property Custodian, Chicago 3.

A fifth volume now is in preparation. This will contain abstracts of German and Japanese patent applications numbering 3086. On the basis of these applications the custodian has been granted 1792 patents, 933 have been dropped because of unpatentability and the others are still pending.

Realizing that a lot of its vested patents are worthless, the Alien Property Custodian has enlisted wide co-operation from competent groups to sort the good from the bad ones. It has approximately 100 such projects under way, mainly with groups organized by trade associations. All of the information possessed by the custodian in reference to its vested patents is available at the above offices, also at the regional offices of the Smaller War Plants Corp., and also at Chambers of Commerce in the principal cities.

The APC continues to grant nonexclusive royalty-free licenses, and it believes that this is the best type of arrangement under the circumstances, according to a statement by Howland Sergeant, chief of APC's Division of Patent Administration.

"If several competing firms each wish to obtain an exclusive license," says Mr. Sergeant, "the custodian would have no basis for determining which should be chosen. If he undertook to grant exclusive licenses to the highest bidder he would very likely find himself in the position of being forced to grant the monopoly privilege conferred by an exclusive license to a large firm simply because a small businessman or one about to start a new business could not afford as high a bid."

The APC, Mr. Sergeant explains, did offer in the early days to grant exclusive licenses for limited periods to applicants provided they proved such exclusivity to be necessary for proper exploitation of the invention. "Although this offer has been outstanding for three years, he says, no person yet has made a formal application on this basis," says Mr. Sergeant. "On being asked to supply supporting data, three applicants withdrew their applications for exclusive licenses, and accepted nonexclusive licenses.

"Another reason for the policy of nonexclusive licensing is that it would not be administratively feasible to negotiate reasonable royalty rates—the concept of 'reasonability' as applied to royalty rates is an uncertain one, not subject to precise definition."

Laws Require Revocability

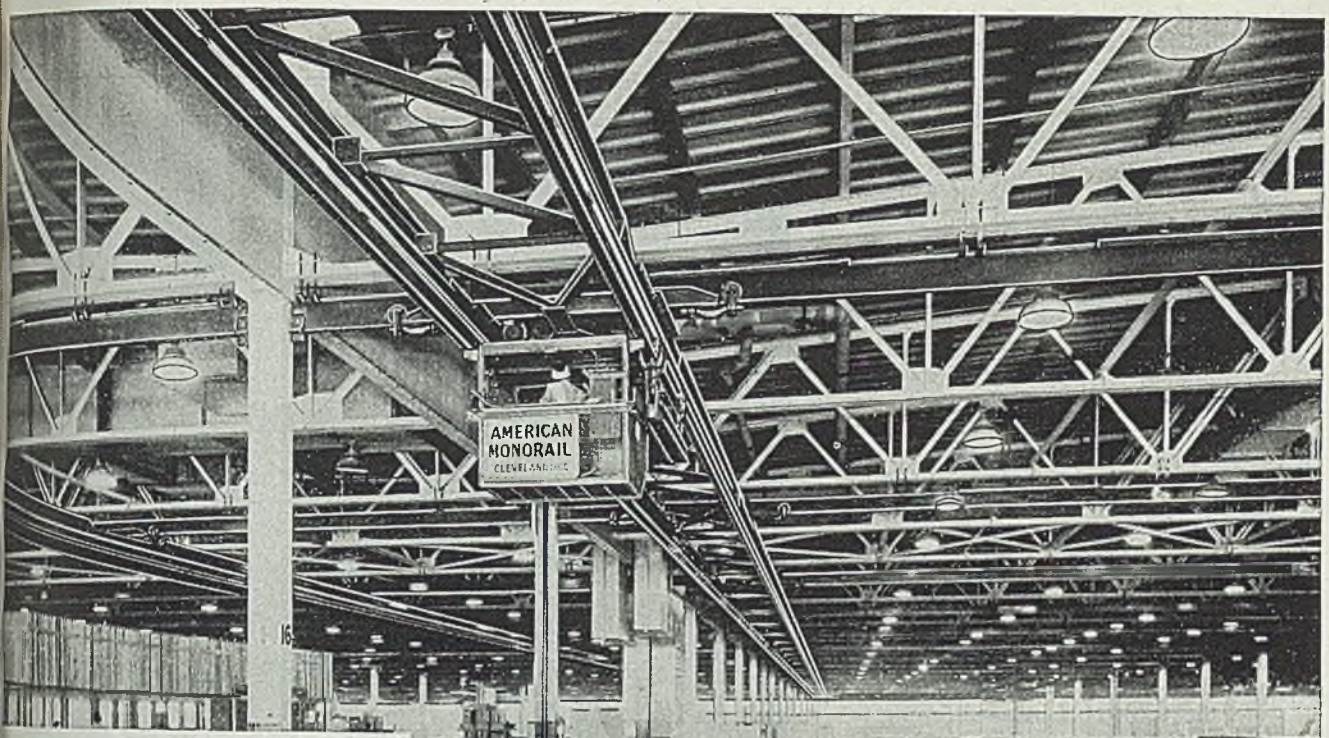
Licenses issued by the custodian under vested patents always have been revocable despite the custodian's belief that this is not a desirable practice.

"We are convinced that the grant of irrevocable licenses would foster greater use of the patents," says Mr. Sergeant, "but revocability appears to be necessary under present laws. Many businessmen are reluctant to place capital in the use and development of inventions for which their licenses may be revoked at administrative discretion."

The APC makes exceptions to its policy in cases where Americans have been the interests in or under vested patents. About 11,000 of its 45,000 patents are in this category. In such cases it is the APC's policy to refrain from making any licensing arrangements which would be counter to the rights of the interested Americans.

As indicative of the general interest in the patents held by the APC, Mr. Sergeant, $127,000 has been received for catalogs and abstracts. The public has paid about $44,000 for copies of catalogs, or copies of parts thereof listing patents under the 300 groups in the official Patent Office classification. It has paid $43,000 for abstracts of chemical patents prepared by some

DIRECTS LATIN-AMERICAN AFFAIRS: Spruille Braden, former United States ambassador to Argentina, and now assistant secretary of state in charge of American republic affairs looks over a map of South America with Secretary of State James F. Byrnes. NEA photo



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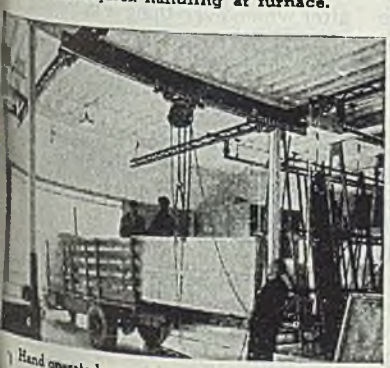

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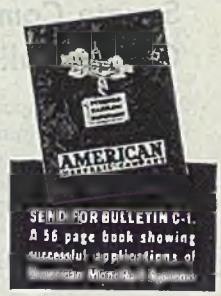

Consult with the American MonoRail engineer, he will gladly explain this extremely easy method of handling—the low cost of installation and operation.

THE AMERICAN MONORAIL COMPANY

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members of the Chicago section of the American Chemical Society and by some 50 members of the Science-Technology Group of the Special Libraries Association. Also, it has paid about $40,000 for abstracts of mechanical and electrical patents. These catalogs and abstracts continue on sale at the APC's Chicago office. Copies of the individual patents, with complete drawings and other disclosures, continue to be available only from the Commissioner of Patents, Washington, at 10 cents each.

The APC finds, says Mr. Sergeant, that patents covered by its licenses are utilized by small licensees more actively than by large licensees. Reports from licensees with less than $1 million assets each showed that about 50 per cent of the patents licensed to them were in production or were the subject of research work in 1944. Reports from larger firms showed about 25 per cent of the patents licensed to them were in production or were the subject of research work in 1944.

German Steel Shortage Minor Factor in Defeat

Shortage of steel was not a decisive factor in Germany's defeat, studies by a mission of experts indicate.

"Although steel production had been reduced to critical levels by the end of 1944 and continued to fall until the end of the war," says a report by a U. S. strategic bombing survey, "as it developed at the end of the war, certain German industries had inventories of steel that ranged from comfortable to generous."

German steel production dropped more from air raid alerts than from actual bomb damage, it was revealed. German steel production for all the Reich and occupied countries declined from 2,570,000 metric tons in July, 1944, to 1,000,000 metric tons in December. Of this loss about 490,000 metric tons were attributable to loss of territory.

Senate Committee Cool On Centralization Probe

Powerful opposition has crystallized in the Senate Committee on Interstate Commerce to a long-standing resolution by Sen. Pat McCarran (Dem., Nev.), re-introduced in the 79th Congress last January, calling for "an investigation of the effect upon interstate commerce of the centralization of heavy industry in the United States." A subcommittee headed by Sen. Brien McMahon (Dem., Conn.), appointed to consider this resolution, is expected to hold hearings on it soon. Current indications are that senators from industrial states will block any proposals to encourage, by freight rate adjustments or otherwise, the flight of established industry from their states.

BID FOR WORLD CAPITAL: Chicagoans have authorized the sending of a committee to London to carry the city's bid as a site for United Nations capital. Left to right, looking at airview of Northerly Island on Chicago's lakefront, the proposed site, are: Congressman William Rowan; Thomas B. Freeman of the Chamber of Commerce; Corporation Counsel Barnet Hodes; Leverett Lyon, Chamber of Commerce. NEA photo

New Home Heating Units Expected To Obsolete Conventional Types

Hard and soft coal industries move to meet competition of oil and gas. Radiant heating from the floors on increase. Fin type radiators to be installed in space customarily used by wa boards offered by several manufacturers

THE MILLIONS of new housing units to be built over the next few years will be equipped largely with improved heating and cooling units. These will operate with greater efficiency, more automatically and will be more versatile, in the opinion of C. W. Farrier, technical director, National Housing Agency.

Many of the new units have been perfected and, now that the plants are being reconverted from war work and materials again are becoming available, they will begin to be offered on the market in the near future.

This development is of particular importance to many companies in the metalworking field, says Mr. Farrier, because of the extent to which the new units will obsolete conventional types of home heating plants of the past.

"The home heating industry is on the move," Mr. Farrier told STEEL, "and a lot of the equipment which has had acceptance in the past has been outmoded."

One of the most important developments, Mr. Farrier points out, is that the hard coal industry to meet competi of liquid and gaseous fuels. The hard co industry has been seeking a setup which hard coal might be burned a matically.

"This goal now seems to have b attained," says Mr. Farrier, "and that is necessary is to load coal into a after which everything is automatic. Fr the bin the coal is conveyed into a cyl rical combustion chamber through wh it is fed by an Archimedean type of scr The combustion takes place in the enc the chamber and a fan in the rear the chamber pulls in the air and exhau the gases of combustion. It works j like you smoke a cigaret."

"The fan operates by thermostat control and is speeded up when mo heat is needed. The ashes are fed i a container which the householder emp ties after it has filled up. The gadge used in this unit are not new; it just the in-line combination of the g

gets that is new," Mr. Farrier said.

This new type of unit has been developed by Anthracite Industries Inc., Primos, Pa., which now has arrived at the stage where it is interesting a number of companies in its manufacture for sale to home heating contractors.

The same idea now is being worked out in the bituminous industry. Some of the soft coal producers see in such an automatic unit, suitable for burning soft coal, a means of increasing their sales for domestic heating purposes.

Much interest also attaches to the efforts of a number of manufacturers of heating plants for Army bombers during the war, Mr. Farrier believes. These operated on gasoline as fuel, with a high-speed fan for mixing the fuel with air and circulating the heated air throughout the bomber. They now are working on the problem of installing a high-speed fan which will operate quietly.

"If they solve the problem," said Mr. Farrier, "they will have a fine small-home heating unit about the size of a suitcase, operating with any gaseous or liquid fuel."

Prefabricated Walls Tested

Mr. Farrier also regards as important the development of a prefabricated wall to be installed between the kitchen and bathroom in small homes. Such units, built by a large manufacturer, have been installed in new homes at Kalamazoo, Mich., for purposes of observation prior to placing them in mass production.

The wall is a steel-frame piping assembly which is rolled into place. One side is provided with kitchen cabinets, a dishwashing machine, a sink, and work-tables. The other side has pipe connections for the bathtub, bowl and toilet, also sewage and water connections. The wall also contains the house heating unit and a water heating unit with tank.

Another important development, says Mr. Farrier, is fin-type radiation which has been put on the market by several manufacturers and which extends all around a room in lieu of the customary baseboards. This radiation is of cast iron, copper and steel, and heating is done by radiation and convection, using hot water.

"This type of radiation," says Mr. Farrier, "has been tried out in a number of homes and is particularly desirable because it saves the space under windows formerly occupied by the conventional radiators. In addition, it affords bodily comfort at a lower ambient temperature, thus permitting consumption of less fuel."

Another type of home heating system which should have wide adoption in the future, Mr. Farrier believes, is that obtained by circulating hot water through piping imbedded in concrete floors.

"This method has been tried out thoroughly, here and abroad, and has worked out well," he said. "Radiant heating from the floor results in a better distribution of heat throughout the room, eliminating stratification of the air in layers of different temperatures. The method admits of various modifications and combustion by installing piping in the walls and ceilings.

Another method considered by Mr. Farrier to hold some potentiality for the future is that of heating rooms by blowing heated air through continuous ducts built in the walls all through the house. Quite a few houses in Boston have been built in this manner and the ducts and heaters used were built in ordinary sheet metal shops.

Increasing interest in liquid media which may be sold as substitutes for water in home heating systems is reported by Mr. Farrier. This study, conducted by a New York research organization, has uncovered a medium which solidifies at 50 degrees below zero Fahr. and becomes gaseous at 850 degrees above zero. Production models now are being designed for the equipment to be used with this medium.

"The advantage with such a medium in place of water is that it permits one heating plant to serve for all purposes in a home," says Mr. Farrier. "Using heat transfer devices at various points, the one heating plant serves not only to heat the house, but roast meat in the oven, fry on top of the stove, heat water for bath and laundry purposes and, where desirable, furnish steam for the operation of a small electric generating plant. The system makes provision for salvaging heat generated in the operation of household refrigerators, and it permits such features as a companion system to permit refrigeration at any desired temperature level in different parts of the home—as ordinary refrigeration in the kitchen and a deep-freeze unit in the basement."

Use of solar heat to save fuel in home heating also may hold some potentialities for manufacturers in the future, Mr. Farrier believes. Some trouble has been encountered in shutting off the heating system rapidly enough to prevent overheating after the heat from the sun has begun to make itself felt.

"One party," says Mr. Farrier, "is making use of a thin steel floor; he uses the space beneath the floor as a plenum chamber and hopes to shut off the flow of hot air quickly enough to prevent overheating when solar heating becomes effective."

Guide Designed To Aid in Retention of Manufacturing

Department of Commerce has issued a guide to aid communities which engaged in war industrial activity to continue such industries into the postwar era.

The guide outlines a method by which community leaders can determine what industries can suitably and profitably be developed in their areas.

OPA Clarifies Ruling on Contractor Inventories

Invoicing requirements have been clarified by the Office of Price Administration for suppliers of war goods to the government whose contracts have been terminated and who elect to retain and sell the contractor inventories. Invoices containing designated information concerning these inventory sales have to be furnished only where there are no established ceiling prices for the products being sold and ceilings have to be determined by the formulas already provided. Where ceilings already exist for the products being sold, the seller is governed by the invoicing requirements of the regulation establishing the ceiling.

Metals Reserve Stockpiles of Tungsten, Copper, Lead and Zinc Revealed by Senator

SIZE of the United States government's stockpiles of four important industrial metals were revealed for the first time last week by Senator McCarran (D., Nev.,) in connection with a plan to assure postwar reserves of strategic materials.

As of Sept. 25, 1945, the Metals Reserve office of the Reconstruction Finance Corp. had following stocks of the four metals: 750 million pounds of tungsten, 677,000 tons of copper, 346,000 tons of primary refined lead, and 915,000 tons of zinc, including concentrates and grades A and B slab zinc.

"In addition," Senator McCarran said, "the Treasury Procurement Division, the War Department and the Navy Department have stocks of these metals. There is no way of determining just how much of these are held by the War and Navy departments.

The McCarran bill, S. 1522, has been referred to the Senate Military Affairs Committee for consideration. This bill would establish a policy whereby surplus materials and metals acquired during the war by various federal agencies would be stockpiled and held indefinitely by the government "to prevent destruction of American prices and American markets for those commodities which have been accumulated by agencies active during the war for the prosecution of the war."

A similar stockpiling bill was introduced in the House some months ago by Representative Andrew May, chairman of the House Military Affairs Committee.

Britain Moves Cautiously To Relax Wartime Restrictions; Coal Production Declining

Labor government's bright pre-election promises fading as it tackles difficult postwar reconstruction problems. Rebuilding export trade one of kingdom's major tasks. Scarcity of manpower serious handicap to industry. Demobilization painfully slow

By J. A. HORTON
British Correspondent, STEEL

BRITISH iron and steel producers are facing up to the new situation created by the cessation of activities on the fighting fronts. There is no denying the war with Japan ended sooner than was expected and industry was not prepared for the situation that developed so quickly. Unlike America, which has already dispensed with many of the restrictions that surrounded her iron and steel trade, Britain is moving slowly and cautiously. Quite naturally, memories of the period immediately following the 1914-18 war with its lack of organization and widespread unemployment influenced the minds of those responsible for straightening out the present tangle. A further complication, and one perhaps least expected, is the election to power of a labor government, many members of which have had little experience in the management of the country and certainly none as far as tackling the great tasks which now lie ahead. Election propaganda painted a glowing picture of the future if the reins of office should be transferred to labor. Already the colors are beginning to fade in the hard light of reality.

The new minister of fuel has appealed to mine owners and workers to increase coal production this winter but so far it has continued to decline, and this is a bad augury for the iron and steel industry. Nevertheless, it may be too early yet to judge the situation fairly since many working days have been lost for holidays, particularly in August and September. This accounts obviously for the drop in production of iron and steel in August. The weekly average production of pig iron in August was 125,000 tons, equal to an annual rate of 6,512,000 tons compared with 134,800 tons, equal to 7,010,000 tons, in July. The weekly output of steel in August averaged 186,100 tons, or an annual rate of 9,676,000 tons, compared with 213,300 tons, equal to 11,118,000 tons, in July.

Publication of steel ingot production figures, resumed after a complete blackout of statistics during the war, confirms not only the progress of the industry, but the remarkable part it has played in supplying the needs of the war machine. Output in the four peacetime years from 1935 to 1938 showed an average of 11,257,000 tons per year which at that time was regarded as substantial for the size of the country. In the war years they were exceeded as follows: 1940, 12,975,000 tons; 1941, 12,312,000 tons; 1942, 12,942,000 tons; 1943, 13,031,000 tons; 1944, 12,142,000 tons; and 1945 (based on the first half returns) 11,970,000 tons. Incidentally they show that the peak was reached just before the Allied invasion of Europe. Since then the needs have gradually declined. This achievement was done in the face of tremendous difficulty, including at one stage severe delay in transport and production because of air raids; further there was the fact that imported ores were not available, neither was the semifinished steel from Belgium, Germany and France which before the war reached a very high total each year. To offset these losses many thousands of tons of steel, chiefly billets and sheet bars, were brought from America to keep the rerollers in full production.

Flow of Trade Reversed

The flow of imports moved in reverse ratio to that of exports. Imports in 1935 to 1938 averaged 1,244,000 tons; they rose to 3,356,000 tons in 1940 and to 3,658,000 tons in 1941, further large consignments from America brought the total available in 1942 (including home production) to 15,349,000 tons and in 1943 to 15,804,000 tons. Against this is the figure of exports in 1943 which was only 122,000 tons, whereas in the four years prior to 1938 they averaged 2,438,000 tons, fell to 1,286,000 tons in 1940 and much lower levels during the war.

The need for export has been stressed over and over again in speeches by politicians and industrialists since the end of the war. Recently Sir Stafford Cripps, president of the board of trade, referring to the trade talks in Washington mentioned the extreme urgency of "our being able to replace the benefits we have obtained from lend-lease by imports which are to be exchanged for exports from Britain. It is not merely a question of getting sales wherever you can, but securing them in the best markets that will bring us hard currency with which we can buy the imports we need. We have to exercise super-salesmanship of our goods, especially in the great export markets of the world."

SIR STAFFORD CRIPPS

According to the records just published for the first half year some recovery in this direction has already been made. Total exports were 156,981 tons as against 92,504 in the corresponding period of 1944. During the first half of 1945 imports totaled 221,277 tons against 971,160 tons in 1944. Of the imports, ferroalloys constituted the largest item at 19,033 tons, and tin plate came second with 5725. Tin plate exports were 5727 tons in the first half of 1945 against 5246 tons in the corresponding period of 1944. It was of course inevitable that the main source of supply for iron and steel was the United States. In the first half of 1944 she sent to Britain 822,102 tons, the two next largest sources being British India 87,737 tons and Canada 60,563 tons; in 1945

contribution from the U. S. dropped to 113,075 tons; British India sent 81,-193, and Canada 26,693.

Now that the imports from America have ceased, contracts have been placed for semifinished steel with the dominions of Canada and Australia, and re-rollers are hoping that deliveries of this material will soon be received as the position is becoming difficult. Bigger tonnages of Scandinavian and North African ores, with which British smelters have had to do without during the war years, are now reaching the country. What is needed perhaps more than anything is a larger supply of fuel for coke ovens.

The scarcity of manpower overshadows British industry as a whole. Demobilization is painfully slow and complaints are heard on all sides of the difficulty of expanding production. In the foundries making light castings there is a dearth of skilled molders which is a serious handicap to producers anxious to meet the huge potential demand for castings needed in connection with the building trade. Britain has started a housing drive which is likely to reach huge proportions during the next few years. The civilian market also has been starved for domestic goods such as stoves, grates, baths and other articles in common use, and distributors are clamoring for supplies.

Licenses Still Required

With regard to exports, although certain restrictions have been relaxed, licenses still have to be obtained for many goods, and there is a great difficulty in obtaining shipping facilities owing to the many calls on shipping tonnage for the armies of occupation. A fair volume of overseas orders has been distributed through the British Steel Export association but the total tonnage involved is small in comparison with the huge actual and potential demand. It seems likely that some limitation may be put on home sales in order to release the maximum tonnage for export.

In Belgium a program has been drawn up to produce 75,000 tons of steel monthly and it is believed that this will soon be reached. Swedish ore has already begun to arrive in the country. Negotiations have taken place for iron and steel to be sent to Holland, including 15,000 metric tons of rolled steel and 4000 tons of metal manufactures monthly. Whereas pig iron production in Belgium was only 5230 tons in September, 1944, it rose to 54,500 tons in June, 1945; during the same period raw steel rose from 810 tons to 51,870 tons, steel castings from 610 to 2120, and rolled steel from 2410 to 50,300 tons. In Belgium 13 blast furnaces and eight open-hearth steel furnaces are working. Belgium obtains iron from France in exchange for furnace coke.

France is also increasing her production. During July output of pig iron was 101,000 metric tons (20 per cent of the 1938 monthly average); raw steel 177,000 tons (23 per cent); and rolled steel 92,000 tons (30 per cent). Corresponding figures for June were 97,000, 126,000 and 8,000 tons, respectively.

The stoppage of imports to Germany has affected the Swedish trade and in the first half of 1945 she exported only 35,000 tons of iron and steel as compared with 182,800 tons in 1939. Home consumption which was heavy during the war years declined in the first half partly owing to a strike in the engineering industry.

Five furnaces are in blast in Luxembourg, and the producers are hoping to reach an output of 45,000 tons of steel monthly.

War's Impact on Civilian Consumption Reported

Yardstick has been applied for measuring the relative impact of the war on civilian consumption in the United States, United Kingdom and Canada, the Combined Production and Resources Board announced last week.

It shows that while in Britain per capita purchases of civilian goods and services fell between 15 and 20 per cent from the 1938 level, similar consumption in the U. S. and Canada increased 10 to 15 per cent during the war years.

The study shows that the war's impact on consumption in the United States and Canada came later and its effects on consumption were both more gradual and less severe than was the case in Britain.

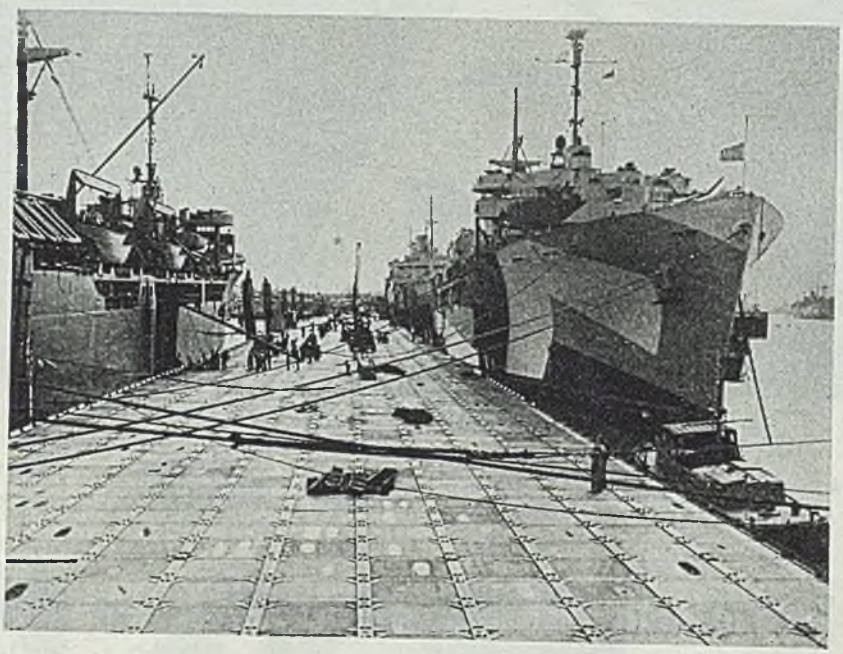
The war effort absorbed a major fraction of national resources first in the U. K., nearly a year later in Canada, and a year and half later in the United States.

The joint report brings out the fact that in 1943 and 1944 war product represented something like half the value of total gross national product both for the U. K. and Canada. The proportion was about 40 per cent in the United States. With regard to the U. S., however, the war production rate and consequent full impact on civilian production did not reach its height until the latter months of 1944 and the early part of 1945.

By June of 1944, Britain had drawn 55 per cent of its total labor force into the armed forces or into war production. The corresponding figure applying to Canada and the United States was 40 per cent. This higher concentration in Britain had direct effect on the production of civilian goods.

In such a prewar year as 1938, the joint report lists civilian goods per capita expenditures at £87.9 in Britain, $508 in the U. S. and $336 in Canada.

By 1944 this had changed so that the average per capita expenditure in Britain was £73.9; U.S. $589; Canada $388. Percentagewise, this is a drop of 16 per cent in Britain and a rise of 16 per cent in both U. S. and Canada.



PONTOON PIER: Another story that now can be told is how the Seabees built this pontoon pier at Le Havre, France, to permit Allied ships to unload supplies for the fighting forces after the Germans had destroyed the permanent docking facilities. The 1768-foot pier was constructed by the 928th Construction Battalion, using many pontoons salvaged from barges wrecked on Normandy beaches on D-Day. International News photo

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

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By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Union flatly rejects General Motors plan to "produce more and have more." Statistics indicate fallacy in 52 hours' pay for 40 hours' work; average work-week was well under 48 hours. Automotive strike votes expensive

DETROIT

THE FIRST and only concrete suggestion outlining an economically sound method of maintaining the take-home pay of automobile labor without increasing prices was proposed by the management of General Motors and presented in detail in STEEL for Oct. 29, p. 70. Subsequently the gist of the plan was summarized in newspaper advertisements by GM throughout the country. Briefly, what it involves is raising base wages 5-8 per cent and lengthening the work week to 45 hours, with premium pay only for hours in excess of this.

The proposal, as was expected by its originators, was rejected flatly by union officials and by tub-thumping congressmen who did not even spend the time to study it carefully. Walter Reuther of the UAW-CIO, for example, brands it as a "conspiracy to slam the door of job opportunity in the face of millions of returning servicemen." This is utterly preposterous, for as explained by GM, it makes no difference in the total number employed whether they work 40 hours or 45 hours or 48 hours. The important difference is that a method has been evolved for maintaining the high level of wartime take-home pay and at the same time realizing a 12½ per cent improvement in productivity over present levels. This has nothing to do with closing the gates against servicemen. In fact, it is a method of providing for returning servicemen the high rates of pay which their deferred and 4-F brethren earned while they themselves sweated out days and nights of combat at $50 per month.

Solicitousness Questioned

Furthermore, Mr. Reuther is no one to become suddenly solicitous over returning servicemen, when his union has been going all-out to prevent veterans who have never worked previously from enjoying seniority which might displace a union employee hired during the war.

As a matter of fact a suit has been filed in federal court here against the UAW-CIO's position on veterans, by the Carboloy Co. Inc. According to the Selective Service Act, a company is compelled to re-employ a returned veteran, while the unions contend the eligibility of a veteran is determined by his seniority status. The issue involved in the test case on which suit has been filed is that preference was given a returned veteran over a woman employee. Both had been hired originally, for similar work, in January, 1943, the woman one day earlier than the man. Subsequently the man left for the service and upon his discharge last December was re-employed by Carboloy. Later, when contract cancellations made layoffs necessary, the woman was laid off and the man retained, in line with Selective Service Act interpretations. Whereupon the union notified the company the woman had been dismissed "illegally", and the company was liable for back pay to her.

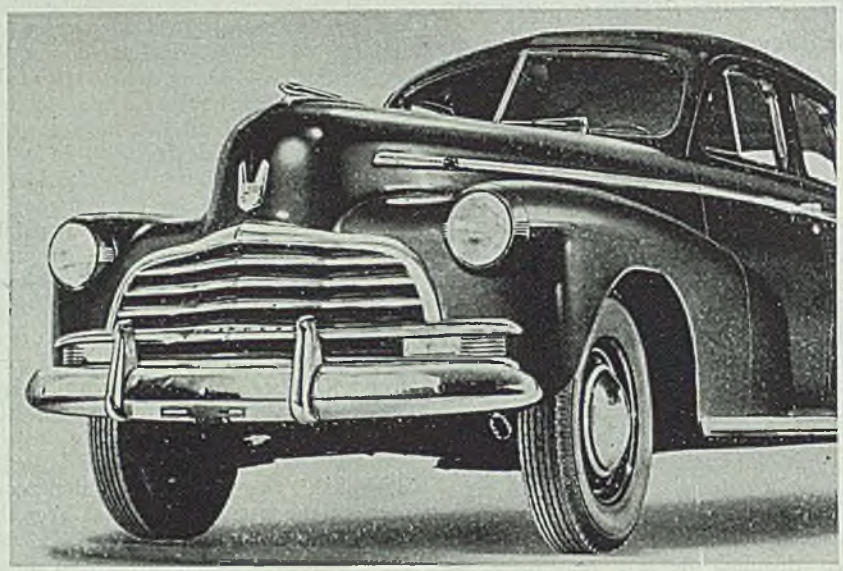
Similar difficulties have been experienced by scores of manufacturers, and a court interpretation of the rulings may set a pattern to avoid future argument on this score.

Getting back to the current wage-price dilemma in the automotive industry, there is another point which should be emphasized. It is the contention of the UAW-CIO that take-home pay during the war has been on the basis of a 48-hour week, with premium pay for 8 hours making the equivalent of 52 hours' work. This is not the truth, as figures from the Bureau of Labor Statistics prove. Early this year, the average work week for all manufacturing industry was around 44 hours, for the automotive industry 42.4 hours, for the steel industry 45 hours, etc. Thus in the automotive industry take-home pay was the equivalent of 43.6 hours per week, not 52 hours. On the basis of a reduction to a 40-hour week, the loss is only 8.3 per cent, not 30 per cent as unions claim. Only a few key plants, facing a critical demand for their product, showed anything like a 48-hour average work week.

And in this connection, it might further be observed, that even where work schedules were on the basis of six days a week, with premium pay for the sixth day, absenteeism ran so high on the sixth day production often was virtually disrupted. This indicates very slight concern on the part of employees over the dire need for premium pay. As a matter of fact working people have about come to the conclusion, sensible or not, they are not going to work on Saturdays and Sundays, whatever the pay is.

Someone may argue . . . . well, if that is the case, then how is Mr. Wilson of General Motors going to move up to a 45-hour week. The answer is simple, of course—merely go to five 9-hour shifts per week instead of five 8-hour

START TECHNICAL CENTER: Ground-breaking ceremonies Oct. 23 marked the official start of construction of the new General Motors Technical Center to be built on a 350-acre tract just north of Detroit. Taking part in the ceremonies were, left to right: C. F. Kettering, vice president in charge of GM Research Laboratories Division; William J. Davidson, directing engineer at the Center; and C. L. McCuen, vice president in charge of GM central office engineering staff. In the background is 18-cubic yard earth mover to be used in excavating a quantity of earth equivalent to 1½ times the volume of the 15-story General Motors building in Detroit. In the excavation will be a 23-acre lake, while the fill will be used to build up a surrounding terrace on which buildings will be erected



NEW CHEVROLET: Minor modifications in front-end styling accentuates massiveness and lowness of the 1946 Chevrolet. Radiator grille comprises chrome-plated horizontal bars, framed within a low-arched heavy molding. Cars are now on dealers' floors

periods. At this point the plant pessimists will say—that just gives the boys another hour to kill by fiddling around doing nothing, and they are already getting away with murder on 8-hour shifts.

While in a nonsensical vein, consider for a moment the strike votes now being conducted in plants of the big three automobile companies, two already finished in General Motors and Chrysler and a third coming up this week at Ford. Carried out under terms of the Smith-Connally Act by the NLRB, these votes are costing the public huge sums of money. To determine what? Exactly nothing. Even the working of the ballots is ludicrous. The worker is asked to vote "yes" or "no" on whether he favors "interrupting war production in wartime to settle this dispute." Result of the vote is absolutely meaningless, in the opinion of both industry and unions. If the vote were 100 per cent against a strike, still no legal reason would exist why a strike could not be called the next day, and if the vote were 100 per cent in favor of a strike, there might never be an interruption to production, if union strategists decided to hold off, as they are in the present instances.

Extent of participation in the strike votes is shown by figures on the GM silliness. A total of 83,289 votes were cast, only 23.8 per cent of the 350,000 supposedly eligible to vote. Affirmatives were 70,853, negatives 12,436. Thus, if the figures are accurate, the strike was supported by 20.2 per cent of GM employees eligible to vote. Obviously the great proportion of eligible voters either recognized the ridiculous aspects of the affair and stayed away from the polling places, or were afraid of intimidation if they might have been discovered casting negatives votes.

About the only people pleased over the affair were 200 extra NLRB assistants brought in to handle the voting and its tabulation. They received $30 each, or $10 per day for two days of work and one day of instruction.

Back of all the gnashing of teeth, negotiations, claims and counterclaims, not to mention economic briefs, statements, press releases and memoranda, which in the General Motors case now measure about 3 inches thick, there is a sneaking suspicion that what the government, labor and price experts would like to see is for one unit of the automotive industry to step out boldly and make the UAW-CIO an offer which would approach what it is demanding, then they imagine competitive pressure on the balance of the industry would force it to go along on the same basis. This would immediately relieve the government from enunciating any clear-cut wage-price policy which might not be politically expedient, and would set the pattern for all industries to follow. Where individual industries might find it impossible to follow the general pattern, they would have to fight it out with their unions, or else be allowed special consideration on price relief.

This may be a politically smart policy or lack of policy, but the current impasse is too widespread and all-encompassing for it to be successful. Studebaker, for example, already has made peace with its labor by offer of a 12-cent hourly increase right across the board, with the promise of meeting anything more Detroit might offer, but there was no move to climb on the Studebaker bandwagon. Hence, even if, as some observers suspect, Henry Ford II should break out suddenly with his "advanced ideas" on wages, there will be no industry-wide scramble to match it. We are not yet operating under a collectivist system, and each company's wage problems are different from those of his neighbor.

Last Saturday, as you may know by now, was C-Day, which is the term Chevrolet publicists cooked up for identifying the date their 1946 models would be available for inspection at dealers. Something over 5000 four-door sedans have been completed, or enough to place one car in most showrooms.

Careful study of pictures and accompanying descriptive material does not reveal much that is new and different in Chevrolet appearance or construction. The division may have decided hungry car buyers are not so much concerned over new ideas in design as they are in buying some cars, therefore the principal emphasis was on getting models on assembly lines. The cars will be offered eventually in three lines, all on 116-inch wheelbase, with six color schemes for every model. First units are in the lowest-priced Stylemaster bracket. Minor revisions have been made in the radiator grille and front bumper. Refinements have been made in engine design, including lubrication and cooling systems. All special features of 1942 models appear to have been continued.

Profits on Exchange of Leases

A recent announcement which was forwarded to Graham-Paige stockholders discloses a rather interesting deal consummated for occupancy of the Willow Run bomber plant by the Kaiser-Frazer Corp. Under agreement with K-F, Graham has the right to use up to one-third of the facilities and is obligated for one-third the operating expense, including rental. The latter is $500,000 for the first year, one third of which figures to $166,667. Meanwhile, Graham has leased its present manufacturing plant on West Warren to the RFC for a period of two years, with renewal options, for annual rental of $500,000 which, after payment of taxes and fixed charges, will leave net proceeds of about $375,000. Thus, in its first year at Willow Run, scheduled to start last week, Graham should realize $208,333 on the exchange of leases and have manufacturing facilities far beyond those of the old plant.

The announcement also indicated production of the Frazer automobile would be well under way within a few months—the miracle of the century if it is accomplished. No mention is made of what units will occupy the other two-thirds of Willow Run, although presumably Kaiser will use a part of it. Possibly one-third will be subleased, since recent news dispatches have stated officials of the Electric Auto-Lite have visited Willow Run with a view to consolidating a number of their small, branch plant operations there.

INDUSTRIES SERVED WITH HORSE HEAD PRODUCTS

THE PRESENT

- Chemical Activation and Heat Dispersion in **RUBBER**
- Durability and Color in **PAINT**
- Deep Drawing in **BRASS**
- Fire Retardance in **TEXTILES**
- Formability and Corrosion Resistance in **STAMPINGS**
- Forming Properties in **METAL POWDERS**
- Non-Toxic, Protective, and Mildly Astringent Qualities in **PHARMACEUTICALS**
- Fluorescence and Phosphorescence in **PLASTICS**
- Resistance to Chemical Change and Temperature Variation in **CERAMICS**
- Rust Prevention in **GALVANIZING**
- High Speed Production, Strength and Accuracy in **DIE CASTINGS**
- Opacity, Whiteness and Brightness in **PAPER**
- Processing and Wearing Qualities in **LINOLEUM**
- Application and Color Permanence in **PRINTING INKS**
- Covering Power and Adhesion in **COSMETICS**

THE FUTURE

?

To our customers—

A MESSAGE OF APPRECIATION

The wartime demands for zinc in both metal and pigment form were without precedent in the history of the zinc industry. At no time during the war, however, did any military use lack the zinc it required. We are proud of the part which our organization played in the zinc industry's fulfillment of this tremendous wartime program.

Without the splendid cooperation of our customers, however, this record of accomplishment would not have been possible. For this help we are very grateful. With the free exchange of information which resulted from this cooperation we were able to ship a large list of zinc products where and when they were needed most. At the same time, we were able to fulfill all contract obligations.

We earnestly solicit a continuance of this free exchange of information on our mutual problems in the years ahead. The war has taught industry that this type of cooperation can offer many advantages. The better we understand our customers' problems—and they ours—the better we can serve them with materials which will perform most efficiently in their ultimate uses (see panel at the left).

The New Jersey Zinc Company looks forward to the coming years with confidence that continued cooperation between our customers and ourselves in the many fields we serve, or in which we may be called upon to serve, will enable us to operate to the mutual advantage of all concerned.

THE NEW JERSEY ZINC COMPANY

160 Front St., New York 7, N. Y.

HORSE HEAD PRODUCTS
New Jersey Zinc

MEN of INDUSTRY

M. L. LANGEL

H. J. THOMPSON

W. H. HENRY

M. L. Langel, head of the export department, Brush Division, Osborn Mfg. Co., Cleveland, recently returned from an extensive trip to business and industrial sections of Mexico. Mr. Langel also is district manager of the company's New York office.

—o—

Frank Davis, formerly tool supervisor at the General Motor Corp.'s Allison engine plant in Indianapolis, has joined Samuel Harris & Co., Chicago, where he will be in charge of its new Carboloy Cutting Tool Division.

—o—

Harry C. Dever has returned following three years' service with the armed forces, to the Copperweld Steel Co., Glassport, Pa. He will be in charge of the Atlanta office which covers Georgia, Florida, South Carolina and North Carolina.

—o—

J. W. Forbes has been named sales manager, Cleveland Tungsten Inc., Cleveland. Mr. Forbes formerly was associated with Western Electric Co., New York, and Wickwire Spencer Steel Co., New York.

—o—

Robert A. Parks, formerly district manager of the company's Washington office, has been named general sales manager, Jessop Steel Co., Washington, Pa.

—o—

R. C. Anderson, formerly supervisor, Republic Steel Corp., South Chicago, Ill., has been appointed assistant to the president, Midland Steel & Equipment Co., Chicago.

—o—

R. C. Cosgrove, vice president and general manager, Manufacturing Division, Crosley Corp., Cincinnati, recently purchased by Aviation Corp., has been named vice president in charge of sales, Aviation Corp.

—o—

F. A. Guba has been appointed eastern manager of sales, and **F. D. Archer**, midwestern sales manager, Welded Alloy Tube Division, Kenilworth, N. J., Carpenter Steel Co. Mr. Guba will have the Kenilworth office as his headquarters, and Mr. Archer, the company's Chicago office.

—o—

Harold J. Thompson has been named district manager at Gary, Ind., Reliance Electric & Engineering Co., Cleveland, where he will serve the industries of the Calumet and northern Indiana districts.

—o—

Donald R. Edge has assumed the duties of assistant rural lines sales manager, Graybar Electric Co. Inc., New York, and he will make his headquarters in Chicago. **Edwin Black** recently has returned from service with the Army Air Forces and has been named assistant to **E. W. Cashman**, vice president.

—o—

Associated Industries of Massachusetts, at its annual meeting, elected the following officers: President, **Harold J. Walter**, treasurer, Uxbridge Worsted Co.; chairman of the board, **Ira Mosher**, president, Russell Harrington Cutlery Co.; vice presidents, **William H. Collins**, general manager of Boston district, Bethlehem Steel Co., **Joseph P. Spang Jr.**, Gillette Safety Razor Co., **C. Lawrence Muench**, president, Hood Rubber Co., and **Richard N. Greenwood**, president, Heywood-Wakefield Co. **Samuel T. MacQuarrie**, director of public relations, American Optical Co., was elected treasurer, and **Roy F. Williams**, executive vice president.

—o—

G. J. Sussman has been promoted to West Coast district traffic manager, Bethlehem Steel Co., and will have headquarters in San Francisco. **Frank Hubert Jr.** has been made traffic representative at Los Angeles.

—o—

Frank Kilcline, Luntz Iron & Steel Co., Kokomo, Ind., has been elected president of the Indiana chapter of the Institute of Scrap Iron & Steel Inc., to succeed **Allison E. Falender**, Falender Iron & Metal Corp., Indianapolis. Mr. Kilcline also becomes a member of the board of directors of the national institute. Other officers of the chapter include: Vice president, Maurice Epstein, Epstein Bros., Indianapolis; secretary, **Harry Alpert**, J. Solotken & Co. Inc., Indianapolis; and treasurer, Leo Cohn, Leo Cohn & Co., Indianapolis.

—o—

W. H. Henry, formerly manager of the Motor Division, General Electric Co., Schenectady, N. Y., has been appointed assistant manager of the Industrial Division, and will be in charge of the motor business, in a recent reorganization of the company's apparatus department. Division managers appointed are **A. W. Bartling**, fractional-hp motor division; **Elliott Harrington**, induction motor division; **J. T. Farrell**, direct current motor division; **P. A. McTerney**, synchronous, large direct current and generator division. **E. A. Green** returns to the motor organization as general assistant to Mr. Henry. **D. E. Moorhead**, who recently returned from the armed forces, is appointed assistant to Mr. Henry to give attention to motor sales activities. **O. F. Vea** continues in charge of motor marketing and promotion, and **A. A. Merrill** is in charge of forecasting, order budgets and statistics for all motor lines.

—o—

Charles H. Morse III has been elected vice president, Fairbanks-Morse & Co., Chicago. He will be in charge of research, traffic, patents, the company's Western Pump Division and the Indiana Utilities Co., a subsidiary.

—o—

George T. Motock, metallurgical engineer, Metalloy Corp., Minneapolis, has returned from a three months' trip to Europe where he served as scientific consultant investigating technical developments in German industry for the War Department.

—o—

Carl E. Bartz has been named manager of the newly opened warehouse at Syracuse, N. Y., Edgar T. Ward's Sons

Co., Pittsburgh. He will also represent Columbia Steel & Shafting Co., Pittsburgh, and Summerill Tubing Co., Bridgeport, Pa., affiliated companies.

—o—

C. H. Butts has been named operating vice president, Sharon Steel Corp., Sharon, Pa. For the past 11 years, Mr. Butts has served as assistant to the president, vice president in charge of research and development and since 1936, has been president, Niles Rolling Mill, a Sharon subsidiary.

—o—

A. R. Fisher, Bound Brook, N. J., vice president, Johns-Manville Products Corp., has been elected vice president, Johns-Manville Corp., New York, in charge of mining and manufacturing activities in the United States and Canada, succeeding S. A. Williams.

—o—

M. L. Frey, formerly chief metallurgist, Aircraft Division, Packard Motor Car Co., Detroit, and prior to that, service metallurgist with Republic Steel Corp., has been appointed assistant to the general works manager, in charge of metallurgy, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee.

—o—

Arthur Purmort, former member of the sales department, who served during the war in the production and engineering departments, has been moved to St. Louis as district sales manager, supervising territories in Missouri, Indiana, central Ohio, southern Illinois and Kentucky for the Hewitt Rubber Corp., Buffalo. William E. McCue, who during the war was in the purchasing department and became traffic manager in February, 1945, has joined the sales department and is covering Cleveland and the northern Ohio territory. Robert Crane, for several years in the Buffalo sales office, has been shifted to the Indiana territory, and will make his headquarters in Indianapolis.

—o—

Dr. Samuel L. Hoyt, technical adviser, Battelle Memorial Institute, Columbus, O., delivered the Adams lecture at the annual meeting of the American Welding Society, held recently in New York.

—o—

G. N. Emmanuel has joined Babcock & Wilcox Tube Co. at Beaver Falls, Pa., as research metallurgist.

—o—

Fred W. Ramsey, former regional director, War Production Board at Cleveland, has been appointed deputy central field commissioner for the Africa-Middle East-Persian Gulf command areas to aid the disposal of overseas war surplus and residue.

—o—

Franz Herbert has been appointed machine tool and small tool sales representative to serve northern Indiana and western Michigan, for Barber-Colman Co., Rockford, Ill. He will have headquarters in Kalamazoo, Mich.

—o—

John Thompson, for the past 20 years chief engineer, Pipe Machinery Co., Cleveland, has established residence in Phoenix, Ariz., where he will be sales representative for gages and tools manufactured by that company.

—o—

Charles H. Peirce has been named sales manager, Edward Blake Co., Newton Center, Mass. Mr. Peirce was associated nine years with Taylor Instrument Cos., Rochester, N. Y.

—o—

J. J. McCormick recently has been named manager, products development laboratory, and Dr. Edward G. Bobalek, manager, resin research department, Arco Co., Cleveland, paint manufacturer.

—o—

Walter F. Skillin has been elected president and Nels B. Lagerlof, assistant treasurer and assistant secretary, Union Mfg. Co., New Britain, Conn.

—o—

Howard V. Clark has joined the Detroit Steel Corp., Detroit, as vice president in charge of sales. Mr. Clark, a graduate of Annapolis, has held executive positions with Carnegie-Illinois Steel Corp., Pittsburgh, and Great Lakes Steel Corp., Detroit.

—o—

R. E. Montgomery, recently was placed in charge of the Cleveland district, succeeding C. M. Stewart, transferred to the company's International Division for overseas assignment, B. F. Goodrich Co., Akron. M. A. Starr becomes sales representative in the Chicago district and J. D. Hamilton in the Milwaukee district. W. A. Bratfisch, who has been sales engineer in the Dallas district for several years, is transferred to the new aeronautical products department with headquarters in Akron.

—o—

R. E. Pauling has been named manager of the Tulsa, Okla. office, Ilg Electric Ventilating Co., Chicago. Marion A. Elliotte has been appointed to the staff of the Detroit office. Since 1939 Mr. Pauling has been midwest representative for the Illinois Malleable Iron Co., Chicago, and Mr. Elliotte was employed in the sales engineering and product development department, Marine Products Co.

—o—

Clyde MacCormack has rejoined the Phoenix Bridge Co., Phoenixville, Pa., as vice president and general manager.

—o—

Henry S. Norris, until recently head of the heating branch, War Production Board, Washington, has joined Consolidated Industries Inc., Lafayette, Ind., as vice president in charge of sales.

—o—

Paul H. Shaeffer has been appointed Cleveland district manager, Vanadium Corp. of America, New York, a new office created to serve the Cleveland and Detroit districts of the corporation. Mr. Shaeffer will make his headquarters in the offices of Cleveland-Cliffs Iron Co., which company continues as agent for the Vanadium corporation.

—o—

Nikola Trbojevich, mathematician, inventor and gear expert, has been ap-

DR. SAMUEL L. HOYT

H. V. CLARK

NIKOLA TRBOJEVICH

FRED C. SMITH

Who recently has been named director of quality, Tube Turns Inc., Louisville, Ky., and noted in STEEL, Oct. 22 issue, p. 96.

F. G. GERARD

Who is vice president in charge of operations, Washington Steel Corp., Washington, Pa., as noted in STEEL, Oct. 29 issue, p. 90.

H. F. KNEEN

Who is vice president in charge of manufacturing, Lincoln Electric Co., Cleveland, as noted in STEEL, Oct. 29 issue, p. 89.

pointed research engineer, Jack & Heintz Inc., Cleveland.

—o—

Philip J. Sandmaier has been appointed manager, Commercial Research Division, Republic Steel Corp., Cleveland. Recently returned from Washington, Mr. Sandmaier fills the post recently vacated by F. H. Ramage who has been made assistant manager of pipe sales. Previous to his service in Washington, he was assistant manager of orders and earlier served as secretary to the vice president and assistant vice president in charge of operations.

—o—

Dr. H. S. Rawdon, chief, division of metallurgy, National Bureau of Standards, Washington, retired Oct. 31.

—o—

J. R. Davis and **H. L. Moekle** have been elected directors of the Ford Motor Co., Dearborn, Mich. **M. L. Bricker**, general superintendent, is now vice president in charge of manufacturing and **C. L. Martindale**, controller. Mr. Davis, director of sales and advertising, and Mr. Moekle, secretary and assistant treasurer, were named to board vacancies created by the resignations of **Harry H. Bennett** and **Ray R. Rausch.**

—o—

H. C. Monroe has been appointed manager, fast coupling division of the Bartlett-Hayward Division, Koppers Co., Baltimore, succeeding **M. T. Maguire.**

—o—

G. S. Swanson has been appointed sales manager, Oscar W. Hedstrom Corp., Chicago, succeeding **Carl E. Payne** who has resigned as vice president in charge of sales and advertising. **William O. Wing**, director of purchases, in addition to his other duties, will handle all matters pertaining to advertising.

—o—

W. Harrison Lackey has been named sales representative for York, Pa., and vicinity, Lukens Steel Co., Coatesville, Pa., and its subsidiaries.

—o—

Stephen B. Metcalfe has been named special engineer in charge of rope plant development and will be located in the chief engineer's office in Cleveland, American Steel & Wire Co., Cleveland. **A. J. King** has been appointed general superintendent of the New Haven, Conn., and Trenton, N. J. works, centering his activities at New Haven. **Charles F. Chase** has been made superintendent of the Trenton works, succeeding Mr. King.

—o—

Jerome W. Ingwersen has been appointed general manager of sales, effective Jan. 1, 1946, succeeding Reinhold Frank, Gibbs Steel Co., Milwaukee, a subsidiary of A. M. Castle & Co., Chicago.

—o—

Donald McClain, Manchester, Conn., has been appointed engineering representative in the New England area for Allcraft Screw Products Co., Long Island City, N. Y.

—o—

J. A. Armstrong has been appointed district manager for the state of Michigan, except Detroit and its metropolitan area, Syntron Co., Homer City, Pa., will have his headquarters in Lansing.

OBITUARIES . . .

James S. McKesson, special pig iron sales agent for American Steel & Wire Co. and Carnegie-Illinois Steel Corp., died at his home in Pittsburgh, Oct. 27, after an illness of two months. Mr. McKesson began his career in the steel business after graduation from high school when he became an assistant auditor in the charcoal blast furnace department, Cleveland-Cliffs Iron Co. at Gladstone, Mich. He moved to Cleveland in 1900 where he joined Corrigan-McKinney & Co. In 1925 he was named vice president and general manager of sales of that company, resigning that position in 1935 to become special sales agent to handle all sales of pig iron for the Carnegie-Illinois Steel Corp.

—o—

William G. Golden, 62, vice president, Reynolds Metals Co., Louisville, Ky., until his retirement in March, 1945, died at his home in that city Oct. 28.

—o—

Frank C. Angle, 45, manager of district offices, Allis-Chalmers Mfg. Co., Milwaukee, died Oct. 25 in that city.

—o—

Charles J. Redd, 38, office manager of the Milwaukee plant, Joseph T. Ryerson Son Inc., Chicago, died Oct. 24.

—o—

Louis D. Rockwell, 70, New York and Detroit, salesman representing Acme Steel Co., Chicago, and other steel companies, died Oct. 25 in New York.

—o—

Frederick J. Schroeder, 81, president Milwaukee Die Casting Co., Milwaukee, died at his home in that city Oct. 30.

—o—

Samuel W. Fike, 60, manager, Commercial Iron Works, Fresno, Calif., died Oct. 19 in that city.

—o—

Edwin J. Mohr, 62, former production manager, Symington-Gould Corp., Rochester, N. Y., died Oct. 21.

—o—

Louis T. Houillion, president, Brighton Screw & Mfg. Co., Cincinnati, died Oct. 17.

Steel Expansion Plans on Coast Hint of Fight for Area's Markets

Many observers believe groundwork is being laid for competitive battle between Kaiser interests and eastern producers with West Coast facilities. Factors involved include disposition of Geneva Works and freight rates

SAN FRANCISCO

AS A RESULT of recent statements by West Coast steel leaders and announcements of mill expansion programs, future prospects for the western steel industry are being clarified.

Many observers believe the groundwork is being laid for a competitive battle between Henry J. Kaiser and the large eastern steel corporations.

Whether such a fight will be necessary depends, of course, as to whether new outlets for steel can be built up on the West Coast. Although there is a large market to be tapped, at present it is exceeded by the amount of steel producing capacity built up during the war. A large number of new fields for steel fabrication have been explored on the West Coast. Some look promising.

One big unsettled factor, too, in the whole western steel picture, aside, of course, from the undetermined question of what is to be done with the Geneva plant, is the matter of railroad rates. If rail rates are readjusted downward to allow favorable competition with waterborne shipments, then the western steel industry will have the opportunity to grow at a much faster pace with the likelihood that eventually it will be able to consume what is now its excess producing capacity.

Reconversion Projects Planned

At present, western open hearth capacity, including Geneva but not Colorado Fuel & Iron, is about 3,200,000 tons annually. A large part of finishing capacity to use this steel is suitable only for wartime products, such as plates for ships. In order to divert as much raw steel as possible into civilian products, three major expansion projects have been announced for fulfillment as soon as possible. Columbia Steel Co. (U.S. Steel) now is blueprinting a $25 million rolling mill near San Francisco. Henry Kaiser's acceptance of RFC terms for the Fontana plant, at least for the time being, include a new loan of $11,500,000 for plant conversion and expansion into peacetime units. Bethlehem Steel has just announced an $8 million expansion at Los Angeles and has stated that before the program is finished another $8 million will be spent. Columbia Steel is reported widely to be considering a $25 million expansion of its Torrance plant in Southern California.

Commenting in San Francisco on Bethlehem's plans, H. H. Fuller, vice president in charge of western operations, said Bethlehem's expansion "is geared to meet an enlarging western market for its products."

The "average of estimates" for the size of the postwar West Coast market, Mr. Fuller said, is about 2,500,000 tons a year, a rise of about 20 per cent over the pre-war level. Bethlehem's three plants on the coast have a present capacity of about 560,000 tons a year.

This market estimate is exclusive of expected demand from the Far East. Mr. Fuller said the bulk of overseas Pacific demand would be met by eastern steel producing facilities because the products likely to be most in demand are not made on the West Coast.

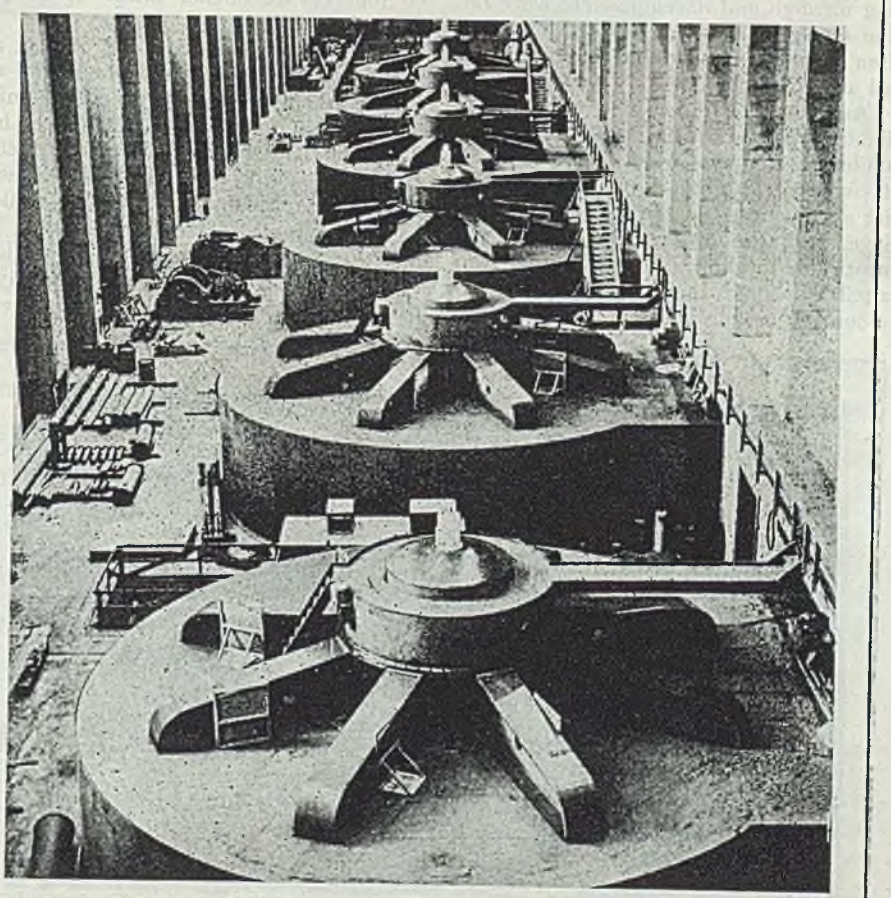
At the same time he pointed out that larger volume production at eastern plants would probably keep production costs lower there than in western plants for products now not made in the West.

Bethlehem's first postwar shipload of steel from the east for the Pacific coast market is scheduled to leave Nov. 4, he said, and the company expects an additional shipload to leave in November and three ships a month thereafter.

Some of the small amount of pig iron used in Bethlehem's Pacific coast operations is now being purchased from Kaiser's Fontana mills because of "availability", Mr. Fuller said.

As to relative costs of steel production here and in the east, Mr. Fuller declined to make estimates as to the future except in the case of specific items. He said that in the case of carbon bars "there is no reason western mills may not approximate, though they are not likely to equal, production costs at eastern mills"—because of greater volume production in the east.

He said Bethlehem's Sparrows Point could produce ingots cheaper than Fontana, though, he added "Geneva is another question."



POWER: More than 12.5 billion kilowatt hours were produced during the war by these six Westinghouse 108,000-kilowatt generators in the West Powerhouse at Grand Coulee Dam. Great blocks of this energy went to the famed atomic bomb plant at Hanford, Wash.

WING TIPS

Review of technical features of German military airplanes, engines, gliders and equipment indicates that country was far ahead of United States in jet and rocket plane development. Experimental work was started in early 1930s

COMPREHENSIVE review of the technical features of German military airplanes, engines, gliders, aircraft guns and armament are contained in a 137-page report compiled by .U. S. and British air intelligence teams and released recently by the Air Technical Service Command and the British Air Ministry. Types of wings, fuselage and tail construction, power plant, landing gear, armament, dimensions, weight and performance characteristics are detailed for several hundred aircraft types, both experimental and production versions.

Considerable amount of space is given over to engines, with such details enumerated as engine type, cooling, supercharging, cylinder bore and stroke, valve gear, types of pistons and bearings, fuel systems, lubrication systems, propeller drive, dimensions, weight and performance characteristics, etc. Much of the information was obtained during the war through captured equipment, intelligence reports and the like, and thus was available to manufacturers doing research and developmental work for the services. However, the full information is now compiled for the benefit of all manufacturers.

An example of a new German jet-type fighter plane is the Focke-Wulf Ta 183, under development when the war ended. It was powered by a Jumo 004 turbojet unit mounted in the rear of the fuselage, with the intake tube passing beneath the cockpit. In one version, an auxiliary liquid rocket unit was to be mounted in the rear of the fuselage above the jet tail pipe, for takeoff and rapid climb. Most of the fuel was carried in the wing. Flight endurance of 3 hours and maximum speed of 590 miles an hour was expected.

Another interesting unit was the Heinkel 162 A, a small single-seat jet fighter called the Salamander, with wingspread of only 23½ feet. It was designed to conserve critical materials and weighed only 5940 pounds loaded. It carried 208 gallons of fuel and had maximum speed of 522 miles an hour at 19,700 feet. Novel feature was the pilot-ejecting seat actuated by an explosive cartridge to aid the pilot in bailing out.

First German heavy jet-propelled bomber to fly was the Junker Ju 287, which had 66-foot wingspan, 47,500-pound overall weight, maximum bomb load of 9900 pounds and maximum speed of 537 miles an hour at 16,400 feet. It carried a 3-man crew, and was intended to utilize two large turbojet engines of either the BMW or Junkers type, but the prototype was powered by four or six smaller units. It never reached the combat stage.

The Messerschmitt Me 163 B was a rocket-propelled interceptor with a Walter 109.509 bifuel liquid rocket unit permitting it to climb to 30,000 feet in 2.6 minutes. It had wood wings, a metal fuselage and a jettisonable twin-wheel undercarriage with wheels which could be dropped after takeoff. Fuel was T Stoff (concentrated hydrogen peroxide) or C Stoff (a solution of hydrazine hydrate in methanol) which produced steam to drive a turbine through action of a solid catalyst. Top speed was 550 miles an hour at 20,000 feet.

From casual inspection of this review of German jet and rocket plane types, it is evident the Nazis were far ahead of the United States in development of this type of craft. Junkers began experimental work on jet propulsion in 1936, while the BMW organization began its experiments in 1934 and completed the first unit in August, 1940. This design, the BMW 003 had a 7-stage axial compressor and an annular combustion chamber with 16 burners. At sea level speed of 560 miles an hour, static thrust of 1150 pounds could be developed with fuel consumption of 3240 pounds per hour. Heinkel-Hirth began turbojet work in 1936 and flew the first German jet plane, the He 178 in 1939. Daimler-Benz also had turbojet units under development.

In the medium size plane field, an unusual German development, never used in military operations, was the Dornier Do 335 A, a fighter or fighter bomber having two Daimler-Benz engines mounted in tandem in the fuselage. The nose engine drove a conventional tractor propeller and the rear engine, mounted behind the pilot, drove a pusher propeller at the tail.

28-Cylinder Engine Described

An interesting large-engine development was the BMW 803, a 28-cylinder liquid-cooled radial with two-stage four-speed supercharger and driving a contra-rotation four-blade propeller. The engine has roughly the appearance of two 14-cylinder radial engines joined together back to back. Cylinders of each unit are built in seven blocks of two, disposed radially around the crankcase, and the cylinder blocks of the two units are in line. Superchargers and all auxiliaries are driven from the rear.

There is one inlet and exhaust valve per cylinder. The two cylinders of each block have a common cylinder head casting and camshaft, the latter driven by inclined driveshafts at the front and rear of the engine. The front unit drives the front propeller through an extended shaft and the rear unit drives the rear propeller through a series of auxiliary shafts which pass between the cylinder skirts of the front blocks. Weight of the engine is about 6490 pounds, developing 3900 takeoff horsepower at 2950 revolutions per minute at sea level.

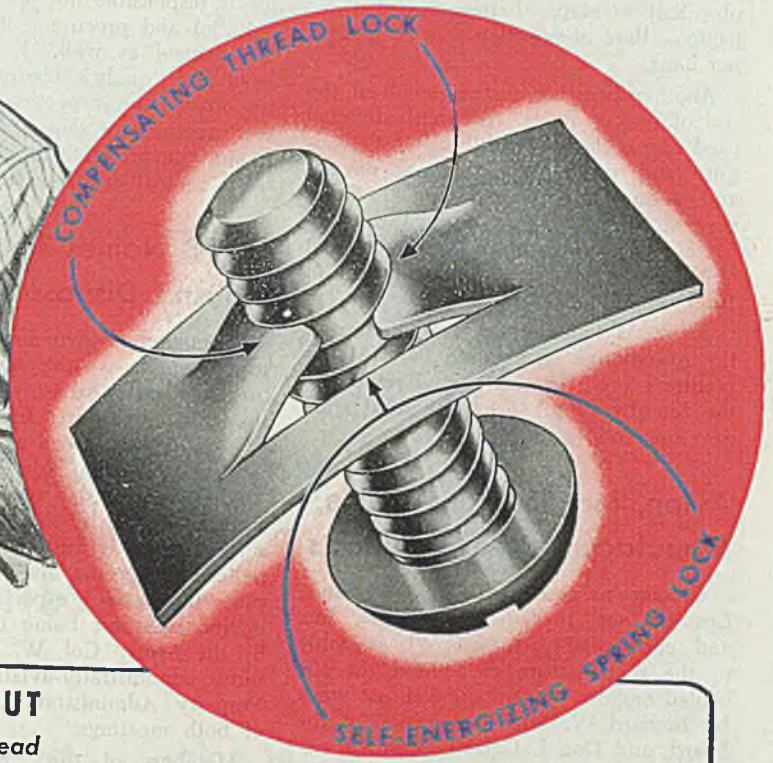
Another engine under development was the Jumo 222, a 24-cylinder power plant with the cylinders in six blocks of four equally disposed radially around the crankcase. It used epicyclic reduction gears and a two-speed supercharger. Three separate fuel injection pumps were used, each pump feeding two blocks of cylinders. It was rated around 2500 horsepower at 3200 revolutions per minute, weighing around 2400 pounds.

The Germans used a variety of me-

DEDICATE NEW AIRPORT: Crowd fills the huge University of Illinois airport as state and university officials dedicate the largest university-owned airport at Champaign. The 772-acre field has three 5300-foot runways and is larger than the Chicago municipal airport. NEA photo

Why Speed Nuts are First

with Production Men



NOTHING LOCKS LIKE A SPEED NUT

Only SPEED NUTS provide a COMPENSATING thread lock and a SELF-ENERGIZING spring lock. As the screw is tightened the two arched prongs move inward to lock against the root of the screw thread. These free-acting prongs COMPENSATE for tolerance variations. Compression of the arch in prongs and base creates a SELF-ENERGIZING spring lock. These two forces combine to definitely prevent vibration loosening.

PRODUCTION men who actually use them really appreciate the ease with which SPEED NUTS are applied. They'll tell you that SPEED NUTS start easier, tighten down faster, and eliminate fumbling around with hard-to-handle lock washers.

Production men also will tell you how much time is saved by using any of the self-retaining types of SPEED NUTS. They merely snap these fasteners into bolt-receiving position by hand, instead of welding or riveting cage nuts in place. Moreover, these self-retaining SPEED NUTS provide "float" to compensate for misalignment of clearance holes.

These are only a few reasons why production men prefer SPEED NUTS. But reasons enough for you to investigate SPEED NUTS for your own benefit by writing today.

TINNERMAN PRODUCTS, INC. • 2039 Fulton Road, Cleveland 13, Ohio

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In France: Aerocessoires Simmonds, S. A., Paris
In England: Simmonds Aerocessories, Ltd., London
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

Speed Nuts ★

PATENTED

*Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS...OVER 3000 SHAPES AND SIZES

ods for power boosting. Methanol-water injection was used in the Me 109 to obtain extra power below the rated altitude of its engine. The mixture of 50 or 30 per cent methyl alcohol was injected into the intake side of the supercharger as an antidetonant. A 4 per cent increase in power could be obtained even at constant boost pressure. Such increased power could be used for a maximum of 10 minutes and at least 5 minutes had to elapse before the next injection. Rate of injection was 35 gallons per hour.

Another boosting system involved the use of nitrous oxide, this method being used above the rated-altitude of the engine and providing additional oxygen and acting as an antidetonant. Compressed air was used to force the liquid gas along pipelines to the engine. Weight of the added equipment was upward of 1000 pounds.

STEEL is indebted to Ed Warner of the Automotive & Aviation Parts Manufacturers Inc., for this partial review of the lengthy report on German aviation developments.

Avion, Inc. Changes Name, Manufactures New Products

Change in the name of Avion Inc., Los Angeles, to Salsbury Motors, Inc. and conversion from aircraft assembly to the manufacture of lightweight air-cooled engines was announced last week by Richard W. Millar, chairman of the board, and Don I. Carroll, president.

The company has been engaged in development of the engine, and an automatic variable speed drive. Production is now in progress.

Glenn L. Martin Effects New Organizational Setup

A completely new organizational setup designed to meet peacetime demands for more efficient production and to reduce overhead to a minimum was annouced last week by Glenn L. Martin, president, Glenn L. Martin Co., Baltimore. The reorganization was carried out under direction of Harry T. Rowland, first vice-president.

Mr. Martin announced creation of a new vice-presidency, responsible for planning-materiel, and revealed that this position has been filled by G. T. Willey, formerly a vice-president and general manager of the Martin-Nebraska Co.

D. W. Siemon was named manager of Industrial Relations, and C. E. Crowley as personnel director.

G. L. Bryan, Jr. now heads the technical department of the Engineering Division, H. C. Wieben the design department and C. W. Miller in charge of the administrative department.

Under the revised organizational chart of the Manufacturing Division, N. H. Lou becomes factory manager; Robert Young, plant superintendent; W. C. Miles, head of tool engineering and manufacturing, and P. E. Tignor, head of the plant engineering department.

P. M. Magruder is director of commercial sales; R. L. Sansbury, Army sales; W. A. Terry, Navy sales, and J. L. Bordley, contract administration department.

The new division headed by Mr. Willey is responsible not only for planning-materiel and procurement, but for quality control as well. J. P. Bailey will head the quality control department, responsible for inspection; F. O. Muller, the procurement department, and R. L. Evans, the production planning and materiel control department.

SWPB Names Two Aircraft Industry Disposal Groups

Formation of two new industry advisory committees—the Aircraft Manufacturers Industry Advisory Committee and the Air Transport Industry Advisory Committee—has been announced by the Surplus Property Administration.

The committees were organized at meetings called by W. Stuart Symington, surplus property administrator, to review policies governing the disposal of surplus warplanes, especially the four-engine transport being declared surplus by the Army. Col. W. B. Harding, deputy administrator-aviation, Surplus Property Administration, was chairman of both meetings.

Members of the Aircraft Manufacturers Industry Advisory Committee are: W. M. Allen, president, Boeing Aircraft Co., Seattle; W. P. Gwinn, general manager, Pratt & Whitney Aircraft Division, United Aircraft Corp., East Hartford, Conn.; Alfred Marchev, president, Republic Aviation Corp., Farmingdale, N. Y.; Glenn L. Martin, president, Glenn L. Martin Co., Baltimore; E. B. Newill, general manager, Allison Engineering Division, General Motors Corp., Indianapolis, Ind.; G. W. Vaughan, president, Curtiss-Wright Corp., New York; J. Carlton Ward, Jr., president, Fairchild Aircraft Division, Fairchild Engine Airplane Corp., Hagerstown, Md.; Harry Woodhead, president, Consolidated Vultee Aircraft Corp., San Diego, Calif.; H. A. Schrader, International Association of Machinists, AFL, Washington; Ernest J. Moran, United Automobile Workers, CIO, Baltimore; James E. Nolan, United Automobile Workers, CIO, Flushing, N. Y.; Ted F. Silvery, CIO Reconversion Committee, Washington.

Members of the Air Transport Industry Advisory Committee are: Luther Harris, vice-president, Pennsylvania-Central Airlines Corp., Washington; Robert E. Lees, assistant to the chairman, Transcontinental & Western Air, Inc., Washington; W. C. Mentzer, director of engineering, United Air Lines, Inc., Chicago; Captain E. V. Rickenbacker, president, Eastern Air Lines Inc., New York; C. R. Smith, chairman American Airlines, Inc., New York; E. Whyatt, vice president and treasure Northwest Airlines, Inc., St. Paul, Minn C. E. Woolman, president, Delta A Lines, Atlanta, Ga.; and the same lab representatives who are members of t Aircraft Manufacturers Industry Ad sory Committee, with the addition John M. Dickerman, Air Line Pil Association, AFL, Washington.

New Carrier Is World's Highest Powered Ship

The 45,000-ton aircraft carrier FRANKLIN D. ROOSEVELT, commissioned by Pre dent Truman at the N. Y. Navy Yard Brooklyn Oct. 27, Navy Day, is t highest powered ship in the wor Captain Apollo Soucek received co mand of the ship whose boilers evapor more than 2 million pounds of steam p hour, or enough to generate elect power for a city of a million populati At full speed, the fuel oil burned in t boiler furnace in one day would he some 300 one-family homes for a ye

These boilers were specially design and built by Babcock & Wilcox Co., Ne York, for the Navy. The FRANKLIN D. ROOSEVELT carries twelve uni of a type known as the single-upti controlled-superheat marine boiler. It a design used on most of the fighti ships of the line in the United Sta fleet, and it combines the advantages minimum weight and positive control steam temperature.

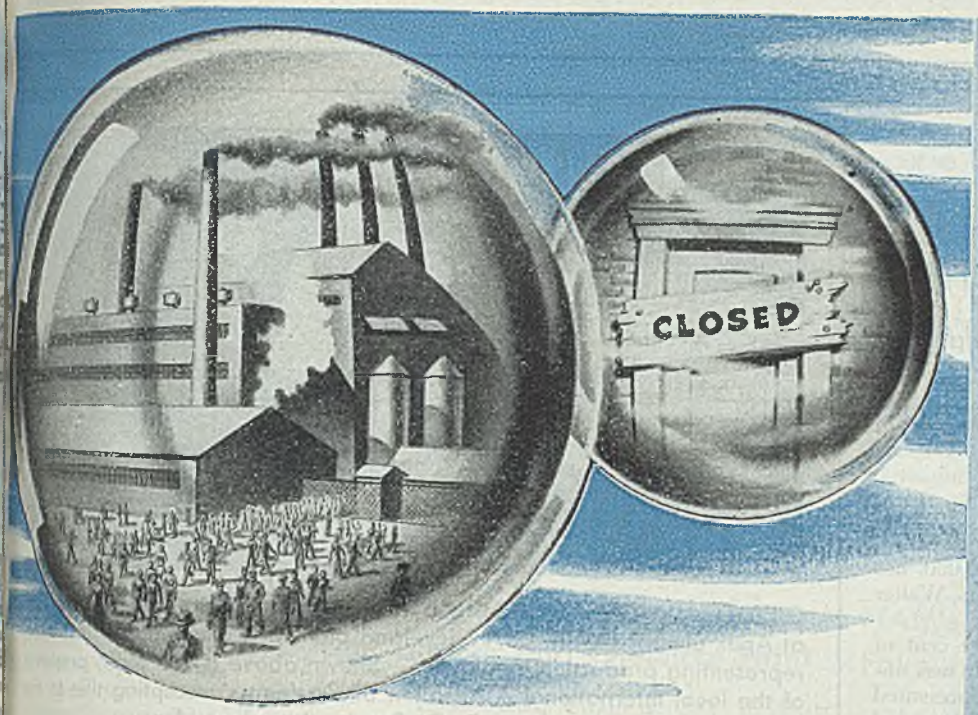
Expenditures for Army-Navy Planes Cut in 1946

The unexpectedly small scale of a nual military and naval expenditures the current fiscal year caused much di appointment in airplane manufacturi circles, according to recent testimony b fore the House Appropriation Commit tee.

The Army has new contracts for 19 aircraft to cost $395,190,000 and is a ing $114 million for research and de velopment, $6,700,000 for gliders an accessories, and $2,400,000 for control missiles. The Navy said that $70 to $ million would be required for about 90 aircraft to be delivered by next ju and expects to spend $61 million f research and development.

Solar Awarded $1 Million Order for Plane Exhausts

Solar Aircraft Co., San Diego, Calif. announces that during the past tw months it has received orders for mor than $1 million worth of exhaust system for commercial aircraft.



WHAT'S AHEAD
FOR YOUR BUSINESS?

Don't gamble with the quality of your product . . . plan to use Ex-Cell-O precision production parts! With a complete organization under one responsible management . . . an organization built up of years of varied engineering experience, modern machine and manufacturing methods, and complete heat treat facilities, and practical assembling and inspection staffs . . . Ex-Cell-O probably has the exact solution to the parts production problem you face. Write today!

XLO
EX-CELL-O for PRECISION

EX-CELL-O's Precision Production Parts *facilities:*

PRODUCTION ENGINEERING

The Ex-Cell-O organization, with skill, facilities and modern methods that have made a wartime record, can make an important contribution in the planning of quantity production of quality parts and unit assemblies for your postwar product.

PRODUCTION MACHINES

- Multiple Vertical Turret Lathes
- Multiple Spindle Automatic Screw Machines
- Single Spindle Automatic Screw Machines
- Hand Screw Machines
- Engine Lathes
- Centerless O.D. Grinders
- Centerless I.D. Grinders
- Single and Multiple Spindle Drilling Equipment
- Form Grinding Machines
- Plain O.D. Grinders
- Plain I.D. Grinders
- Surface Grinders (Plain and Rotary)
- Milling Machines
- Thread Milling Machines
- Broaching Machines (Vertical and Horizontal)
- Precision Thread Grinders
- Thread Rolling Machines
- Precision Boring Machines
- Lapping Machines
- Special High Production Equipment

HEAT TREAT

- Induction Heat Treating
- Laboratory for Heat Treat Control Including Micro Examination and Photography
- Atmosphere Control Continuous Hardening Furnaces
- Atmosphere Control Box Hardening Furnaces
- Various Types of Air-Draw Batch Type Furnaces
- Gas Carburize Furnaces
- Box Carburize Furnaces
- Pack Anneal Furnaces
- Nitriding Furnaces
- Cyanide, Lead, and Neutral Salt Pot Furnaces
- High Speed Steel Atmosphere Control
- Vertical and Horizontal Hardening Furnaces
- Continuous Air-Draw Furnaces
- Sub-Zero Heat Treating Equipment

UNIT ASSEMBLIES

For many years Ex-Cell-O has supplied large and small manufacturers with parts and has also supplied many parts in unit assemblies after machining, heat treating and grinding.

INSPECTION

Ex-Cell-O has always maintained that quality in a product is not the result of accident; that quality is built into a product by rigid adherence to accepted quality standards . . . standards that are upheld at Ex-Cell-O by efficient inspection at every step of the machining process.

To right: Typical of the many modern and complete production machines in the Ex-Cell-O Miscellaneous Precision Parts Division—*facilities that are available for the production of accurate parts and sub-assemblies for your product*—is this sectional view of single automatic screw machines.

SEE EX-CELL-O FIRST

EX-CELL-O CORPORATION, DETROIT 6, MICH.

Schotts Seek To Purchase Cleveland Firm

Cincinnati family would add Cleveland Pneumatic Tool Co. to its holdings. $4,150,000 offered for stock

OFFER to purchase all of the stock of Cleveland Pneumatic Tool Co., Cleveland, for approximately $4,150,000 has been made by the Schott brothers, Walter E. and Harold, of Cincinnati.

Thus far, consents for 36 per cent of the stock have been obtained. It was understood that the 36 per cent represented stock owned by Herbert W. Foster and his family. Mr. Foster is president of the Champion Machine & Forging Co., Cleveland. All of the Cleveland Pneumatic stock is closely held.

The Schott Brothers' offer is $4 million for the Cleveland Pneumatic common stock and $100 each for the 1500 shares of preferred.

By acquiring stock control of Cleveland Pneumatic, the Schotts also would obtain a plant in Toronto, Canada, and an interest in the $20 million Cleveland Aerol Co. plant built in Euclid, O., by the Defense Plant Corp.

The Schott family has rapidly been acquiring an assortment of firms.

Control of Indian Cycle Taken by Rogers and Atlas

The Ralph B. Rogers interests of New York have acquired a majority of the shares of the Indian Motorcycle Corp. with the Atlas Corp. as a substantial participant in the transaction, terms of which have not been disclosed.

The present manufacturing equipment of Indian will be supplemented by new machinery from the group of companies manufacturing air-conditioning equipment, diesel engines, railway motor cars and other equipment, of which Mr. Rogers is head.

Jack & Heintz To Build Engines, Refrigerators

Jack & Heintz Inc., Cleveland, plans to manufacture a new-type gasoline engine, refrigerators and possibly automobiles, according to William S. Jack, president.

"Production of the gasoline engine will begin soon," Mr. Jack said and added that some refrigerators will be made in 1946. "We may be producing our own automobile before the close of 1947," he said but declined further comment.

GIFT TO UNION: First postwar washing machine to come off the line at Apex Electrical Mfg. Co.'s Cleveland plant was presented to the union representing production employees. Shown above is Ted Mills, president of the local International Association of Machinists, accepting title to the washer from C. G. Frantz, Apex president

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

American Pipe & Construction Co., Los Angeles, has purchased Steel Tank & Pipe Co., Portland, Oreg., and will continue manufacture of boilers, tanks, and other steel items.

—o—

Pitney-Bowes Inc., Stamford, Conn., maker of postal meters, has announced a $1,300,000 expansion program, first step of which will be construction of a $700,000 plant addition.

—o—

American Central Mfg. Corp., Connersville, Ind., has opened a school at its plant for distributor representatives selling the all-steel kitchen sinks and cabinets now in production. D & H Distributing Co. Inc., Harrisburg, Pa., has been enfranchised to handle the American Kitchen line.

—o—

Builders Structural Steel Co., Cleveland, was awarded the Army-Navy "E" last week as the final presentation of the award in the Cleveland Ordnance District.

—o—

Special Machine Tool Engineering Works, New York, has opened an Auxiliary Service Department designed to solve manufacturing problems.

—o—

Robins Conveyors Inc., Passaic, N. J., handling machinery, has opened southern offices in the Brown-Marx Bldg., Birmingham.

—o—

Gerotor May Corp., Logansport, Ind., has announced Garco Machinery Co., Cleveland, as representative for its air and hydraulic valves, cylinders and pumps.

—o—

Bethlehem Steel Corp., Wilmington, Del., has begun a $400,000 improvement program of the recently acquired Pacific Coast Forge Co., Seattle.

—o—

Canadian Vickers Ltd., Montreal, Que., will begin to manufacture Watson-Stillman Co.'s complete line of hydraulic equipment with Canadian Fairbanks-Morse Co. continuing as sole Canadian sales agent.

—o—

Carboloy Co. Inc., Detroit, has named Samuel Harris & Co., Chicago, as distributor of Carboloy products for the Chicago area.

—o—

Chapman Valve Mfg. Co., Indian Orchard, Mass., has purchased from the Navy, equipment, machinery, and the million plant which it operated during the war.

—o—

Machlett Laboratories Inc., Springdale, Conn., producers of x-ray tubes and high voltage rectifiers, is doubling the size of its Springdale plant. The building program is scheduled for completion Dec. 1.

—o—

Association of Steel Re-Distributors Inc., New York, has offered the services and facilities of its members to the Surplus Property Board and the Reconstruction Finance Corp. in moving huge supplies of steel surplus owned by the government and awaiting disposal.

Aviation Corp. Buys Control Of New Idea Co.

Entry into farm equipment manufacturing field further increases Avco's diversification of interests

PURCHASE of control of New Idea Inc., manufacturer of farm machinery at Coldwater, O., and Sandwich, Ill., has been completed by Aviation Corp., New York.

Controlling interest was obtained from Henry Synck, J. H., J. A., and T. H. Oppenheim, all officers of New Idea. On an offer open through Nov. 30, Avco announced its willingness to purchase all outstanding New Idea stock on the same terms at which controlling interest was acquired, $30 per share of no par common. If all shares are tendered total purchase price would be $8,160,000.

Entry into the farm machinery manufacturing field further increases the already lengthy list of enterprises in which Avco is interested financially and adds further to the diversification of its interests.

That the size of Avco and its diversification of interests may be extended is seen in the fact that Avco is willing to consider other acquisitions that would fit into its program of managing companies producing necessities. Avco shuns production of luxuries.

To Use Idle Plant Capacity

Acquisition of firms, including New Idea, will help utilize plant capacity left idle by war contract cancellations received by Avco's industries and associated companies. With indications that post-war demand for New Idea products will exceed that company's present production capacity, Avco plans to use part of the Nashville, Tenn., plant of Consolidated Vultee Aircraft Corp., an Avco affiliate, to supplement New Idea's output.

On the other hand, it is hoped, according to Irving B. Babcock, Avco president, that New Idea will be able to merchandise certain products of Avco and its associated companies through regular dealer outlets long established by the New Idea organization. New Idea, founded in 1889 by the Oppenheim family, now employs about 800 people. The trade name, "New Idea," will be continued in use by the New Idea firm.

Mr. Babcock has been elected chairman of New Idea and William F. Wise, Detroit, has been elected president. The latter succeeds Henry Synck, Coldwater, O. Other officers elected are: W. A. Mogensen, vice president in charge of finance; L. I. Hartmeyer, vice president, and R. S. Pruitt, secretary. Officers formerly with the company and continuing to serve are: T. H. Oppenheim, vice president in charge of engineering; J. H. Oppenheim, vice president in charge of sales; and J. A. Oppenheim, treasurer and assistant secretary.

New Idea's board has been increased to 11 members, as follows: Irving B. Babcock, Detroit; Carlton M. Higbie, Rochester, Mich.; F. B. Dean, Chicago; Victor Emanuel, New York; Benjamin H. Namm, Brooklyn, N. Y.; J. A., J. H., and T. H. Oppenheim, and Henry Synck, all of Coldwater, O.; William F. Wise, Detroit; and Harry Woodhead, San Diego, Calif.

Firm Seeks Operator for Lumber and Chemical Plant

Consolidated Products Co., 15 Park Row, New York 7, is seeking someone to take over and operate the plant of the Newberry Lumber & Chemical Co., Newberry, Mich., which the New York firm has purchased from stockholders of the Newberry company.

The 234-acre Newberry property consists of a chemical plant, charcoal iron blast furnace, and saw mill and planing mill. Most of the buildings are steel, brick, and concrete, and provide 200,000 square feet of floor space served by 12 miles of standard gage track. The property is located on the main line of the Duluth South Shore & Atlantic Railroad and is about 60 miles east of Sault Ste. Marie.

Joy Mfg. Expands; Adds La-Del Conveyor Facilities

Joy Mfg. Co., Pittsburgh, has acquired La-Del Conveyor & Mfg. Co., New Philadelphia, O., and will operate the latter firm to supplement its line of mine equipment. Acquisition of La-Del makes it possible for Joy to concentrate all manufacture of conveyor equipment at New Philadelphia, O., and will obviate the need for subcontracts as in the past.

NAM's 50th Congress To Follow Truman's Meeting

The golden anniversary Congress of American Industry, under sponsorship of the National Association of Manufacturers, Dec. 5-7, will be the first major gathering of top management since the conclusion of the war. Ira Mosher, president, pointed out that it will follow President Truman's labor-management conference and said, "Because of the timeliness of this meeting, industry will be able to give high speed consideration to any constructive program or measures originating in the Washington labor-management discussions."

THREE STARS: Army-Navy "E" with three stars is raised at the Willard Storage Battery Co., Cleveland, which produced batteries for war until V-J Day and then quickly converted to production of batteries for peacetime purposes. Shown in photo, left to right: J. E. Hatfield, works manager; R. O'Bryan, chairman of union negotiating committee; K. E. Roof, personnel manager; L. E. Crowther, chief guard; E. MacAvoy, guard; J. R. Hull, production manager; J. Swartz, president of local union; M. Katala, chief shop steward

By ORVILLE T. BALNETI
Production Engineer, Welding D
Metal & Thermit Corp.
New York

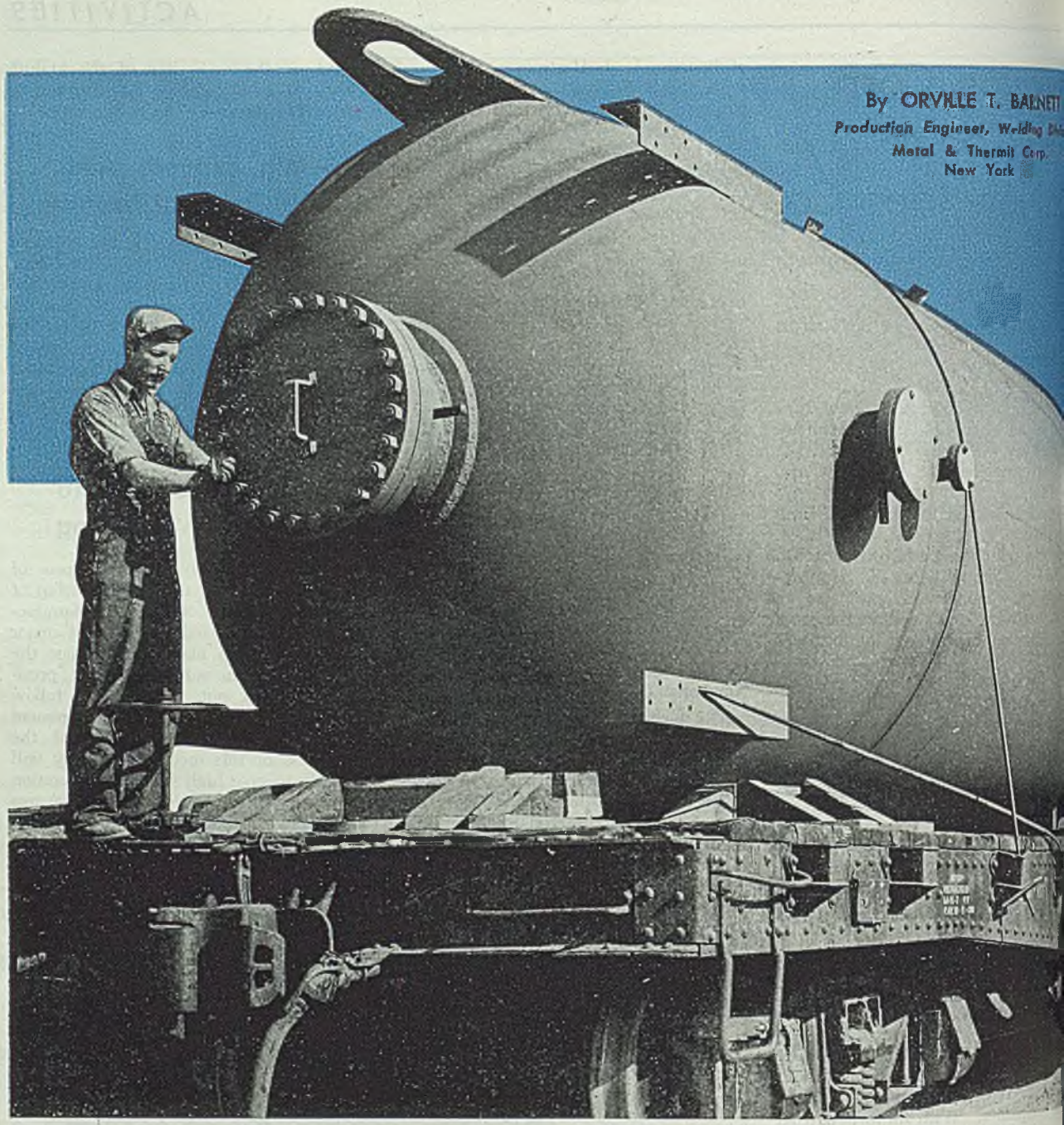


Fig. 1—Illustration of proper use of E6010 electrodes in welding pressure vessels. Photo courtesy Black, Sivalls & Bryson Inc., Oklahoma City, Okla.

PREFERRED AND USABLE CURRENT CONDITIONS FOR METALLIC ARC WELDING ELECTRODES

PREFERRED RANGES

Diameter	E6010 E7010 Amperes	E6010 E7010 Volts	E6011 E7011 Amperes	E6011 E7011 Volts	E6012 Amperes	E6012 Volts	E6013 Amperes	E6013 Volts	E6020-E6 E7020-E7 Amperes	E6020-E6 E7020-E7 Volts
3/32″	60- 80	23-25	60- 70	22-24	60- 70	19-21	60- 70	21-23	65- 85	24-
1/8″	100-120	24-26	100-120	23-25	100-120	19-21	100-120	21-23	110-140	25-
5/32″	130-150	25-28	130-150	24-26	135-165	19-21	140-160	21-23	165-205	27-
3/16″	150-175	25-28	160-190	25-28	170-210	21-24	175-205	21-24	200-260	28-
7/32″	210-240	26-29	200-240	26-29	200-260	21-24	200-260	21-24	250-310	29-
1/4″	240-280	27-31	240-290	27-31	250-300	21-24	250-300	21-25	300-360	30-
5/16″	300-350	29-33	300-350	29-33	310-390	21-25	310-390	21-25	360-440	30-

USABLE RANGES

3/32″	20- 80	18-25	25- 85	17-29	25- 90	16-21	20- 90	17-25	50-100	25-
1/8″	70-150	22-28	85-135	21-29	55-140	19-25	45-140	18-25	90-150	26-
5/32″	90-200	24-30	115-185	22-26	90-200	19-28	75-200	18-28	120-220	24-
3/16″	130-350	24-36	150-235	24-28	110-275	21-32	100-250	19-32	160-285	26-
7/32″	160-400	25-38	165-280	25-29	140-325	21-35	160-290	21-35	220-340	28-
1/4″	175-500	25-40	225-315	26-31	175-500	21-40	170-385	21-35	250-450	29-
5/16″	250-625	29-42	250-500	29-33	240-625	21-42	250-450	21-36	350-525	32-

CURRENT RANGES FOR Quality Welding

Closer limits on current and voltage settings for various types of electrodes are providing better welding results

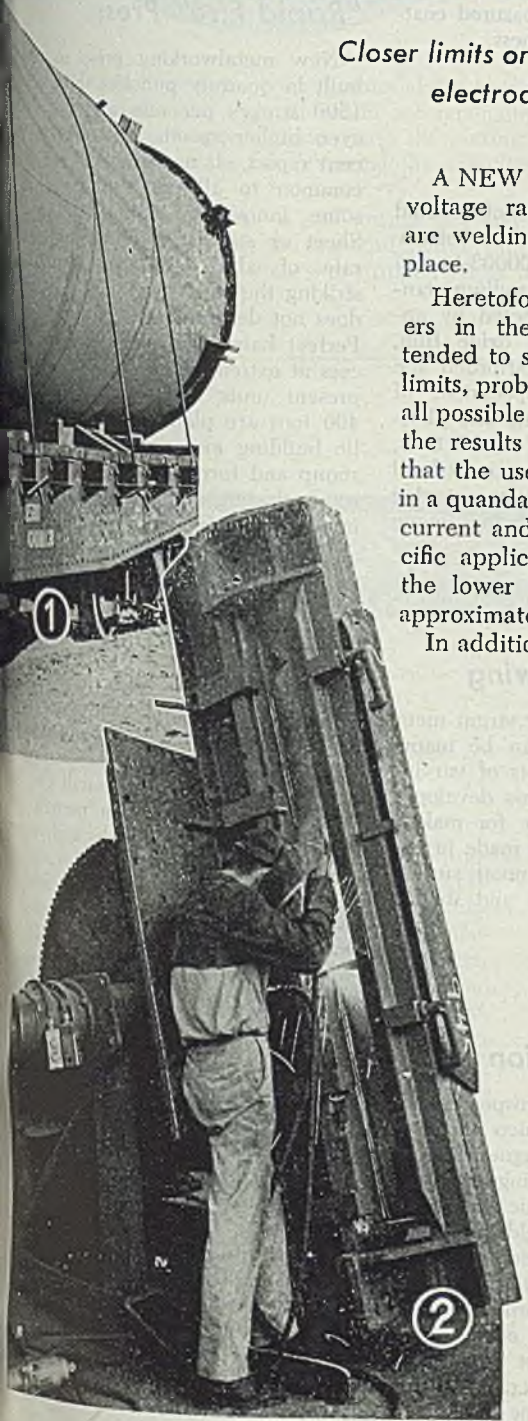


Fig. 2—Welding positioner is shown here being used in plant of the Northern Ordnance Co., Minneapolis, in welding of girder for 5-in. gun base ring

A NEW trend in listing current and voltage ranges suitable for metallic arc welding applications is taking place.

Heretofore, electrode manufacturers in their recommendations have tended to specify rather wide current limits, probably in an attempt to cover all possible applications. In some cases the results have been unfortunate in that the user has frequently been left in a quandary as to whether the proper current and voltage setting for a specific application lay at the upper or the lower limit of the range, or at approximately the center.

In addition, the citing of these wide ranges occasionally proved disadvantageous to the electrode manufacturer since he could seldom be sure that his product was being used to the best of its ability. The narrower ranges now being specified should correct these conditions and prove of help both to the user and to the electrode producer.

In accompanying table are listed preferred and usable current conditions for metallic arc welding electrodes. The preferred range is one that will lead to the best balance of physical properties, x-ray soundness, good appearance and satisfactory production rates. The usable ranges, on the other hand, are applicable to freak or unusual conditions where their use is satisfactory. It must be assumed that wherever portions of the usable range that lie outside of the preferred range are employed, weld deposits may suffer in some quality or appearance features. Thus the preferred currents should be specified for all welding applications where quality factors are of paramount importance. Where production considerations are the more important and quality is certain to be ample no matter what current is selected, the use of extremes in the usable range bracket will prove satisfactory.

The physical properties of a weld deposit are dependent upon the performance of the electrode coating as the wire and flux are consumed by the arc. Chemical features of such reactions vary with current conditions. Low currents may lead to gas and slag entrapment and insufficient cleansing of the molten pool by the flux. The

(*Please turn to Page* 158)

Engineering NOTES

Germanium

Some years ago, the Eagle Pitcher Co., Cincinnati, found the rare element germanium somewhat concentrated in waste products from its zinc smelter. At the time research was begun to study methods of recovery, price of the metal was in the range of $4500 per lb, but with increasing production it is now around $200 per lb. Last fall the world's biggest shipment was made—15 lb. Only 5 or 10 lb can be eventually recovered from 15,000 tons of processed zinc and lead ores. Traces of germanium in magnesium and alloy castings are said to make the alloys more resistant to fatigue and corrosion; its alloys with gold have many possible uses and the oxide has the ability to impart refractive properties to optical glass.

★ ★ ★

Stainless Clad Bumpers

One of the improvements hailed for automobiles to come not too long hence are bumpers of stainless clad steel. As a result of a new development made by a steel company, solid stainless steel now may be bonded to fine spring steel to produce bumpers that will not rust or peel, and are super-strong and tough.—*Electromet Review.*

★ ★ ★

Coating Thickness Gage

A new coating thickness gage, developed at Frankford Arsenal, Philadelphia, employs the electromagnetic principle for determining the thickness of nonmagnetic coatings on steel. Principle of operation is as follows: A soft iron core withdrawn from the field of an energized solenoid undergoes increased magnetic pull; therefore, if the solenoid is held in a vertical position over a coated steel article and lowered sufficiently to permit the lower end of the core to contact the surface, distance through which it must be raised for pull of solenoid to overcome attraction of the core for the ferromagnetic basis metal will vary inversely with thickness of the coating. Reproducibility of the instrument has been found to range from plus or minus 5 per cent for films 0.002-in. thick to plus or minus 3 per cent for coatings exceeding 0.002-in. Instrument has measured coatings up to 0.008-in. in thickness.

★ ★ ★

Anti-Corrosive Film

Accelerated corrosion tests of painted steel recently completed by British scientists indicate that 0.00003-in. of tin, electrodeposited from a sodium stannate bath and further protected by application of an anti-rusting oxide film, adds greatly to protection afforded the steel surface by paints. Specimens of plain steel, hot-dipped tinplate and phosphated steel were included in the tests, as were 12 different paints—linseed oil types, nitrocellulose lacquer, stoving paints and air-drying japans being among the latter.

★ ★ ★

Mesh Without Weaving

Depositing electrolytically virgin metal to form a design which can be manufactured in continuous sheets of varying sizes is the basis of a process developed by C. O. Jelliff Mfg. Corp. for making wire mesh. This product is made in one piece with unbroken glass-smooth surface in circular shapes, patterns and stencils which have solid selvage.

★ ★ ★

Magnet for Inspection

Formerly used only by prospectors and in laboratory work, the Alnico horseshoe magnet made by Dings Magnetic Separator Co., Milwaukee, is being employed with finely divided magnetic sprinklings to inspect castings and welds for flaws. Magnet is placed on underside of surface being inspected, with sprinklings on upper surface. Operating on principle that magnetism always seeks an edge, sprinklings are induced by magnet to collect at minute internal or external cracks, if they exist, and show up as a line of powder. Both castings and welds can be inspected where thickness of metals is as much as 1-in.

★ ★ ★

Expansion Fitting . .

When two parts are being joined by shrink fitting, it is sometimes impractical to cool one part sufficiently. However it may be possible to heat the other part and bring about the same result. One shop joins heavy crank webs to 10-in. crank pins in that way. Heating for 5 min with two welding blowpipes gives the desired 0.030-in. expansion without signs of carbon or discloration.—*Acetylene Tips.*

★ ★ ★

"Rapid Fire" Press

New metalworking press soon to be built in quantity punches sheet metal at 1500 strokes per min and has reached even higher speeds, according to a recent report. It uses the eccentric motion common to all crank presses, but has some innovations not yet announced. Sheet or strip steel is fed to it at the rate of about 750 fpm, with the punch striking the steel so rapidly that material does not deform but shears off instantly. Perfect balance is one secret of its success at extreme high speeds. Capacity of present units is 30 tons, but some 400 tons are planned for making metallic building materials. Press will blank, stamp and form a variety of metals and some plastics, and its use in deep drawing is being explored.

★ ★ ★

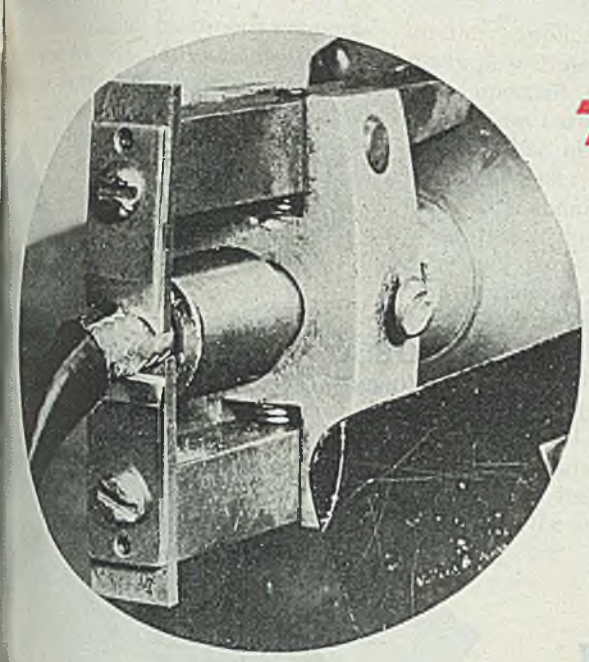
Recording Strain Gage

Contribution to research, as yet utilized in only a preliminary way, is development of an electric strain gage in conjunction with recording oscillograph. James Hartley of Heppenstall Co., Pittsburgh, says combination permits measurement of actual static and dynamic strains in a structure under service conditions. Consideration of complicated pattern of dynamic stresses developed under service makes it easier to understand why earlier concepts of static stress distribution have been inadequate.

★ ★ ★

Simple Expedient Best

At present, customary method of insuring desired grain size in magnesium castings is to superheat the metal while still in the pot. Out of the University of California comes a process, based simply on stirring the metal at comparatively low temperatures, which produces grain size 50 times smaller than originally possible, thus insuring a stronger product. Stirring time can be held to 1 min, maximum.



Adjustable Stop

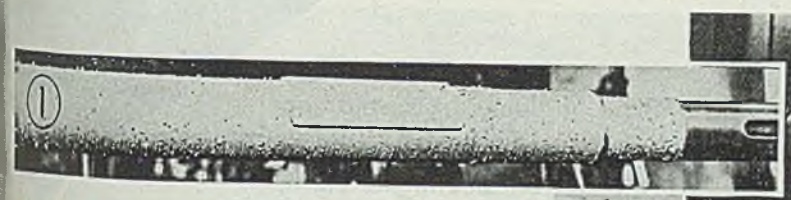
—operating in conjunction with blades of wire stripping machine controls depth of cut, avoiding wire damage

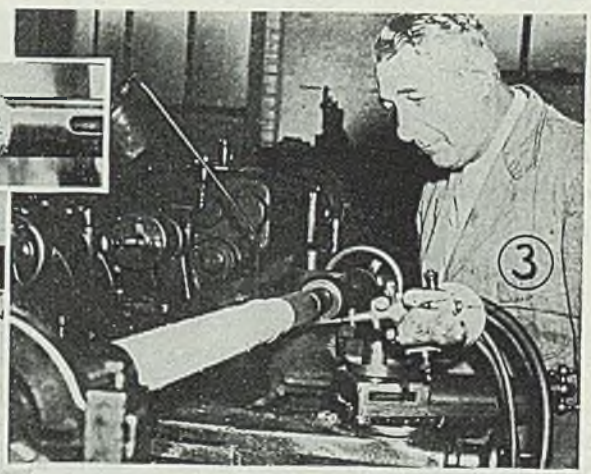
CONSIDERABLE savings of scrap material are obtained by use of an adjustable metal stop, shown in accompanying illustration, which operates in conjunction with the cutting blades on a wire stripping machine for removing the shielding from co-axial cables.

Formerly, cable was placed in the cutting slot and blades closed around the cable from the top and bottom until they cut through insulation which then was stripped off at the end of the wire. Problem was that the cutting machine was used on many sizes of cables, and thus depth to which blades were permitted to cut was more or less a matter of guesswork on the part of the operator. Cuts often were made too deep and wire was damaged, making it unfit for use.

Stop fixtures now are attached to the side of both the bottom and top blades of the stripping machines at Glenn L. Martin Co., Baltimore. They have convex ends so that edges of the fixture, when closed, form a circle around the cable and prevent blades from cutting any deeper than necessary into the insulation. They are adjustable, and various sizes are provided, permitting many kinds and sizes of cables to be cut on the same machine with the same blades.

Before these stops were added, scrap loss on smaller cables sometimes ran over 50 per cent. Now it is entirely eliminated. It also has resulted in savings of approximately 1500 manhours per year by eliminating rework formerly necessary. Experiments are being made to determine if the same idea, with changes and modifications, can be applied to other cutting processes.





Salvaging DRIVE SHAFTS

SIX WEEKS after obtaining metallizing equipment, a New York newspaper had salvaged $2110 worth of equipment at a cost of only $142. Among the equipment reclaimed by this method were 10 badly worn upright drive shafts which formerly were replaced at a cost of $1850. A $200 fountain roller and a 160 top folder horizontal shaft also were salvaged, resulting in a total saving of $1968.

The upright drive shaft, 94½-in. long, was rebuilt by spraying a bearing surface 24½-in. long on one end, as shown in Fig. 3. There are three diameters in this section, one of 2 5/16-in., another of 2¾-in., and a third of 2.756-in. This part has two keyways in the 2¾-in. section. On the other end of this shaft, which is 2½-in. in diameter, an oil groove was sprayed.

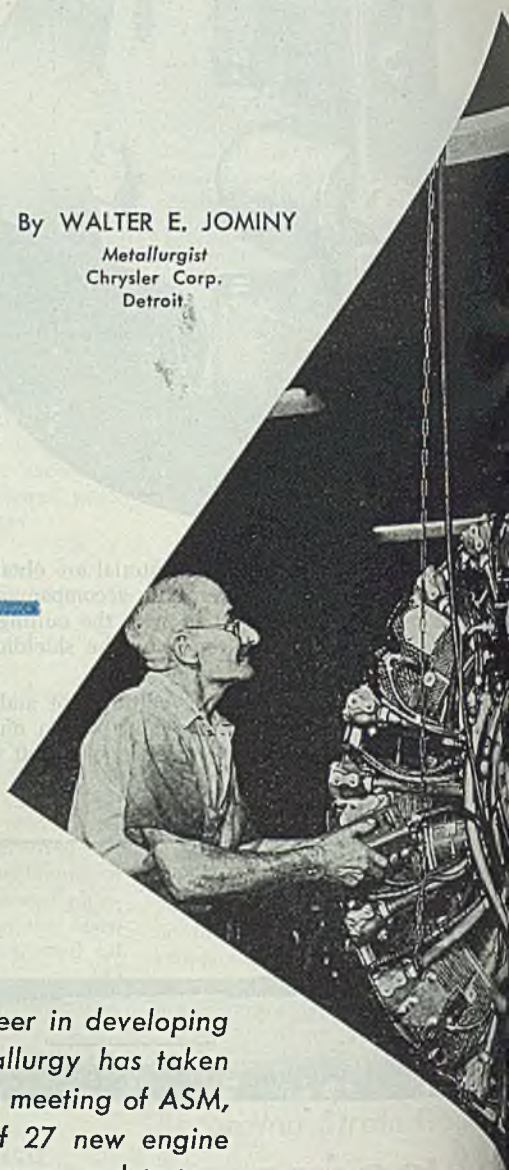
The shaft was prepared by conventional rough threading and machine finished, according to C. W. Reynolds, field engineer, Metallizing Co. of America. Dummy carbon keys were inserted in the keyways, as shown in Fig. 1, to a height of approximately 1/32-in. above finished size. After finishing, the dummy carbon key was broken up and removed, leaving perfect edges along the keyway sides. Total time required for spraying was 1 hour and 50 min, and 9¾ lb of 0.10 carbon steel wire was used. Total wire cost was $1.60. Cost of the acetylene, oxgen and compressed air used in spraying was $6. Approximate labor cost for preparation, spraying, and finishing was $6, making a total cost of salvaging per shaft of $13.60. Fig. 2, left, shows a worn shaft before spraying. A salavaged shaft is shown at right. Note the clean-cut edges of the keyway which is in the upper part of the shaft at right.

The fountain roll which was reclaimed is 80 in. long and 5 in. in diameter, and was worn at the journals on both ends. One journal was 1½ in. in diameter, and the other 1 in. in diameter, before metallizing.

AIRCRAFT ENGINE METALLURGY—

Since World War I

By WALTER E. JOMINY
Metallurgist
Chrysler Corp.
Detroit



At times pacing, at all times aiding the mechanical engineer in developing the great airplane power plants of World War II, metallurgy has taken vast strides. As reported by the author at a recent Detroit meeting of ASM, the between-wars period witnessed unveiling and use of 27 new engine materials, in addition to many new metallurgical processes and tests

MECHANICAL engineers who specialize in aircraft and aircraft engines probably would be quick to admit the vast strides since World War I would not have been possible without the metallurgical developments which have come since then. Not many, however, seem to realize that the basic improvements in metallurgical processes or materials make possible the really great forward steps in mechanical engineering.

Some of these developments, such as sintered carbides, induction heating, and chromium plate, are so well known they need merely be mentioned. It seems rather startling to realize they were not available in the last war. Other developments, such as the S-curve of Bain and Aborn and hardenability conceptions, affect aircraft engine materials only in a general way. They have, however, been useful in making more accurate applications of materials and processes.

Scanning the materials in aircraft engines of World War I and comparing them with those used in World War II discloses many newcomers. They are: Magnesium, sodium, silver, lead plate, indium plate, beryllium, stainless steel, columbium, titanium, selenium, chromium plate, sintered bushings, sintered carbides, molybdenum high-speed steel, nitralloy steel, forged aluminum, heat treated aluminum castings and high-temperature alloys.

New processes or tests which have been developed in the period under discussion are: Nitriding, grain size control development of S curves and hardenability testing, induction [h]ening, magnaflux testing, furnace [a]mosphere control, hydrogen bra[z]hardness testing with rockwell [m]chines, shot blasting, and quantit[a]spectrography.

Of the many recent new mate[r]magnesium has attracted much [a]tion. This metal is used in the [f]of strip, sheet, bars, forgings and [c]ings. It is seldom used in the [p]state, other metals being added relatively small percentages to [im]prove the properties and usability the alloy.

Although certain precautions [a]necessary in making magnesium [c]ings—prevention of fire by means suitable fluxes during melting [a]casting and prevention of fire in [h]treatment of castings by careful [c]

trol of the solution treatment temperature and by the addition of sulphur dioxide to the atmosphere—magnesium has proved itself a commercial material. Its cost is low enough for aircraft applications and probably many peacetime applications. One of the important items in the cost of magnesium castings is the large number and size of the risers, gates and sprues necessary to insure good castings. It is commonly necessary to use three times the casting weight for gates and risers in the production of high-grade castings. Rapid strides were being made toward the end of the war in learning how to reduce the weight of metal necessary for risers and gates. It is expected these developments will reduce the price of the rough casting.

An item of importance in considering cost is the easy machinability of magnesium castings. Magnesium alloys may be machined faster than aluminum, and where a large amount of machining with good finish is required, the cost of the finished part may compare favorably with aluminum. When aircraft quality is not required, savings can be had through the elimination of chills and the reduction in gates and risers. Physical properties possible with magnesium sand castings compare satisfactorily with the common aluminum sand castings.

Sodium is used in exhaust valves to carry the extreme heat in the head of the valve to the stem and lower parts

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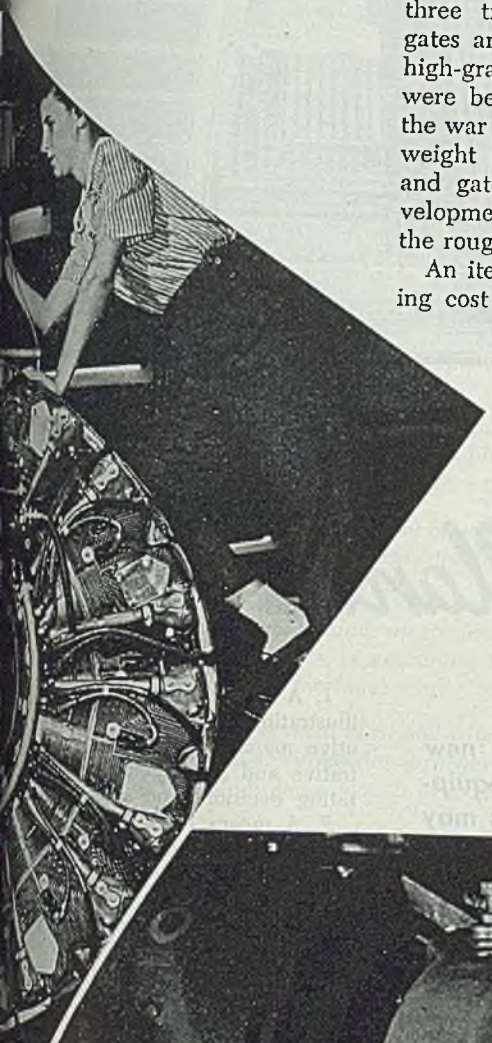
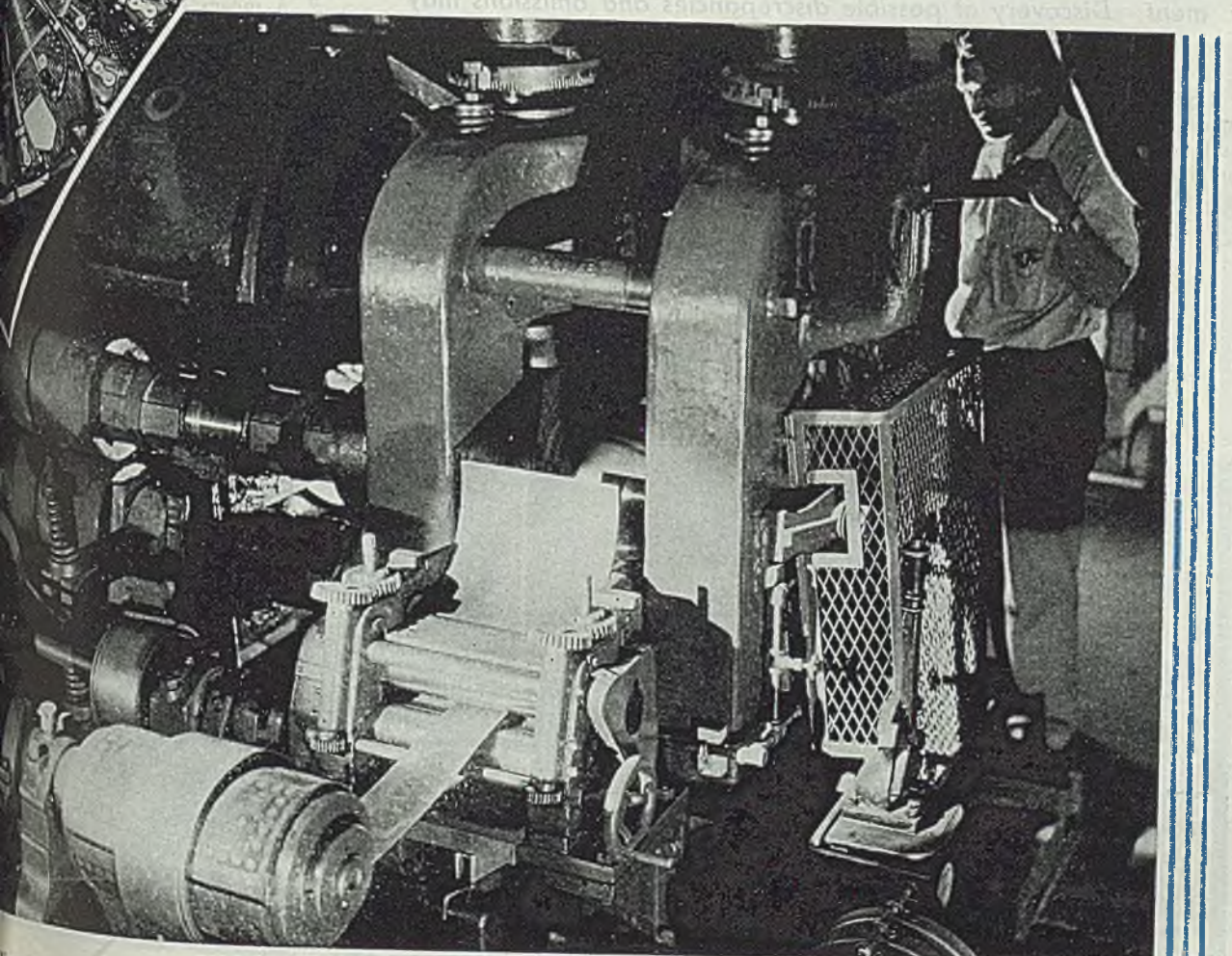
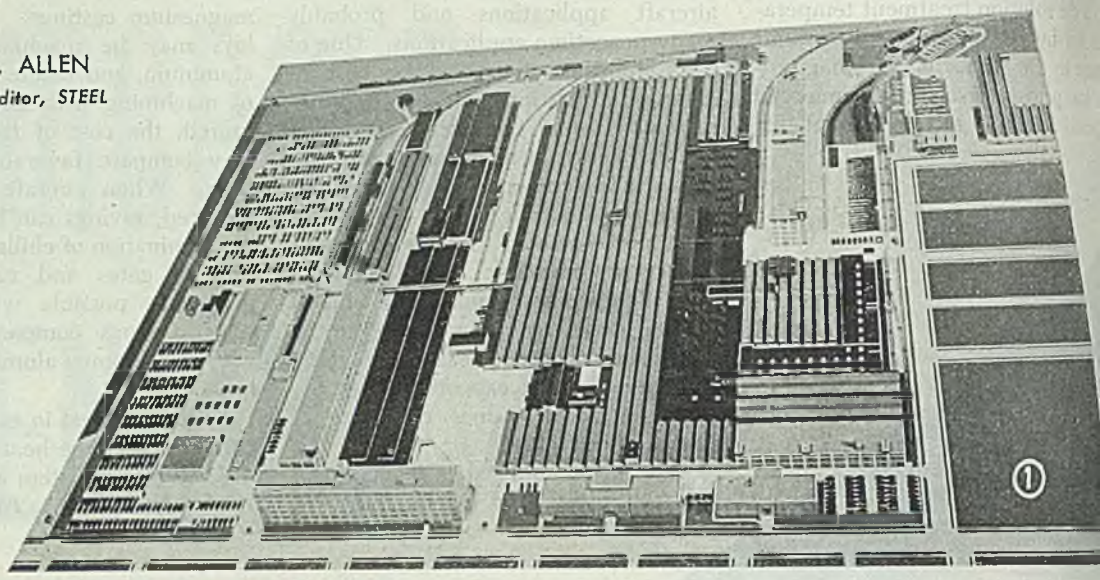


Demonstrating swift pace in aircraft engine development, position of this great 18-cylinder, 2200-hp Wright Cyclone as a power plant for the Boeing B-29, C-97, Martin Mars and Lockheed Constellation, now is threatened by larger engines of considerably greater horsepower. Photo courtesy Wright Aeronautical Corp.

Rolling magnesium metal into strips for further fabrication into aircraft components. Photo courtesy Dow Chemical Co.



By A. H. ALLEN
Detroit Editor, STEEL



SCALE MODELS *for Plant Layout*

Changes in existing setups and "previewing" proposed new plants made easy with scale models of buildings and equipment. Discovery of possible discrepancies and omissions may save cost of miniatures

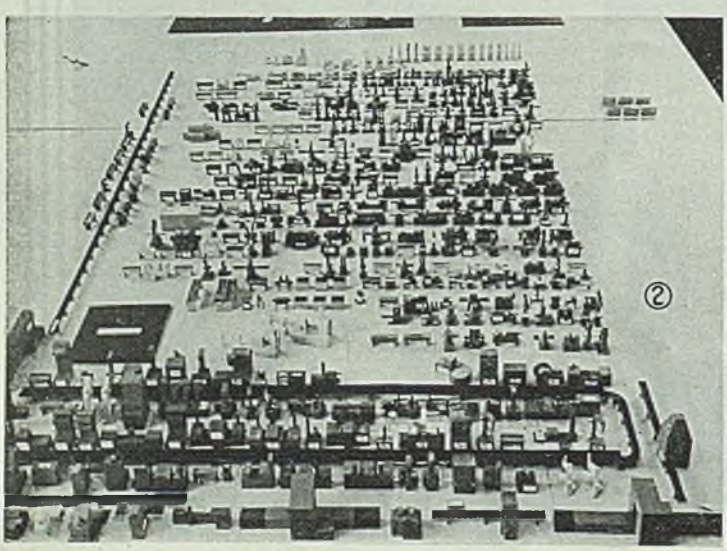
USE of three-dimensional scale models of plant buildings, machinery and equipment is one of the means of predetermining the appearance and efficiency of revised or new plant layouts of Chrysler Corp., Detroit. As developed by corporation engineers, the virtues of these models lie in three directions:

1. A quick and graphic method illustrating proposed changes to e utive management, particularly admi trative and procurement officials, fa tating decisions and speeding action
2. A means for clarifying a new out in the minds of plant engineers charge of new construction, often closing discrepancies and omissions more quickly than do blueprint sketches.
3. A helpful tool for time study

Fig. 1—Example of typical topographical layout of plant buildings and property, made on scale of 0.05-in. to the foot. It is sectionalized so that portions may be removed when improvements are proposed. Note parking lots with cars at left

Fig. 2—Complete department laid out with three-dimensional models of all equipment, including conveyor tables. Lighter colored units indicate machines which must be purchased, the darker ones those already on hand

Fig. 3—Closeup of layout shown in previous view. Note faithful detail carried out on some of the machine models, all of which are labeled and reproduced on a scale of 3/8-in. to the foot



production control departments in determining the number of men required for various operations, as well as necessary materials handling facilities, inspection benches, clearances, etc.

In the automotive industry, the conventional method of preparing interior layouts of equipment is on a two-dimensional basis, using a flat floor plan laid out to a scale on the order of ¼ to ½-in. to the foot, depending upon the overall size of the department. Then cardboard scale cutouts of equipment as it appears in plan view are prepared, labeled and either pinned or cemented to the floor plan.

While such a system has proved satisfactory, it does not of course convey a clear picture of how a new department will look, or reveal possible layout flaws which become readily apparent in a three-dimensional layout. At the same time, it must be appreciated that much of this layout work has been of a rush nature, with little time available for the tedious procedure of building actual scale models of the equipment involved. Chrysler plant engineers, however, have used the three-dimensional system as an adjunct to the conventional method of layout.

There are two ways to use three-dimensional material. One relates to models of plant buildings and property, on which interior equipment in buildings obviously is not shown. The other deals with model layouts of interiors, made on a somewhat larger scale, on which the principal features are individual machines, conveyor lines, inspection benches and the like.

In the first category, complete topography may be reproduced, as well as all manufacturing buildings, loading and shipping docks, railroad main lines and spurs, roadways, parking lots (complete with miniature cars), materials and die storage yards, fencing and gates, power houses—in fact, everything that occupies a place on a plant property as shown in Fig. 1. Scale is 0.05-in. to the foot.

A feature of this type of layout is that it may be made up of hundreds of small sections fitted together like a jigsaw puzzle, except that most sections are usually rectangular, permitting any one section or group of sections to be removed and new ones substituted to show how contemplated construction changes may appear. Buildings are solid wood blocks, painted on the outside to resemble the actual structure. Sections of rail lines may be attached to thin wood strips and easily lifted

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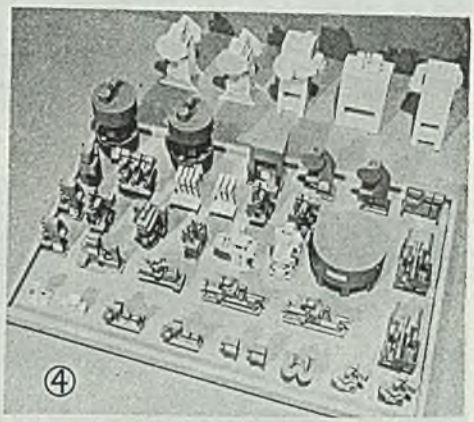
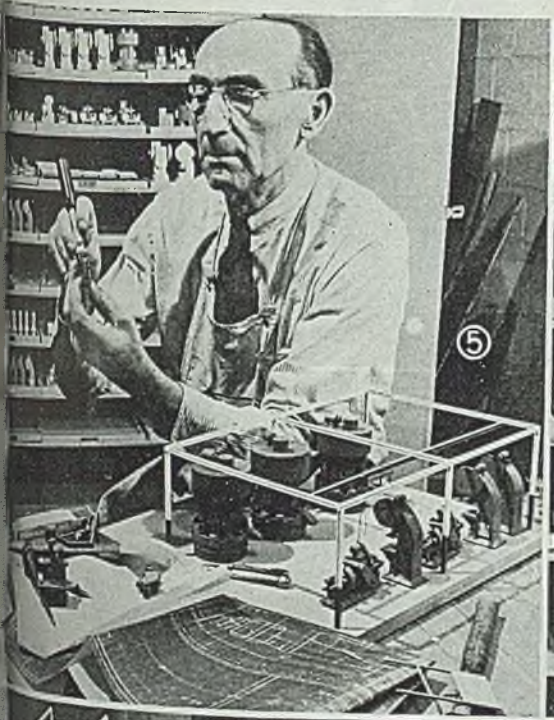
Fig. 4—Typical model of departmental unit, showing models of vertical automatics, welders, presses, multiple drills, lathes, hobbers, electric furnace, etc. White painted units indicate machines to be bought

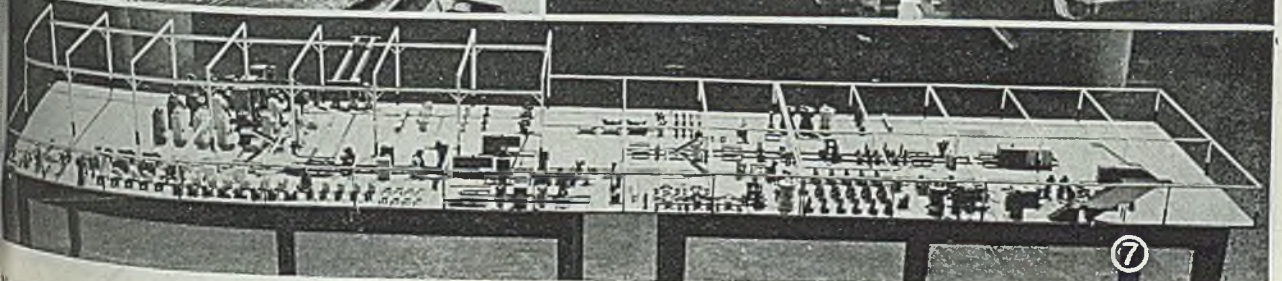
Fig. 5—Veteran carpenter puts finishing touches on wood model of single-spindle drill. To his left is partially completed departmental units of vertical automatics, presses and lathes

Fig. 6—Trays of machine tool models built up for inventory and eventual spotting in equipment layouts. Operator is examining tray of assorted welding machines

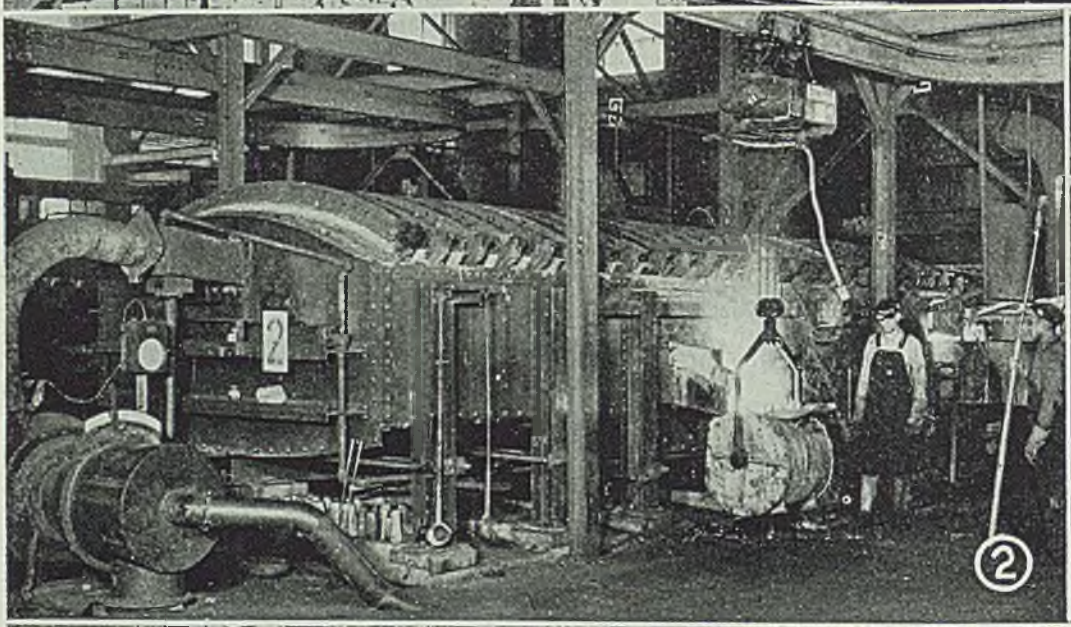
Fig. 7—Complete model layout of small plant and equipment, exact down to the smallest detail such as stairways, inspection benches and structural columns. For further study it is possible to place models of workmen at various machines

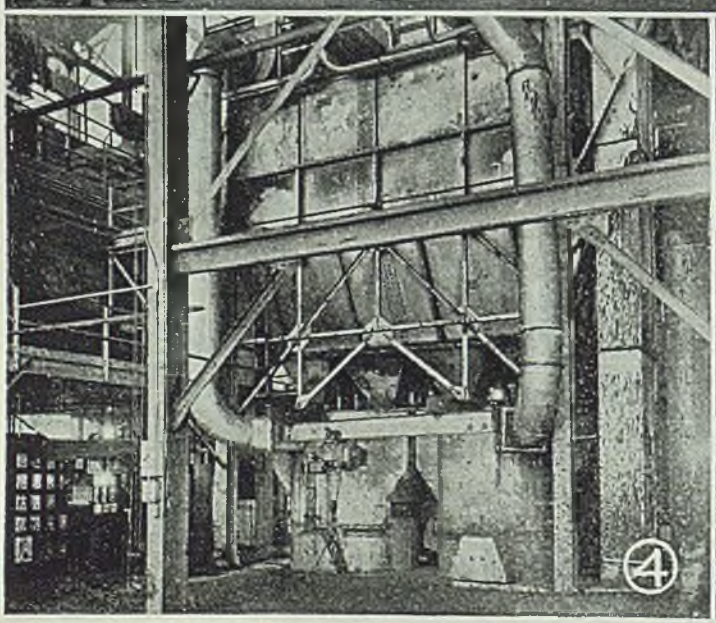


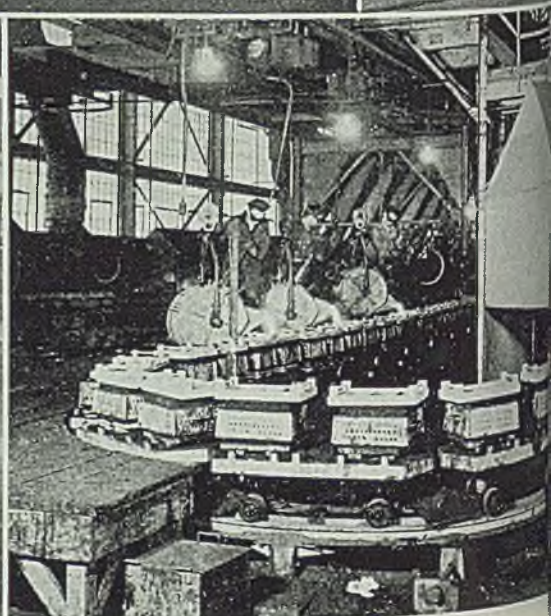




new foundry *Is Model of Mechanization*







latest available fa-
cilities insure fastest
and most econom-
ical production of
malleable castings

DURING the period of multitudinous shortages, Lake City Malleable Co., Cleveland, like others in its field, was forced to meet the huge iron tonnage demanded by war by expanding its existing capacities through the building of a new foundry of streamlined efficiency at Ashtabula, O. It was designed to incorporate the latest developments of foundry equipment available in America.

The main foundry building measures 240 x 790 ft, and of its 37 ft height, 35 ft are devoted to glass windows. Roof is topped with three large monitors, also made up largely of windows. In addition to the large amount of natural illumination, dust control provisions were installed and wide aisles and correct spacing of equipment were instituted in the plant layout to insure satisfactory working conditions and maximum efficiency without loss of product quality.

Plant departments are laid out so that operations proceed in a straight line the length of the building and require a minimum of handling of the castings from their pouring to final inspection. Materials handling as a whole is highly mechanized and includes such operations as charging of the cupolas, conveying and transferring sand, coal, hot metal, molds, castings and sprues.

To produce malleable castings ranging in weight from 1½ to 175 lb, the plant uses four cupolas and three pulverized-coal-fired air furnaces. It employs the duplex melting practice. Three continuous conveyors handle molds for the smaller castings made on machines, while additional machines produce molds for the larger castings. Shakeouts are located in tunnels below foundry floor. Overhead obstruction usually caused by exhaust piping is eliminated by carrying the piping under the floor. Plant has wet-type dust collectors and disposes of accumulated sludge through a pipe leading from the plant to a ravine on the property. Four mixers are used to prepare and distribute sand to the molding stations.

Melting equipment is located at one end of the foundry building where the roof is about 20 ft higher. Four cupolas are located in relation to three air furnaces so that the latter can receive hot metal from either of two cupolas. This arrangement accommodates the necessity of operating a cupola on alternate days to

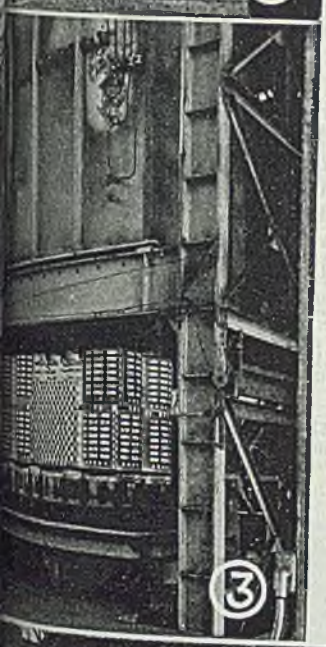


Fig. 1—View of plant after completion showing raw materials receiving tracks

Fig. 2—One of the pulverized-coal fired-air furnaces discharging metal into 1000 lb ladle. Emerging from underground tunnel at left is pulverized coal duct

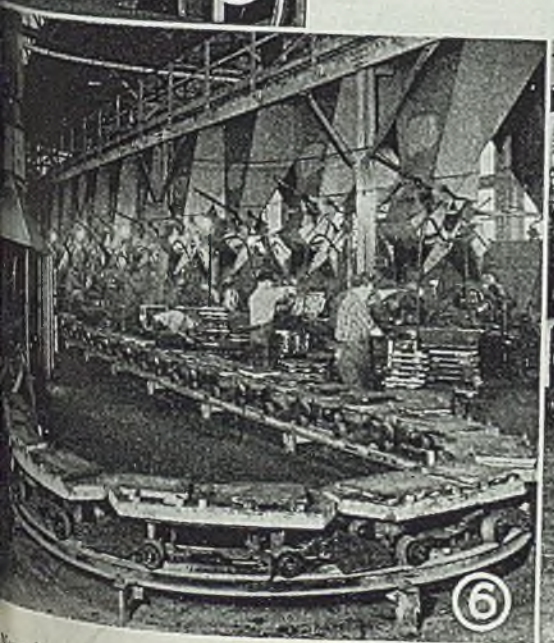
Fig. 3—Car-type electric annealing furnace showing charge being removed

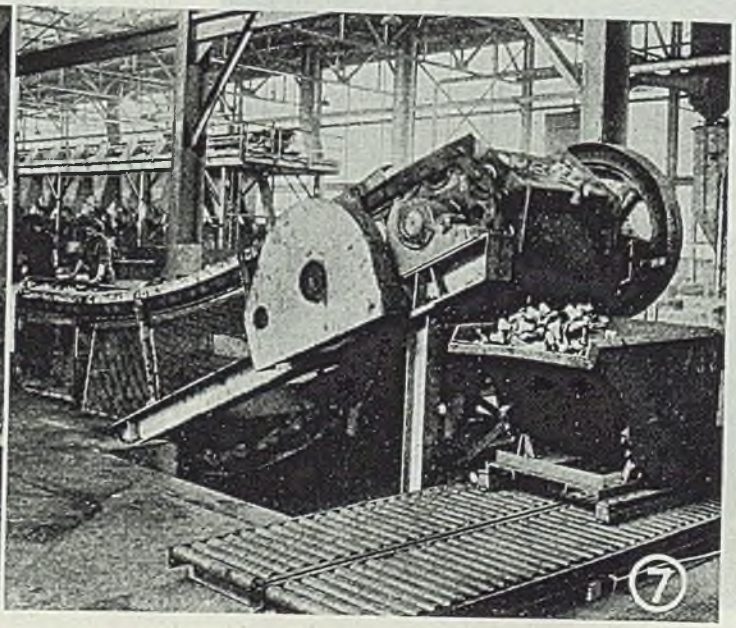
Fig. 4—Storage hopper and sand mixer. Casing at right encloses bucket elevator which delivers spent sand from shakeout to storage hopper. Control panel at extreme left, dust collecting duct at extreme right

Fig. 5—Pouring station, showing overhead metal transfer monorail connected from and returning to the air furnaces. Jackets and weights are placed on molds midway between molding stations and pouring platform

Fig. 6—Automatic dump-off for castings and sand. Castings drop to shakeout below; conveyor, in foreground, takes molds from this point to pouring station

Fig. 7—Conveyor from shakeout to hard iron inspection permits castings to cool. Sprues fall off at discharge end into container for yard storage and reuse





allow for repairs. Slag from cupolas flows down a spout into the air furnace near the stack end.

Procedure in melting is to tap the cupola about 6 a.m. and run 25 tons of the molten metal continuously into the air furnace. After skimming, which takes about 1½ hr, the first bull ladle is filled at 8 a.m. The 1000 lb bull ladles, of cylindrical insulated type, are transported by electrically operated hoists on a loop monorail to the pouring stations where molten metal is transferred to covered and insulated 250-lb-capacity ladles.

Close control is maintained throughout the melting schedule by pouring test specimens and bars every half-hour from the furnace metal. Carbon, silicon, and manganese contents are determined on all specimens from the time they are tapped. Tensile test bars placed in strategic locations with the charges going into the annealing ovens provide a check on physical properties and on correctness of annealing cycle. Fracture tests are made on small square bars cast for this analysis.

Castings are annealed in car-type elevated electric furnaces, the equipment consisting of 14 furnaces, operated in pairs. One of each pair of furnaces operates at high temperature, the other at low temperature. Procedure with the two-furnace arrangement is to place the castings in the high temperature furnace and hold until all the carbon is in solution. Castings are then removed and placed in the low temperature furnace for slow cooling through the critical range.

Smaller castings are placed in heat-res.stant, alloy steel baskets or box about 24 in. in diameter and 30 in. h tor annealing; the larger castings are pl on cars in such a manner as to prev warpage. Generally, a car is loaded w baskets of small castings and the lar castings are placed on end between r of baskets.

After annealing, the castings cleaned, the procedure followed depe ing on the size of the castings. Sma o..es are cleaned in mechanical blas units with metallic abrasive. To facil handling of castings into and out of t units the company has standardized s tote boxes which are the same width tne blasting units. Larger castings hooked on to a conveyor chain and tr ported through a room type blasting which has a movable screen and sli one wall through which the nozzle sp the abrasive to any desired point.

Finally, castings are ground to rem gate stubs, etc. on a row of heavy d stand grinders or on swing frame grind depending on the size of the casting

Castings that must meet dimensi and shape tolerances are straightened coined on a series of hydraulic pre ranging from 250 to 1000 tons. Type press used depends on the size of the c i g and results desired.

The plant is so designed with comp conveyorized line production as to be tirely flexible for the production of medium and small malleable castings gardless of end-uses. No reconve problem has presented itself except of replacing patterns.

The new foundry is operated by company subsidiary, Lake City Malle Inc. Its installations now are comp in fact, shipment of castings began summer.

The foundry's management finds it venient at this time to conduct visitors th the plant.

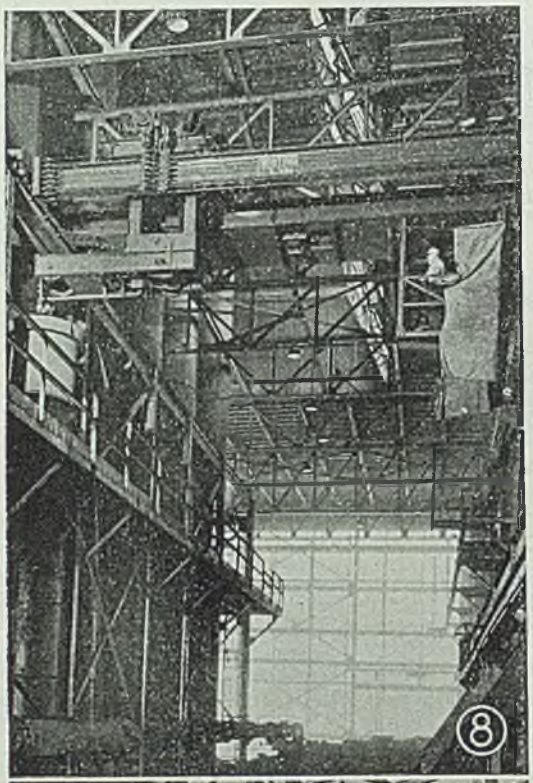
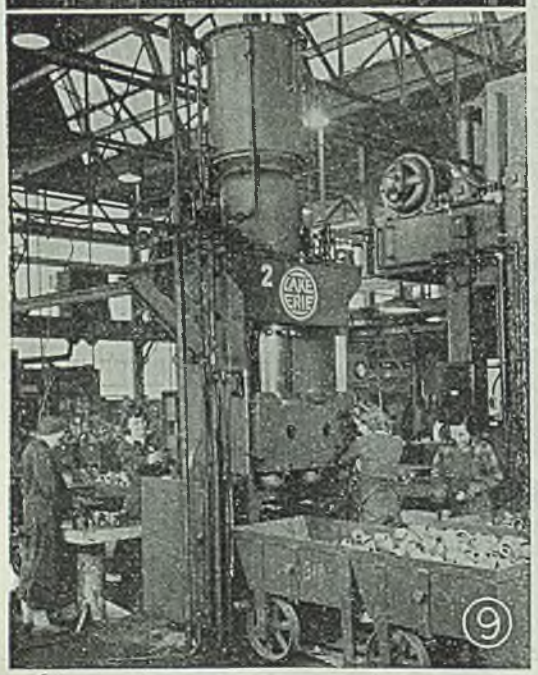


Fig. 8—Three-ton charging crane delivering charge to cupola

Fig. 9 — Hydraulic presses straighten and coin small castings

Fig. 10 — Enclosed swing frame grinders control dust problem



Steel Strapping METHOD

... developed by Navy materials handling laboratory for safeguarding ordnance materials against rough wartime handling is equally suited to many industrial packing problems

PROPERLY applied steel strapping transforms a number of loose boxes on a pallet into a tight unit load that will withstand all manner of hard usage. Shipping ordnance material from factory to front entailed much rough handling in railroad cars, ship's holds, and on distant islands where the load was to have been dragged over coral beaches and through jungle. A poorly bound pallet load not only risks losing the speed and efficiency inherent in mechanical handling, but also is a constant threat to the safety of personnel.

Steel strapping does two things: First, it binds loose articles into one rigid unit; second, it secures them to the pallet.

Two types of strapping materials are manufactured to perform these functions: Round wire and flat strapping, both of which have their specific purposes. Their relative strengths are, of course, a matter of primary interest. Extensive studies conducted by a leading package testing laboratory indicate that if round wire and flat strapping are made from material having the same static tensile strength, their strengths depend on the relative areas of their cross sections. In other words, the shape of the strapping does not affect its static tensile strength. Cold rolled flat strapping has tested at 100,000 psi of cross section, minimum. (Hot rolled strapping is approximately 10 per cent stronger than this. Some ¾-in. and most larger sizes are hot rolled.) Three types of wire have been tested—soft wire with minimum strength of 60,000 psi, hard wire with minimum of 100,000 psi, and special wire with minimum of 140,000 psi. The ability to preserve its initial tension when bound around a pallet load is an essential quality of any strapping material. Only when strapping is tightened nearly to the breaking point is maximum holding power maintained. In the tests mentioned above, wire exhibited a far greater tendency to stretch than did flat strap. Where additional strain applied to a tensioned wire around a pallet load, it would be more apt to stretch and loosen than a similar piece of flat strap. Middle gages of soft and hard wire elongated between 13 and 18 per cent of their length before breaking as compared to 2 per cent and 3 per cent for pieces of flat strapping with cross sections of equal area. No special wire (i.e. 140,000 lb tensile strength per sq in. of cross section) was tested. Excessive stretching is a serious disadvantage, as a loose strap is of relatively little value in binding up a unit load no matter how strong it may be. Very little stretch is needed to cause looseness.

A second difficulty in the use of wire is that it can cut into the corners of the material it is binding. Strain put on a round wire around a pallet at times may cause it to cut in and consequently loosen itself. To some extent, this difficulty can be overcome by the use of metal plates at the corners. Wire has been found valuable for such uses as diagonal strapping, binding irregular objects to a pallet, or for light loads where great strain (to cause stretch) is not expected.

The Material Handling Laboratory of the U. S. Naval Ammunition Depot, Hingham, Mass., which conducted the tests described, reports it has had greater success with flat strap. Flat strap does have more tendency to snag than wire, but this can be virtually eliminated by the use of staples. Snagging has not been a serious problem.

The size of strap to be used depends on the type of container and the weight of the load. The most useful strap for general purposes has been found to be ¾ x 0.035-in. Eight-gage round wire provides roughly equivalent strength. When the package is fragile and the article light, ⅜ x 0.020-in. strap, or even smaller, may be strong enough, while rugged, heavy packages destined for overseas shipment or other rough handling may

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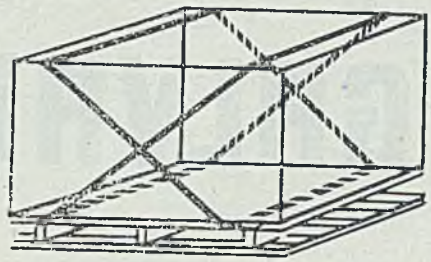
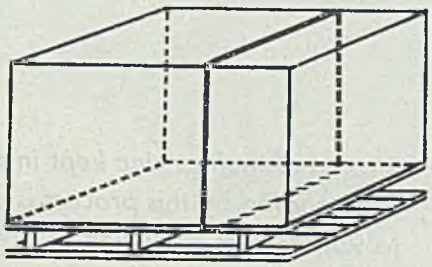
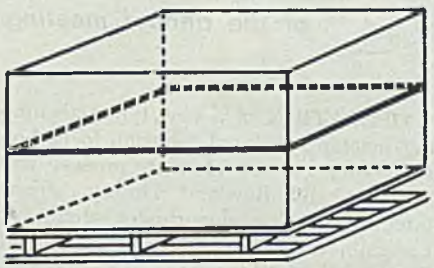


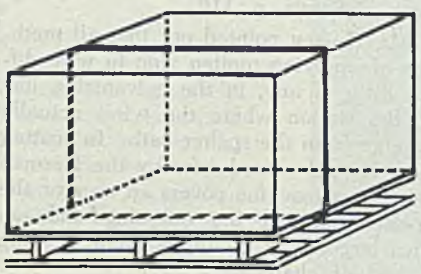
Diagonal



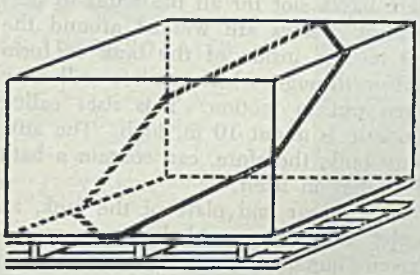
Fore and Aft



Girthwise



Athwartships



Diagonal

New Process Speeds Up GALVANIZING of Wire

Stream of molten zinc kept in circulation well above dross line. Wire coated by this process is drawn to diameter corresponding to 95 per cent reduction of area with speeds in some fine sizes of 2000 fpm. Tensile and torsional values on galvanized rope wire are above specified range and coatings are uniform and resist abrasion. This is the concluding installment of the report of the annual meeting of the Wire Association

OPERATION of a new type galvanizing machine for applying zinc to carbon steel wire by the Herman process was explained by Rowland Hussey, superintendent wire department, Jones & Laughlin Steel Corp., Aliquippa, Pa. at the annual meeting of the Wire Association, La Salle Hotel, Chicago, Oct. 15-18. A report of the opening technical sessions was presented in last week's issue of STEEL, p. 116.

Mr. Hussey pointed out that all methods of applying molten zinc to wire differ little, if any, in the galvanizing line to the station where the wires actually emerge from the spelter bath. In coating type III galvanized wire by the Herman process, a machine covers an area of the spelter bath at the outgoing end—an area larger than usually is found floating a bed of charcoal.

The Herman machine is an auxiliary spelter tank partly submerged in the bath of the main kettle. Its bottom plate has a slot for all the wires to pass upward. Plates are welded around the slot on the inside of the tank to form a riser through which spelter will flow when put in motion. This riser called a nozzle is about 10 in. high. The auxiliary tank, therefore, can contain a bath of spelter in itself.

In the rear end plate of the tank, an outlet duct is provided; two motor-driven impellers cause the spelter to flow from the auxiliary tank to main bath.

Immediately above the outgoing slot in the auxiliary tank, a nozzle directs a solid stream of clear water across or at right angle to the plane of travel of the galvanized wires. Opposite this nozzle, a roll is placed to hold the upgoing wires steady and in a fixed position relative to both the upper slot and the nozzle in the bottom of the auxiliary tank.

In the enclosed space, not filled with zinc, means are provided for introducing natural gas to prevent an oxidizing atmosphere, and thus keep the galvanized wires bright and clean while the zinc is solidifying and to the point where they can be quenched by water.

The outgoing end sinker roll turns continuously and smoothly for long periods while immersed in the molten zinc. The roll journals are cased in Stellite metal deposited by electric welding; the bearings are blocks of carbon similar to carbon brushes on motors.

After the wires being galvanized leave the sinker roll and turn upward they pass through the nozzle in the bottom of the machine. Flowing upward through the nozzle at the same time continuously is a stream of molten zinc, kept in steady circulation by the motor-driven impellers. The circulating stream of molten zinc is rather shallow compared to total depth of main kettle so that the supply of zinc in the final stage of galvanizing the wires is well above any dross line and the stream of molten zinc is so widely dispersed on being expelled from the machine, that newly formed dross has space in which to settle and not included in the return flow to the noz stream.

The speaker in referring to galvaniz rope wire produced by the Herman p cess mentioned that the tensiles are u up on the specified range for all r grades, torsional values are maintai well above the specified minimum, coatings are uniform, smooth, lustr and resist abrasion well.

Galvanized wire made by this pro is readily drawn to diameter corresp ing to 95 per cent reduction in a with speeds in some of the finer s of 2000 fpm. Wrap tests made on dra down galvanized stock show no suri peeling, but rather a hard, dense sur of high luster.

Production rates normally obtained slightly higher than those experien with the charcoal process and the carry-off is no greater on compar size. At normal operating speeds, ratio of alloy layer to the pure zinc tent of Herman galvanized stock i balanced that the theoretical Preece coating weight relationship is maintai that is, 0.18-oz. of zinc per sq ft of face is equivalent to 1 min dip.

Mr. Hussey related that in starting a frame, the 36 wires are put d through a slot and around the sinker and then hitched to a bar welded the back of the machine. The wires in place before the machine is put the spelter tank and when the oper wants to start operations he puts wires on both ends and pulls through.

The machine can be readily remo by a hoisting rigging and a spare set in place. From time to time, speaker stated, we are compelled remove a machine particularly if bearings should go bad.

Mr. Hussey mentioned that the probably less dross coming from wires but a little more from the w the main kettle because of its size. In order to process 36 wires s taneously, he explained, it was n sary to use a wider tank because journals and bearings at each end machine. On the usual range of the tank is 41 in. deep and becaus its width it is necessary to have suffi wall space in order to get heat to tanks.

A change in speed controls the w of coating on 12-gage wire. The pa is to put on a coating up to 1½ oz. speaker did not recommend going below 0.6 or 0.7-oz. One comp which has a Herman installation the use of propane gas but was obl to abandon its use because under high temperature considerable co was removed from the base metal. gas is not satisfactory; coke oven can be used. Consensus of opinion that natural gas gives the best re with the use of this process. The of the kettle is around 10,000 tons a mum according to current practice.

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wire was done, Kenneth Lewis, consulting wire mill engineer, Worcester, Mass., stated in opening the Wednesday morning session. Wire was cleaned by scratching off the scale with old bricks and the lubricant had to get hold of the surface as best it could. The draft was light and the wire of small diameter. It was not until fine wire came upon the scene that attention was paid to the surface, the speaker stated. There was no market for coarse wire; the pieces were short. Lime was used for the first cover though not for the purpose of neutralizing acid. The use of acid began to creep in about 1850. Pickling was accomplished in tumbling barrels containing sand and water. The bundles called faggots weigh approximately 14 lbs. Each man, the speaker pointed out, had his own lime tub and mixture. The faggots were hung on a peg on the wall and were baked by the hot sun. In the speaker's opinion, lime has its place but in the wire mill it is only there until something better can be found. At least seven new techniques for the improvement of surface preparation are being investigated by the wire industry it was announced.

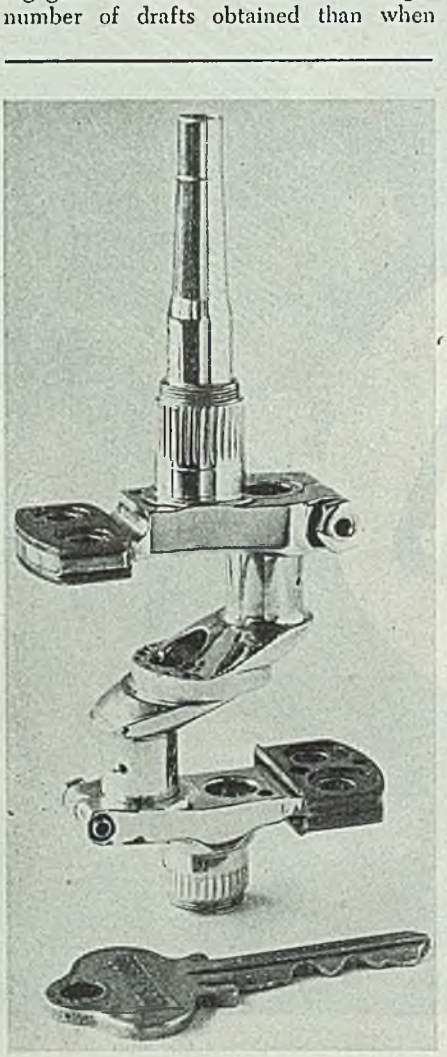
H. L. Trembicki, manager, Metro Coating Division, Magnus Chemical Co., Cleveland, in speaking on "Preparing Rod Services for Drawing" claimed the most successful type of coating is a compound with low alkalinity and wetting properties. However, he warned, it must not be hydroscopic. It is possible today, the speaker contended, to coat wire, ship it to other plants without rusting and then draw seven holes on a high-speed machine. New coating processes eliminate baking without any danger of hydrogen embrittleness.

A clean surface is important in the efficient use of coating compounds. The wire rod is pickled in acid and then washed in cold water. It is then dipped in the coating solution contained in a welded steel tank which is heated by enclosed steel coils. The temperature of the solution is maintained at 200°F. High-carbon wire is left in the solution for a period of 3 min.

Better die life on high-speed machines is afforded by use of coatings. Mr. Trembicki stressed the importance of using a lean lubricant in the first die box only. If lubricant is used in other boxes, he stated, it will actually remove the coating compounds. When low-carbon wire is being processed say No. 5 rod, properly coated, the procedure includes placing lean lubricant in the ripper box, draw four drafts, remove, and draw four more holes on a single block machine with no lubrication. Wire drawn with coating compounds is easily cleaned and will take subsequent coatings effectively. Welding wire is improved when drawn with compounds, tire bead wire and rope wire get a perfect bond and wire to be drawn with liquor finish is much better.

In the opinion of one wiremaker lime still has its place. The best results, he maintained, from coatings are not yet obtained because specification lubricants must be developed and must go hand in hand with the coatings.

Phosphate coating works well with lime, another speaker stated. One of its advantages is that it does not attack the base metal. Usual practice is followed before placing the cleaned wire in the lime tubs. By the use of phosphate coating good die life is secured and a larger number of drafts obtained than when using lime coatings. In rebuttal to what had been claimed for coating compounds another speaker mentioned that lime still is used. It is cheap, it counteracts rust and provides a good bond for lubricants.



LILLIPUTIAN CRANKSHAFT: 512 times smaller than its 179-lb, 36-in.-long counterpart for the Wright 14 cylinder 1700 hp Cyclone engine is the 4½ oz, 4½ in. miniature made by tool designer Al Vitt of Ohio Crankshaft Co., Cleveland. Critical dimensions of this one-eighth scale model are held to 0.0005-in. Wright crankshafts have total tolerance of 0.001-in. for the 145 dimensions, and the bearing surfaces are finished to a smoothness of four millionths inch

Increased use of beryllium-copper wire is attributed to the production of suitable wire bars according to M. J. Donachie, technical director, Beryllium Corp. of Pennsylvania, Reading, Pa. He warned that certain characteristics of the alloy must be controlled in all redraw operations if wire is to be produced economically on a quality basis.

Mr. Donachie drew attention to a fine red powder layer formation of corrosion metal which plugs the dies. This, he stated, is readily removed by suitable pickling practice and when the wire is properly cleaned, the resultant wire can be drawn either wet or dry.

In discussing the annealing of beryllium-copper the speaker stated that atmospheres developed from cracked gas at a ratio of 2.0 air to 1 gas to 3.0 air to 1 gas when dried to minus 20°F will prevent formation of intergranular corrosion in annealing. Softening at temperatures from 1450 to 1475°F followed by a quench are required to restore the alloy to a suitable working condition.

S. C. Avallone, metallurgist, Spang Wire Co., W. Brookfield, Mass. agreed with Mr. Donachie that in temper-drawn straightened wire tensiles of 220,000 psi are readily available. However, it may not always be readily used at the high tensile value because of local or severe brittleness. Mr. Avallone pointed out that the wire will shape or coil over a large radius, or about four times the wire diameter, but in sharp angular forms or crimping application he recommends tempering back to tensile strength between 165,000 and 195,000 psi, depending on the size and end use. This, he explained, reduces the brittle tendencies in the local areas.

In the opinion of J. Ogden, Little Falls Alloys Inc., Paterson, N. J., increased die life is afforded by plating wire before drawing. It also prevents the wire from becoming oxidized. He explained that oxidized wire cannot be plated satisfactorily. Therefore, any wire that has been plated and then drawn through a number of dies, maintaining a sound adherent coating must be free of surface oxides and intergranular corrosion.

At the final morning session C. Shopmyer, Works Laboratory, General Electric Co., Schenectady, N. Y., presented details of a machine employed in measuring wire stiffness by low elongation which is applicable for large, round and rectangular wire. A sample about 16 in. long is straightened and marked with a bar having two knife edges exactly 10 in. apart. The sample is then placed in a tensile testing machine and loaded to a value of 150 psi for 30 sec. After the load is removed, he continued, a new set of marks is made with the 10-in. bar. By means of a shop microscope, having a scale graduated in mils it is possible to measure the possible elongation or low elongation.

The speaker mentioned that the test has been useful in several ways. It provides a figure for softness which can be used in specifications and which is independent of wire sizes. It is a useful tool for determining the effectiveness of annealing procedures and the hardening effect of various combinations of bending and stretching.

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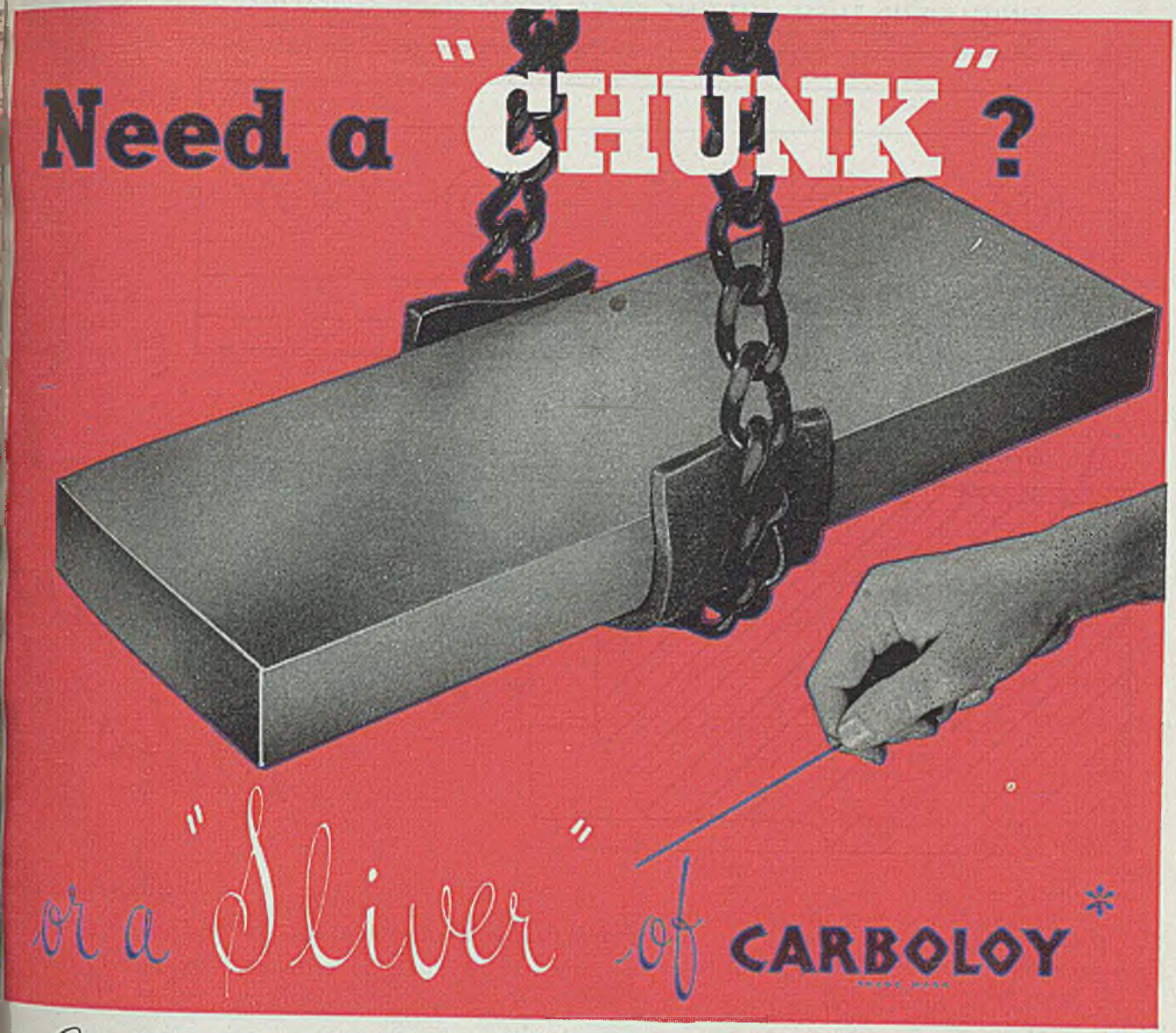

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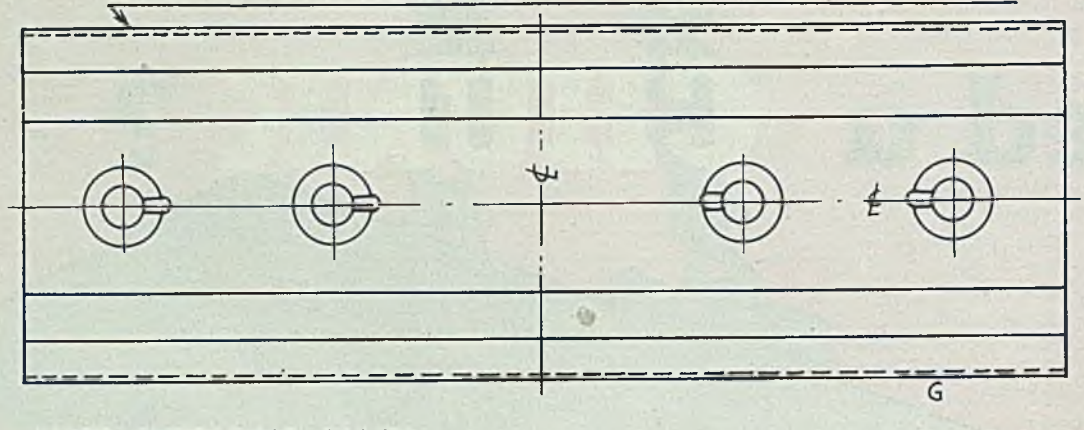

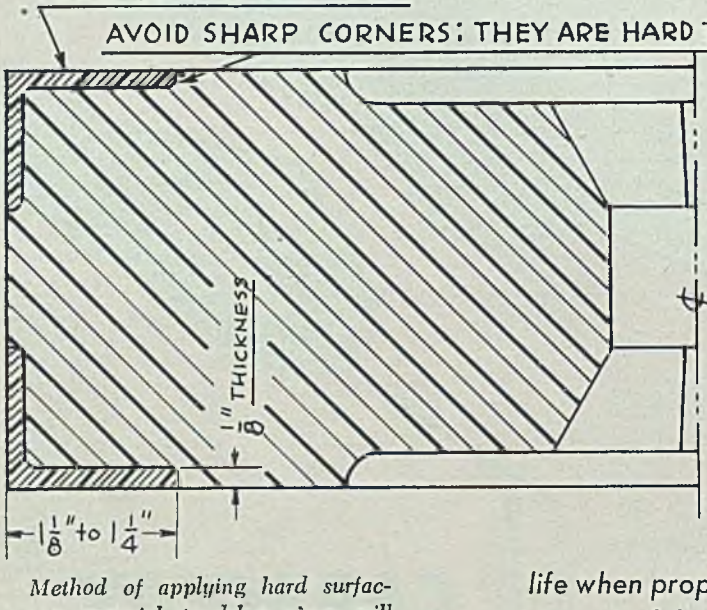

Method of applying hard surfacing material to blooming mill shear knives is shown here

Hot-Shearing Blades

. . . are made to last several times normal life when properly hard surfaced. Method not merely a salvage tool but valuable on original equipment as well

By A. T. CAPE
Vice President and Director of Research & Development
Coast Metals Inc.
Canton, O.

THE STEEL industry suffers aggravating and costly delays in the production of blooms, billets, slabs and bars owing to the rapid wearing of the hot-shear blades used in the operations. There have been many attempts to correct this, and a vast number of different compositions of alloy steel blades have been tried with varying success.

Homogeneous (as contrasted with hard-faced) blades are expensive when made from the semi-tool steel compositions, owing not only to the cost of alloy but due to the problems involved in the process of manufacturing. Blades of carefully adjusted alloy compositions have contributed notably to the art, but there has always been a demand for greater life, not merely because with perfectly human desire to get more for one's money, but because with increasingly tougher steels to be sheared, the life of blades has become a serious concern.

In the early stages of the development of suitable hard-facing metals for use on hot shears, the guiding motive was to salvage worn blades. This was relatively successful as long as the blades were not made of a sensitive alloy steel composition. Many steels were found to be impossible to weld unless elaborate and costly precautions were taken to avoid the cracking and breaking away of portions of the blade.

A plain carbon steel was then selected as being the type most readily welded. The carbon content was kept between 0.40 and 0.50 per cent so that base metal was sufficiently rigid to support the hard-facing while avoiding any tendency to brittleness.

At first it was thought necessary to use a high alloy type of hard-facing metal, particularly in view of the success obtained by the use of cobalt-chromium-tungsten alloys in certain shearing and hot-trimming operations. An iron containing alloy high in chromium, cobalt, nickel and molybdenum, gave excellent results. Later on a patented alloy welding rod, high in iron with less than 1 per cent of carbon and containing relatively small amounts of nickel and chromium, with a substantial amount of molybdenum, gave by far the best results. Shears, with the above alloy arc welded to a properly prepared steel base, are in general use throughout steel mills of the country. The life tained ranges from three to four to, in some cases, as much as two to fifteen times that obtained with geneous shears.

There is nothing more disturbing the engineer than the occasional fa of what is apparently a well estab formula, and yet that experience is rule rather than the exception. In case of hot-shears, while reports of cesses were coming in from steel everywhere, there were also distur reports of a few failures that at seemed inexplicable. These were vestigated, and in some cases the of the trouble was poor welding.

In others, however, the hard-fac was found to be crushed by the imposed in shearing. In severe instanc the hard-facing was broken away the parent metal. In one case, the bo tom shear, which is normally the that wears out first, was working succ fully, while the top shear was fail badly. The bottom shear was, how water-cooled, while the top shear, ow to the construction of the mill, c not be cooled. It was clear that

(*Please turn to Page 178*)

15 minutes...

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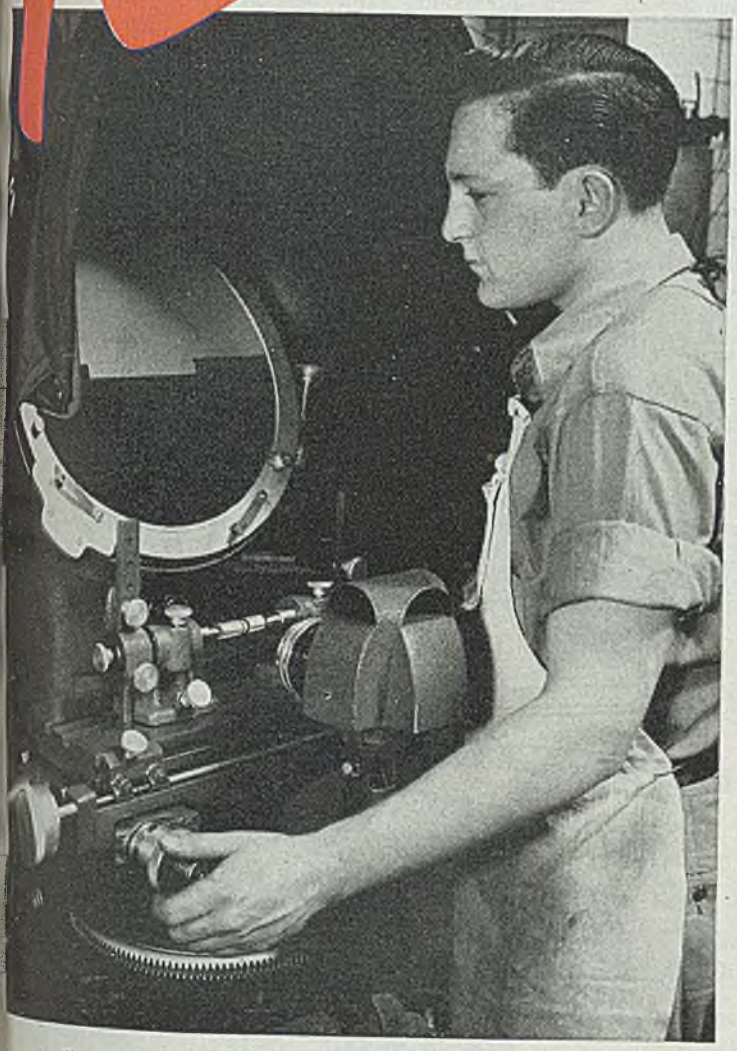

Photo courtesy of United Precision Products Company, Chicago, Illinois

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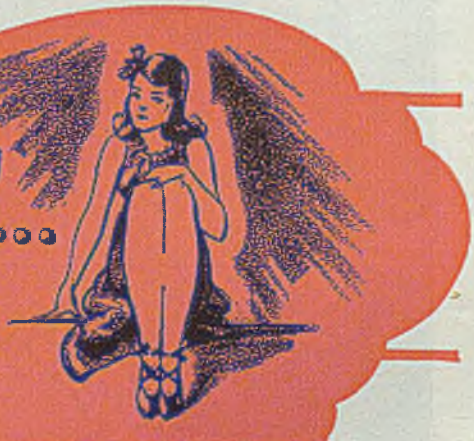


By DR. ALLEN G. GRAY
E. I. du Pont de Nemours & Co. Inc.
Cleveland

CURRENT Zinc Electroplating PRACTICE

Author shows how to test quality of electrodeposited zinc coatings in fifth article of series

THE criteria of a satisfactory zinc deposit depend somewhat upon the purpose to be served and also in some measure upon the point of view, whether that of the manufacturer or of the consumer. All angles must be considered if a permanently satisfactory basis is to be reached. It is possible to define the quality of an electrodeposit either in terms of the process to be employed or of the requirements to be met. Unfortunately both bases of specifications have their shortcomings. In many instances the factors which determine the service of the product are usually not well understood and even when tentative specifications are prepared, methods of testing are often inadequate. Among the various factors which may determine the usefulness or durability of electrodeposited zinc are thickness, adhesion, ductility, distribution and permeability.

Thickness of Coatings

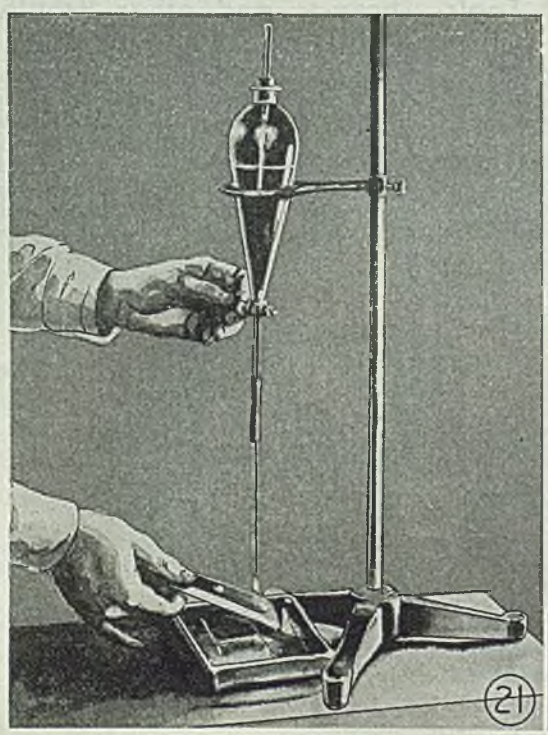
For zinc as well as many other metals, it is possible to determine by some stripping method, the total weight of metal coating upon a given area, and using these values calculate the average thickness of the deposit. Such information is often useful, however, upon most objects and especially those of irregular shape the deposit is never of uniform thickness, due to the tendency of metal to accumulate upon edges or points or upon parts nearest the anode. In general, for protective purposes and for durability, the plating on an object is as good as its thinnest part. It thus becomes obvious that no stripping method dependent upon determining the total weight of the deposited metal is a true measure of the distribution of the plating. Such procedures may be useful in detecting very lightly plated work, in comparing products plated under nearly similar conditions, and in determination of thickness of fairly uniform coatings such as electrogalvanized strip steel.

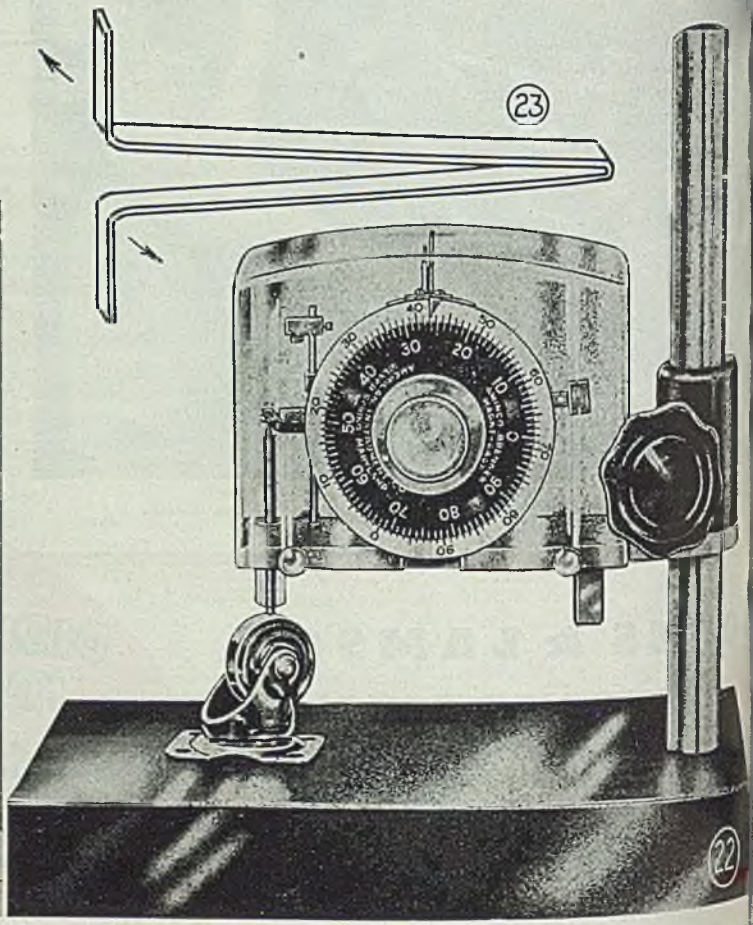
It has been reported that in general electrogalvanized coatings on strip steel are uniform except at the very edges as may be seen by examining carefully polished sections with a microscope[1].

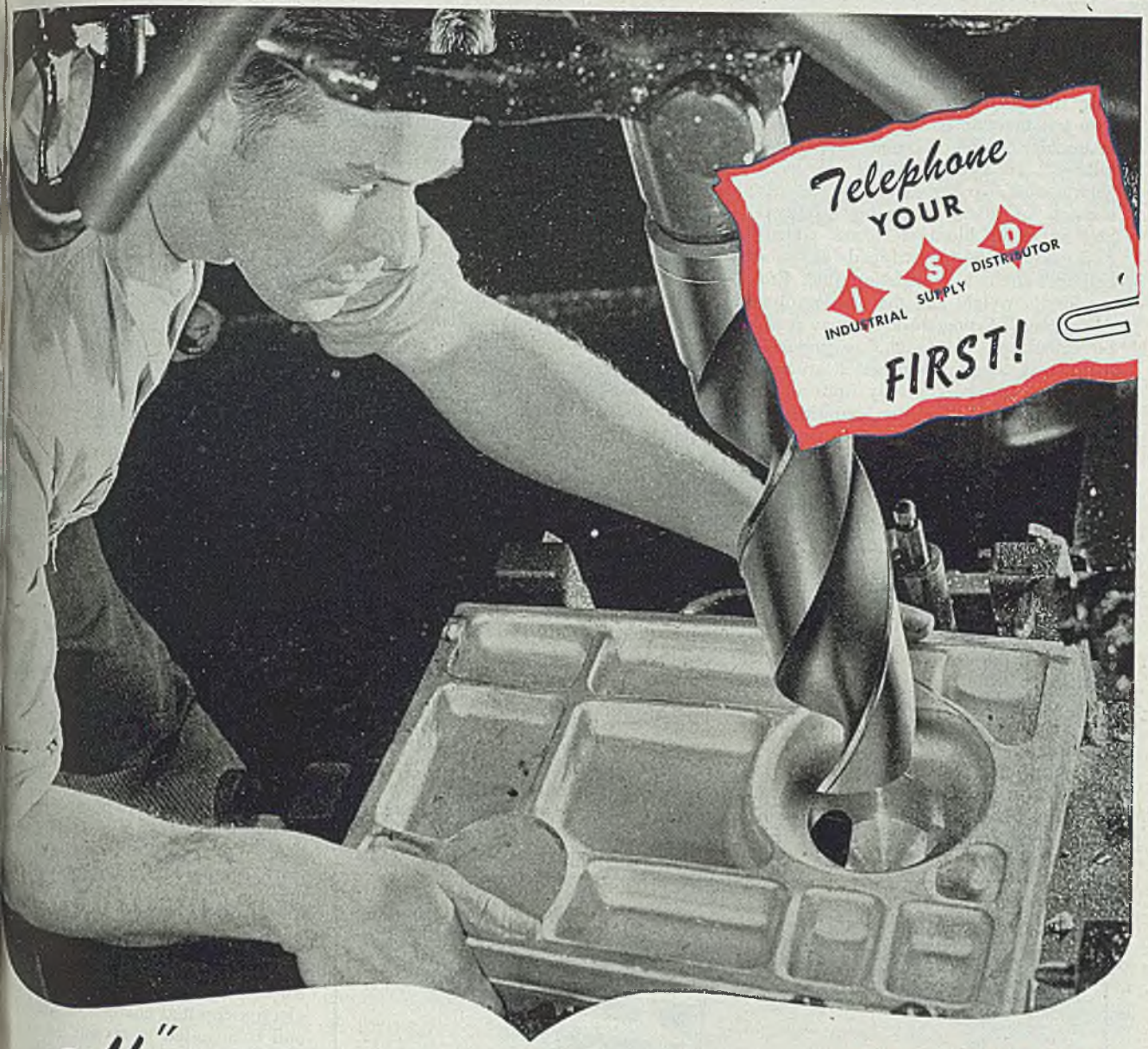
Fig. 21—Drop test apparatus for determining thickness of zinc electrodeposited coatings

Fig. 22—Gage based upon magnetic principle for determining coating thickness. (Courtesy American Instrument Co.)

Fig. 23—Ductility test—Specimen, bent into V shape, is twisted as shown by arrows, then in reverse direction; twisting is repeated until failure occurs







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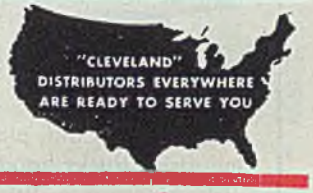

by slicing the strip longitudinally into a number of thin pieces averaging 0.03 to 0.05-in wide and chemically stripping the coating on each slice. In the strip test the zinc is removed in a special hydrochloric acid solution prepared as follows: To every 100 ml. of hydrochloric acid (sp. gr. 1.19), 5 ml. of a solution of 20 g. antimony oxide per liter of hydrochloric acid are added[52]. Zinc may also be stripped in strong boiling sodium hydroxide solution. From the loss in weight and the area involved, the average coating thickness may readily be calculated. Although, as previously mentioned, electrogalvanized coatings on strip steel are not entirely uniform, the non-uniformity is not too significant. It has been reported that on a narrow strip 6 in. wide the excess coating carried on edges is less than 1 per cent of total weight of zinc[53]. However, along the length of the strip the coating is perfectly uniform, whereas it has been reported by Lyons[54] that certain hot-dip zinc coatings have been found to vary as much as 50 per cent and in quite an unpredictable manner. On commercial strip steel, the heavy coating at the edge sometimes extends as far in as 0.19-in. The comparatively heavy ridge along the very edge rapidly falls off to the uniform thickness of the central area of the strip. In plating relatively narrow steel strips as for box strapping and Venetian blind stock the factors[55] which have been found to govern the ratio, of the edge-deposits to the average thickness are (1) dimensions of the strip; (2) space between the strip during plating; (3) distance from anodes; (4) distance from surface of the solution; (5) polarization and conductivity of the electrolyte. The two outermost strips may receive a heavier coating than inner strips in the plating tank.

The Preece test[56] is very frequently specified for thickness tests although its deficiencies are well known[58]. According to this test, after dipping the specimen in a specified copper sulphate solution for certain time, usually 60 sec, the black immersion dip of copper is washed or scrubbed off and the immersion is repeated. When the coating is penetrated an adherent, red copper deposit is often plated on the steel. The number of dips withstood without the appearance of adherent copper is taken as indicating the thickness of the coating. Considerable variance of results may be expected since it has been shown that the amount of zinc removed in each dip may vary from 0.104 to 0.247 oz/sq ft[59], and even when the necessary elaborate precautions are observed is not reproducible [55]. Further uncertainty results from the occurrence of both "premature" and "delayed" end points. The average loss of zinc in a 1 min dip is 0.16 oz/sq ft for hot dip galvanizing and 0.22 oz/sq ft for electrogalvanizing[59]. Therefore, to meet a Preece test specification it is usually necessary to apply a heavier electrodeposit than a hot-dip coating.

The lack of precision of the Preece test has been particularly pointed out by Lyons[55] as illustrated below: On "B" strip a "2 dip" specification is met by applying a coating which will be penetrated early in the second dip. Copper deposition on the bare steel does not occur until the third immersion, when the strip may be 60 to 70 per cent bare. If a slightly heavier coating is applied, the only effect is to delay the penetration of the coating until later in the second immersion; copper is still deposited immediately on the third immersion. Thus, as far as the Preece test shows this is still a "2 test" coating. To withstand more than two dips, enough additional zinc must be deposited to resist penetration during the second immersion; that is, the central area (referred to above) must withstand 130 sec of attack instead of 60 so that if the rate of attack were uniform the coating must be 85 per cent heavier to give a 50 per cent improvement in Preece test[55]. This is a serious objection to the test. Federal specifications for flat steel strapping require that the zinc coating withstand one 60 sec immersion in the Preece test solution "without showing signs of penetration of coating"—a condition not defined and not always easy to detect. Observations suggest that the deposition of copper on the steel after removal of the coating often depends on the exposure of the specimen to air[60]. It is sometimes found that more zinc is required to give a "2 test" coating on round wire which is uniformly coated, than on narrow strip.

Drop Test

The *drop test* is particularly applicable for determination of the thickness of electrodeposited coatings, is widely used and is included in several federal specifications. The rapid and simple test is based on the principle, developed by Clark[61] and later modified and improved by Hull and Strausser[62] and Brenner[63], of dropping a corrosive solution onto the plated article and timing the interval to the instant when the base metal becomes visible. The solution originally proposed by Clark consisted of iodine in potassium iodide; Hull and Strausser recommend a solution of 100 g./1. ammonium nitrate and 55 ml./1 of nitric acid (C.P.—Sp. gr. 1.42). This solution is dropped at the rate of 100 ± 10 drops per minute on the zinc plated specimen until the base metal appears. The rate of stripping is 10 sec for each 0.0001-in. of zinc. To facilitate the detection of the end point the solution freshly prepared may contain 3 g/1. potassium ferricyanide which will give a characteristic blue color as soon as the steel is exposed. Another dropping test solution for determination of thickness of zinc electroplates has been recently proposed by Brenner[63] consisting of 200 g./1. chromic acid which is dropped at the rate of 100 ± 5 drops per minute. The rate of stripping is about the same as for the Hull and Strausser reagent although slightly

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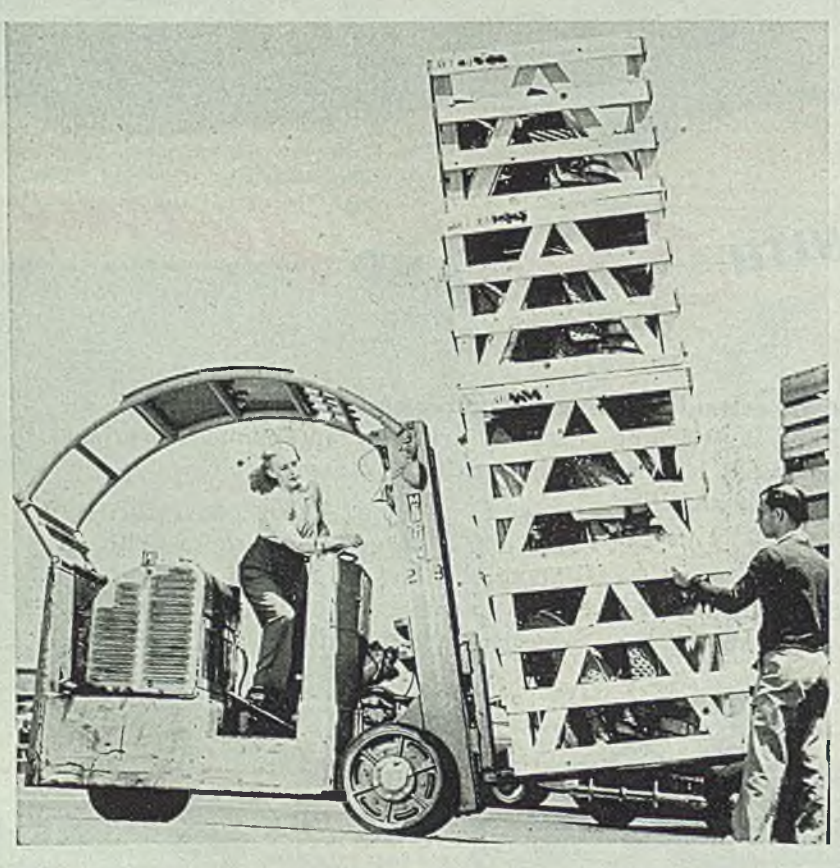
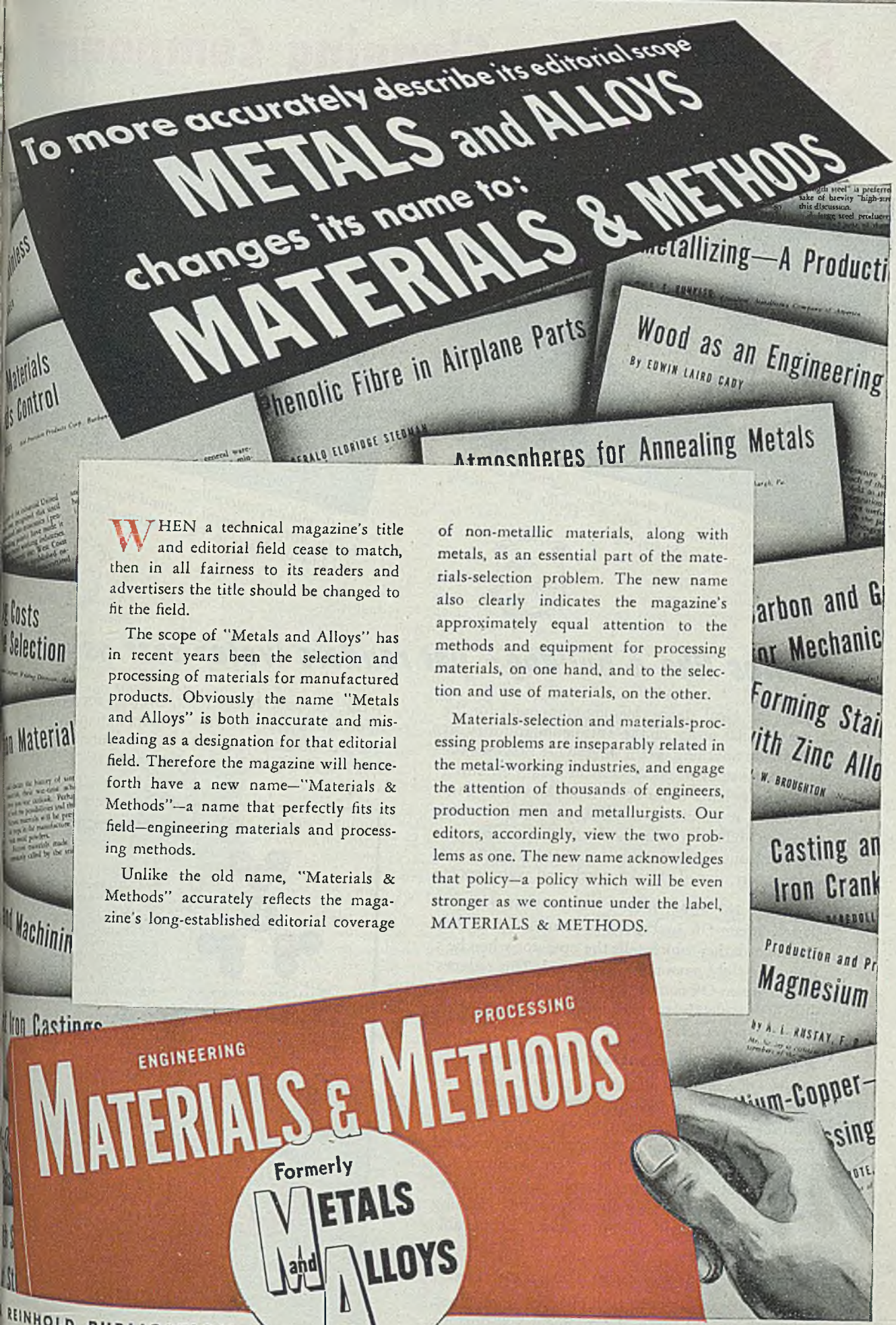


SAFETY CANOPY: Douglas Aircraft Co. engineers at the company's Long Beach, Calif. plant designed this safety canopy to protect drivers of industrial trucks handling high stacks of crates containing aircraft parts



WHEN a technical magazine's title and editorial field cease to match, then in all fairness to its readers and advertisers the title should be changed to fit the field.

The scope of "Metals and Alloys" has in recent years been the selection and processing of materials for manufactured products. Obviously the name "Metals and Alloys" is both inaccurate and misleading as a designation for that editorial field. Therefore the magazine will henceforth have a new name—"Materials & Methods"—a name that perfectly fits its field—engineering materials and processing methods.

Unlike the old name, "Materials & Methods" accurately reflects the magazine's long-established editorial coverage of non-metallic materials, along with metals, as an essential part of the materials-selection problem. The new name also clearly indicates the magazine's approximately equal attention to the methods and equipment for processing materials, on one hand, and to the selection and use of materials, on the other.

Materials-selection and materials-processing problems are inseparably related in the metal-working industries, and engage the attention of thousands of engineers, production men and metallurgists. Our editors, accordingly, view the two problems as one. The new name acknowledges that policy—a policy which will be even stronger as we continue under the label, MATERIALS & METHODS.

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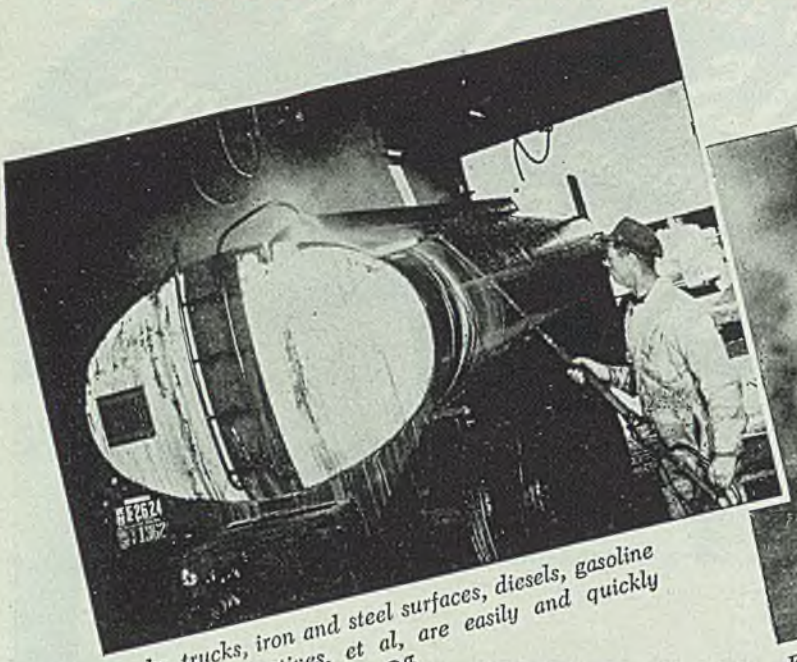
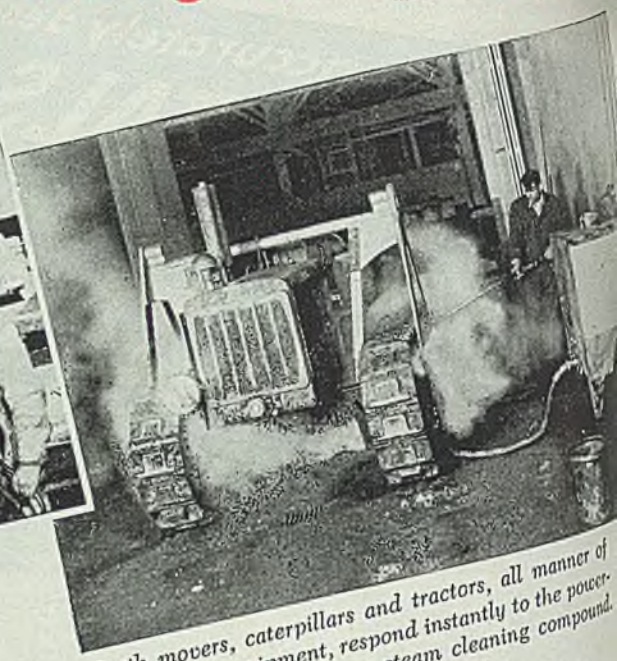
A New Steam Cleaning Compound



Tanks, trucks, iron and steel surfaces, diesels, gasoline engines, locomotives, et al, are easily and quickly cleaned with Turco Steam-Off.



Earth movers, caterpillars and tractors, all manner of heavy, dirty equipment, respond instantly to the powerful bite of this new Turco steam cleaning compound.

-bites like a bulldog- yet renders water soft as rain

Here's the ideal steam cleaning compound for the many special needs of the Petroleum Industry. It will tackle anything, yet it effectively prevents the biggest cause of break-downs in steam cleaning equipment—hard water scale that clogs coils. Furthermore, it functions efficiently, without loss of cleaning ability, even in the hardest water. Steam-Off turns out finished work that is entirely free not only of dirt, but of streaks, curds and water spots.

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Steam-Off combines all the necessary cleaning elements in proper balance. Its penetrating action and emulsifying ability are extremely powerful. In fact, used in strong solution, Turco Steam-Off is an ideal paint stripper. Yet, for all its power, its water softening ability is truly remarkable, and the fumes usually associated with such a heavy duty cleaning compound are held to an almost unbelievable minimum.

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*THIS IS TURCO SURFACE CHEMISTRY

Surface Chemistry is the scientific balance and application of these cleaning factors to a specific problem.

WA—Wetting Action
EA—Emulsifying Action
SV—Saponifying Value
SA—Solvent Action
CA—Colloidal Activity
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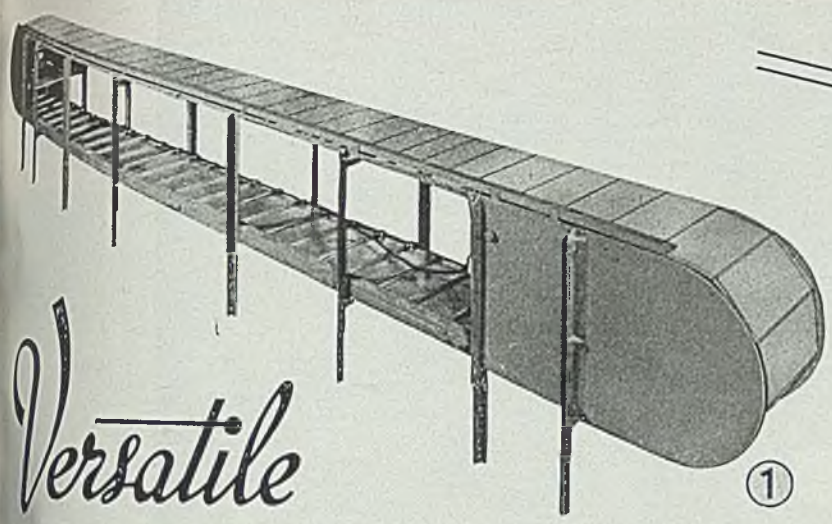
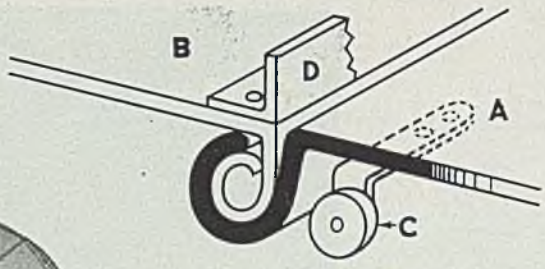
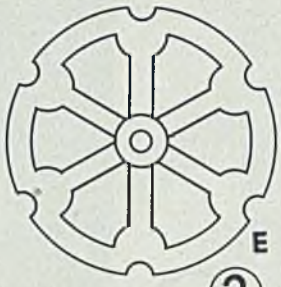






Versatile ALL-STEEL CONVEYOR

. . . employs novel method of linking steel plates

VERSATILITY to handle anything from cream-puffs to drop forgings is assured with an innovation in the method of linking steel plates for a recently introduced all-steel conveyor illustrated in Fig. 1. The locking method of linkage employed prevents sag at any point along the length, and there are no open spaces between the links.

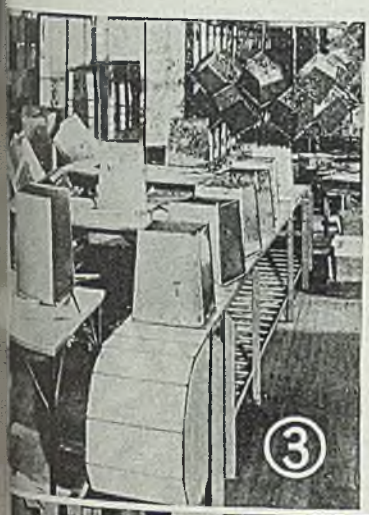


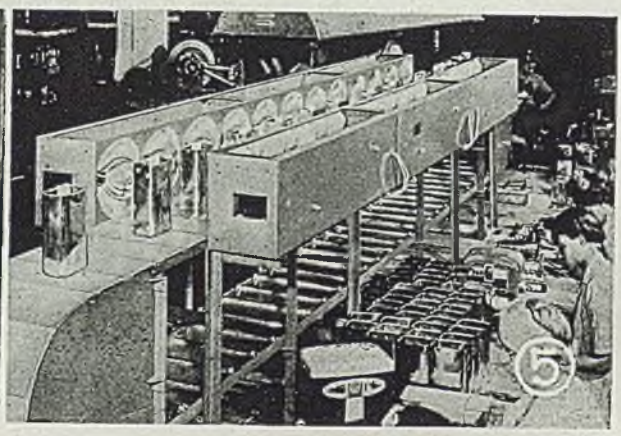
Fig. 2 is a sketch illustrating the detail of locking used. A and B are 18-gage cold-rolled steel plates, which form the conveyor sections, with ends formed as shown to provide a lock which functions in the nature of a hinge. Fig. 2-C is roller attached to the side of each plate; this roller runs on a track and carries the load. If a conveyor runs on an incline, provision is made to prevent load sliding by use of attachment D, Fig. 2.

A non-slip drive for the belt is obtained by means of a sprocket which meshes accurately with the hinges of the belt. This driving mechanism is shown in Fig. 2-E and consists of a hexagonal sprocket with six grooves on the periphery into which the plate links rest.

The flat working surface obtained with this conveyor, called the Steelok, makes it adaptable to assembly-line and packaging applications. Some of these applications are shown in Figs. 3, 4, and 5, and portray, respectively: A waste basket assembly line in Steel Parts Mfg. Co.'s plant; packaging hydraulic brake parts at Motive Equipment Mfrs. Inc., Chicago; and conveying part of an electric fence controller through an infra-red heat treatment at Guard-it Mfg. Co., Chicago. The unit is equally capable of handling heavy loads; steel castings can be conveyed and assembly lines erected for heavier products. A load of 50 lb per sq ft can be handled by these units. Varying belt lengths and widths, and speeds of operation adapt the unit to meet any requirement. One unit of 90 ft lengths has been installed for the Galvin Mfg. Corp., Chicago.

This conveyor, made by the Steel Parts Mfg. Corp., Chicago, has also been used in conveying cafeteria foods. Another reported feature is the noiseless operation of the conveyor. Links are lubricated sparingly with a light oil containing graphite.

Inasmuch as there is no leather or rubber belt to wear out, it is claimed that maintenance problems are simplified. If a plate should become damaged it requires only a few seconds to slip out the damaged plate and insert a new one.



Oreing open hearth heats requires shovels and plenty of, brau

Practice followed in use of OPEN-HEARTH CHARGE ORES

Advantages and limitations of charge ores including soft fine, hard lump and briquetted ores, and nodules and sinter are considered. Use of wet ore is not recommended. Various combinations of these charging materials permit the use of certain percentages of pig iron in open-hearth heats

By CLYDE DENLINGER
Superintendent Steel Division
Bethlehem Steel Co.
Lackawanna, N. Y.

STEEL scrap and pig iron are the major constituents of the open-hearth charge. Varying proportions of these major constituents may be used if ore is included in the charge. Extremes of the proportions are found in duplex plants where pig iron is used exclusively and in some small nonintegrated plants where scrap alone is used.

Under normal conditions in the steel industry, there has generally been an adequate supply of both scrap and pig iron to satisfy steel production requirements. In many plants, the proportions of scrap and pig iron used in the open-hearth charge is largely a question of economics. The cost of ingots depends to a great extent on the cost of the raw materials. When scrap is cheap a high proportion of this material is used; when the price of scrap goes up, more pig iron is used.

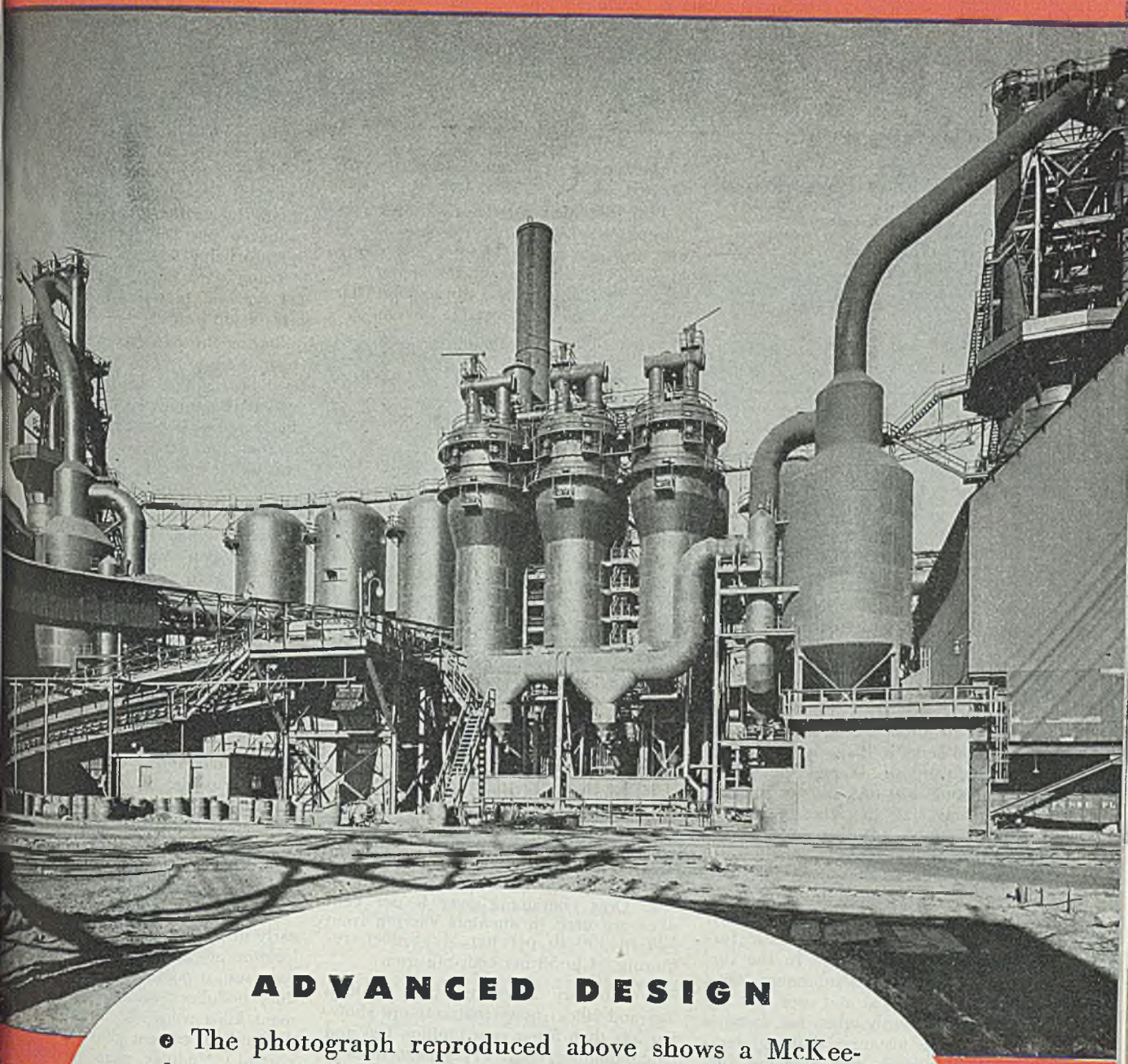
Some of the larger companies, over a long period of years, have used a relatively high proportion of pig iron in the open-hearth charge. This has been done by using additional ore in the charge. As these companies operate coke ovens and blast furnaces as well as open-hearth furnaces, advantage is taken of the opportunity to use the product of the blast furnaces, pig iron in the molten state—hot metal—as part of the charge. Use of hot metal in the open-hearth charge reduces the weight of material which must be melted and adds thermal energy to the furnace. This cuts the time required to finish the heat, thus increasing production. Furthermore, with the large investment in coke ovens and blast furnaces it is desirable and good business to keep them operating.

During 1940 about 67 million tons of steel were produced in the United States, a record at that time. In 1941, the production rose to about 83 million tons. These two consecutive years of record production, coupled with heavy exports of steel scrap during the preceding five years, depleted the stocks of one of the major constituents of the open-hearth charge—steel scrap. The scrap shortage became so acute during the latter part of 1941 that some open-hearth furnaces suspended operation. In order to [illegible] rect the scrap shortage a nation-[illegible] scrap drive was started. Public in[illegible] was aroused so that enough scrap [illegible] found to permit idle furnaces to re[illegible] operation. Additional scrap drives [illegible] organized when stocks got low and [illegible] drives met a similar response from [illegible] public.

As a result of the many studies ma[illegible] to determine our own steel requirem[illegible] and those of our Allies, for carrying [illegible] the war, it was decided that 10 mi[illegible] tons additional steel ingot capacity w[illegible] needed. It was apparent that the m[illegible] tallics for the additional ingot ton[illegible] would have to be provided from pig [illegible] and 11 million tons of the additional [illegible] iron capacity were allocated to take c[illegible] of this emergency. With pig iron [illegible] to replace scrap, a high percentage [illegible] pig iron would be needed in op[illegible] hearth charges, and this practice ma[illegible] that charge ore would become a fac[illegible] of major importance. Sinter which [illegible] being used as a charge ore by some op[illegible] hearth operators was allocated for bl[illegible] furnace use in order to increase the pr[illegible] duction of pig iron.

Materials generally used as charge o[illegible]

UNDIVIDED RESPONSIBILITY IN ONE ORGANIZATION



ADVANCED DESIGN

The photograph reproduced above shows a McKee-designed blast-furnace plant with three precipitators superimposed over gas washers to provide uninterrupted gas cleaning for both furnaces. This feature is typical of advanced McKee design.

Arthur G. McKee & Company

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TABLE I
DATA ON SOFT ORES FOR OPEN-HEARTH HEATS

No.	Analysis dry, % Ignition loss	SiO_2	Fe	Lbs ore/ton of product Max. used	Avg. used	% Hot metal required Max.	Avg.	No. of shops in avg.
2	2.78	6.47	52.96	310	267	67	61	10
4	3.62	4.26	57.26	290	226	65	58	11
3	2.04	6.65	56.91	300	270	65	62	5
1	2.11	7.10	52.75	320	212	65	61	4
9	6.13	4.66	52.10	158	136	60	56	4
5	3.68	3.65	57.61	226	220	60	56	3
6	3.91	6.33	49.58	209	158	59	58	3
8	2.67	8.96	53.77	190	190	58	58	1
7	4.99	3.24	57.46	199	199	57	57	1
10	6.26	9.90	52.99	128	128	54	54	1

TABLE II
PRACTICE OF COMBINATIONS USED IN CHARGE ORE

Pig iron, %	Lbs per ton of product Soft ore	Sinter	Hard ore	Total
70	170 No. 6	82	75	327
69	158 No. 1	88	70	316
68	150 No. 6	158	..	308
68	90 No. 1	146	..	236
67	198 No. 7	77	..	275
63	143 No. 2	216	..	359
61	165 No. 2	130	..	295
60	139 No. 9	92	..	231

TABLE III
FLUSH SLAG ANALYSES

Slag No.	SiO_2	CaO	P_2O_5	FeO
1	25.60	20.40	2.91	26.00
2	21.20	21.15	3.18	27.40
3	23.40	13.45	3.37	23.80
4	21.10	23.00	3.34	29.30
5	19.40	17.40	3.30	30.20
6	18.00	17.70	2.24	25.10

are soft (fine) ore, sinter, hard (lump) ore, nodules and briquetted ore.

Soft (Fine) Ore: This grade of ore has been used extensively, over a long period of years, if charge ore is desired in the open-hearth charge. Since soft ore is available in abundance and is used in the as-mined state, it is the logical material for this purpose. It must be recognized that some soft ores are not suitable for charge ore and that those soft ores which are suitable for this purpose can be used in only limited amounts.

To be suitable as charge ore, soft ore should have low ignition loss, be fairly low in silica, and not too fine physically. Silica is objectionable in the basic furnace and additions of silica to the furnace should be kept to a minimum. Ores with high ignition loss and ores that are too fine react violently when hot metal is added, in some instances causing damage to the furnace roof, regenerators, etc.

The charging of soft ore when it is wet is usually followed by very violent "blows," and this practice should be avoided.

In order to charge the maximum amount of soft ore some companies claim benefits derived from "sandwiching" the ore in the charge, the term applied to placing alternate layers of scrap and ore in the furnace when charging. Other companies claim similar benefits from spreading the ore evenly over the hearth and allowing a short drying period before adding the scrap.

Operating conditions such as depth of bath, hearth area, size of heat, and type of fuel are all important factors in determining the amount of soft ore that can be charged without causing damage to the furnace or adversely affecting production.

Data obtained by the institute's subcommittee investigating the use of soft ores in open-hearth charges are shown in Table 1. The percentages of pig iron shown in Table 1 and throughout this paper, refer to total metallic charge.

Since operating conditions have not been considered and the physical condition of the ores with respect to fines has not been evaluated, averages instead of maximums appear to offer a proper basis for drawing conclusions.

Summarizing on the basis of ignition loss it is seen that:

1. Soft ores showing less than 3 per cent ignition loss are used in amounts varying from 190 to 270 lb per ton of product, requiring 58 to 61 per cent pig iron.

2. Soft ores showing from 3 to 5 per cent ignition loss are used in amounts varying from 158 to 226 lb per ton of product, requiring about 57 per cent pig iron.

3. Soft ores with over 6 per cent ignition loss show 132 lb per ton of product, requiring 55 per cent pig iron.

Summarizing on the basis of silica:

1. Ores containing less than 7 per cent silica are used in amounts varying from 136 to 270 lb per ton of product requiring 58 to 62 per cent pig iron.

2. Ores containing over 9 per cent silica are used in amounts varying from 128 to 190 lb per ton of product, requiring 54 to 58 per cent pig iron.

A summary based on both ignition loss and silica shows that soft ore showing less than 5 per cent ignition loss and containing less than 7 per cent silica is being used in amounts varying from 158 to 270 lb per ton of product, requiring 56 to 62 per cent pig iron.

Sinter: This product has been used in blast furnace operation for many years. Originally devised as a method for making blast furnace flue dust suitable for blast furnace use, the material is improved if soft fine ore is combined with the flue dirt in the sintering operation. Good blast furnace sinter must be porous so that it will be readily reduced. Analysis of blast furnace sinter is dependent on the raw material sintered. An analysis will usually show 56 to 62 per cent iron, 6 to 11 per cent silica, and ignition loss 0.

In recent years sinter for use in the open hearth received attention due to the low moisture content and the high iron content. It was recognized that the physical properties desired for blast furnace use would not satisfy open-hearth requirements, which call for a heavy dense material instead of the light porous sinter preferred for blast furnace use. Also more attention had to be paid to silica content, as high silica is objectionable. Sinter made from mixture of soft ore fines fairly low in silica, and 10 to per cent roll scale is suitable for use the open hearth.

This material is satisfactory in amounts up to 250 lb per ton of product, requiring 60 to 65 per cent of pig iron. Analysis of this sinter shows 63 per cent iron and 6 per cent silica. A superior quality of sinter is being produced using 25 per cent of roll scale in the mixture being sintered, and this material is being used in amounts up to 380 lb per ton of product, requiring 70 per cent of pig iron.

During the past few years sinter made from hard-ore fines has been used extensively as open-hearth charge ore by several companies. A heavy dense material is produced, showing an analysis 68 per cent iron and 3 per cent silica. This sinter is being used in amounts up to 380 lb per ton of product, requiring 80 per cent pig iron.

Hard (Lump) Ore: Lump ore is known to most open-hearth operators as "feed" ore. In prewar days, when a considerable tonnage of lump ore was imported, some companies used lump ore as charge ore. Low in ignition loss, fairly low in silica and physically satisfactory, although it contains considerable fines, lump ore is a good charge ore. It has been used in amounts up to 400 lb per ton of product, requiring 83 per cent pig iron. When import of lump ore was no longer possible, on account of the war, the domestic supply had to be conserved for use as "feed" ore, leaving little for use as charge ore. The analyses of lump ores show 59 to 68 per cent iron, 2 to per cent silica and low moisture content.

Nodules: During the scrap shortage early in 1942 and coincident with the dislocation of sintering capacity to blast furnace use, experiments were made to produce nodulized ore in cement kilns. Cement kilns were idle at the time as the demand for cement clinker was less than normal. Nodules were produced from soft ore showing high ignition loss, fairly low silica, mixed with 8 to 10 per cent of limestone fines. The limestone fines are added to prevent the material from sticking on the kiln lining. The kilns, using powdered coal as fuel, are operated at a temperature over 2400°F. producing a heavy, dense material. From soft ore showing 56.97 iron, 3.74 silica and 9.93 moisture, nodules were produced showing 62.72 iron, 4.85 silica, 4.00 and 0 ignition loss. A number of plants are using nodules in amounts varying from 177 to 310 lb per ton of product, requiring 54 to 70 per cent pig iron.

Briquetted Ore: Another method developed for improving the condition of soft ore to make it more suitable for

(*Please turn to Page 188*)

INSTRUMENT SCREWS

EACH ONE A

Picture of Precision

National
HEADED AND THREADED
PRODUCTS

Many civilian products will require precision-made screws of the same high quality that has been perfected for aircraft instruments.

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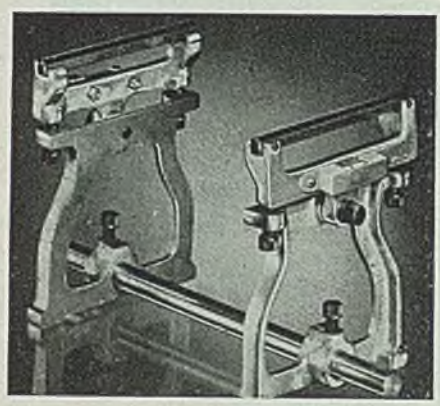
INDUSTRIAL EQUIPMENT

Static Balancer

A new precision built static balancer is offered by Samuel S. Gelber, 34 South Jefferson street, Chicago 6. The 9 in. model illustrated has a finger tip span adjustment up to 9½ in. The unit can be set up on any fairly level support. The balancing surfaces have built-in spirit level and fine adjustment screws which permits compensation for high or low spots in the bench or supporting surface.

Balancing surfaces are deep hardened with accurately ground ways for extreme

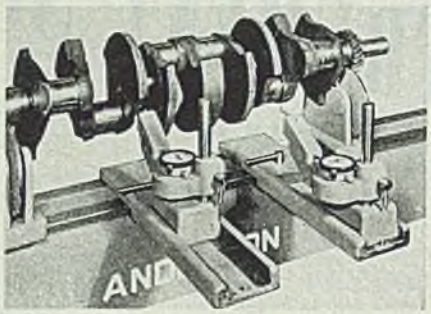


sensitivity and elimination of friction. Supporting standards are light weight. Swing capacity is 9 in., supporting capacity is 50 lb. Two large models are available in the 20 and 30 in. size.

Checking Device

For speeding up the operation of checking crankshaft bearings, Anderson Bros. Mfg. Co., Rockford, Ill., has developed a special Roto-Checker. The crankshaft is placed on four rotating disks and a number of indicators are brought into position and the crankshaft is revolved. One indicator can be provided for each bearing.

The four disks roll on accurate and



super-sensitive ball bearings designed by the company. The bases are made in two lengths, 42 and 64 in. Larger units can be made to customers' specifications.

Two Spindle Boring Unit

A new two way automatic cycle machine for performing 12 processing operations on a brass sprinkler head body is designed and manufactured by Snyder Tool & Engineering Co., 3400 East Lafayette avenue, Detroit 7. The machine is a vertical, two spindle boring unit for heavy duty work and is actually two machines in one.

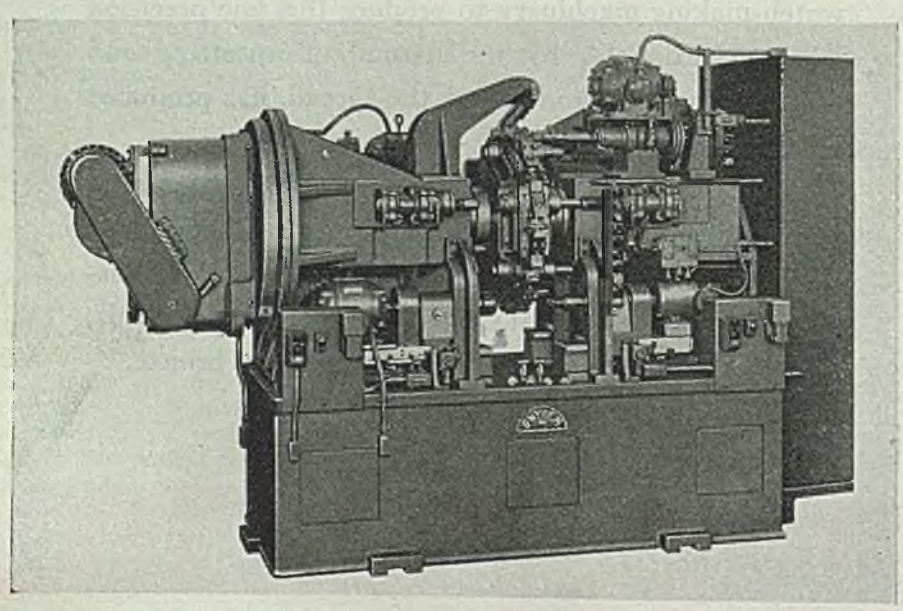
Work piece is held in a fixture which is a double jaw, right-and-left-hand screw chuck. This chuck assembly is actuated in loading station by hydraulic cylinders. Six of these fixtures are mounted on a trunnion which is indexed 60° station to station. Workpiece is a brass casting without previous machining and operations performed are drilling, reaming, hollow milling and threading on one end and hollow milling, facing, drilling and tapping the other end, plus assembling and spinning in place a pressed metal deflector of which there are three sizes and sha

Loading the sprinkler body is mani Metal deflectors are loaded automati ly from a magazine which operator ke filled. Each sprinkler on the indivi station has a separate slide and spi motor, and each spindle has sepa hydraulic control. Hydraulic po for the operation of the tool slides clamping and unclamping cylinder co from a hydraulic power unit set be the machine.

Index mechanism with large diam locating plate, is mounted near one of the machine and the fixture trun is keyed to that mechanism throug heavy trunnion shaft. Base and trun bearing housing are of welded while index mechanism housing hydraulic slide bases are cast Slides are hardened and ground As the workpiece is brass, no coo is provided.

Limits Bridge

Model 81 low range limits br is one of a series of units for the r comparison of large quantities of sistors having comparable values. is adapted to volume testing of re



ance values up to 2000 pieces an particularly for testing motor wind transformer primaries or secondar rheostats, potentiometers, lamps, or multiplier resistors, any item offers ohmic resistance to flow current.

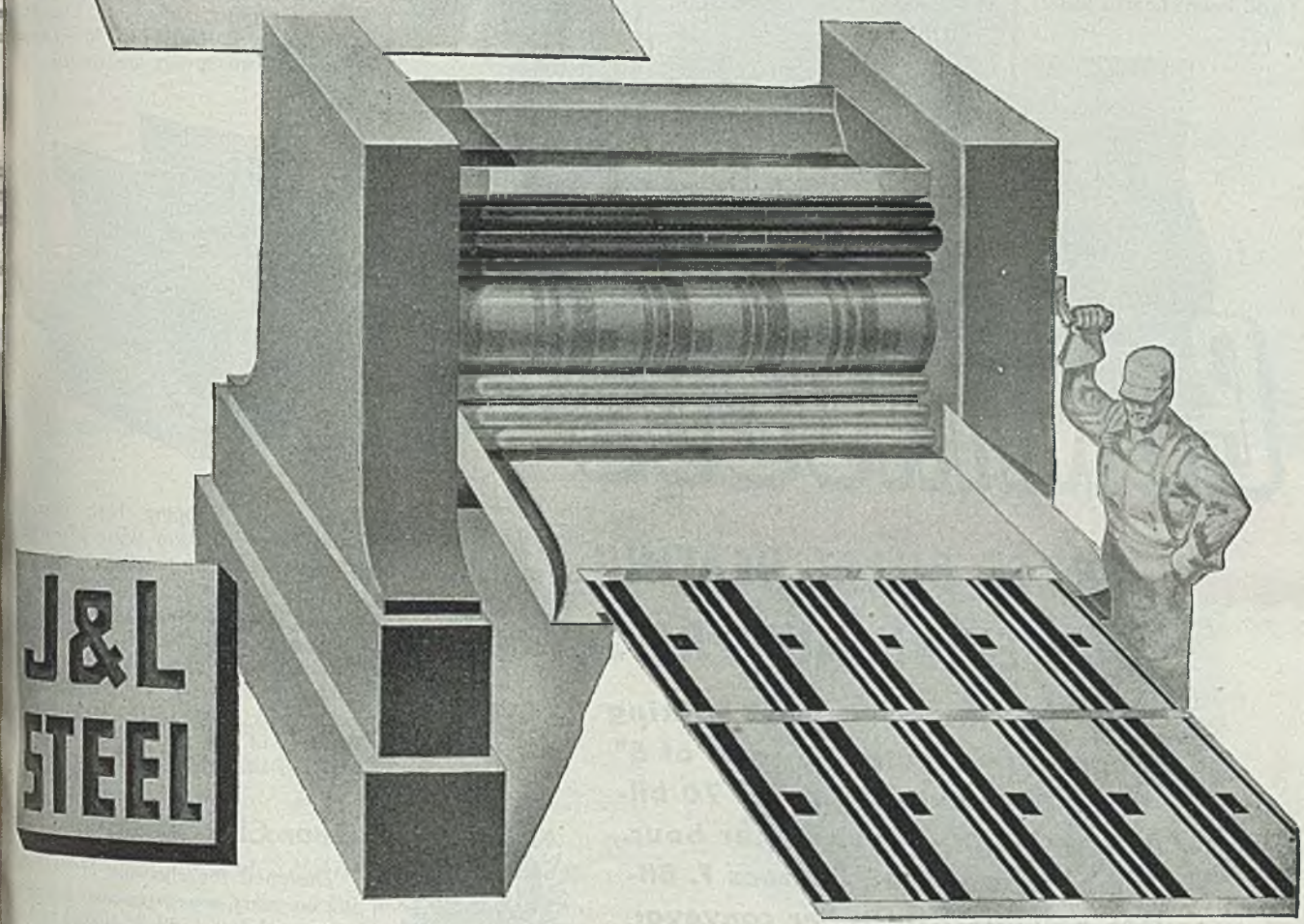
Flexibility through use of an ternal reference standard is one fea of the instrument. A combination fixture and automatic control adds to this characteristic; also bind posts at the right side of the unit connection to user's test fixture wh desired. Left hand binding posts for connection of reference stand which can be supplied if desired.

This unit is battery operated. T overall adjustable range is from ¼ ohm to 10,000 ohms, with adjustable

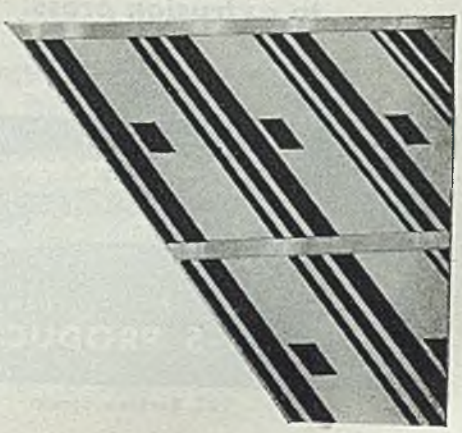
All claims are those of the manufacturer of the equipment being described.

J&L TIN MILL PRODUCTS

HOT DIPPED TIN PLATE • ELECTROLYTIC TIN PLATE
SPECIAL COATED MANUFACTURING TERNES • BLACK PLATE



• Superior finish that affords excellent adhesion and gives exceptional clearness to painted, decal and lithographed designs . . . Uniform gauge . . . Consistent forming qualities that make for easy, economical fabrication.



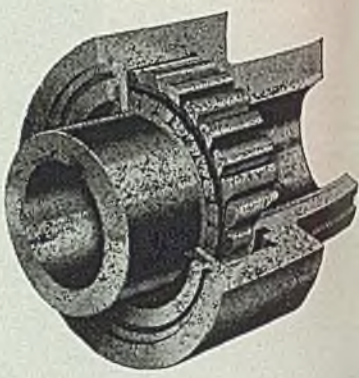
JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA

arm, sensitivity control, production type test fixture with automatic on-off switch. The sensitivity control range is from plus or minus ¼ per cent to plus or minus 10 per cent. Indicator is a sensitive zero center galvanometer.

The bridge is self-contained, measures 8 x 8 x 12 in., weighs 18 lb and is mounted in gray wrinkle finished metal cabinet. On the sloping panel are mounted the ratio arm control, galvanometer, binding posts and combination test fixture. The unit is manufactured by Associated Research Inc., 231 South Green street, Chicago 7.

Over-Running Clutch

Designated as Formsprag, a new over-running clutch consisting of cylindrical inner and outer races with annular space between them filled with accurately formed sprags, is offered by Gear Grinding Machine Co., 396 Christopher, Detroit 11. When torque is applied, all sprags are rotated at the



same time, gripping both inner and outer races to form what is practically a single piece of metal.

Once torque is removed, all sprags release instantaneously. Positive engagement and disengagement may be made hundreds of times per minute. Torque carrying capacity of the clutch, in general, is equal to the torque carrying capacity of any shaft which has a diameter less than the diameter of inner race.

Gear Checker

Designed for checking of tooth spacing on gears, a new precision gear checker, model No. 1130, is offered by Michigan Tool Co., 7171 East McNichols road, Detroit 12. The machine checks the base pitch and tooth spacing along the line of action on spur or helical gears. Spacing can also be checked on worm gears. Gears up to 12 in. OD and having a maximum shaft length of 18 in. may be checked.

Principle of operation of this machine is based on the fact that distance between two corresponding sides of adjacent teeth along line of action is equal to distance between corresponding sides of adjacent teeth measured on the gear's base pitch circle. It measures along line of action thus indicating whether

EXIDES ASSURE "FULL AVAILABILITY" OF ELECTRIC MATERIALS HANDLING TRUCKS EVERY MINUTE OF THE SHIFT...

When electric industrial trucks, powered by Exide-Ironclad Batteries do the lifting, hauling and stacking of materials, you can be certain of *full shift availability* hour after hour, day after day. There is no down time for adjustments, repairs or other attention.

Exide-Ironclad Batteries have the *high power ability* needed to meet the high-kilowatt demands encountered in "stop and go" materials handling. They provide *high maintained voltage* throughout discharge, thus assuring a uniform rate of operations. And the *high capacity* of Exides keeps electric industrial trucks on the job during every working minute of the shift. You can always count on powerful, rugged Exides for dependability, long-life, safety and ease of maintenance. *These are the factors which add up to lower handling costs per ton.*

Write us for a FREE copy of the bulletin "Unit Loads," prepared by The Electric Industrial Truck Association. It tells how to cut handling costs up to 50% . . . covers latest developments in materials handling . . . and includes actual case histories.

POWER

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32

Exide Batteries of Canada, Limited, Toronto

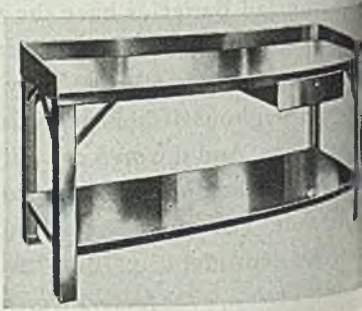
spacing is correct both along line of a
tion and along base pitch circle of ge

A handwheel operated rack and pini
permits indicator table to be adjus
to line up contact points tangent to ba
circle. Gage blocks enable accurate a

justment of contact points. Adjustme
are also provided to limit retraction
table when indexing from tooth to too
Head and tailstock centers are harde
and ground; ways are precision scrap

Steel Work Bench

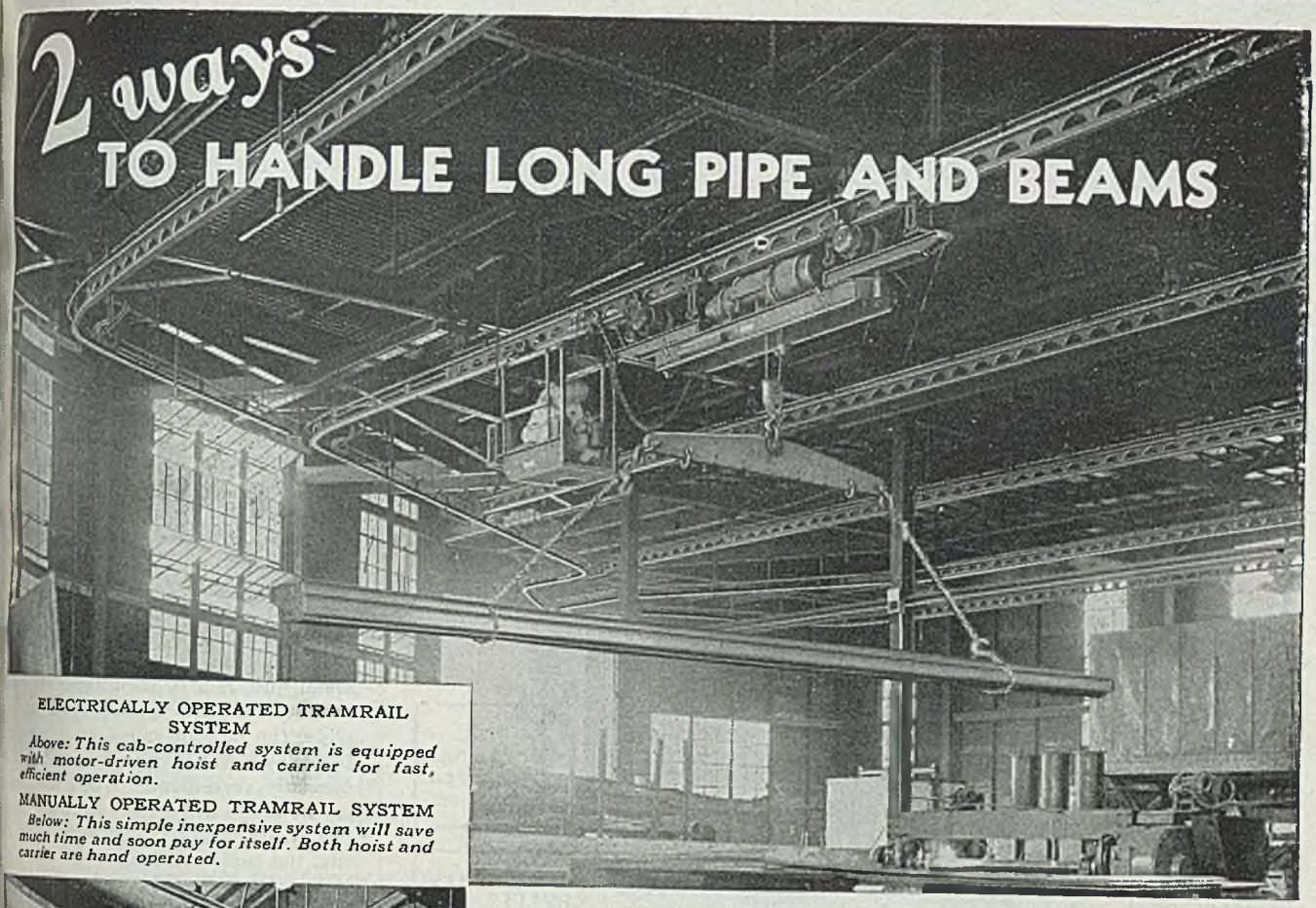
An improved 12 gage steel wo
bench, announced by Equipto, Divis
of Aurora Equipment Co., Aurora, I
may be provided without back and s
railings for use as a packing bench.
four flanges of the bench are form
into a boxed edge for rigidity. A secon
12 gage steel plate may be tack weld
on to top for vise reinforcement. Bo



is suitable for both work bench use a
for supporting light machine tools. It
available in 42 in. and 6 ft lengths,
in. high and 28 in. deep.

It can be provided as a plain wo
bench with 12 gage steel top and w
bottom tray, back and side railings
drawers with padlock attachment, adjus
able three compartment tray for drawe
Benches may be used side by side a
back to back forming larger work
surfaces in a minimum of floor space

2 ways TO HANDLE LONG PIPE AND BEAMS

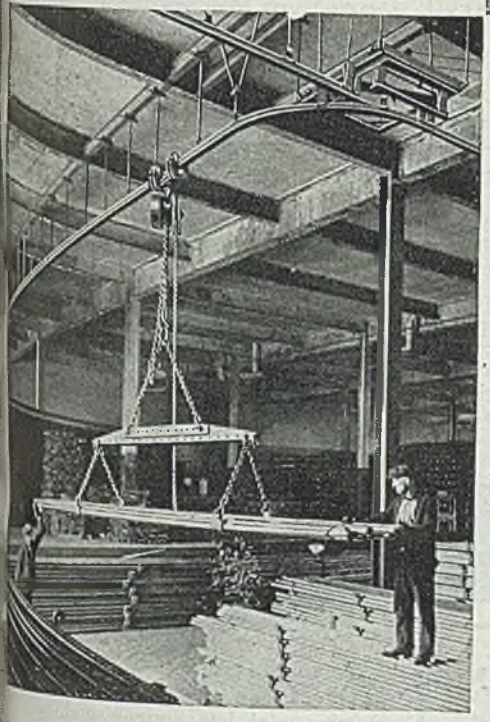


ELECTRICALLY OPERATED TRAMRAIL SYSTEM

Above: This cab-controlled system is equipped with motor-driven hoist and carrier for fast, efficient operation.

MANUALLY OPERATED TRAMRAIL SYSTEM

Below: This simple inexpensive system will save much time and soon pay for itself. Both hoist and carrier are hand operated.



Long pipe, beams and metal stock are heavy and awkward to handle by hand or on floor conveyances. It is difficult to haul them through narrow shop aisles and around corners. In many instances it is necessary to reload onto different types of conveyances in order to overcome floor obstacles and reach the ultimate delivery point.

Cleveland Tramrail materials handling equipment simplifies the transportation of unwieldy materials within or between plants, because it operates overhead above and away from floor obstacles and traffic. It hoists and delivers the materials direct from point to point without in-between handling. Illustrated are two types of overhead materials handling systems for conveying lengthy items. Other manually or electrically operated equipment is built to suit individual requirements.

Now is the time to consider methods of improving plant efficiency. A discussion with your local Cleveland Tramrail engineer may start you on the way to greater production, lower costs, improved safety and other advantages possible with a good overhead system properly engineered.

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THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

Quality Welding

(*Continued from Page 125*)

other extreme of high current may d stroy certain chemicals in the coati thereby preventing the desired met lurgical interaction between molten w metal and the slag covering.

Just as the physical properties are fluenced by current conditions, so is the x-ray soundness of the deposi metal. Current values that are too frequently bring about lack of good s wall fusion, resulting in slag strin that show up during x-ray examinat Very high current values may dest the deoxidation power of the coat and result in an exograph indicating p osity. The appearance of the finis weld metal is dependent upon the c rent used. All through this discussi it is assumed that the preferred ran will be applied to diameters for appli tions in which those diameters are b suited. Since a 5/16-in. electrode co not satisfactorily be employed on sh metal, just as a 3/32-in. electrode wo not normally be applied on 2-in. th plate, the current values are selected the base metal thicknesses to which t normally correspond. When the cor relationship between electrode dia eter, plate thickness, and joint design ists, the preferred ranges will permit operator to lay down beads of go appearance.

Five Important Factors

A number of factors influence t choice of current even within the p ferred current ranges. In general, f factors must be kept in mind: Positi of welding, thickness of material, o erator's skill, fit-up, and desired appe ance. In vertical and overhead weldi the lower ends of the range will pro most useful. For flat position and ho zontal fillet welding, the upper limits the range will normally be chosen.

Since heavier plate material absor more heat than lighter sections, m current within the desired range may employed for plate of heavier gage. Al as the diameter of the electrodes i crease, a greater spread occurs in t preferred current values.

Operator's skill has a bearing on th selection of welding current. In sh metal welding, a skilled welder will of be able to use less current than a we who has more trouble maintaining a arc under low current conditions. T opposite situation will be found in ve tical welding on heavier sections, whe the more skilled operator can han higher currents.

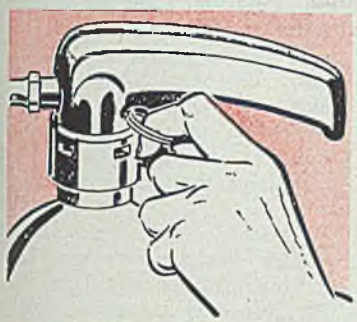
Of course, fit-up always deserves co siderable attention. It too has an infl ence on the choice of welding current Where fit-up is good, higher current va ues may be used with safety. If poo fit-up is encountered, the welder must reduce the amount of current to pe bridging of occasional gaps without th necessity of re-setting his welding ma chine.

Within the preferred ranges, satisfac

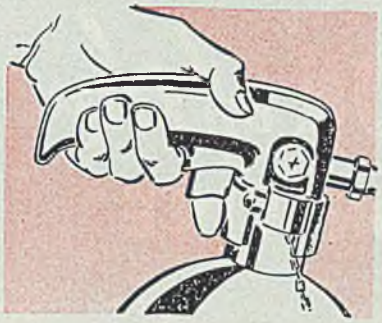
Here's the HOW . . . and the WHY of

TRIGGER-FINGER CONTROL

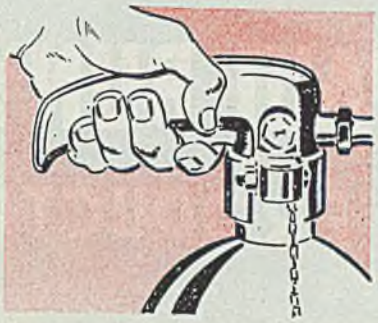
(Soon available on 10, 15 and 20-lb. Fire Extinguishers)



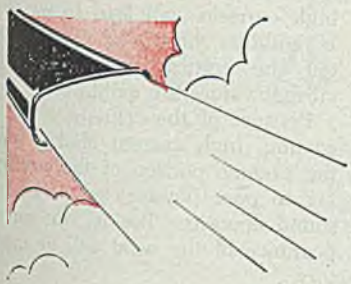
1. Pull out non-jamming locking pin. Seating in two blind holes, it can't be turned . . . the ends cannot get bent over.



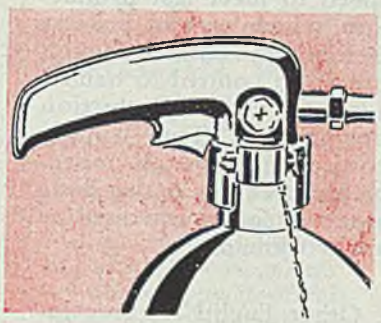
2. Pick up easy-to-carry extinguisher. Balanced design and low center of gravity make carrying job simpler.



3. Press the trigger. That's the simple, *natural* way to operate extinguisher — one finger does the trick.



4. Get full flow at once. No half-way measures with this fast-starting valve . . . carbon dioxide goes right to work!



5. Lock open—if desired. Just move trigger forward slightly to latch it in open position—no danger of fouling.

6. Recharge without replacement parts. Merely connect carbon dioxide supply and fill extinguisher up.

Simple, safe and foolproof, this new trigger-control valve on 10, 15 and 20-lb. Kidde extinguishers speeds the attack on fires. A novice can operate it! Write for the full details today.

Walter Kidde & Company, Inc., 1154 Main Street, Belleville 9, New Jersey

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Kidde

tory appearance of the weld bead is bound to result. Much lower current will pile up a convex bead, while high currents will give shallow beads with comparatively widely spaced ripples.

In order to get a better understanding of current ranges, it seems desirable to review the basic electrode types with re lationship to appropriate current conditions. Taking first the cellulosic E6010 electrode, which is primarily applied in tack welding, shipbuilding, pressure vessel manufacture, structural steel work and pipe line fabrication, a study of current conditions will prove profitable. Fig. 1 illustrates the use of E6010 electrodes in fillet welding of reinforcing pads around nozzle and manway openings. Also seen in the picture are the fillet welds joining the nozzle and manway necks to the reinforcing pad and shell. This work is customarily done in a position that varies from vertical to flat.

E6010 electrodes in the 3/16-in. and smaller diameters are used for vertical and overhead welding, in addition to the less restricted positions. Low current will cause convex weld deposits without good root penetration or side wall fusion. High currents will cause the weld metal to sag and give a poor appearance bead.

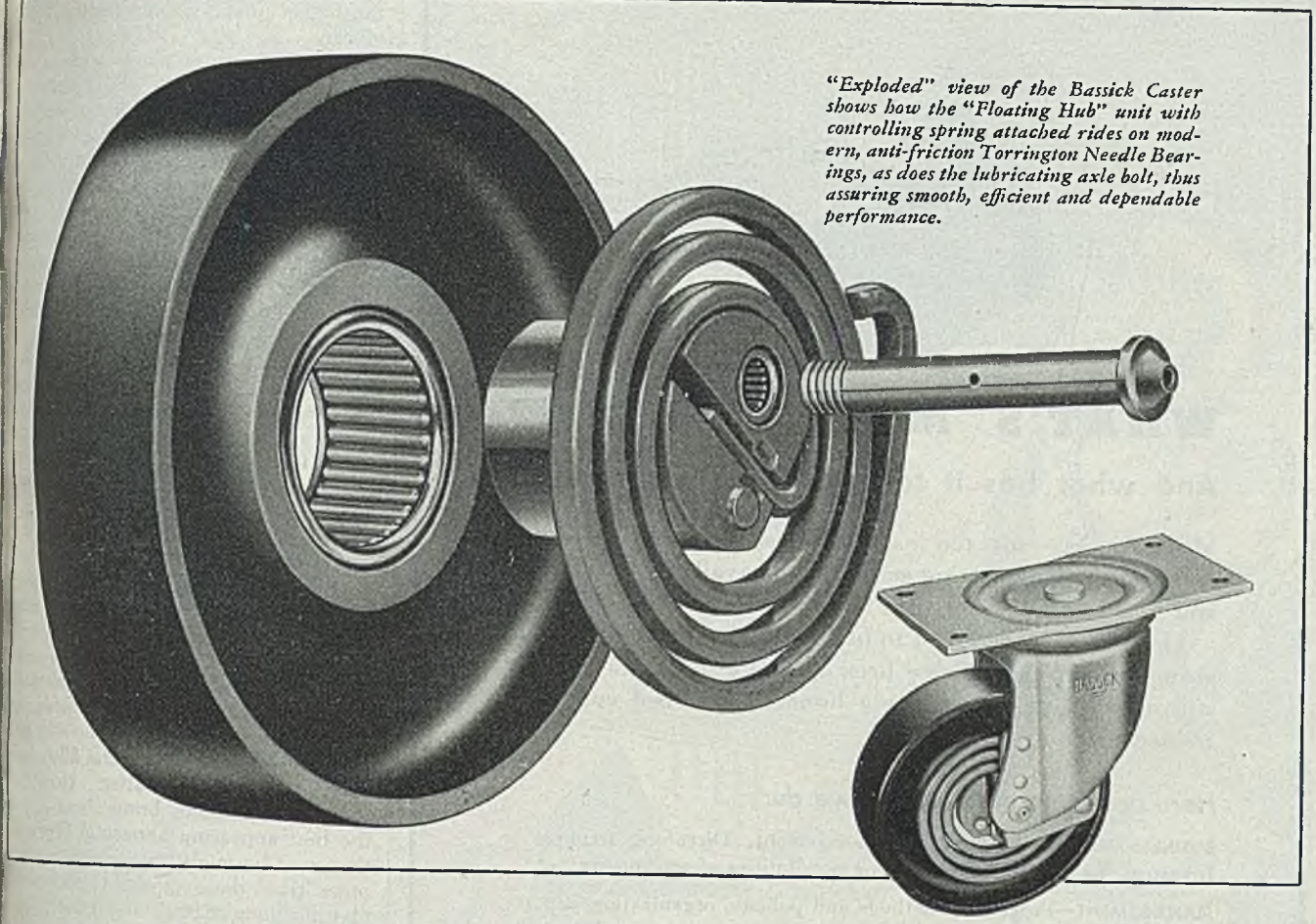
Unsatisfactory Penetration Results

For flat and horizontal fillet welding currents below the preferred range will result in unsatisfactory penetration, while high currents will lead to pitted welds. In addition, horizontal fillets will undercut the vertical member, if excessive current values are employed.

Because of the cellulose nature of the coating, high current choices will burn the organic portion of the coating leading to poor physical properties and unsound deposits. Besides, the surface appearance of the weld will be unsatisfactory.

The same considerations apply to the use of E6011 electrodes as those outlined above for the E6010 types. However, some E6011 electrodes are more sensitive to current values than are the E6010 varieties. Thus a careful selection of moderate current intensities is essential to the production of welds with acceptable physical properties. Rather small variations above or below the permitted ranges will impair the ductility of the deposited weld metal.

E6012 electrodes are used for structural welding, light gage fabrication, storage tank manufacture, secondary structures in shipbuilding, and truck bodies. Some of these applications are by their very nature less important from a quality viewpoint than those listed for the E6010 and E6011 electrodes. The E6012 electrodes are not intended to produce the quality of the two aforementioned groups. Because of the nature of the coating employed on E6012 electrodes, the preferred current ranges may be widened without hurting performance characteristics. Furthermore, E6012 electrode applications in the usable ranges rather than the preferred



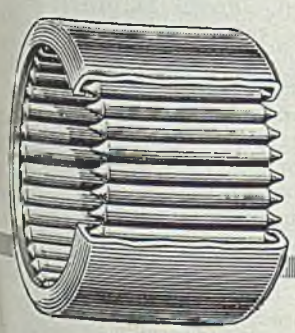
"Exploded" view of the Bassick Caster shows how the "Floating Hub" unit with controlling spring attached rides on modern, anti-friction Torrington Needle Bearings, as does the lubricating axle bolt, thus assuring smooth, efficient and dependable performance.

Needle Bearings Help Make a Rough Ride Smooth

Protection from shock and vibration is of prime importance in equipment such as engine parts trucks, food and dish trucks or portable control panels containing delicate tubes and instruments. When Bassick "Floating Hub" Casters, used on equipment of this type, hit an obstacle they ride over the bump without lifting the load. These ingenious, smooth-running casters are equipped with modern, *anti-friction* Torrington Needle Bearings, which assure easy, efficient performance in the moving of heavy and delicate loads over rough surfaces.

Built for long life, these sturdy, compact bearings can stand up to the countless sudden shocks to which they are subjected in equipment such as the casters described above and provide efficient *anti-friction* operation. Furthermore, the simple, unit construction of Torrington Needle Bearings makes for ease of installation and lubrication.

Perhaps *your* design or production problems could be simplified if you were better acquainted with the many advantages Needle Bearings have to offer, including high load capacity, small size, *anti-friction* operation—and low cost. Our Catalog 32, which contains a world of engineering data, will help you choose the size and type Needle Bearing best suited to meet your particular requirements. We'll be glad to send your copy upon request.



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ranges will be more frequent than with the higher quality groups mentioned previously.

About the same points apply to all-position welding with E6012 electrodes as were reviewed in connection with the preceding groups. More leeway exists in the flat and horizontal fillet positions where there is almost no danger of undercut in the latter position.

High current values may be specified with virtually no danger because the coating is stable in the face of greater heat conditions, thus insuring good weld properties.

In most applications, the use of excessive current does not effect bead appearance nor, with good electrode types is the spatter objectionable.

E6013 electrodes are found in the welding of aircraft tubing, sheet metal light gage tanks, and the making of large welds and horizontal fillets. E6013 coatings are sensitive to current values and ductility results will not meet existing specifications if the currents are either too low or too high. All position welding yields the best bead contour within the recommended narrow current limits.

Except for light gage metals, [illegible] welding is not regularly done with mild E6013 electrodes. Horizontal fillets, however, are another matter. Here good electrical conditions bring about some of the best appearing horizontal fillet welds that may be made with electrode groups other than those of the highest quality classifications, E6020 and E6030.

Use of E6013 Electrode

Extremely low current values may be chosen for light gage welding. The inherent good arc stability of E6013 electrodes permits their application at current values where other types of electrodes would be unable to sustain an arc.

Most E6013 electrode coatings contain cellulose, which is an automatic warning signal against the use of too high current levels. X-ray soundness in the small diameters is most acceptable, provided that machine settings are arranged to give proper amperage and voltage conditions. Deviations from good practice will certainly lead to porous deposits.

The highest caliber weld metal comes from the E6020 and E6030 electrode groups. Regularly selected for the welding of pressure vessels, machine bases and frames, heavy sections in shipbuilding, heavy ordnance, heavy piping, railroad center sills, and heavy construction road-building machinery. Massive jigs and fixtures, essential to heavy ordnance manufacture, are also fabricated with E6020 electrodes, as illustrated in Fig. 2. Here, in the welding jig, is a girder for a 5-in. gun base, which is rotated by means of a positioner to permit fast downhand welding, of outstanding quality. The very nature of these applications points to the need for good current control. For here the highest quality of service is most essential.

More latitude in amperage selection exists in the flat position than in the horizontal fillet position. Even though many electrodes perform very well at astor-

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ishingly high amperage settings, soundness of the weld deposit may teriorate unless the preferred range followed. This statement is not true all coatings and the simplest way to certain the true limit, provided that heat capacity of the joint is sufficie is to make sample welds duplica actual manufacturing conditions, x-ray examination proves such ty welds to be sound, regular production tivities may follow the same prog However, some sad experiences have sulted when molten pool and slag havier were used for current selec criteria before checking with r graphic examination.

Current limitations in the horiz fillet position are covered by lack of dercut on the vertical leg and free from surface porosity, which may more prevalent at the upper edge of fillet. Extreme currents, fast rates travel, and deep fillet techniques sometimes brought about pits along upper leg of a horizontal fillet weld would have been avoided with a b balance of welding conditions.

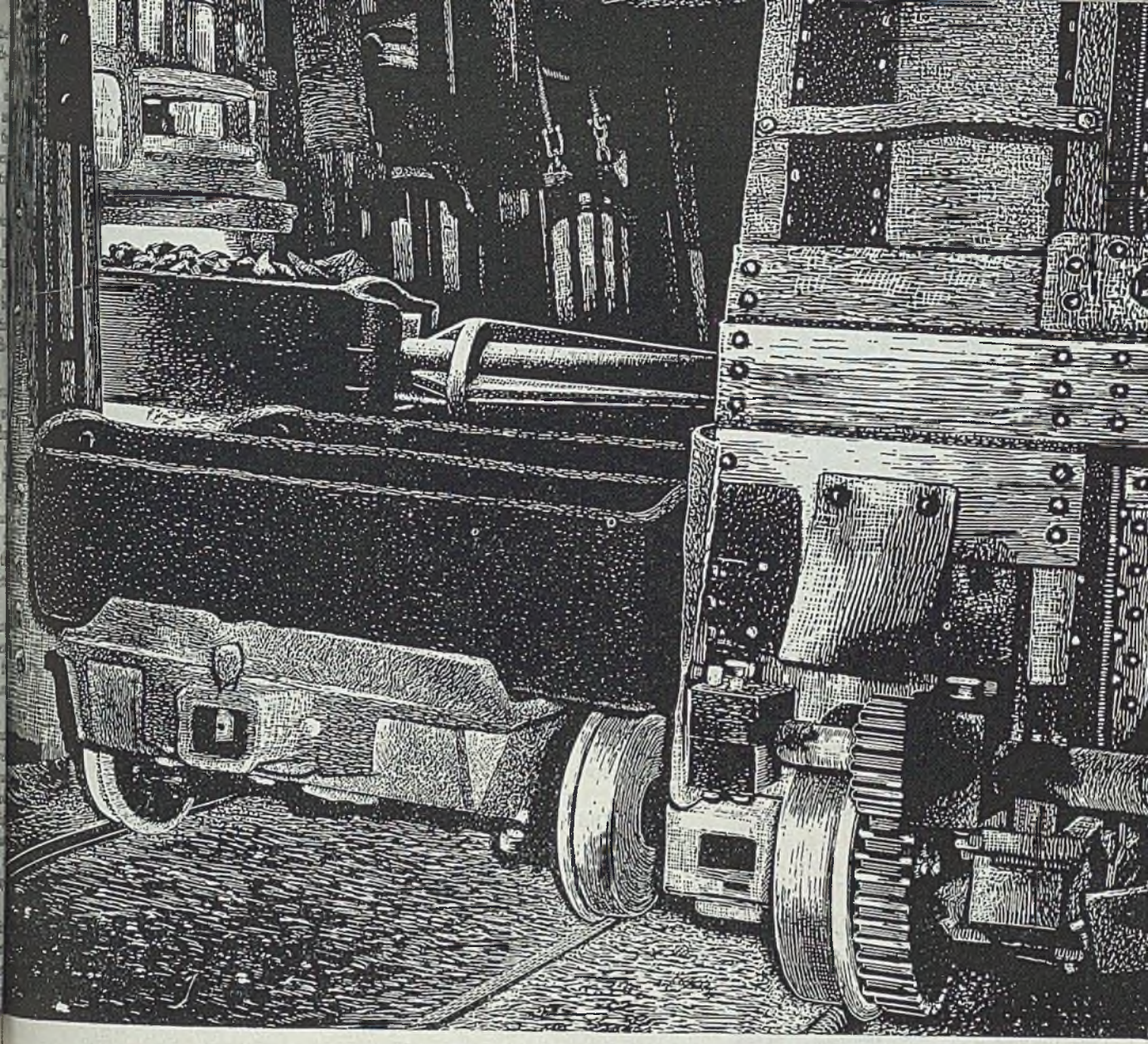
Lower limits of the prevailing r are adopted, therefore, for best app ing horizontal fillet welds and for application of cover beads of unif neat appearance.

Where production conditions are as to permit a small degree of metal porosity, provided that it does appear on the surface, some electr grades will successfully handle very currents without any noticeable decr in efficiency of deposit or increase spatter loss. At the same time, weld pearance will remain good.

Many shops that are doing qu work have come to depend upon p able indicating or recording amme or volt meters to keep production weld within prescribed bounds. These ac rate instruments are of considera more benefit than the meters often fu on welding machines and transform By controlling current values w proven limits, the avoidance of an necessary amount of x-ray cutouts more than pay the small cost of ga metering equipment. Needless to s where code specifications are chec by means of physical test plates, the surance afforded by maintaining corr current conditions will prove quite be ficial. When shops are embarking new work programs, where electr types or joint preparations are m ately different from any previously countered, the pre-selection of sat tory current values checked by rel meters often is the quickest way to started on the right foot.

—o—

How, when, and why of using cr type cylinders are explained in bulle No. 126 by Askania Regulator C 1603 South Michigan avenue, Chica 16. Cylinders are said to provide a fle ible source of hydraulic power with minimum of gland leakage and main tenance trouble.



PUTTING HEAT-PROOF BRAWN *Into Peels!*

Charging peels, used to introduce scrap metal into open-hearth furnaces, are subject to alternate periods of terrific heat and cooling, causing the charging ends to develop fire cracks. For this "business end" of the peel, a heat-and-wear resistant alloy steel is frequently specified; the remainder of the peel is made of mild steel. Thermit welding is used to join the two parts together.

Thermit welding is the favored welding process for this exacting assignment because the weld must be strong, permanent and stress-free. Thermit welding is readily adaptable for such heavy section jobs—an outstanding example being its use in fabricating stern frames for Liberty ships. It is also used extensively for repairing rolls, pinions, machine frames, crankshafts and other large parts—where the permanency of the weld and the economy of the process are decided advantages.

Thermit welding can be done in your own plant or at one of the Metal & Thermit plants at Jersey City, N. J., Pittsburgh, Chicago or South San Francisco. Write for full details to Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y., Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

Thermit Welding

Scale Models

(*Continued from Page* 131)

out of place. A parking lot accommodating 50 or 60 cars, for example, may be a solid flat piece of wood to which miniature car models are glued, so that the entire lot may be lifted out to make way for a new building. Even such minutiae as dies in a storage yard or scrap piles stored along rail lines can be duplicated in detail.

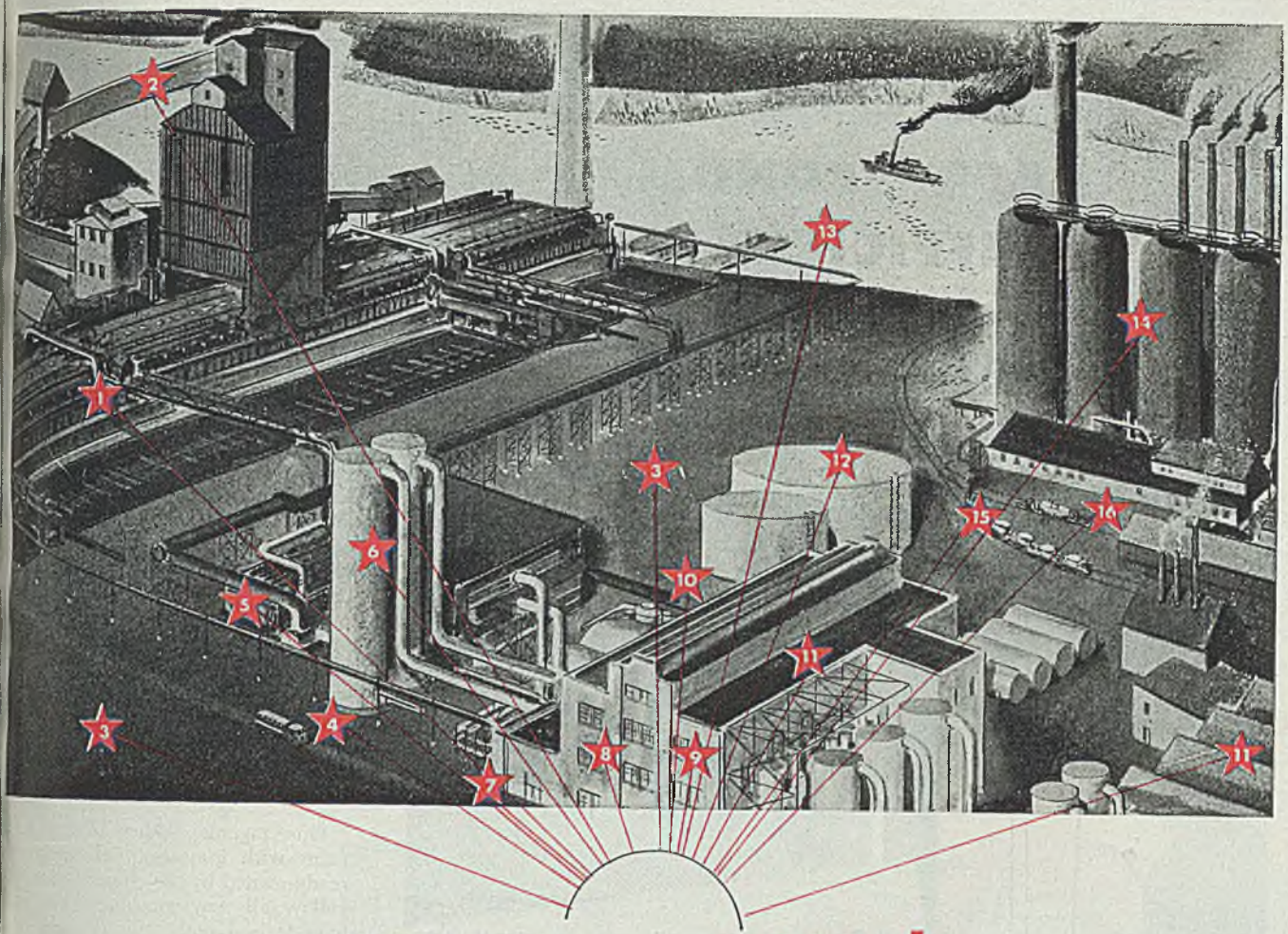
When a new building project or addition to present structures is proposed, plant engineers may prepare a small-scale facsimile of the structure, paint it complete with windows, doors and whatever other exterior features are called for. Then the old structure to be replaced can be lifted from the layout table; railroad tracks, roadways, loading docks and other related properties, rearranged, and the new building fitted into place. The physical rearrangement can be accomplished in a matter of minutes, and it is a simple matter to work out a number of alternate suggestions which can be set up in a moment or two. With this flexible method, it is possible to show various new construction ideas quickly, and at the same time give a clear conception of how the changes will appear with relation to the entire plant area.

Give Ultimate Appearance

It can readily be appreciated the number of blueprints, drawings, photographs and other delineations that would be necessary to equal the continuous record of plant layout provided by this novel three-dimensional system. Furthermore, drawings and blueprints cannot come close to scale models in getting across the ultimate appearance of proposed changes, even to the engineer trained to appraise them at a glance.

The other, and perhaps even more important phase of three-dimensional plant layouts, is concerned with equipment arrangement in the plants themselves as in Figs. 2, 3, 4 and 7, and Chrysler has experimented with this at considerable length. It has involved the "manufacture" of literally thousands of pieces of equipment, ranging from such standard tools as automatic lathes, presses, multiple drills, grinders and milling machines, to specialties such as degreasing equipment, work benches, tote boxes, roller conveyor lines and other appurtenances of metalworking departments in a mass production industry.

Most of these were fashioned by a single veteran carpenter working in a small shop with equipment such as is found in one of the better-equipped home work shops, Fig. 5. This skilled artisan, beyond the retirement age, incidentally, proved to be a master at reproducing the general contours of highly complicated machine tools, sawing and carving out the various components from bass wood, gluing them together



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and painting the complete assembl

Scale used on plant equipment is ¾ in. to the foot, and some of the mod (See Fig. 4) are remarkable reproductio of the originals. The builder work from photographs, sketches of the act equipment and from manufacturer's ca logs, involving a dimension-conversi job of no small magnitude itself, found he could build about four mod of a fairly complicated machine tool a day's time; other equipment of s pler design could be fashioned m faster.

Models were sent from the carpen shop to plant engineers who in meantime had ruled off floor layo on large tables, as in Fig. 7, mark them into squares to facilitate dim sional spotting. Then the equipment located exactly as it had been drawn on two-dimensional layout. Aisles w ruled off between batteries of machi inspection benches spotted where t would be required in production, e tote boxes placed where they would needed. In some cases, conveyor l were installed adjacent to machines permit a clear study of materials ha ling problems.

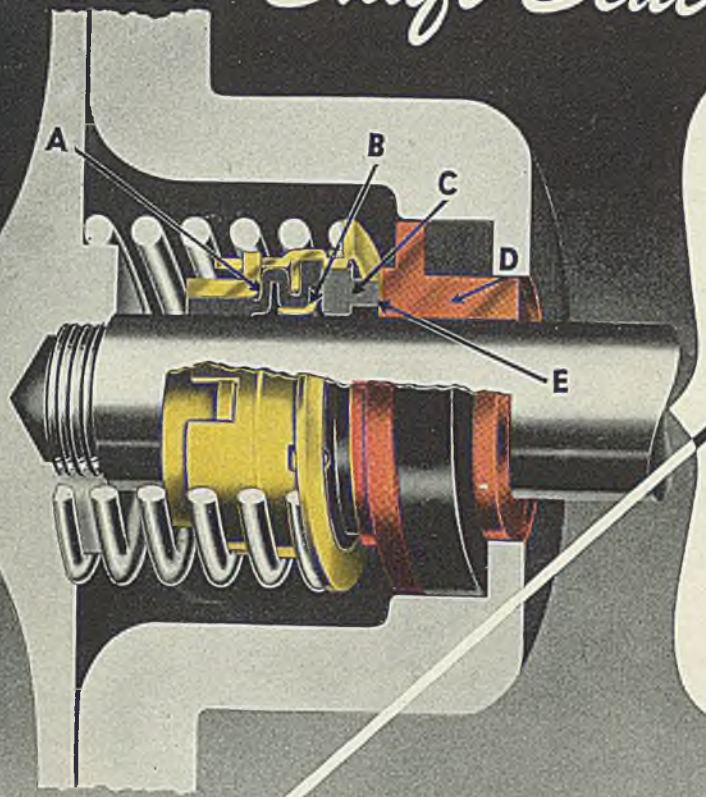
Color Identifies Machines

One ingenious idea adopted was paint with gray color all machines ready owned by the corporation and w yellow all new machines which wo have to be bought. By this means, wh all machines in a department were sp ted in place, it was possible to note a glance the proportion of new equi ment required—a far more graphic re resentation than a mere listing of s machines.

As some engineers studied th equipment layouts, the thought occur to them: Why could not equipm builders provide a useful service prospective buyers by making availa scale models of the various machines their line? Thus, when a new machi ing department is in the layout sta a buyer might order, say, 12 of builder's No. 2 machines, six of No. 5 units and 20 of his No. 8 un all in accurate scale models, and i mediately spot them in his product layout. These would advantageously su plement the blueprints and catalogs. T same principle might be extended auxiliary equipment such as conveyo electric trucks, tote boxes, benches, If these models all were available fro suppliers, a considerable amount of ti could be saved by layout engineers the buyer's plant, and an equipm supplier could turn out several hun dred models of his standard lines far less cost than the buyer could fab ion just a few, or whatever quantity i installation required. Equipment sup pliers also might well consider the sal appeal of well-built models of thei product over and above the usual litera ture available.

It would be necessary, of course, t standardize on a scale for such models

This NEW Shaft Seal Eliminates



A Synthetic Rubber Bellows—tail seals on shaft. Head is flexible; adjusts automatically for washer wear or shaft end play.

B Protecting Ferrule—prevents flexible bellows from adhering to shaft; assures free movement.

C Sealing Washer—rotates with shaft; driven through metal parts; no torque on bellows.

D Floating Seat—cushioned in synthetic rubber sealing ring, eliminating stress distortion of sealing faces.

E Sealing Faces—both carefully lapped at our factory to insure a perfect seal.

✓ STUFFING BOX LEAKAGE
✓ GLAND ADJUSTMENT
✓ SHAFT WEAR

Pump Manufacturers and Design Engineers—write for the new illustrated bulletin which describes the JOHN CRANE Bellows-Type Shaft Seal. This precision-built Shaft Seal is giving excellent service on centrifugal and rotary pumps, refrigeration compressors, agitator shafts—all types of rotary shaft sealing applications. Note these important advantages:

- *Flexible; adjusts automatically for wear*
- *Eliminates stuffing box leakage and shaft scoring*
- *Reduces friction to a minimum; saves power*
- *Excellent for high speeds and pressures*
- *Permits compact unit with less shaft overhang*
- *Shipped complete; ready for easy installation*

CRANE PACKING COMPANY

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Bunting manufactures not only Special Bearings to your specification but Standard Stock Bearings and Precision Bronze Bars. On Special Bearings our engineers will be glad to work direct with you. Standard Stock Bearings and Precision Bronze Bars are available from your nearest Authorized Bunting Distributor. The Bunting Brass & Bronze Company, Toledo 9, Ohio.
28
Bunting
BRONZE BEARINGS ☆ BUSHINGS ☆ PRECISION BRONZE BARS

but few difficulties should appear in arriving at agreement on this score. The ⅜-in. to the foot scale seems to be suitable for most departmental work.

Experiments with the use of equipment layouts do not end with their study by administrative, purchasing and engineering officials. It is also possible to take photographs of the layout and supply them to erection crews, machinery movers and anyone else concerned with a new installation, to supplement detailed specifications on locations and dimensions. The picture of the actual layout as it will appear has been found helpful in clarifying blueprints, specifications and whatnot usually connected with a new equipment project. It is even possible in some instances to take the actual model itself to the site of a new project for the same purpose.

Beyond that, a careful study of models may disclose some difficulty or error which might not otherwise be noted until the actual installation is under way. Such a disclosure might conceivably more than repay the cost of construction of the model.

Carrying the scale model technique one step further, Chrysler engineers in one case went to the extent of casting lead figures to represent workers required in the department and stationing them at their posts on the plant floor. The idea was suggested by one executive after he had watched his young son casting lead soldiers from an outfit he had received as a Christmas gift. A refinement was the painting of production workers black and nonproductive workers yellow, to permit time study and labor control staffs to observe the overall proportions of the two classes of workers with a view to recommending changes.

Color Code for Tool Size Identification

A color system for tool size identification has been devised to assist operators in differentiating at a glance between closely related sizes of such tools as drills, reamers, etc.

This identification system, initiated by Lenmore Sales Co., P. O. Box 1234, St. Louis, utilizes color code painted on the shank of the tool. The inch is divided into 64 parts for twist drills, with letter and number sizes denoted by their decimal equivalents. Each color repeats itself every ⅛-in. For example, brown is used for ⅛ (0.125), ¼ (0.250), ⅜ (0.375), etc. Number sizes 35 (0.1100), 34 (0.1110), 33 (0.1130), 32 and 31 are brown on the upper half of the shank, as ⅛-in. is their next larger sixty-fourth, and there is a supplementary color on the lower half of the shank to place the exactly within the sixty-fourth-inch group.

A large wall chart gives the color scheme used in the system and the sizes to which the colors apply.

Steel Strapping Method

(*Continued from Page* 135)

require something as large as 1¼ 0.035-in.

Straps can be put on in four differ ways, as shown in the accompany illustrations. Any combination of th can be used; each has its own partic qualities. The shape of the article be secured and their arrangement on pallet may make one way valuable another useless.

Fore and aft strapping binds the together in one direction and binds the pallet at the same time. If t enough, it will prevent shearing of load (i.e. tendency for the top laye slip). It is especially valuable for road shipment because it braces aga the fore and aft shock caused by the pacts that a box car must take in tra Recent experience with palletized projectiles in wooden boxes has sh conclusively that two such straps are s cient for freight car shipment of an load as heavy as 3600 lb. Howe when live ammunition is shipped, sa demands three or four straps to bind b more securely. Fore and aft strap alone is generally inadequate for o seas shipment, as it does not pro sufficient rigidity athwartships. W used in combination with straps run in other directions, it should be app last, on top of the others. This gu against any possibility of snagging strap, since fore and aft scraping (principal hazard) will not snag a and aft strap.

Athwartships Strapping

Athwartships strapping cannot passed under the pallet because it wo interfere with pallet slings as well transporters or hand lift pallet tru Thus it can only serve to bind the together. The straps must either be on the pallet before the load is put or else tediously threaded through spaces between the pallet boards. T method has limited uses, but can do satisfactory job in conjunction with and aft strapping.

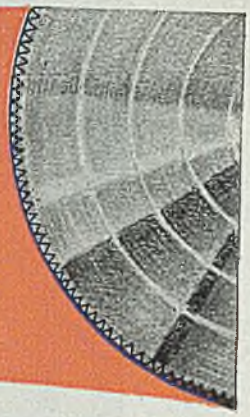
If the pallet pattern has a central of any size, either fore and aft strapp or athwartships strapping may tend squeeze the boxes in towards the ho thus opening cracks around the pe meter, unless some sort of blocking used in the hole.

This blocking may be anything fr a simple scrap of soft wood to a ca fully built core.

Girthwise strapping, like athwartsh strapping, does not bind the load to pallet, but is easier to put on and far m useful. It does have the disadvantage dropping out of position if it becomes all loosened, unless fastened in some w A single strap around tall light items hold them nicely if extensive bundli is not required. Although some multi decked loads tend to fall apart in colum one strap around the top layer will ten to keep the boxes therein together, a the weight of this bound top layer wi

Walker-Turner

Metal-Cutting Radial Machines



CUT 'EM HIGH, WIDE AND HANDSOME!

NO matter what kind of metal shapes you're cutting—high or wide, large or small—the Walker-Turner Metal-Cutting Radial Machine does an exceptionally fast, clean, accurate job. The "slab-cutting" method employed by this machine gives it an unusually wide range as compared with other methods.

1 EASIER OPERATION Sliding ram gives clear view of work.

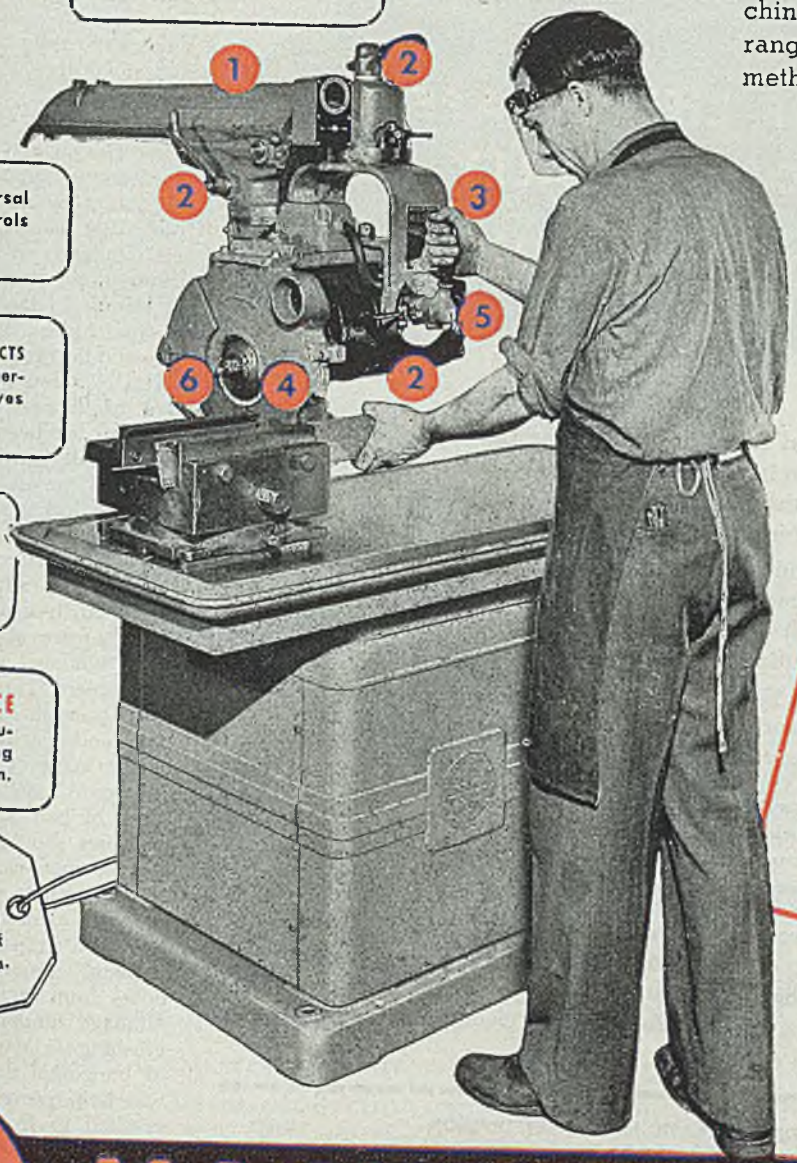
2 QUICK SETTING Universal head, convenient controls easily adjusted.

3 ELIMINATE COSTLY REJECTS AND LOST TIME "Finger-touch" control improves quality of work.

4 FASTER CUTTING Due to smaller blades with greater rim force.

LOW MAINTENANCE Sturdy construction, accurately machined moving parts, easy lubrication.

LOW PRICE $374.50 (with 2 or 3 H.P. motor) Slightly higher west of Rockies and in Canada.



5 LOW POWER CONSUMPTION Patented geared design permits use of 2-3 H.P. Motors.

6 LOWER BLADE COSTS "Slab-cutting" method gives more effective cutting with smaller blades.

WRITE FOR NEW FOLDER

WALKER-TURNER COMPANY, INC.
PLAINFIELD, N. J.

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MACHINE TOOLS

DRILL PRESSES — HAND AND POWER FEED • RADIAL DRILLS
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
RADIAL CUT-OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

stabilize the rest of the load sufficiently for limited handling.

Strips of vertical dunnage may be used with girthwise straps at the top and bottom, providing a complete tie-in of the load. Finally, where containers on the same pallet vary a bit in size (e.g. the old and new styles of projectiles boxes) small gaps may open up between the boxes when fore and aft straps are pulled tight. To counteract this defect, place a single girthwise strap near the top of the load.

The principal virtue of diagonal strapping is that it prevents shearing better than any of the others, which makes it ideal for tall, relatively light loads that are to undergo rough handling. It is most effective for items that are not too small. Because diagonal strapping binds the material to the pallet and can be used alone, it saves strap in many cases. It has the advantages here of threading easily through the corners of the pallet and of being able to make a diagonal turn without putting more strain on one side of the strap than on the other as girthwise strapping does.

Articles Secured to Pallet

Articles bound with athwartships or girthwise strapping may be secured to the pallet by nailing blocks or cleats to the pallet in such a way that they stand up into gaps of the load, preventing it from sliding on the pallet. Two examples of this are a load of boxes built around a square block of 2-in. lumber nailed in the middle of the pallet, and a load of metal cylinders secured on the pallet by two trapezoidal blocks nailed on after the load has been strapped. This method is especially good for items with a high center of gravity.

Regardless of what type of strapping is used, some consideration must be given to its effect on the article or container being strapped. When strapping is tensioned, it tends to draw into a circle. On a square object, the crushing effect of a tightened strap is thus greatest on the corners. This unequal distribution of stress presents no problem with substantial wooden or metal boxes. On the other hand, many wirebound, veneer, and fibreboard packages will not stand the strain of bare straps against them. Such packages should be piled on the pallet in that manner in which the container or its contents will provide the greatest support against the pressure of the tightened strap.

Metal corners may serve to prevent boxes from crushing. A strip of wood dunnage under a strap will prevent crushing in one direction (i.e. a piece of horizontal dunnage on top of a box will help prevent the boxes from being crushed in from the side, but will not prevent their being crushed downward). Also a couple of pieces of dunnage at right angles to a strap near a corner help relieve the corner pressure. Pieces of dunnage also can be a great help in strapping loads that underlap the pallet.

Boxes of green lumber should be allowed to dry out as much as possible before being strapped. Shrinkage of such

No operation is "farmed out" in producing

TUBE TURNS

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FROM the original design, through the tool and die shop, to completion of the upset or mechanical press forging under rigid laboratory control—every operation in the production of Tube Turns steel forgings takes place within the Tube Turns plant.

This is of vast importance to the industries using Tube Turns forgings. It means that all responsibility for completion and delivery of the finished product is centered in one organization.

Tube Turns engineers, tool and die men, plant personnel, and laboratory technicians all know steel from every angle. They have the experience and the equipment to produce exactly what you want, in any desired quantity.

You are invited to make full use of Tube Turns forging skills in the preparation of designs for improvement of your product. Your inquiries will receive prompt and complete attention. Write to TUBE TURNS (Inc.), Louisville 1, Kentucky.

boxes can loosen strapping enough in few weeks to make it worthless.

Strapping once selected and proper applied must not be abused. It is not i tended to be used for picking up pulling pallets, but to form solid, ef cient units out of what would otherwi be loose piles of material.

Finds Nazi "Super" Cutting Alloy Inferior

Harry Crump, carbide tool specialist the Foreign Economic Administratio Technical Industrial Intelligence Co mission, who has returned to the Uni States after a first-hand 8½-month sur of wartime development in Germa states that of the two metal-cutti substitutes for tungsten carbide, neit has proved as effective as tungsten c bide for machining metals.

One German substitute, an alumin carbide—although extremely hard—ga rather dismal results. It could be us effectively only for taking light cuts nonferrous metals such as brass a bronze. Germans themselves admit tools that were made of aluminum c bide were "not too good".

Another substitute, somewhat bet than aluminum carbide but neverth less inferior to the tungsten product, w a vanadium-titanium carbide containi no tungsten. Production tests with sa ple tools revealed them to be hig brittle, with a tendency to chip eas and break down when taking anythi except light cuts. The latter carb was produced by the slower hot-pr method. According to Mr. Crum tools made from it had to be sharpen with extreme care in order to preve cracking of the material from heat gen ated in grinding.

Mr. Crump, who is assistant to t vice president, Carboloy Co. Inc., Detro said that German tool producers admitt to him they probably would not ha continued to utilize the tungsten-fr carbide if supplies of tungsten had b come available to them before the en of the war.

New Electrode for Machine Use

American Agile Corp., Cleveland, ha announced development of its newes electrode, Agile-Blue. This rod is be ing developed for the broad field of a welding applications with low open-ci cuit transformer type welding machines Maker says it performs equally well in all welding positions and can be appl with ease and efficiency, for weldin light gage sheet metal, steel furniture tanks of all types, ornamental structures auto fender work, steel window frames and sashes, switch boxes, sidewalk gra ings, motor housings, conveyors, etc. It is said to give smooth, extremely neat weld deposit, minimum spatter loss, very easy slag removal, and rapid welding speed.

Hot Shearing Blades

(*Continued from Page* 140)

failure was due to the lack of rigidi of the base metal when shearing lar and heavy plates of a tough alloy ste

A blade made from an SAE 1335 st was prepared for hard-facing. It was p heated to 600°F, arc welded with ha facing, allowed to cool without a special precautions being observed, edges were ground, and the blade th put into service. The life from one ed alone was 30 days, compared with two or three days obtained with a hon geneous blade.

It is important to emphasize that SAE 1045 is satisfactory in the ov whelming number of cases, but the b or parent metal blade must be sufficie ly rigid to support adequately the ha facing for any particular operation. user of hard-faced shears goes so far to heat treat the welded blades bef grinding, and, for the conditions ex rienced in his plant, the procedure been very worth while.

The Base Metal: The purpose of hard-facing deposit is to take the br of the impact, the abrasion and the h in a shearing operation. It is essential use a base sufficiently rigid to supp the hard facing. In general, an SAE 1 steel is satisfactory, but in cases wh the operation is severe, an SAE 1335 a 4135 can be used to advantage.

It is usually inadvisable to attempt weld worn blades as they may be m of special alloy steels which are diffic to weld without cracking and, in so cases, without fracturing the base me

Preparation of the Blade: Recess cutting edges to the blade about ⅜ deep and 1 to 1½-in. wide to allow a finish ground deposit approximat ⅛-in thick.

The best method is to machine b top and front of the blade as shown the accompanying illustration. This p tects the hard-facing from under-cutti

Welding: The blades can be hard fa without preheating but a preheat about 600°F is recommended. This facilitate the application of the ha facing metal and will give a sou deposit.

The hard facing may be applied the oxyacetylene or the electric arc me od (with direct current). Arc applied is recommended, particularly on la blades, as it is faster and more e nomical.

The following amperages will g satisfactory results in the majority cases, but may be altered at the op of the welder:

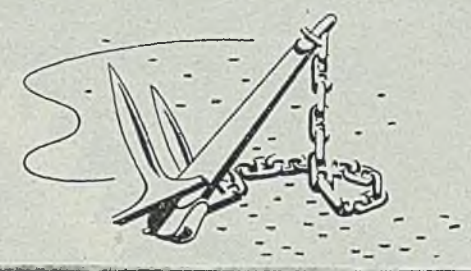
Rod Size	Amp—DC
$\frac{5}{32}$-in.	175 to 20
¼-in.	200 to 250

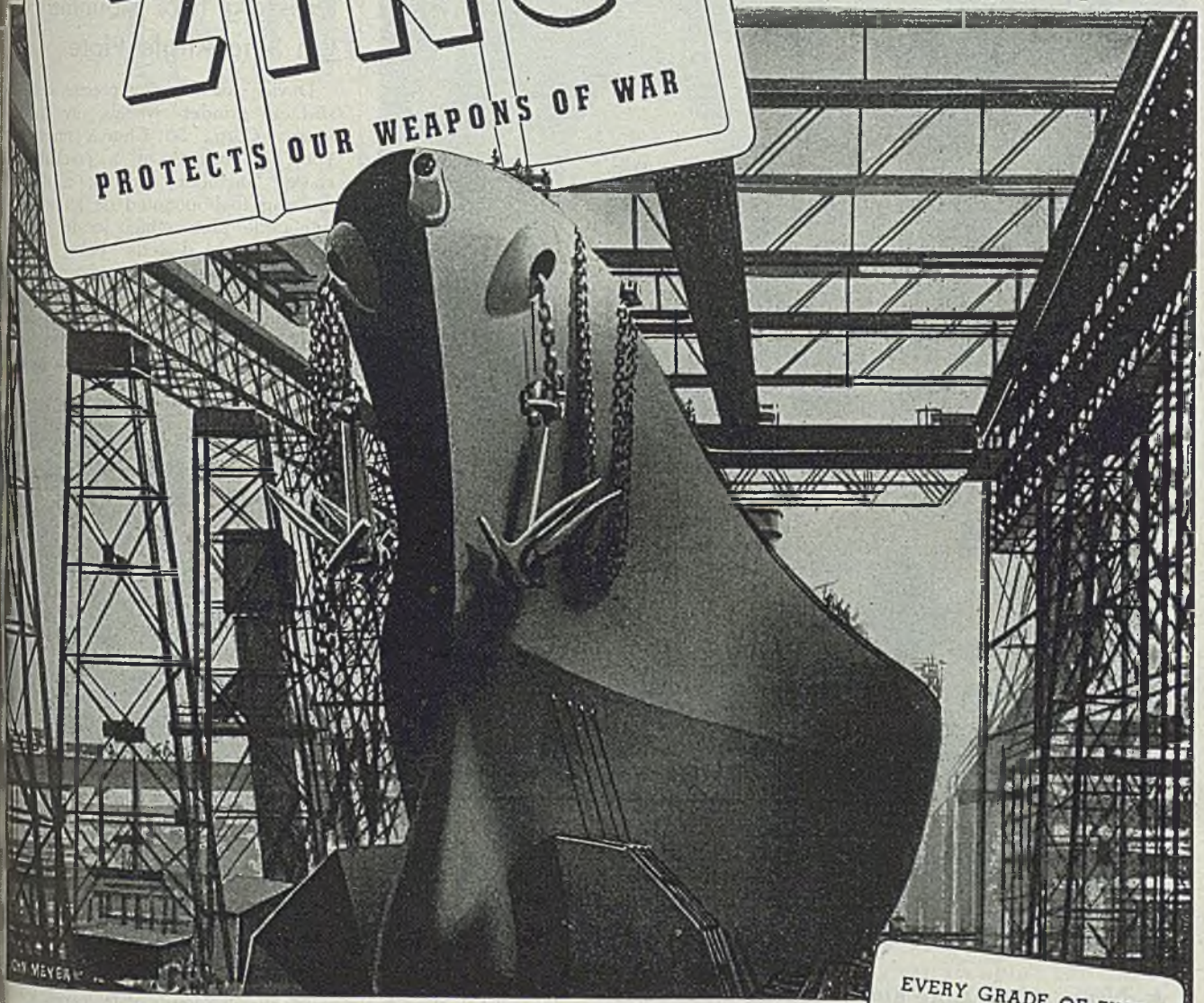
Be sure to use sufficient current bond the hard facing firmly to the ba metal, particularly on the cutting ed All the pressure is exerted on the ed and if the bond is weak, the hard faci may chip off. Use reverse polarity.

Grinding: The following grindi

ZINC

PROTECTS OUR WEAPONS OF WAR





★ On every ship there are miles of galvanized pipe and conduit, innumerable items of galvanized hardware, cans and cases formed of galvanized sheets. For coating with zinc is the most effective method of protecting all ferrous metal against rust and corrosion. And tomorrow zinc will serve equally well in the protection of America's peace-time products.

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AMERICAN ZINC SALES COMPANY

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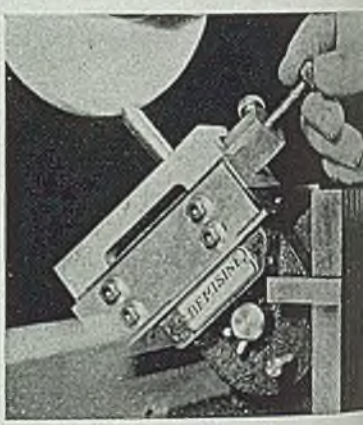
wheels or their equivalents are recom-
mended for grinding the hard-facing de-
posit:

Type of Grinding	Standard Marking
Rough and Finished	C 60 L V
Rough	A 54 O 6

In some cases, after the deposit is ground, minute checks are found. The are in no way deleterious to the per-formance of the hard facing, as the ma-terial is well bonded to the base.

Dressing Tool Mounted On Sine-Angle Plate

Device for dressing precise angles on surface grinder wheels, by Nichols-Morris Corp., 50 Church street, New York 7, consists of a precision-fitted sliding member carrying a diamond dressing tool mounted on an adjustable sine-angle plate which locates on mag-netic chuck directly below grinding wheel, as shown in accompanying illus-tration. Sine-bar principle is used in tilting the sine plate precisely to the de-sired angle. Two-inch micrometer is the only measuring instrument requi-



to set any dressing angle from 0 to 9 to accuracy within 1 min of arc in a minute's time.

When angle is determined, the dia-mond tool is brought in contact with the wheel, and the slide is moved back and forth manually to generate a cor-responding angle on the wheel. Slide attachment can be removed quickly from the sine-angle plate, leaving a work-ing surface prepared for holding small parts at accurate angles for grinding, milling, or jig-boring operations.

Radium Button Marks Danger Points

Safety-marking button, utilizing ra-dium for marking hazards and danger points in homes, stores, offices, and fac-tories, glows in total darkness without need for recharging or activation by light. The button, made by Lustrolite Cleveland Corp., Cleveland, is a hol-ring of clear plastic. A sealed chamber in ring is coated with a minute and hard-less charge of radium compounded with other ingredients to make a paint. The dium gives off a constantly glowing elec-trical emanation (a single particle will not exhaust its energy for 1500 yr

NAMES WORTH REMEMBERING . . .

DAVY . . . *for making the first carbon electrode, in 1800, with charcoal and syrup*

INTERNATIONAL *for* Graphite ELECTRODES

• that are TOUGH

A FIRM, UNIFORM structure of high mechanical strength is an essential in electric furnace electrodes if losses through breakage are to be kept to a minimum. INTERNATIONAL Graphite Electrodes "have what it takes" to assure the greatest possible safety and economy, the utmost freedom from damage in handling—because of the high shock-resistance that is built into them. Rigid manufacturing specifications for INTERNATIONAL electrodes call for a *minimum* breaking strength of 1500 lb. per sq. in. and a *minimum* crushing strength of 2800 lb. per sq. in. An ample margin of safety is thus provided so that breakage of these electrodes, except through the most careless handling or furnace-charging operations, will be negligible.

The same structure and uniform density of INTERNATIONAL electrodes that accounts for their extreme ruggedness also provides other important operating advantages—low consumption, high current capacity, and slow rate of oxidation.

These are good reasons why you'll want to remember INTERNATIONAL when you want time-saving, cost-cutting furnace electrodes.

OTHER ADVANTAGES

- Slow consumption
- High current capacity
- Low rate of oxidation
- High thermal conductivity
- High degree of purity
- Consistently uniform properties and dimensions
- Low cost per ton of production

Send for free copy of this helpful booklet—"Handling and Proper Use of Electrodes"

International Graphite & Electrode Corp.

SAINT MARYS, PA.

Zinc Electroplating

(*Continued from Page* 144)

tions with temperature have been not

The drop test apparatus as shown Fig. 21 comprises a 250 ml. separat funnel connected by rubber tubing t glass capillary tube with a bore of proximately 0.75 mm and a length o in. Between the capillary and the st cock of the funnel there is 3 to 5 of wide bore tubing to increase the h of liquid so that the proper rate of fl is obtained. A one-hole rubber stop is inserted in the mouth of the fun and through the hole is run a glass t 6 in. long by 5 mm inside diame The tube is pushed down into the f nel so that the end is submerged in liquid. Minor variations in the head r be compensated by varying the depth immersion. A glass or porcelain dis placed under the capillary tip, and specimen so supported that the drops liquid strike the point to be tested run off quickly without touching a to be subsequently tested. The surf to be tested should be inclined about from the horizontal.

In view of the fact that the drop is one of the most widely used t for determination of thickness of z plates, specific directions for using apparatus just described are given bel

Operation of Drop Test

1—Prepare the surface of the pla sample by cleaning with an alka cleaner or an organic solvent, lowed by light rubbing with a m nesium oxide suspension; rinse th oughly, and then dry.

2—Place the separatory funnel with tached tubing in the ring holder.

3—Fill the funnel with the test solut selected at about 75°F and open stopcock until tube is filled with tion. Now adjust flow by sliding glass tube in the stopper so that tip discharges from 90 to 110 dr per minute (100 drops preferred.

4—If used, indicator solution in amount of about 1 per cent of drop test solution should be added rectly to the drop test solution in separatory funnel immediately bef use.

5—Hold the plated sample firmly und the stream of drops at an angle about 45° so that the solution dro continuously on one spot and flo off freely.

6—Observe the number of seconds quired for the removal of all the pl in the dropping area, i.e., a spot ance of the base metal, the endpoi being observed by contrast of the tw metals, or in the case that indicat solution has been added, the pota sium ferricyanide reacts with the ste or iron base metal as soon as it exposed, and a brilliant blue color re sults.

7—Calculate the thickness of the deposi

How Up-To-Date are you on Aluminum?

SEE THE DIFFERENCE!

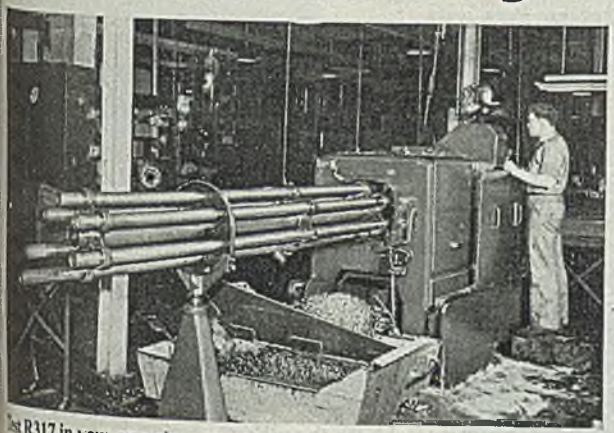
A

TIME LOST! Ordinary aluminum machining stocks produce long, spiral chips which curl around tool and machine, fouling moving parts and clogging feeder lines. A waste of operating and clean-up time. Alternative: use R317.

B

TIME SAVED! R317, Reynolds free machining strong aluminum alloy, breaks into small chips when machined. These particles fall clear, do not interfere with operation of tool or machine, are easily disposed of.

How Free-Machining R317 Cuts Machining Costs



Test R317 in your own shop. Nationwide reports demonstrate that it is admirably suited in "T" temper to general manufacture of aluminum alloy screw machine products requiring free-machining characteristics. Available in rounds, hexagons, rectangles and squares.

Metallurgically speaking: R317 is an aluminum-copper-manganese-magnesium alloy (17S) with small additions of other metals to improve machining characteristics without sacrifice of strength.

Economically speaking: Since cold drawing is not required to impart hardness and strength after heat treatment, tendency to warp during machining is minimized; also greater uniformity is gained. Result: time saved all along the line! Fewer rejects! Finer production *faster!*

Consider Aluminum . . . strong . . . light weight . . . corrosion-resistant . . . readily workable. Whatever your problem, Reynolds technicians will gladly work with your engineers. Offices in principal cities. Phone nearest office . . . or write Reynolds Metals Company, Aluminum Division, 2520 South Third St., Louisville 1, Kentucky. **Consult Reynolds.**

Write for Bulletin 55-A on R317 . . . also Bulletin 100-A, "Reynolds Aluminum. Its Important Role in Tomorrow's Products."

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REYNOLDS ALUMINUM

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using the following stripping facto
10 sec.=0.0001-in. zinc.

The Brenner magnetic test[64] is utiliz for determining the thickness of zinc ov steel. The mechanical force required separate a permanent magnet from t surface is determined by a sensitive ha spring attached to a calibrated scale a zinc thickness is determined by referen to a suitable curve supplied with ea instrument[65]. This method has be growing in favor as a useful non-destr tive test for determining "minim thickness of metals on significant s faces," which is evidenced by the repo that the National Bureau of Standa has calibrated over 1000 instruments this purpose during the past 2 ye almost all of which have been used military supplies.

In order to insure that the coati furnish good protection against corrosi resistance to the salt spray for a d nite period of time is often specified. spite of the well recognized shortcom of the salt spray test it serves a use purpose in excluding decidedly infer coatings. Part of the criticism of this t arises from the variations in the con tions used. For example in differ specifications the concentration of sodi chloride is 3, 5, 10, or 20 per cent. T temperature may be 35°C (95°F) "room temperature." In order to ma the salt spray test more definite a reproducible efforts are now being ma to draw up requirements for a standa salt spray test in which the conditions operation will be defined[66]. Althou the salt spray test may be useful for co paring similar coatings, it is genera thought that the same information m be obtained more readily and accurat by minimum thickness measurements

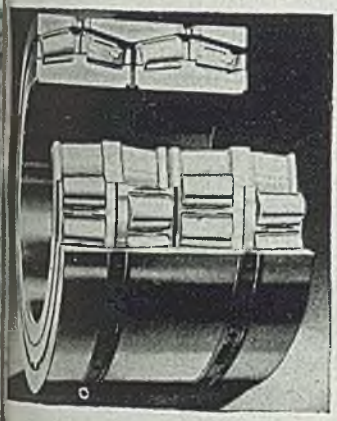
Adherence and Ductility

To be of any permanent value a plat coating must *adhere* closely to the b metal and possess *ductility* to the ext that it is free from undue strain a stress. It is reasonable to assume th the adhesion of a metal to the ma upon which it is deposited depends pr marily upon an intimate contact of t two, requiring the absence of any film grease, oxide, gas, or other foreign m terial. In those cases where the cryst of the electrodeposit represent a conti ation of the crystals of the base met perfect adhesion is achieved. Whatev are the ultimate factors in the adhesion a plated metal it is certain, that for pra tical purposes, it is most largely depen ent upon thoroughness of preparation surface to be plated. It is necessary n only to remove all grease or foreign ma terial originally present, but also to rin thoroughly for removal of all alkali c soap from the cleaning operation. In ad dition it appears that the best adhesio and ductility of coating is secured whe the deposited metal is (1) as nearly fre from internal strains as possible and (2 free from occluded oxides, basic salts or gases.

It is sometimes rather difficult to specify the degree of adherence of one metal

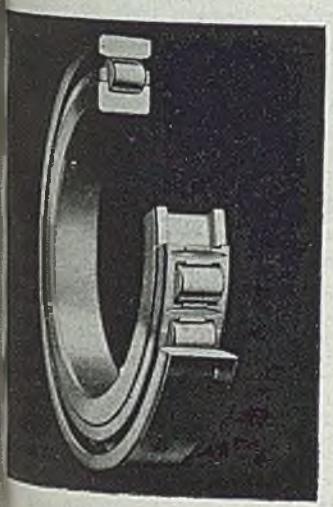
FOR MORE OUTPUT, LESS MAINTENANCE
SPECIFY TORRINGTON BEARINGS

With the trend in steel mills toward speedier production at lower cost, comes the demand for equipment that "rolls it out" faster with fewer and shorter shutdowns for maintenance. Shown on this page are some typical steel mill applications of Torrington Bearings. Designing and building to specific requirements has for years been a function of Torrington's Bantam Bearings Division. Our engineers will gladly help yours to incorporate Torrington Bearing advantages into your present or future designs.



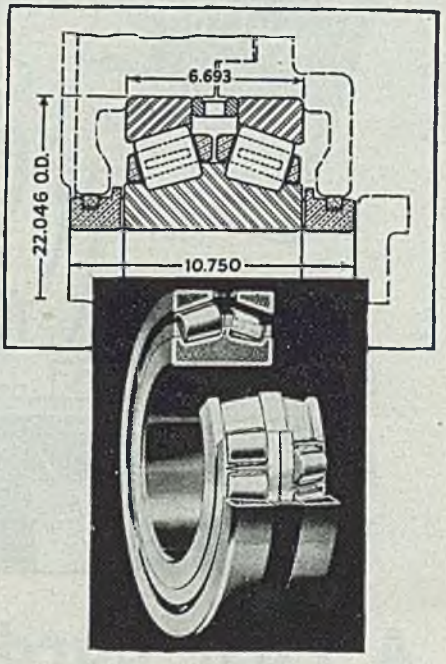
⬅⬅ HIGHER ROLL NECK SPEEDS

and maximum service life are attained by use of Torrington Tapered Roller Bearings. Four-row taper type bearing shown here is used on the roll necks of Mesta five-stand mill delivering 3200 feet of cold strip per minute. Bore is 12 inches; O.D. is 17¼ inches. These bearings handle loads efficiently, assure long and trouble-free service life.



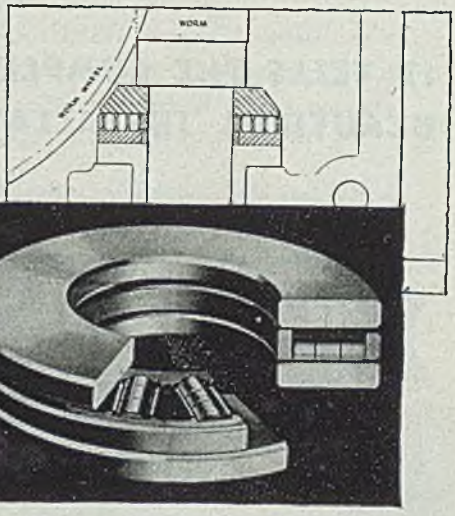
PEAK TONNAGE RECORDS ➡➡

come easier when Torrington Two-Row Tapered Roller Bearings made of S.A.E.-3310 steel (with higher nickel content) carry the thrust loads imposed on back-up rolls. Bearing shown here, designed for 80" four-high continuous hot strip mill, has thrust load capacity of 220,900 pounds at 100 r.p.m. Features include simplicity of design for positioning in housing; controlled lubrication; clearance adjustment to permit assembly as received; and take up as required, with spacer width control.



⬅⬅ MORE ACCURACY

is attained when Torrington Radial Roller Bearings are used in flying shears. Bearing shown here is built to take the around-the-clock punishment imposed by high speed operation of a modern strip steel cutter and to provide the necessary accuracy in shearing so that edges are clean and lengths are cut within specified tolerances.



LESS MAINTENANCE ATTENTION ➡➡

is needed when screw downs turn on Torrington Roller Thrust Bearings. Bearing shown here is used on four-high screw downs. Specifically designed to handle tremendous loads at high speeds, it helps the mill deliver more work for less power... stay on the job longer with less interruption... give more years of dependable, trouble-free service.

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to the other or the degree of ductility the coating especially in the case of co mercial articles of various shapes. In perimental work comparative tests be made by depositing upon sheet m which is subsequently subjected to b ing or other deforming operations. S a method, however, falls down for ins tion purposes except for similar mate The method of Burgess[2] referred earlier, employed for an adhesion te zinc coated steel, a technique in whi piece of metal was soldered to the co metal, and the force necessary to de the coating was then measured. method, of course, assumes that the hesion will not be effected by the elev temperature used in soldering.

Recently a bend test has been scribed[69] which should prove useful detecting brittleness and studying a sion of zinc coatings on strip steel. I tests are usual tests for ductility and hesion of coating and detection of brittlement of the steel in acid trogalvanized strip steel, but this te somewhat more severe than the ordi bend test. The strip is bent into shape with handles, as shown in Fig and then is given repeated bending a direction perpendicular to the p of the V which results in a rolling at the point. It is reported that a s factory electrogalvanized coating withstand such twists until the breaks, which in some instances ma after 60 or 80 twists.

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[52]Committee A-5 Am. Soc. Testing Mat Standards, (I) 318 (1933).

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[65]The "Magne-Gage" is manufactured the American Instrument Company, Springs, Md.

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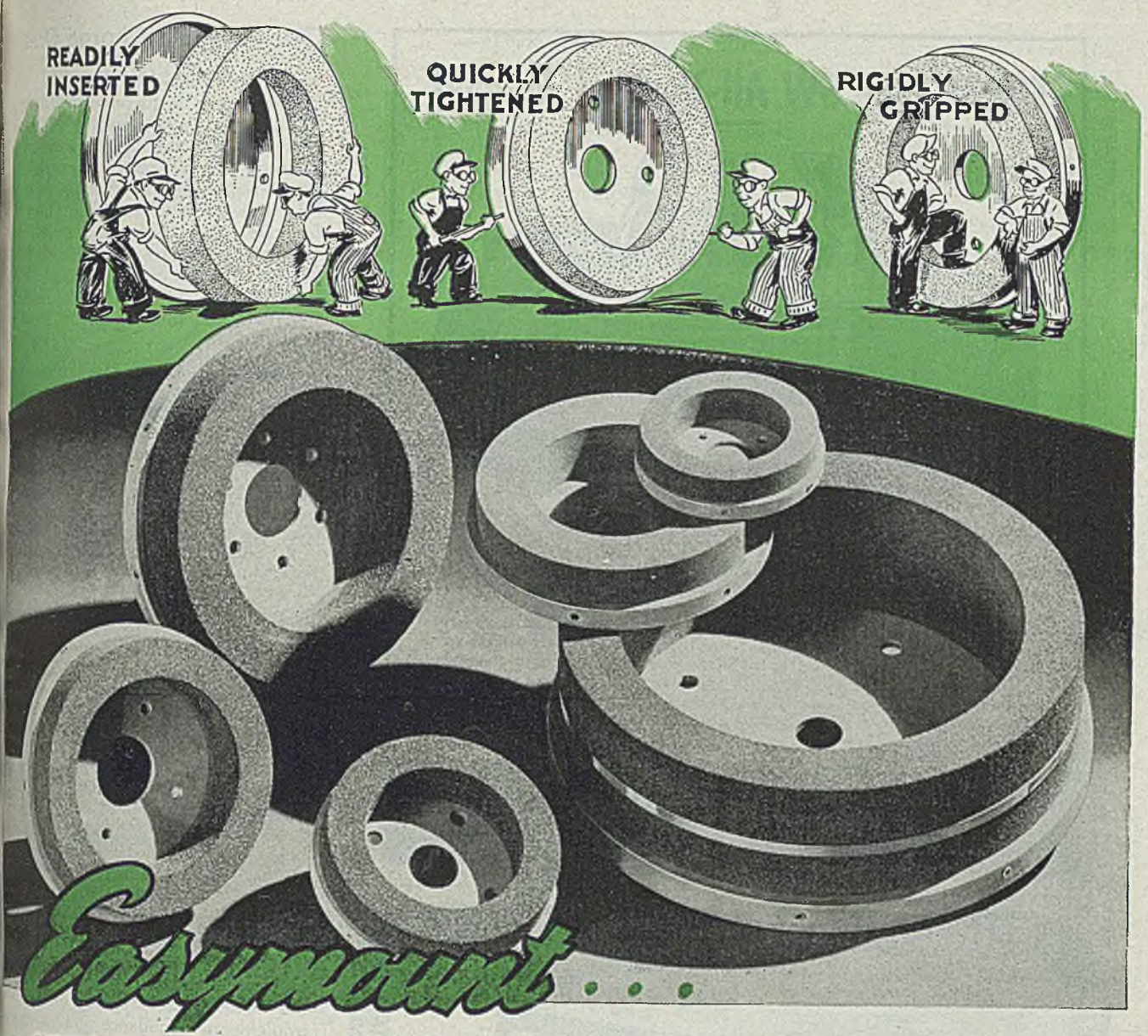
[69]See Discussion following Reference 65.

(Continued next week)



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THE WHEELS OF INDUSTRY

Open-Hearth Charge Ores

(*Continued from Page* 150)

as charge ore, is to briquette it. Us soft ore fines mixed with 1 to 1¾ cent of cement the material is molded ordinary concrete block machines, briquettes produced weighing about lb. The briquettes are then dried fore use. One company producing quettes used charge ore made up of per cent briquettes and 75 sinter.

A summary of the different mater described and their limitations shows follows:

1. Soft ores with low ignition l fairly low silica and not too fine pa ically can be used in quantities up to lb per ton of product, requiring up 62 per cent pig iron. These ores hav tendency to blow when hot metal added. If the ore is wet when char violent blowing is likely to take pla The use of wet ore should be avoid

2. Sinter made from soft ore and scale can be used in quantities up to lb per ton of product, requiring 60 65 per cent pig iron. Sinter made fr hard ore fines can be used in quanti up to 380 lb per ton of product, req ing 80 to 85 per cent pig iron. Use sinter as charge ore is restricted as sin ing capacity is needed to maintain h furnace production.

3. Hard (lump) ore can be used quantities requiring 80 to 85 per cent iron. The use of hard lump ore as cha ore is restricted as most of the dome supply is required for use as "feed" o

4. Nodules can be used in amou up to 310 lb per ton of product, quiring 70 per cent pig iron.

5. Briquettes have not been used tensively. Used in combination with ter as charge ore.

At present soft ore is the only ma rial being used as charge ore which available in abundance and requires preparation. Obviously a maxim amount should be used when high p centages of pig iron are desired in open-hearth charge.

To obtain percentages of pig iron the charge which are not possible w the use of soft ore, various combinati of soft ore and sinter, soft ore and h ore, or soft ore, sinter and hard ore being used. Table II shows the practi when combinations are used.

Some of these combinations are sta ard practice replacing sinter, or sin and hard ore, materials whose use charge ore is more or less restricted.

Run-Off Slags: If the open-hea charge consists of scrap and pig ir (hot metal), a minimum of about 48 p cent of pig iron is required. The sl produced from the limestone charg and the silicous materials in the charg stays in the furnace until the heat tapped. If ore is included in the charg the practice remains the same until th pig iron percentage used reaches 53 55 per cent. If 53 to 55 per cent pi iron is used it is possible to run the sl off the furnace soon after the hot meta has been added. This is usually accom plished by providing a 10-in. squar slag hole on the back side of the furnace

If you have a WEAR-RESISTANT Problem

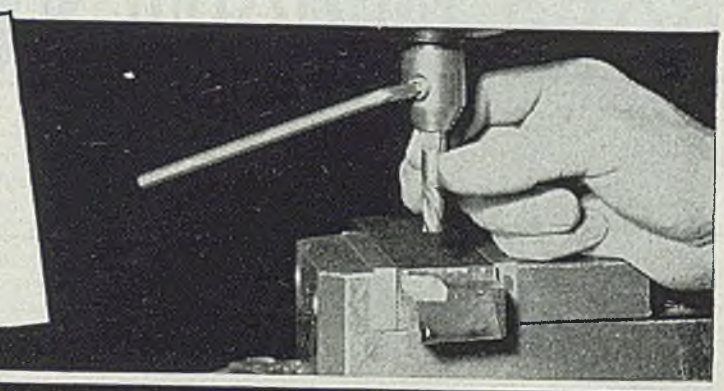
THIS milling machine collet, in its original form, had an average life of two to three months, before being scrapped. Instead of scrapping it—we bored it out, inserted two simple Kennametal bushings—and now, after 11 months of continuous service—it shows no apparent wear!

Yes, inexpensive Kennametal inserts can be successfully substituted after the original material has failed, and can give greatly extended life to otherwise worn-out parts. *But the logical place to insert Kennametal is in your original design.*

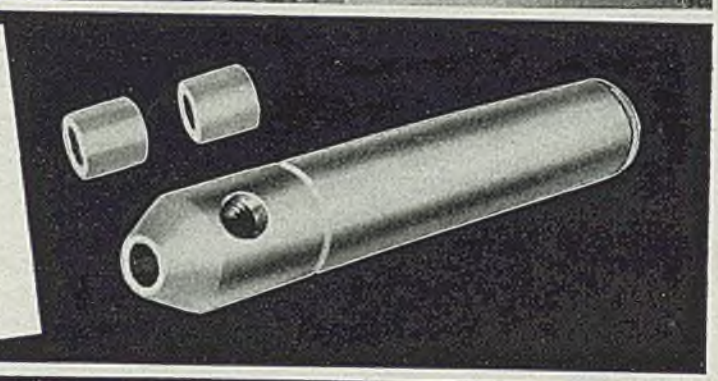
How much will it cost you to use Kennametal? There is a strong possibility that your product may actually cost less to produce with Kennametal, than it now does without it. Why? Because the incorporation of Kennametal at friction and bearing points in your basic design often makes possible a more compact, simplified, lighter-weight component that requires less of other materials, and a minimum amount of Kennametal. And, this does not take into consideration ... the greater sales possibilities, and customer satisfaction, inherent in a product whose service performance is immeasurably improved by the wear-defying characteristics of Kennametal.

Our metallurgists, engineers, and the facilities of a highly-specialized experimental laboratory are available to help you. And remember, Kennametal can be used in your basic design without entering into any complicated, continuing agreements.

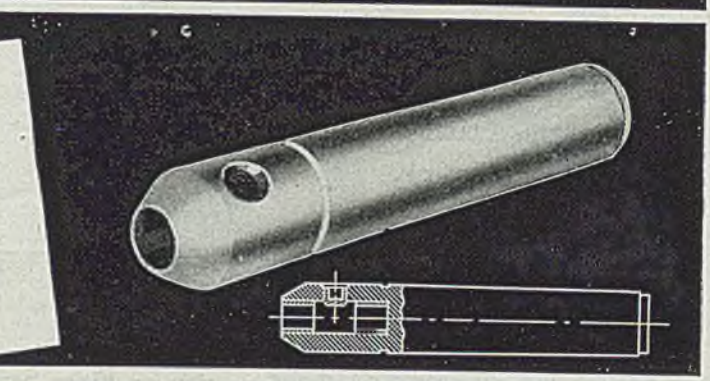
Consider the case of this COLLET



Its service life in original form WAS 2 TO 3 MONTHS



NOW with KENNAMETAL INSERTS... It has been used 11 months and shows NO wear



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6 in. above the bath level, as close as convenient to the tap hole.

Removal of the slag from the furnace is called flushing and this slag is called "flush" slag to distinguish it from tap slag which flows from the furnace when the heat is tapped. The slag hole is kept closed until after the hot metal is added, at which time the flushing starts and continues for about 1 or 1½ hr. Flushing of the slag is of the utmost importance to obtain the advantages which are possible from the use of high percentages of pig iron used in the charge. Flushing carries off most of the acid constituents from the bath, permitting the limestone which was charged to take care of the remaining acids. Analyses of some typical flush slags are shown in Table III.

Equipment must be provided for the handling of flush slags. The run-off spout can be either cast iron or cast steel. This spout discharges into a slag pot similar to that used for handling the tap slag which overflows from the ladle. Flush and tap slags are used in blast furnace burdens for the utilization of their contained lime as blast furnace flux and their iron and manganese.

Advantages gained from the use of ore in the open-hearth charge requiring 53 per cent or more pig iron are:

1. Increased production.
   (a) Less scrap to charge, reducing charging time.
   (b) Less scrap to melt, reducing melting time.
   (c) More sensible heat added due to increased amount of hot metal used.
   (d) Less limestone required due to flushing of slag.
2. Direct conversion of the iron oxides in the charge ore to steel in the open-hearth furnace.
3. Effect of residual alloys in scrap is minimized as less scrap is used in the charge.

Disadvantages which accompany the use of ore in the open-hearth charge requiring 53 per cent or more pig iron are:

1. Open-hearth yield reduced about 2 per cent.
   (a) The use of increased amount of pig iron containing 3.75 per cent of carbon will reduce the yield.
   (b) Production of increased amount of slag containing 25 to 30 per cent FeO which is flushed off reduces the yield.
2. Some are of the opinion that the quality of the steel produced suffers. Generally speaking we do not believe that this is true. Some grades of steel may be affected, and if this is true special high scrap charges can be used in such cases.

From a paper prepared for the 1945 Yearbook of American Iron and Steel Institute.

—o—

Bulletin DM-345, containing design data, an analysis of stress-strain diagrams and description of other engineering applications of Meehanite indicating strength and toughness, may be obtained from Meehanite Research Institute, 800 Pershing Square building, New Rochelle, N. Y.

Engine Metallurgy

(*Continued from Page 129*)

and thereby lower the operating perature of the head of the valve. sodium is sealed inside the valve and is useful because it liquefies the action of the valve causes it to the top of the valve and then back into the stem and thus carr heat from the top of the valve t cooler stem. The sodium cooled has been an important factor in th cess of air cooled engines since the temperatures which are developed out the use of sodium are such cause early failure of the best high perature alloys known today.

Silver. One of the chief difficulti perienced with the old Liberty was with the connecting rods and bearings. These were made of ti babbitt on bronze and were the of many engines being rejected by failure to last 50 hr in the test The use of silver plating on ste made it possible to have much load concentrations and speeds. as 1200 psi is considered the li safe load to use on babbitt in auto applications, 5000 psi can be us lead-indium plated silver. In fact porary loads of 6000 psi are po

Silver has a much higher stren moderately high temperatures than bitt and, of course, has excellent conductivity. It also has good wea scoring resistance, though for score ance it is not as satisfactory as b or lead. Its corrosion resistance cellent. In order to improve the ing resistance, which is of importa the run-in period, it is aircraft pol plate somewhere between 0.000 0.0006-in. of lead on the silver a make the lead resistant to corros small quantity of indium is plated lead (about 4 per cent of the weig lead). The indium then is diffused the lead by heating in oil at 450°F. thickness of silver plate in the fi bearing is usually in the neighbo of 0.005 to 0.010-in. with some ap tions as high as 0.016 to 0.024 in.

When silver is plated on steel for ing purposes, a flash of copper or is plated on the steel before the is plated. If a copper flash is used silver is annealed at about 450°F nickel is flashed on the steel, the is annealed at 950°F in a nonoxidi atmosphere or in fused salt. Unl good bond has been obtained, the will blister. The most severe tes blisters can be obtained by heating finish machining if distortion ca avoided.

One of the important advances i art of making bearings was through use of a steel backing material in place of bronze which was used in last war. The steel backing mak because of its high modulus of elasti permitted less movement of the bal and, consequently, stress on the bal was lower and fatigue failures avoi

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as common failures of bearings are from fatigue of the bearing material.

Beryllium as used in the form of beryllium bronze makes possible the easy machining of bronze parts which require high hardness during service. By means of beryllium it is possible to obtain the scoring resistance, nonmagnetic, or other properties of bronze and tensile strength of hardened steel. Common hardness of beryllium bronze used in aircraft engines is rockwell C 35-40.

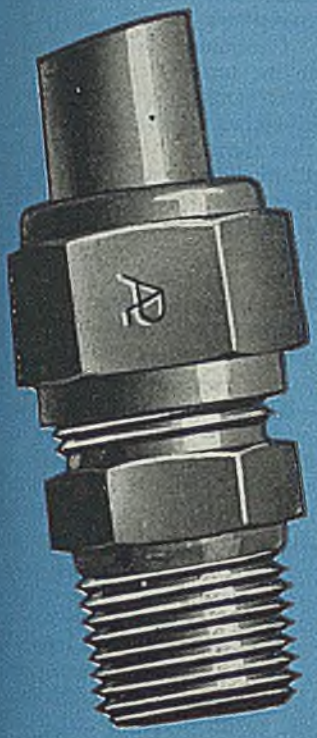
Beryllium bronze can be purchased in the form of bar stock with a hardness of about 200 brinell. Machining bars in this hardness offers no unusual difficulty. After parts are fabricated they may be heated to about 600°F for 3 hr and the hardness increases to rockwell C 35-40. If for some reason the parts do not harden with this aging treatment, or if the parts are accidentally overaged, they may be solution treated by heating for 1 hr at 1450°F, followed by water quenching. They will then respond to aging at 600°F.

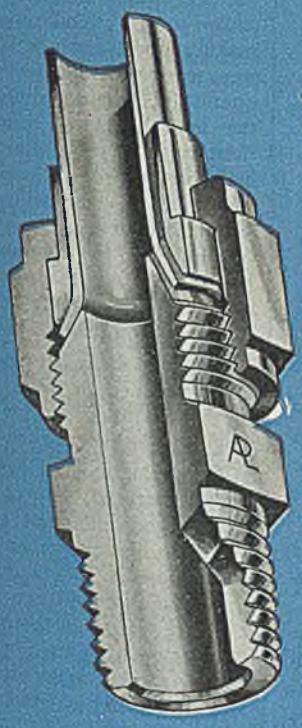
Stainless steel is used in many applications such as screens, fuel lines, injection fuel adapters, fittings, lockwire and miscellaneous tubing which could not be rust proofed conveniently on the inside. The most common variety is 18 chromium-8 nickel material. If the parts are to be heated to temperatures in the neighborhood of 1000°F or above, the stabilized stainless steel is used rather than the standard. The stabilizing material is either columbium or titanium; the columbium being used in a quantity equivalent to at least eight times the carbon and the titanium at least four times the carbon.

One of the common uses for the stabilized stainless material is for parts to be silver brazed. A silver brazing alloy commonly used contains about 50 per cent silver, 15 copper, 16 zinc, and 18 per cent cadmium. Silver brazing appears a very satisfactory method of joining stainless steel to stainless steel and the presence of columbium and titanium in sufficient quantity protects the material against injurious carbide precipitation. Thousands of feet of tubing have been brazed to fixtures with good success by this method. It appears to be more difficult to make clean tubing with columbium than without. Columbium tubing has a greater tendency for seams. This difficulty, plus the additional cost of columbium, makes the cost of the tubing about 25 per cent higher than the 18-8 material in small tubing.

Selenium metal is used in stainless steel to give increased machinability. It is used in the range of 0.10 to 0.35 per cent. Frequently the phosphorus is increased to about 0.10 to 0.17 per cent to aid in the free machining quality. Wherever this free machining quality can be tolerated there is no question that a great advantage is obtained in machinability.

Chromium Plate. Principal applications in aircraft engines for chromium plate have been where high resistance to wear is required. One of the applications is in holes in which inserted pins





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oscillate. Chromium plating reduces wearing and also eliminates fret which occurs rather commonly there is a small amount of motion tween two parts.

Chromium plating also has been in the top piston ring. In this loc it is common practice to produce is known as porous chromium pla that the material will be wetted b Chromium plate which is not p seems not to retain an oil film wh scant supply of oil is present. De increase in the life of piston ring been demonstrated with the porous of chromium plate. About 0.0 thickness of chromium plate is co practice.

Sintered carbides are so comm used as to require little discussion. less to say, their use in cutting has been of tremendous advantage i chining materials which, in the last were considered nonmachinable i hardness ranges used in modern en

Sintered bushings made from pow copper-tin are well known today. found possible to replace copper castings with sintered copper bushi many instances. Copper-lead bus having lead in the neighborhood of 20 to 25 per cent and tin about cent, have good bearing properties. became rather difficult to purchas cause so few vendors were capab making good castings. When att were made to make these castings in quantities, it appeared that segregati the lead became a major problem there was a good deal of pressu find substitutes. In many applicati was found the sintered copper base ing performed equally well. The siz bushing has the advantage that it be pressed into the size desired so no machining or only little machini required to finish the part.

In using sintered copper bushings good practice to avoid grinding i of the operations, to prevent emery ting into the pores of the bushing.

Forged aluminum has come to useful material. By proper heat t ing, forged aluminum can be obta with tensile properties of 65,000 elongation of 10 per cent, and a ness of about 140 brinell, using a kg load. One of the common uses aluminum forgings is pistons, wh combination of lightness, strength, ance to scoring and wear is not possi

Nitralloy steel is commonly use aircraft engines. In general, it is when high hardness is required on surface and, in addition, distortion make carburizing and hardening of part untenable.

One of the commonest applicatio in gears of intricate design. The common composition is the so-called modified which contains 0.95 to 1.5 cent aluminum; 1.40 to 1.80 per chromium; 0.30 to 0.45 per cent mo denum, and 0.38 to 0.45 per cent bon. A small amount of nitralloy steel also has been used. This steel

tains 3.50 per cent nickel; about 1.10 per cent chromium; 1.25 per cent aluminum; 0.25 per cent molybdenum, and 0.25 per cent carbon. The steel has the property of age hardening at the nitriding temperature to about 400 brinell, thus giving a stronger core hardness than can be obtained with the common nitralloy No. 135 modified.

One of the difficulties which is encountered with the use of nitralloy steel is the white layer, which must be removed if high loads are to be endured at the surface. The presence of this white layer is the reason for the common requirement to remove from 0.001 to 0.003-in. of metal from the surface after nitriding. Many shops find this requirement difficult, and there is a tendency to lap and take off merely 0.0001-in. or else to grind too much. As is well known, the desirable high hardness of nitralloy steel is relatively shallow so that grinding 0.008 to 0.010-in. frequently will reduce the hardness to the point where wear resistance is poor. Unless carefully designed locating fixtures and locating points are used, it is easy to grind off too much of the nitrided case. Much scrap and many poor quality parts have resulted from this difficulty.

Failure to remove the white layer is often the cause for flaking or spalling during engine performance. It is well for anyone using nitralloy steel to be warned of this condition, for although metallurgically the steel and heat treatment are highly satisfactory, parts are ruined during grinding. The nitriding process seems to be almost trouble free. A relatively wide range of dissociation of ammonia will give highly satisfactory results and case depths are uniform and easily duplicated. It is necessary before any parts are nitrided that the furnace be saturated so that the furnace fixtures do not take up nitrogen and thus rob the parts of this gas.

Processes

Nitriding—May be applied to steels other than the nitralloy type. It has been used with good success to stop scoring on SAE 1137 steel. In this instance, 5 hours of nitriding at 970°F gave a definite skin hardness and overcame the difficulty of scoring which was encountered if the nitriding was not done.

Nitriding also has been applied to the SAE 4300 steels to increase resistance to fatigue. The hardness obtained with nitriding this steel is in the neighborhood of 550 to 600 Vickers brinell. An increase of fatigue strength of about 25 per cent can be obtained by this means.

Another steel which is nitrided in production is a high molybdenum steel used in crankshafts in some of the in-line engines. This steel contains 0.30 to 0.35 per cent carbon; 0.70 to 0.90 per cent manganese; 0.50 to 0.80 per cent chromium; 0.90 to 1.20 per cent nickel, and 0.90 to 1.10 per cent molybdenum.

Grain Size Control—It is common aircraft practice to call for fine grained steel but to accept a few grains as large as No. 3. The question often is raised to why we should be concerned with grain size of medium carbon, oil-h ened steel which is not heated bey 1500°F in the hardened process. answer to this is that a large grain might affect the normalizing cycle. ther, fine grain does indicate a s what different treatment of the ste the mills. Whether the effects of su treatment are deleterious has never demonstrated, but there is a strong ing in favor of fine grained steel a metallurgists.

Hardenability Testing—A numb the most recent aircraft specificatio developed by the SAE, now in hardenability as measured with the cooled bar. The following are the s fications: AMS 6240 (SAE 2 6242(2518), 6250(3310), 6252(3312), (3315), 6254(3318), 6260, 6262, 6264, 6270(NE 8615) 6272 (NE 8 6274(NE 8620), and 6342(NE 9840) is well known, the hardenability te has made possible the easy determin of those steels which may be substi for standard types of known perform

An example of the application of enability testing may be quoted in nection with crankcases at Dodge-C go Division. AMS 6382, which is 4140 steel, was specified for a cran which has a forging weight of abou lb. Before too many heats were forge to crankcases, there was found a he steel which would not harden pro when the crankcase was quenched i Hardenability bars were cut from crankcases and were hardened to well C 50 only for a distance of 5/ The hardenability bars then were from some of the heats which hard properly. It was found that these hardened to rockwell C 50 for i in. on the standard end cooled bar a result the specification was chang require a minimum of rockwell C 12/16-in. on the end cooled bar. I necessary to permit steel producers t over the specification limitations in ganese, chromium, and molybden order to guarantee this hardena The heats of steel received there averaged well to the top side o specification, but no further trouble encountered in hardening crankcas long as a minimum of rockwell C ¾-in. was maintained.

Somewhat lower hardenability ings were obtained when bars were from the steel billets rather than they were forged to 1¼-in. round in cordance with the SAE specificatio hardenability. Inasmuch as our la tory had a well equipped machine and could much more quickly and veniently cut bars from the 9-in. sq billets in which the steel was rece than they could be obtained by fo the billets to 1¼-in. round, test were cut from the billets. The test was taken half way between the ter and surface in billets and from lets which were rolled from the bo of the ingot, because, in general, bottom of the ingot has the lowest h

ensibility. Steel producers made their test bars by forging, and it was found that their test results averaged lower. We seemed to get as low as 9/16-in. on steel heats for which they reported 13/16-in. This difference is worth noting for those who expect to purchase steel on hardenability specifications.

Magnaflux testing was extensively used during World War II. Thousands of parts have been scrapped because of Magnaflux indications and much time was spent in attempting to determine whether certain indications could be tolerated and what indications were required in scrapping the piece.

In general, indications in sharp corners, fillets, at the base of threads and any indications that are transverse to the grain flow were usually looked upon as unsatisfactory. Indications which did not come to the surface were practically always acceptable unless in sharp corners or fillets. With indications that came to the surface, the severity of the indication or the apparent size of the indication was a guiding factor as to acceptability. Any kind of a crack, even though it was a grinding crack, has commonly been the cause of rejection in aircraft parts. It has been found, however, that thousands of parts have Magnaflux indications which do not affect the utility of the part. It has been rather common practice to run parts with questionable indications in model test engines and observe whether there is any tendency for failure under test conditions.

A difficulty which occasionally was experienced was through the erroneous requirements of Magnaflux on high-sulphur free machining steel. Obviously, this steel always has bad Magnaflux indications and it is a waste of time to so test parts made of this steel.

Furnace atmosphere control is another subject which is well developed and which requires a good deal of detailed information to discuss intelligently. One point needs to be brought out about atmosphere control for parts which are not case ground. It is essential to be careful about decarburization because of the difficulties in maintaining nondecarburizing atmospheres. Many plants have gone to the expedient of copper plating parts before hardening and then stripping the copper plate after hardening. It seems that atmosphere control should render this expedient unnecessary.

Quantitative spectrography has been used as a tool in determining the composition of alloys. In our laboratory at Chicago we used the spectrograph both for steel and nonferrous analyses. In steel it was used for the determination of small (if under 4.0 per cent) chromium content in stainless steel), molybdenum, copper, aluminum and manganese. In the magnesium alloys we determined everything but the aluminum by means of the spectrograph. In aluminum alloys the spectrographic method was used for the complete determination of the entire composition.

Looking to the future, there is much work still to be done—more possibly than appeared at end of the last war.

THE BUSINESS TREND

Industry's Readiness for Work Is Demonstrated

AN EXAMPLE of the rapidity with which industry would swing into volume peacetime production if spared from the strangle hold of strikes is furnished by performance in the automobile industry.

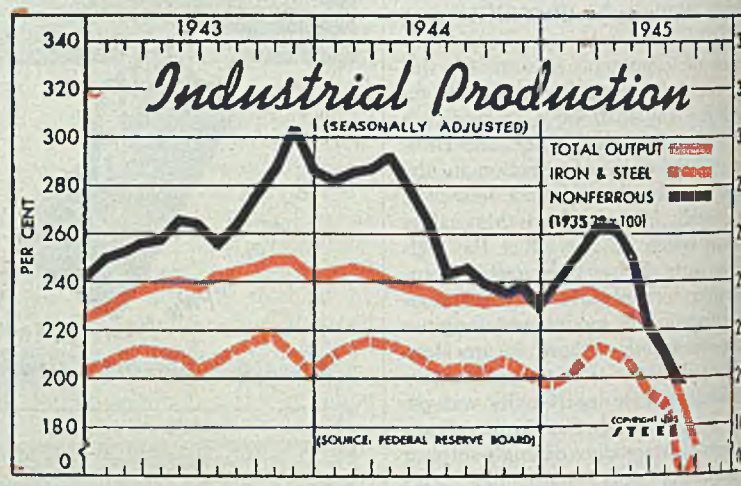
In the week ended Oct. 27 that industry produced 20,675 cars, a 50 per cent increase over the previous week and the greatest output since V-J Day. The auto industry had hoped to get into volume production quickly but was thwarted by strikes in suppliers' plants. While all producers of components are not free from labor difficulties, enough progress in obtaining components has been made for the auto assembly plants to demonstrate their readiness to forge ahead. How much further they can go depends largely on whether strikes are avoided in unions' efforts to obtain increased wages for employees in the auto and steel industries.

STEEL—Return to work of coal miners on Oct. 22 halted the decline of ingot output in the steel industry which was running short of fuel. Pent-up demand will rapidly push the steel ingot production rate upward, labor conditions in the steel industry permitting.

COAL—Final week of the recent miners' strike had a bituminous coal production of only 49 per cent that of the corresponding week a year ago. Now, production this year is 9.8 per cent behind that for the similar period of 1944.

INDUSTRIAL PRODUCTION—Reflecting continued liquidation of output for war purposes, the Federal Reserve Board's seasonally adjusted industrial production index for September was 172 per cent of the 1935-1939 average. Indexes for August and July were 187 and 210, respectively. Reduced activity in the machinery and transportation equipment industries continued to account for most of the decline in the total index. Production of nondurable g changed little in September as cuts in war production the chemical, petroleum, and rubber products indus were offset by rising output of civilian products.

CONSTRUCTION—Continuing to rise in September, struction volume in the 37 states east of the Rocky m tains was 5 per cent above August and 58 per cent a September, 1944, the F. W. Dodge Corp. reported. valuation of September contracts was $278,262,000. residential construction featured September's activity, substantial gains over the previous month and over corresponding month of last year. Ninety-five per ce the residential awards were for private accounts, only 511,000 of a total of $181,033,000 being classified as licly-owned. The September record for private non dential construction continued to sharpen the trend publicly-owned projects characteristic of the war yea



Federal Reserve Board's Production Indexes
(1935-39=100)

	—Total Production—			——Iron, Steel——			——Nonferrous——	
	1945	1944	1943	1945	1944	1943	1945	1944
January	234	243	227	197	208	204	240	281
February	236	244	232	202	212	208	257	285
March	235	242	235	210	214	210	265	288
April	231	239	237	206	213	209	264	292
May	226	237	238	204	210	208	251	279
June	220	235	236	192	204	201	219	264
July	211	231	240	187	202	204	210	243
August	187	232	242	155	203	210	198	245
September	172	231	244	165	202	214	...	239
October	...	232	247	...	206	215	...	236
November	...	232	247	...	201	209	...	239
December	...	232	241	...	198	200	...	229
Average	...	236	239	...	206	208	...	260

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago
Steel Ingot Output (per cent of capacity)	65	65	83
Electric Power Distributed (million kilowatt hours)	3,937	3,915	4,039
Bituminous Coal Production (daily av.—1000 tons)	968	1,022	1,933
Petroleum Production (daily av.—1000 bbls.)	4,273	4,237	4,357
Construction Volume (ENR—Unit $1,000,000)	$58.4	$73.1	$88.8
Automobile and Truck Output (Ward's—number units)	20,675	13,750	10,430

*Dates on request.

TRADE			
Freight Carloadings (unit—1000 cars)	794†	773	832
Business Failures (Dun & Bradstreet, number)	17	15	10
Money in Circulation (in millions of dollars)‡	$27,974	$27,952	$27,729
Department Store Sales (change from like week a year ago)‡	+13%	+11%	+14%

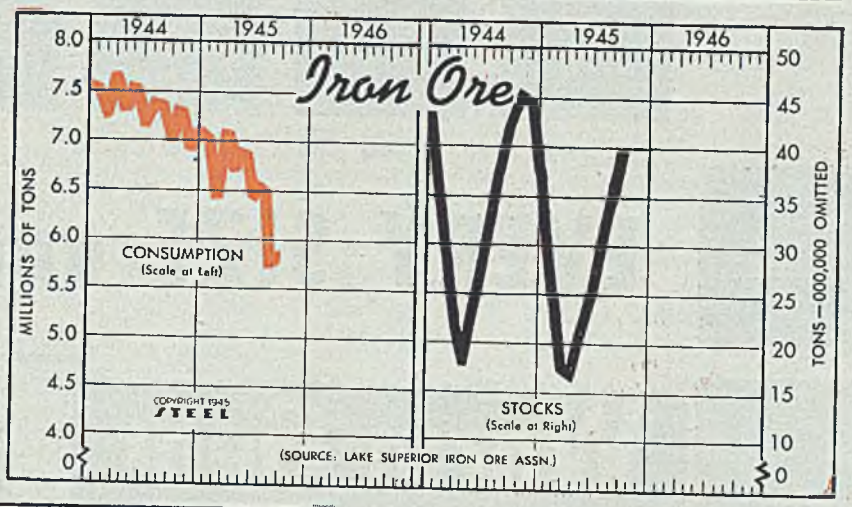
†Preliminary. ‡Federal Reserve Board.

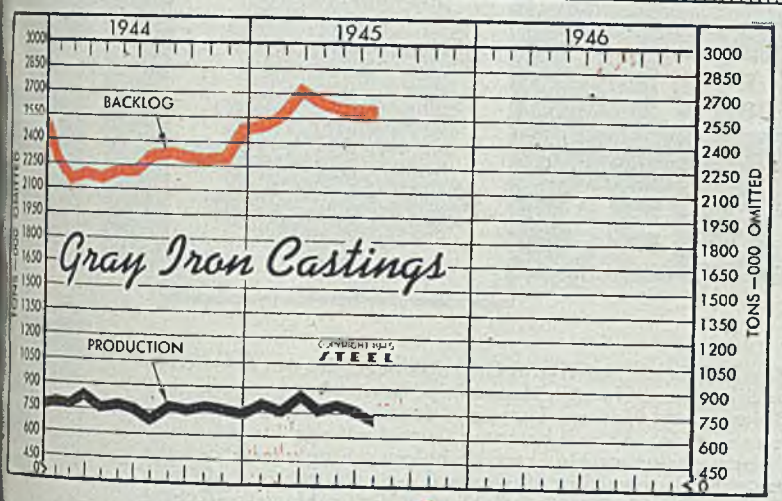
Iron Ore

(Lake Superior Iron Ore Assn.)

Gross Tons—000 omitted

	Consumption		Stocks at Lake Erie docks, & furnaces	
	1945	1944	1945	1944
January	6,983	7,482	30,889	36,059
February ...	6,371	7,207	24,577	28,910
March	7,082	7,659	17,304	21,333
April	6,642	7,273	16,429	17,892
May	6,872	7,558	20,715	21,474
June	6,397	7,112	24,847	26,655
July	6,532	7,372	29,485	32,069
August	5,658	7,342	34,781	37,243
September ..	5,887	6,950	39,549	41,943
October ...	.....	7,320	.....	45,343
November ..	.....	6,883	.....	44,722
December ..	.....	7,090	.....	37,824





Gray Iron Castings

(U. S. Bureau of Census)

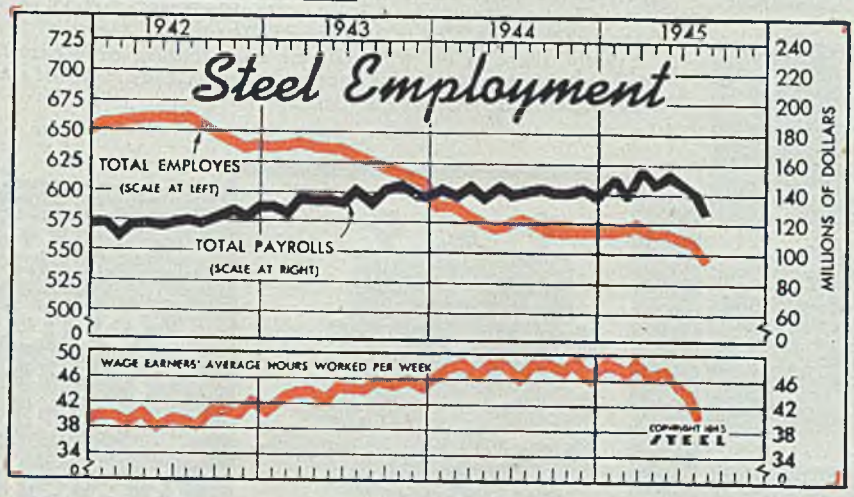
Tons—000 omitted

	Production		Backlog	
	1945	1944	1945	1944
Jan.	807	794	2,497	2,259
Feb.	753	773	2,562	2,145
March	851	841	2,714	2,184
April	769	766	2,641	2,159
May	806	789	2,603	2,205
June	773	766	2,596	2,218
July	693	698	2,565	2,314
Aug.	...	778	.....	2,335
Sept.	...	769	.....	2,304
Oct.	...	788	.....	2,297
Nov.	...	770	.....	2,300
Dec.	...	744	.....	2,475
Mo. Ave. ..	...	773	.....	2,266

Steel Employment

Employees (000 omitted)			Total Payrolls (Unit—$1,000,000)		
1945	1944†	1943	1945	1944	1943
564	583	637	$150.3	$141.8	$129.7
566	583	635	138.4	137.6	122.8
570	578	637	155.0	145.3	136.8
567	573	634	147.0	138.9	133.3
565	569	632	154.0	145.4	137.4
562	570	631	144.1	140.5	136.2
557	571	627	141.0	141.8	142.8
543	569	625	128.1	143.9	139.9
...	565	620	....	142.2	143.8
...	564	615	....	141.7	144.9
...	564	611	....	143.1	141.5
...	564	605	....	139.9	140.2

†Monthly average; previous reports showed total number regardless of whether they worked one day or full month.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,380	$10,072	$11,553	$9,413
Federal Gross Debt (billions)	$262.0	$262.1	$262.5	$211.5
Bond Volume, NYSE (millions)	$28.9	$39.3	$33.1	$34.9
Stocks Sales, NYSE (thousands)	6,403	9,168	6,505	4,567
Loans and Investments (billions)†	$61.1	$60.9	$61.6	$54.1
United States Gov't. Obligations Held (millions)†	$45,471	$45,108	$45,473	$40.2

†Member banks, Federal Reserve System.

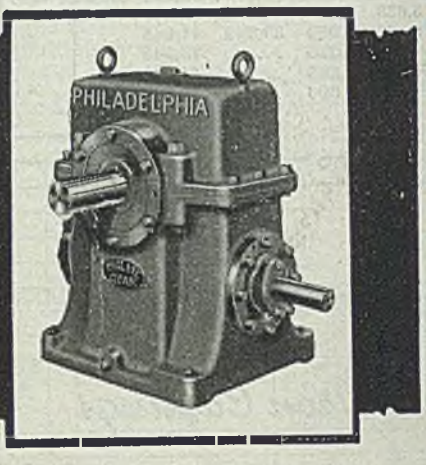
PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	56.73
All Commodities†	105.5	105.3	104.9	103.8
Industrial Raw Materials†	116.9	116.6	115.5	113.2
Manufactured Products†	101.9	101.9	101.8	101.2

†Bureau of Labor Statistics Index, 1926 = 100.

EVERY SIZE and TYPE

Worm Gear SPEED REDUCER



As a standard series, the Philadelphia Line of Worm Gear Reducers are not excelled in Design, Versatility of arrangement, and Fine Workmanship. Generally speaking, they are divided into 3 groups: Heavy Duty, Medium Duty, and Small Units (for all-around low and fractional horsepower service). As will be noted from the diagrams surrounding this advertisement, the worm shaft locations may be below the gear or above the gear; or the output shaft may extend upward or downward,—of course, Philadelphia Worm Reducers may also be had in Double Horizontal; Double Vertical Units;—Helical Gear attachments,—or in Motorized Worm Gear Units.

Finally, there is no type, size or combination of Worm Gear Speed Reducer that Philadelphia has not, or cannot make—and, they're all of the highest quality. Be convinced, send for *Worm Gear Catalog No. 25*.

....for every Conceivable Industrial Application

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Industrial Gears and Speed Reduc

LimiTorque Valve Controls

HELPFUL LITERATURE

1. Seamless Steel Tubes

Michigan Seamless Tube Co.—4-page illustrated bulletin on "Michigan Seamless Steel Tubes" lists major advantages of cold-drawn seamless steel tubes and shows available shapes and sizes. Aircraft tubing, pressure tubing and mechanical tubing are described and data given on entire line.

2. Porcelain Enamel

Porcelain Enamel Institute, Inc.—20-page illustrated bulletin No. 445 describes characteristics and applications for porcelain enamel, protective finish against abrasion, corrosion, heat and dirt. Pictorial description of how porcelain enamel is made and applied to metal parts is also included.

3. Tools, Jigs & Fixtures

Products Engineering Co.—Four illustrated catalogs cover lines of self-adjusting toggle clamps, drill bushings, machinists tools and jigs and aircraft tools. Applications, features, catalog numbers and ordering instruction as well as complete specifications and prices are given.

4. Safety Shoes

Lehigh Safety Shoe Co.—16-page illustrated handbook entitled "Stop Foot Injuries" describes construction and advantages of steel toe box safety shoes. Prevention of injury to workmen wearing these shoes is shown in case history form. Charts regarding injuries through industrial accidents are also included.

5. Laboratory Apparatus

Precision Scientific Co.—62-page illustrated bulletin No. 850 covers line of laboratory equipment which includes specimen cutters, mounting presses, automatic and manual polishers, polishing solutions, laps, hardness testers, salt fog cabinets and sulfur racks. Specifications, prices and data for ordering are also listed.

6. Grinding & Finishing

Minnesota Mining & Mfg. Co.—12-page illustrated booklet entitled "Faster, Better Finishing of Metal, Plastic and Glass" describes the Wetordry method of precision grinding and finishing at high speeds.

7. Production Facilities

Cleaver-Brooks Co. — 20-page illustrated booklet entitled "Silent Partner For Your Post-War Success" presents data on company's facilities for designing, engineering, tooling and producing such special parts as aircraft, marine and railway windows; bridge control boxes; housings for communications equipment; tank and deck assemblies; shock mounting; junction boxes and deep drawn, spun, formed and welded aluminum parts.

8. Arc Welding

Lincoln Electric Co. —16-page illustrated booklet No. 405 entitled "101 Welding Ideas for Low-Cost Maintenance" covers such factors as reclamation of worn parts, repair of broken parts and structures and replacement of worn or broken equipment. Various welders, electrodes and protective wearing apparel are briefly described.

9. Trailers

R. G. LeTourneau, Inc.—4-page illustrated folder No. TR-106 describes Model W210 trailer which has capacity of approximately 20 tons. Features including power, maneuverability, tires, loading and dumping are fully covered. Trailer is used for hauling rock and similar material.

10. Steel Fabrication

John Nooter Boiler Works Co.—4-page illustrated folder discusses alloy welding and steel plate fabrication, steel boiler rebuilding, metal forming and stack work in which this company specializes. Steel materials up to approximately 1¼ inches are regularly fabricated.

11. Office Equipment

LeFebure Corp.—32-page illustrated catalog covers company's line of ledger trays, posting and filing cabinets, portable racks, stands and tables; bookkeeping desks and casters for use on posting stands and other portable units.

12. Production Equipment

Precision Equipment — 16-page illustrated booklet entitled "Industrial Buyer's Bulletin—August 1945" lists such items as steel toolroom units, fans, slide rules, micrometers, counting scales, time switches, inverters, grinding tools, tool chests and wire strippers. Prices and dimensions are fully covered.

13. Temperature Control

Leeds & Northrup Co.—25-page illustrated catalog No. N-00A(2) contains data on control for efficient operation of electrically-heated furnaces, ovens, baths and similar units. Control can be applied to laboratory and production furnaces, salt and lead pots, high speed steel and forced-convection furnaces.

14. Marking Devices

New Method Steel Stamps, Inc. — 8-page illustrated booklet describes line of hand and machine marking devices for all stamping and identification operations. Data on type and type holders, roll marking devices, logotypes, dies and identification stamps are given.

15. Tungsten

Molybdenum Corp. of America—92-page illustrated wirebound booklet entitled "Tungsten Steel" presents complete technical data on physical properties of tungsten, its production and use as alloying element in manufacture of cutting tools, hard-surfacing and heat-resisting materials as well as filaments of incandescent lamps, radio and radar tubes.

16. Prefabricated Buildings

National Machine & Foundry Co.—8-page illustrated booklet explains advantages of Rigidsteel standard building construction. They include simplicity of erection, utilization of all interior space, minimum of maintenance and easy dismantling. Ventilators, sashes, doors, skylights, gutters and downspouts are also covered.

17. Thread Cutting Units

Landis Machine Co.—20-page illustrated booklet describes hardened and ground die heads, munitions threading equipment, bolt and pipe threading machines and collapsible taps. These machines are applicable to aircraft, munitions, railroad, automotive and petroleum industries.

18. Portable Conveyor

Lamson Corp.—4-page illustrated bulletin No. 245 is descriptive of lightweight portable gravity conveyor. Designed for handling packaged merchandise, this conveyor can be used to load and unload trucks, trailers and freight cars and in warehouses and elevators.

19. Flowmeter

Fischer & Porter Co.—24-page illustrated bulletin No. 98-Y is entitled "Theory of the Rotameter". History and technical development of area-type flow meters are traced. Capacities and corrosion factors of Rotameters for liquid, gas and vapor service are covered.

20. Salt

Pennsylvania Salt Mfg. Co.—12-page illustrated booklet entitled "Salt of the Earth" explains chlorine-alkali plant in operation and importance of salt in relation to industry. Three dimensional model of chlorine atom, its origin and chemical and physical properties are shown.

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21. Cemented Carbides

Kennametal, Inc.—56-page illustrated catalog No. 45 defines Kennametal, gives proper ordering procedure and covers specifications and prices of blanks, milling and step cutters, face mills and various special tools.

22. Production Facilities

General Mills, Inc., Mechanical Div. — Two booklets entitled "Men, Machines and Methods" and "Geared To Your Tomorrow" are descriptive of company's facilities for engineering, processing, tool designing, tool making, precision machine production, nonferrous foudnry, heat treating, furnace brazing and sub-zero stabilizing.

23. Change Gear Tables

Michigan Tool Co.—40-page illustrated bulletin no. T-45 contains tables for computing change gears for helical gear hobbing machines. Booklet covers data on approximate feeds and speeds for rough and finish hobbing of gears made from cast iron, bronze, plain and alloy steels, fiber, rawhide and Micarta.

24. Fuel Injection Nozzles

Fuel Injection Div., Ex-Cell-O Corp.—12-page illustrated bulletin No. 39351 describes fuel injection nozzles for diesel and gasoline engines. Details of nozzle and how it works in relation to these engines are described.

25. Wire Strippers

Ideal Commutator Dresser Co.—Illustrated folder describes data on bench, foot-operated, hand, rotary, lever and brush type cable and wire strippers and cutters. These units remove glass, silk, cotton and rubber coverings from fine stranded or solid conductors.

26. Honing Machines

Moline Tool Co.—8-page illustrated booklet contains complete data on No. 18 multiple spindle honing machine, No. 15 single spindle, hydraulically-reciprocated honing machine, hones and control mechanisms. Principal specifications of each machine are listed.

27. Amphibious Vehicle

Food Machinery Corp.—20-page full-color illustrated "Amphibian Diary" relates story of development, manufacture and wartime use of the "Water Buffalo". Originally developed as vehicle which would travel through swamps, water and country hitherto impassable, this dual-purpose vehicle was improved and converted into effective fighting weapon. Other equipment produced by company is described.

28. Carbide Dies

Vascoloy-Ramet Corporation — 8-page illustrated bulletin No. VR 348 is descriptive of Vascoloy-Ramet standard round hole carbide dies for drawing wire, bar and rod. Specifications, prices and proper ordering procedure are fully covered.

29. Drilling, Boring & Tapping

National Automatic Tool Co.—28-page illustrated circular No. 145 presents details of line of Natco Holeway drilling, boring and tapping machines. Diagrams illustrate sequence of operations for each machine.

30. Gear Chucks

Garrison Machine Works, Inc.—Illustrated folder No. 1145 shows typical gear type chucks for locating bevel gears and other gears by splines to insure concentricity between splines and teeth.

31. Thread Milling Cutters

Plan-O-Mill Corp.—4-page illustrated folder contains complete information and specifications on high speed steel or carbide thread milling cutters. Tabular data are provided on diameter, number of flutes, face width, hole size and keyways for shank and shell type cutters.

32. Fire Prevention & Control

Walter Kidde & Co.—Illustrated booklet entitled "Kidde Industry" is published every other month to circulate information on fire protection and plant safety, on new developments in high-pressure gases and on fire fighting equipment manufactured by company.

33. Alloy Steel

Lebanon Steel Foundry—4-page illustr leaflet presents chemical and physical proper of four Lebanon Circle L chrome-nickel a steels which can be used for regulator va poppet castings, kier base and cover, spider cup rings for dyeing reels, disc holder cast for centrifugal separators and diffusion r for centrifugal pumps.

34. Jib Cranes

Industrial Equipment Co.—8-page illustr bulletin J-345 presents data on line of cranes with capacities from 250 to 12, pounds and incorporating swings of 180 to degrees. Eleven other industrial crane various types are also shown.

35. Metal Spinning

Milwaukee Metal Spinning Co.—36- illustrated data book No. 2 gives informa on design, applications and adaptability metals to metal spinning process. Metals for various industries include aluminum, stainless steel, copper, bronze, brass, ni tin, magnesium, Monel and Inconel.

36. Barometric Condensers

Ingersoll-Rand Co.—8-page illustrated letin No. 9012 covers uses, advantages operation of disc-flow and ejector-jet barometric condensers. Used with engines, steam turbines, vacuum pans evaporators, these condensers are suitable high-vacuum processes in chemical, ferti sugar and power plants.

37. Gage Stock

Jessop Steel Co.—4-page illustrated le discusses Jessop precision gage stock, its ha ing, tempering and heat treating. This stock is applicable to manufacture of flat test gages, machine parts, jigs, dies, fixt levers, templates and keys.

38. Employee Policies

Ilg Electric Ventilating Co.—12-page bo No. 102 contains information on profit-sh plan, vacations, cafeteria, group life insur first aid department, hospitalization and tirement annuity which are part of compa personnel benefits.

39. Materials Handling

Orton Crane & Shovel Co.—24-page trated catalog No. 74 contains various histories involving solutions of problems thr use of such equipment as gantry, dry hammerhead, Aero, barge and diesel electrically-operated cranes.

40. Corrosion Preventives

E. F. Houghton & Co.—64-page tech data book "Digest of Corrosion Preven Specifications", Fourth Edition, contains description of principal government corro preventives, specifications and company's proved products for each.

41. Finish Tester

Engineer & Physicist—4-page illustr bulletin about Faxfilm explains method using this process for comparing produc finishes with approved standards. Surface reproduced on plastic film and then projec in comparator to afford accurate inspection comparison.

42. Oxygen Generators

Air Products, Inc—Illustrated technical bo let "Making Your Own Oxygen" explains savings of up to 60 per cent can be obtai on oxygen production costs through use Air Products oxygen generators. Various mo and sizes of equipment are described. Units available with capacities to suit needs of s industrial applications.

43. Self-Tapping Screws

Parker-Kalon Corp. — 20-page illustr pocket-size form No. 480 is entitled "How Use Parker-Kalon Self-Tapping Screws" has been prepared to give assistance in termining what screw or hole size to u Correct type of screw to be used in sheet met stainless and structural sheet, castings, fo ings, plastics, plywood and asbestos is given.

STEEL **10-15-45**

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Readers' Service Dept.

Labor, Price Uncertainties Hold Back Steel Buying

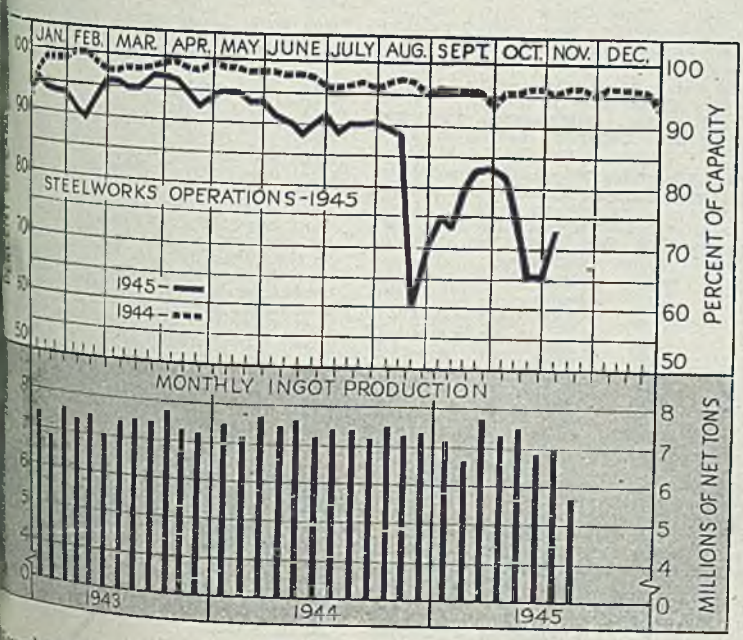
Mills sold far ahead despite drawbacks . . . Quota plan more general . . . Production recovering from coal strike . . . Pig iron, scrap scarce

CURRENT unsettlement, caused by possibility of a steel strike and expected increase in steel prices, unquestionably has restricted steel buying. This is especially noticeable in the building field where close timing on material delivery is important and where labor charges must be appraised over relatively long periods.

This is also true in varying degrees in other lines. Nevertheless steel buying still is highly active and in many products backlogs are steadily extending. This probably would be greater were it not for measures taken by producers to discourage future buying. In light flat products in particular, most mills now are operating on a quota basis and some are making no commitments beyond first quarter of next year, which in effect means they are out of the market. In virtually all cases where sellers still accept business they are doing so on an increasingly selective basis.

Actually, as the situation stands, it is practically impossible for mills to make definite promises. It is a matter of interest how many buyers are willing to place tonnage without assurance as to when they will get delivery, if only they can get tonnage on mill books.

Except for the uncertain labor outlook, makers of some products could make firm promises with little difficulty, notably plates. One eastern mill quotes March on sheared plates, provided there are no labor interferences, but in the main backlogs are not far extended. On the basis of present operating conditions at mills buyers are being promised shipments in January and February. While plate demand is increasing and exceeding most expectations, it is not getting out of hand to the extent that producers do not know where they stand and are forced to ration tonnage.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Nov. 3	Change	Same Week 1944	Same Week 1943
Pittsburgh	72.5	+23	91.5	100.5
Chicago	73.5	+1.5	99	100.5
Eastern Pa.	74	+ 3	94.5	94
Youngstown	54	+ 9	88	95
Wheeling	86.5	+ 6	91	99
Cleveland	83	+ 2	95.5	92.5
Buffalo	81.5	+12	72	90.5
Birmingham	95	None	90	67
New England	80	None	86	95
Cincinnati	71	None	89	91
St. Louis	68	None	75	90.5
Detroit	88	None	88	94
Estimated national rate	73	+ 8	95.5	99

[a]Based on steelmaking capacities as of these dates.

Because the coal strike forced a sharp reduction in steel output WPB says consumers will be required to reduce immediate consumption of steel to insure even distribution.

Recent placing of 320 locomotives and tenders for France, divided equally between American Locomotive Co. and Baldwin Locomotive Works, will require about 11,000 tons of plates.

While shipbuilding has slumped sharply as a steel consumer the Maritime Commission will take bids Nov. 13 for four tankers of 13,500 tons each, on which a ceiling of $1,800,000 per vessel has been placed.

Further recovery from effects of the soft coal strike last week caused the estimated national steel production rate to rise 8 points to 73 per cent of capacity. Greatest gain was at Pittsburgh, which increased production 23 points to 72½ per cent of capacity and at Youngstown, which rose 9 points to 54 per cent. Other increases were 1½ points to 73½ at Chicago, 6 points to 86½ at Wheeling, 2 points to 83 at Cleveland, 3 points to 74 in eastern Pennsylvania and 12 points to 81½ at Buffalo. Other districts held their rates unchanged from the prior week, as follows: Birmingham 95, Cincinnati 71, St. Louis 68, New England 80, and Detroit 88.

Pig iron production is coming back as coke supplies enable producers to return blast furnaces to activity, but tonnage still is short and melters are unable to build reserves for winter. Continued improvement in output is expected as coal supply becomes freer during the next few weeks.

Scrap continues scarce and enlarged use to supplement pig iron supply has caused steelmakers to use more costly grades, such as low phos steel, usually reserved for electric furnaces. This, in turn, is reducing supply for the latter. Even borings and turnings, especially those free from alloy, are scarce. One cause of shortage is said to be slow reconversion to civilian manufacture, which limits output of industrial scrap.

Average composite prices of steel and iron products are unchanged, all at OPA ceilings. Finished steel composite is $58.27, semi-finished steel $37.80, steelmaking pig iron $24.80, and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Nov. 3	Oct. 27	Oct. 20	One Month Ago Oct., 1945	Three Months Ago Aug., 1945	One Year Ago Nov., 1944	Five Years Nov., 19
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$56.73	$56.3
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.0
Steelmaking Pig Iron	24.80	24.80	24.05	24.25	24.05	23.05	22.0
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	16.40	20.8

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. **Steelmaking Pig Iron Composite:**—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. **Steelmaking Scrap Composite:**—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; all others gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material

	Nov. 3, 1945	Oct., 1945	Aug., 1945	Nov., 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel 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	2.25	2.25	2.25	2.10
Plates, Philadelphia	2.30	2.30	2.30	2.15
Plates, Chicago	2.25	2.25	2.25	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron

	Nov. 3, 1945	Oct., 1945	Aug., 1945	
Bessemer, del. Pittsburgh	$26.94	$26.35	$26.19	$
Basic, Valley	25.25	24.65	24.50	
Basic, eastern del. Philadelphia	27.09	26.53	26.34	
No. 2 fdry., del. Pitts., N.&S. Sides	26.44	25.85	25.69	
No. 2 foundry, Chicago	25.75	25.15	25.00	
Southern No. 2, Birmingham	22.13	21.57	21.38	
Southern No. 2 del. Cincinnati	26.05	25.50	25.30	
No. 2 fdry., del. Philadelphia	27.59	27.03	26.84	
Malleable, Valley	25.75	25.15	25.00	
Malleable, Chicago	25.75	25.15	25.00	
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	
Gray forge, del. Pittsburgh	25.94	25.35	25.19	
Ferromanganese, del. Pittsburgh	140.00	140.26	140.33	

Scrap

Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$
Heavy melt, steel, No. 2, E. Pa.	18.75	18.75	18.45	
Heavy melting steel, Chicago	18.75	18.75	18.75	
Rails for rolling, Chicago	22.25	22.25	22.25	
No. 1 cast, Chicago	20.00	20.00	20.00	

Coke

Connellsville, furnace, ovens	$7.50	$7.50	$7.50
Connellsville, foundry ovens	8.25	8.25	8.25
Chicago, by-product fdry., del.	13.35	13.75	13.75

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and M... 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel p... and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal ... lished basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to ind... companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00. (Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54. (Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18-in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—$\frac{9}{32}$ in. inclusive, per 100 lbs., $2.15 Do., over $\frac{9}{32}$—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons. (Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		(.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus f... on hot-rolled bars from Buffalo to Mans...

Cold-Finished Alloy Bars: Pittsburgh, C... Gary, Cleveland, Buffalo, base 3.35c; D... del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pitts... Chicago, Gary, Cleveland, Birmingham, ... rows Point, Buffalo, Youngstown, base ... Detroit del. 2.25c; Eastern Mich. and ... 2.30c; Gulf ports, dock 2.50c; Pacific ... dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh ... cago, Gary, Cleveland, Birmingham, Y... town, Buffalo base 2.15c; Detroit, del. ... Eastern Mich. and Toledo 2.30c; Gulf ... dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; ... refined 5.40c; Pittsburgh, staybolt, 5.75c; ... Haute, single ref., 5.00, double ref., 6.2...

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, ... Cleveland, Birmingham, Buffalo, Youngs... Sparrows Pt., Middletown, base 2.20c; G... City, base 2.30c; Detroit del. 2.30c; E... Mich. 2.35c; Phila. del. 2.37c; New York ... 2.44c; Pacific ports 2.75c. (Andrews Steel Co. may quote hot-rolled ... for shipment to Detroit and the Detroit ... on the Middletown, O., base; Alan Wood ... Co., Conshohocken, Pa., may quote 2... hot carbon sheets, nearest eastern basing ...

Cold-Rolled Sheets: Pittsburgh, Chicago, ... land, Gary, Buffalo, Youngstown, Middl... base, 3.05c; Granite City, base 3.15c; D... del. 3.15c; Eastern Mich. 3.20c; New York ... 3.39c; Phila. del. 3.37c; Pacific ports ...

Galvanized Sheets, No. 24: Pittsburgh, ... cago, Gary, Birmingham, Buffalo, Youngs... Sparrows Point, Middletown, base 3.70c; ... ite City, base 3.80c; New York del. ... Phila. del. 3.78c; Pacific ports 4.25c. (Andrews Steel Co. may quote galv... sheets 3.75c at established basing p...

Corrugated Galv. Sheets: Pittsburgh, Ch... Gary, Birmingham, 29 gage, per square ...

Culvert Sheets: Pittsburgh, Chicago, ... Birmingham, 16 gage not corrugated, ... alloy 3.60c; Granite City 3.70c; Pacific ... 4.25c; copper iron, 3.90c; pure iron 3.65c; ... coated, hot-dipped, heat-treated, No. 24, ... burgh, 4.25c.

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Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	....
65	7.25c	8.00c	....
58	7.75c	8.50c	....
52	8.55c	9.30c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commercially C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.25c.

Cold Finished Spring Steel: Pittsburgh, Cleveland, bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.35; 0.50 lb. tin, 0.50, 0.75 lb. tin $4.65; Granite City, $4.45, $4.60, $4.75, respectively

Roofing Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed, 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package of 112 sheets; 20 x 28 in., coating I.C. 8-lb. 112.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing Geneva Steel Co., Provo, Utah, 3.20c, Calif. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports 2.75c; Gulf ports, 2.45c.

Piling

Pittsburgh, Chicago, Buffalo 2.40; Pacific ports, 2.90.

Wire Products, Nails

Wire, Nails: Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads.

Standard basic, bessemer wire ..... °2.75c

Spring wire ..... °†3.35c

Wire Products to the Trade:

Standard and cement-coated wire nails, base; staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Pacific ports, $3.40; galvanized, $3.90 and $3.05, resp.

Standard Merchant quality wire, 100-lb. Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.20

Galvanized Merchant quality wire, 100-lb. Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.55

Fence, 15½ gage and heavier, per base column 67

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted wire, column 72.

Pittsburgh Steel Co., 0.20c higher; add 10 cents for Worcester, 1 cent for Duluth; add 10 cent for bright, annealed or galvanized and 20 cent for other finishes for Pacific ports.

Cleveland bases as for bright basic except Birmingham.

Add 10 cents for Worcester; 50 cents for galvanized, bright basic and 70 cents for all other finishes for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

	Steel		Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	61	40½	⅜	30	10
½	63½	51	½	34	16
¾	66½	55	¾	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

	Steel		Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½-3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

°Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

°Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
....	4	2	8	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
°316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
°°410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
††430F.	19.50	22.50	29.50	18.75	24.50
440A.	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

°With 2-3% moly. ‡With titanium. †With columbium. °°Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago Birmingham

Structural 3.75c

⅞- inch and under ..... 65-5 off

Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ..... $2.75 3.00 off

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extra mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	°7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

°Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945.

†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[21]	4.715	6.012[22]	6.
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[11]	4.613[14]	4.203[21]	4.774	.....	..
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	..
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[26]	4.172[21]	4.772	5.816[22]	5.
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.152[21]	.....	.....	..
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....	..
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.265[21]	.....	.....	..
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..
Claymont, Del*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	..
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	..
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.85[21]	4.669	5.60[22]	5.
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[22]	5.
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[12]	4.40[24]	3.85[21]	.....	.....	..
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[12]	4.30[24]	3.75[21]	.....	.....	..
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[12]	4.40[24]	3.85[21]	4.45[21]	5.60[22]	5.
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.75[21]	4.35[21]	.....	..
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.900[21]	4.659	5.93[22]	5.
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.543[12]	.....	.....	..
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	..
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.111[21]	4.711	6.10	6.
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	..
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	..
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.85[21]	4.65	5.75[22]	5.
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.987[21]	4.787	5.987[22]	6.
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	4.08[21]	4.78	6.08[22]	6.
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[22]	6.
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[11]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[22]	6.
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.43[21]	.....	.....	..
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.64	5.215	.....	..
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[20]	5.079[10]	4.70[21]	5.429	.....	..
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[20]	4.10[10]	3.75[23]	.....	.....	..
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6 00[13]	7.20[6]	5.683[22]	5.613	5.85[22]	5.
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.433[21]	7.333	8.304[22]	8.
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....	3.
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[28]	7.05[15]	5.883[21]	.....	.....	..

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries o above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bu [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 po [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—100 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 po [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, [27]— 300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) 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, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

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.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80
less $7 freight allowance	

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, C 91.0c; prices include duty on ported ore and are subject to miums, penalties and other p sions of amended M.P.R. No. effective as of May 15. Price basing points which are also p of discharge of imported m nese ore is f.o.b. cars, shipside dock most favorable to the b

Molybdenum

Sulphide conc., lb., Mo. cont., mines	

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric fur

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Bi pe
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$2
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	2
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	2
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.30	2
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.15	2
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.30	2
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.30	2
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	3
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00		

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 11 effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.75	$26.25	$27.75	$27.25
Newark, N. J., del.	28.28	27.78	29.28	28.78
Brooklyn, N. Y., del.	29.25	.....	.....	29.75
Birdsboro, Pa., base	26.75	26.25	27.75	27.25
Birmingham, base	†22.13	†20.75	26.75	.....
Baltimore, del.	27.36	.....	.....	.....
Boston, del.	26.89	.....	.....	.....
Chicago, del.	25.97	.....	.....	.....
Cincinnati, del.	25.81	24.48	.....	.....
Cleveland, del.	25.87	24.99	.....	.....
Newark, N. J.	27.90	.....	.....	.....
Philadelphia, del.	27.21	26.71	.....	.....
St. Louis, del.	25.87	24.99	.....	.....
Buffalo, base	25.75	24.75	26.75	26.25
Boston, del.	27.25	26.75	28.25	27.75
Rochester, del.	27.28	.....	28.28	27.78
Syracuse, del.	27.83	.....	28.83	28.33
Chicago, base	25.75	25.25	26.25	25.75
Milwaukee, del.	26.85	26.35	27.35	26.85
Muskegon, Mich., del.	28.94	.....	.....	28.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, O., del.	27.14	26.64	27.64	27.14
Detroit, base	25.75	25.25	26.25	25.75
Saginaw, Mich., del.	28.06	27.56	28.56	28.06
Duluth, base	26.25	25.75	26.75	26.25
St. Paul, del.	28.38	27.88	28.88	28.38
Erie, Pa., base	25.75	25.25	26.75	26.25
Everett, Mass., base	26.75	26.25	27.75	27.25
Boston, del.	27.25	26.75	28.25	27.75
Granite City, Ill., base	25.75	25.25	26.25	25.75
St. Louis, del.	26.25	25.75	.....	26.25
Hamilton, O., base	25.75	25.25	.....	25.75
Cincinnati, del.	26.19	26.36	.....	26.86
Neville Island, Pa., base	25.75	25.25	26.25	25.75
Pittsburgh, del.				
No. & So. sides	26.44	25.94	26.94	26.44
Provo, Utah, base	23.75	23.25	.....	.....
Sharpsville, Pa., base	25.75	25.25	26.25	25.75
Sparrows Point, base	26.75	26.25	.....	.....
Baltimore, del.	27.74	.....	.....	.....
Steelton, Pa., base	.....	26.25	.....	27.25
Portland, Pa., base	26.75	26.25	27.75	27.25
Philadelphia, del.	27.59	27.09	.....	28.09
Toledo, O., base	25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	27.69	27.19	28.19	27.69

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent	(base)	....	$31.25
6.51-7.00	$32.25	9.01- 9.50	37.25
7.01-7.50	33.25	9.51-10.00	38.25
7.51-8.00	34.25	10.01-10.50	39.25
8.01-8.50	35.25	10.51-11.00	40.25
8.51-9.00	36.25	11.01-11.50	41.25

F.o.b. Jackson county, O., per gross ton, Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $25.25
Valley base 25.25

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $31.25 base; $32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $28.25.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	58.36
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.90
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

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

Dry Press	32.80
Wire Cut	30.80

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	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded Magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% gross ton, duty paid, $135 f.o.b. Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn., where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; $140 f.o.b. cars, Etna, Pa., where Carnegie-Illinois Steel Corp. is producer; add $6 for packed c.l., $10 for ton, $13.50 for ton; $1.70 for each 1%, or fraction contained manganese over 82% and under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese: eastern zone, low carbon, bulk c.l., 23c; 2000 lb. to c.l., 24.50c; medium, 14.50c and 15.20c; c.l., low carbon, bulk, c.l., 23.50c; 2000 lb to c.l., 24.40c; medium, 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.50c and 17.20c; f.o.b. shipping point, freight allowed.

Manganese: 19-21% carlots per gross ton, Palmerton, Pa., $36; Etna, Pa., $40.50; Chicago, $40.60. **Metallic Manganese:** 99.9% plus, ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk c.l., 79.50c, 2000 lb. to c.l. delivery central 81c and 82.50c; western 82.50c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central: 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ten lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c, and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3* for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder. Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltim[ore] and St. Louis, 6.8% carbon $142.5[0] 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.1[…] net ton to carload, 8c lb. f.o[.b.] Suspension Bridge, N. Y., frt. [al]lowed same as high-carbon fe[rro]titanium.

Bortam: Boron 1.5-1.9%, ton [lots] 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, cont[ract] basis, per lb. contained vanadi[um] f.o.b. producers plant with us[ual] freight allowances; open-hea[rth] grade $2.70; special grade $2[…] highly-special grade $2.90.

Zirconium Alloys: 12-15%, per [lb.] of alloy, eastern contract, car[lots] bulk, 4.60c, packed 4.80c, ton [lots] 4.80c, less tons 5c, carloads, b[ulk] per gross ton $102.50; pac[ked] $107.50; ton lots $108; less-ton [lots] $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, East[ern] contract basis, carloads in bulk [or] package, per lb. of alloy 14[…] gross ton lots 15.00c; less-ton [lots] 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% alumin[um] 40% silicon, 40% iron) contract [ba]sis f.o.b. Niagara Falls, N. Y., [per] lb. 5.75c; ton lots 6.50c. Spot [¼] cent higher.

Siminal: (Approx. 20% each [Si.,] Mn., Al.) Contract, frt. all. not [exceeding] St. Louis rate, per lb. alloy; [carload] lots 8c; ton lots 8.75c; less ton [lots] 9.25c.

Borosil: 3 to 4% boron, 40 to [45%] Si., $6.25 lb. cont. Bo., f.o.b. P[hilo,] O., freight not exceeding St. L[ouis] rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRA[P]

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page [...] of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices.)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS

(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	$1[…]
Shoveling Turnings	
Rerolling Rails	
Steel Car Axles	21.50-[…]
Steel Rails, 3 ft.	
Steel Angle Bars	
Cast Iron Wheels	
No. 1 Machinery Cast	
Railroad Malleable	
Breakable Cast	
Stove Plate	
Grate Bars	
Brake Shoes	

(Cast grades f.o.b. shipping p[oint])

Stove Plate	

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	
No. 2 Heavy Melt. Steel	
No. 1 Comp. Bundles	
No. 2 Comp. Bundles	
Machine Turnings	9.50-1[…]
Shoveling Turnings	11.50-1[…]
Cast Iron Borings	11.00-1[…]
Mixed Borings, Turnings	10.50-1[…]
No. 1 Cupola Cast	
Breakable Cast	
Low Phosphorus	21.00-2[…]
Scrap Rails	20.50-2[…]
Stove Plate	16.00-1[…]

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	
No. 2 Heavy Melt. Steel	
No. 1, 2, Deal. Bundles	
Machine Turnings	
Mixed Borings, Turnings	
No. 1 Cast	

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	
No. 2 Heavy Melt. Steel	
No. 1 Busheling	
No. 1, No. 2 Bundles	
No. 3 Bundles	
Machine Turnings	
Billet, Forge Crops	
Bar Crops, Plate	
Cast Steel	
Cut, Structural, Plate, 1", under	
Alloy-free Turnings	
Tin Can Bundles	
No. 2 Steel Wheels	
Iron, Steel Axles	
No. 2 Cast Steel	
Uncut Frogs, Switches	
Scrap Rails	
Locomotive Tires	

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Castings, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Lsland.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb., add for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 19, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8%, or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, $93-95 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" shapes, 90.00c f.o.b. Niagara Falls.

straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ⅜c for shipment of 60,000 lbs. of one group and ¼c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 206

Largely on a quota basis as producers seek to care for regular customers, sheets and strip are the tightest steel product. Consumers without regular sources of supply find difficulty in placing orders. Under the quota plan delivery promises are not being made as in normal conditions, mills setting up schedules on monthly and quarterly basis to get best results. Stainless steel sheets are in easiest position, with deliveries promised for January and February on unpolished.

New York—As sheets are being placed more and more on a quota basis, there is less talk of advanced deliveries, although the situation is as tight as ever. It is simply that mills are setting their orders up on a quarterly and monthly basis for a relatively restricted period and are letting the more advanced scheduling take care of itself when the time comes. Most mills now, although there are important exceptions, are devoting attention to laying out first quarter rollings. This results in many orders being turned back, including some that have actually been accepted.

Unless consumers have close mill connections they are practically out of luck in placing new tonnage. Sellers generally give preference to old customers and find that even then they have not enough tonnage to go around. Cold-rolled, hot-rolled pickled and galvanized sheets and narrow hot-rolled strip are all in especially heavy demand. One district seller, who is now setting up quotas for first quarter on these products, reports that a few of his customers combined could take his full allotment for the district in any one of these products. Certain sellers are operating on a month to month basis, accepting tonnage on an average lead time of around 45 days. Practically the only grade not under quota is stainless steel, with deliveries generally falling in January and February on unpolished, although well beyond on polished.

Chicago — New inquiry for sheets continues as heavy as previously, although pressure for deliveries is not as heavy. This lessening in pressure comes chiefly from the automobile industry, which is apprehensive of labor difficulties. Typical of sheet and strip deliveries are the following: Strip mill size, hot-rolled, hot-rolled pickled, cold-rolled and galvanized sheets stand in January; narrow and wide strip, hot-rolled and hot-rolled pickled strip do no better than February. Some mills find their situation so muddled, partly through effect of the coal strike, that they decline to name definite delivery dates. Lack of manpower prohibits an increase in cold-rolled sheet production.

Boston — With substantial tonnage to be assigned space in production schedules, narrow cold strip producers are booked through first quarter. Deliveries of hot strip are lagging and more uncertain, resulting in revisions in cold-reducing schedules and heavier withdrawals from inventory. In at least one instance application for CC priority has been made for hot strip to avoid a bottleneck in production.

After Jan. 1 deliveries on sheets by one producer will be based on quotas for each district and others are rationing tonnage in some form. If output falls quotas will be reduced in proportion. Fabricators who have taken contracts during the last month are shopping widely for sheets, especially cold-finished. Large orders for delivery beyond first quarter await placement in mill schedules. This forward inquiry has reached large scale demand for special sheets. The major difficulty is continued heavy carryover, which threatens to disarrange schedules during the next two months. In strip some cold rollers have recently received some hot bands due in August.

Cleveland—Tightness in sheet and strip has not yet seriously affected civilian goods producers. If their production were actually curtailed by lack of steel, many would accept delivery of higher priced alloy products, which are in relatively good supply. While orders for carbon steel sheet and strip are piling up, extending deliveries from some mills well into the third quarter of next year, alloy sheet and strip are available from some mills in December of this year. Stainless steel strip however, is unobtainable before late next year. Additional mills have ceased making delivery promises on new bookings and are preparing to place into effect a combination quota-reservation system. Under quota provisions, customers are permitted to purchase only a proportionate share of available supplies, based on purchases in a specified base period; under reservation provisions, the mills reserve rolling space for their customers on future mill schedules even though no orders have actually been placed. These provisions assure customers an equitable share of the mill's output. Demand for galvanized sheet continues to increase, with supplies of base metal limited. Mills have ample supplies of zinc and now are receiving foreign zinc, which is being used in the manufacture of products for export. Supplies of tin also are adequate to meet WPB tin plate directives, although they would fall far short of meeting unrestricted demand.

Pittsburgh — Inquiry continues to exceed production and pressure for early deliveries is more acute. Fact that output of household appliances and other civilian goods is lagging, plus threat of strikes and possibility of higher prices, has prompted many metalworking companies to put additional pressure on steel producers for early delivery. Automotive industry in particular, is accepting all scheduled deliveries despite possibility of a complete strike tie-up of their plants. Mills report no hold-up of deliveries from any source. Carryover mill tonnage in sheets is substantial although less than other steel products.

Cincinnati — Equitable distribution of the available tonnage is the leading problem of district steel mills. Demand is insistent, pressure for deliveries strong and backlogs indeterminate. Repairs to equipment, deemed necessary after wartime stress, temporarily curtailed rolled output but normal schedules have been resumed. Mills anticipate tonnage expansion when labor supply is easier.

St. Louis — Sheet production locally is about 70 per cent of normal, with demand increasing steadily. Mills are allocating practically all output to regular customers. Orders have accumulated to such an extent that mills have divided 1946 tonnage of flat-rolled st among district offices, allowing them t task of distributing it equitably. Sh ments are about 10 per cent better th a month ago. Hot-rolled sheet pro ises now are for June delivery and co rolled for fourth quarter of 1946. El trical sheets can be had in October, w galvanized sheets and tin mill produ are promised for April.

Present mill schedules are exten into second quarter on cold-rolled, e trical, galvanized and hot-rolled pick sheets. Narrow cold-rolled strip als extended into second quarter. Pre rationing systems on basis of prewar tomer relationships through district fice distribution are closely adhered

Considerable export tonnage is s ing placement for early 1946 deliv much of which probably will not shipped until second quarter at the e est. Vessel shipments of steel to cific ports on a limited scale are sch uled to get under way early this mo However, OPA price ceilings at th points make such long range shipm unattractive for producers in this trict, due to the excessive freight sorption.

Philadelphia — Sheet sellers coat to report far more demand than can handle. Most producers now selling on a quota basis and in m instances refuse to make promises yond first quarter. Demand for nar hot strip is particularly pressing and least one mill is accepting tonnage fourth quarter of next year. Wh promises are made on hot-pickled, and galvanized sheets and where quota system applies, deliveries promised for late second quarter early third.

Steel Bars . . .

Bar Prices, Page 206

Delivery promises on steel bars widely, some sizes and some produ refuse to quote until the situation cle Large sizes are available variously f December to March and in small dia ters second quarter is general. In ruption of production by the coal st has caused all deliveries to be defer Some barmakers have set up quotas others are highly selective in accept business.

New York — The situation in bars pears a trifle steadier. While deliver are extended, especially on smaller si schedules are about holding their for the present. Small rounds are g erally available late in second quar with the intermediate sizes late in quarter and early in the second. Pro ises on large rounds fall mostly in January and February, although so mills are practically booked up for quarter. Cold-drawn bars, especially larger sizes, can be had in January February. Deliveries on alloy bars relatively easy. Some producers qu December on plain hot-rolled bars January and February on cold alloy ba and specially treated hot alloy bars.

Some producers have set up quotas carbon bars; others have not gone th far, but are nevertheless selecting the tonnage.

Chicago — Some sizes of carbon ba can be had for December deliver others are not available until Marc and a few items stretch out to Octob

of next year. The situation has grown worse with the recent coal strike. One important barmaker has been suffering from a labor slowdown on its merchant mills. Some mills decline to name definite delivery on new orders, which continue heavy, until conditions become more settled. Alloy deliveries are in better position, with most grades available from November through January.

Cleveland—All bar mills shut down during the recent pinch of fuel have resumed. Pressure is strong on eight and nine-inch mills with deliveries extended to November of next year on hot-rolled carbon bars. The larger mills, 12 and 14-inch, are in a more comfortable position, being able to promise delivery early in first quarter. Cold-drawn carbon bar deliveries extend from February through May. Alloy bar demand has improved recently but is available for delivery late this year. Bolt and nut manufacturers have large order backlogs and are active in the coiled rod market. However, their steel purchases will increase substantially as soon as operations at automotive plants attain a higher level and will stimulate activity in alloy grades. Bolt and nut deliveries extend from December through January.

Pittsburgh — Production loss due to the coal strike varied three to five weeks on carbon steel bars, with carryover tonnage estimated at about one month's output. Many alloy and carbon steel bar consumers were forced to reduce production schedules and in a few instances complete plant shutdowns occurred. Producers do not expect to return to full production until middle of this month, for it will take considerable time to build up adequate steel inventories. Mills are scheduled through April on some small bar sizes, but large rounds are available in January, with alloys in about the same position. Cold finishers are booked well into first quarter, with deliveries recently further extended to three weeks because of the coal strike.

Boston — Hot carbon bar deliveries are substantially further extended than cold-rolled, January being possible with some mills in middle-size ranges of the latter. Most hot-rolled deliveries in smaller sizes are in second quarter, although there are some exceptions. Alloys, both hot and cold-finished, are available before the end of the year. The swing toward carbon stock continues, notably among forge shops, reflecting heavier operations on automotive work and much less on aircraft.

Philadelphia — Commercial bar demand is well sustained through a diversity of requirements. Principal pressure still is for smaller sizes, with most mills booked well into second quarter. In general, where quotas are not being built up, producers quote late May and June on small sizes, April or May on intermediate and February and March on larger, although some producers have open hot carbon steel capacity in any size for first quarter.

Steel Plates . . .

Plate Prices, Page 207

Plate production is recovering from the setback during the coal strike and output for the quarter is expected to show a fairly good total. Deliveries are further delayed and promises are mainly for January delivery, with some capacity open for December, while some mills can offer nothing better than February.

Pittsburgh — Mill plate production schedules are recovering slowly with pre-strike levels expected to be reached late this week. At mid-week Carnegie-Illinois Steel Corp. had its 100-inch plate mill at the Homestead works back in operation, while the 48-inch universal plate mill and 160-inch plate mill were scheduled to be in operation by last week end. Producers' order backlogs formerly were extended into December and January, with probable further extension in delivery schedules of three to four weeks likely, due to sharp curtailment in operating schedules resulting from the coal strike. Demand from railroad car and locomotive builders and in heavy construction lines is somewhat better than anticipated. Steel distributors are taking considerable tonnages, although below former wartime volume. Ship repair and maintenance work is also a factor in overall requirements.

New York — While plate shipments were set back in October as a result of the soft coal strike and other labor disturbances, trade leaders still believe shipments for the current quarter will average around 425,000 tons per month unless there are further disturbances of this character. Demand for strip plate is still active, and including narrow strip plate it would not prove surprising to some if shipments averaged 60,000 to 70,000 tons per month as against a nor-

mal peacetime production of approximately 35,000 tons.

Deliveries cover a rather wide range. While promises fall largely in January, some tonnage can still be picked up in December; and on the other hand, at least one mill is booked solidly into February. Contributing to the more extended deliveries is the diversion of steel to other products. Export demand also is bolstering plate schedules. Special demand continues for light plates for fuel storage tanks and for car builders. The latter are taking considerable 3/16-inch plate in wider ranges, with requirements exceeding supply.

Birmingham — Plate production continues at approximately 80 per cent of capacity. Deliveries are tight and are being extended on many items.

Chicago—Demand for plates has been sustained better than anticipated and deliveries are lengthening. Narrow sheared plates are not to be had on new order before January, wider sizes not before April. Likewise, larger sizes of universal plates stand in January delivery, and the smaller sizes in February.

Boston — Relatively small plate tonnage now is available for January delivery and most mills are in February. Tank heads, for which there is strong demand, can be shipped in six to eight weeks. Some are fabricated from heavy sheets and plate shops have been offered contracts if sheets are available for pressing. Buying continues concentrated in lighter gages for prompt delivery, notably for small tanks, and total volume is sli heavier. Flame-cutting shops are ing but demand is below the e peak, as in the case of weldments. yard orders are absent but the Mar Commission takes bids Nov. 13 for tankers of 13,500 tons each for Nat Bulk Carriers Inc., New York, on a ceiling of $1,800,000 per ves placed.

Fabricating shops are buying od of surplus plates, but several large ventories at two shipyards are no offered. Of 205 tons sold in the fortnight compilation by the dis agency, 122 tons went to Massach Engineering Co. Inc., North Q Mass. Walsh Holyoke Boiler W Holyoke, Mass., disposing of s from Navy pontoon fabricating, ha tons of plates, including 165 to floor plates.

Cleveland—Demand for light is well maintained at a level much h than had been expected only a months ago. Inquiries are being rec from a wide variety of consumer cluding storage tank producers, chinery equipment manufacturers, structural fabricators. Most mills filled through first quarter and May on light plates and into Feb on heavier plates.

Tubular Goods . . .

Tubular Goods Prices, Page 207

New York — Merchant pipe dist tors are being hard pressed for ton So far in the current reconversion riod new building construction req ments have not been heavy, but ma nance and repair requirements, w have long been accumulating, have large. Moreover there are various p ing needs for manufactured prod such as bed frames, lawn mower dles, vacuum cleaning equipment so forth.

As a result, pipe sellers are u to keep stocks in balance, particular view of the fact that various pipe have difficulties, due to labor dis ances and the like, in maintaining duction. The situation has becom tight that pipemakers generally have are planning to shortly, set up quota a monthly basis, so as to spread a able supply more equitably. In ce cases quotas do not become effec until the first of the year, but in instances they are now being ach applied.

Tubing, however, has not been pl on such a basis, nor is there thought of doing so at the moment demand has not been too pressing the whole situation so far has been well in hand. However, most prod ers of tubing are now fairly well boo up for the year. Some sizes of hot ished tubing can be had in Decem but generally speaking both hot-finis and cold-drawn tubing are being q ed for January. One leading inte is now booked up solidly into Febru on certain sizes of cold-drawn, tub

Seattle—Small tonnages of cast pipe are pending, including 125 t at Tracytown, Wash., and 100 tons 6 and 8-inch water mains at Raymo Wash., bids Nov. 5. Bellingham, Was plans a 3750-foot supply line extensi Oak Grove, Oreg., will open bids N 12 for 8000 feet of 2 to 6-inch cast ir

pipe, plans by L. C. Gilbert, Portland, Oreg.

Cleveland — Production of tubular products is still curtailed by strikes, although one pipe mill reopened early last week, following a short shut down, due to labor difficulties. Although some mills are no longer scheduling new orders, seamless tubing is still available for delivery in January and merchant pipe in June. Progress is being made in holding purchases to minimum needs and in reducing order books to a normal 90-day basis, which mills hope to attain by the yearend.

Boston—Merchant steel pipe buying is up to the extent of quotas permitted distributors by most mills, generally based on a percentage of 1940 volume. Consumer demand for industrial use leads but distributors in building up inventories account for most mill volume. Small sizes under 2-inch in black and galvanized are most active. Butt-weld deliveries are in May and June for 4½-inch and under. Boiler tubes now are in January with mills that have been making December shipments for some works.

Wire . . .

Wire Prices, Page 207

Boston — Demand for fine wire specialties is unabated, with consumer pressure for deliveries strong. Most mills are filled through first quarter on a larger number of products and have heavy orders scheduled for second. Spring wire is one of the most extended products, especially for bedding and furniture springs. Lack of wire for beds has delayed deliveries of railroad hospital cars in one instance. Range of demand is broadening and although there have been sharp reductions in some lines, such as rope wire and welding wire, open capacity is crowded. Buying of cold-heading rods is brisk. Most mills are sold out on nails until March.

Chicago — In merchant products, corn cob material, light welded fabric for poultry purposes, fence posts and nails are in heavy demand and like most lines of manufacturers' wire, production lags far behind requirements. Supply of rods is critical. Numerous inquiries are being received for bale ties for 1946 delivery. Sales of wire rope have slipped sharply, explanation being that consumers have substantial stocks, also that the government has substantial surplus inventory.

Birmingham — Despite somewhat larger production, wire products are not in sufficient supply to meet demand. Consumers especially agricultural users, are pressing jobbers for many items, notably fencing.

Structural Shapes . . .

Structural Shape Prices, Page 207

Pittsburgh—Structural mill operations are gradually returning to normal, although it will not be until late this week that output will reach pre-strike levels. By the close of last week Carnegie-Illinois Steel Corp. was operating its structural mills at about 70 per cent of capacity, with gains by other producers in about the same ratio. Mills are booked well into first quarter on most structural items. Sharp curtailment in production resulting from the coal strike will increase carryover tonnage, as about three weeks' production has been lost, and outlook is not encouraging, due to possibility of strikes over the wage issue. Sellers are booked well into first quarter on most structural items and little improvement in delivery is anticipated as new business matches pre-strike output in most instances. Fabricators are booked through first quarter and report some projects being held up by lack of steel.

Philadelphia — Structural buying is light. Considerable work is in prospect but uncertainties as to shipment and wages hold up various products. Moreover, especially noticeable on public work, contractors' bids exceed appropriations in many instances, as contractors play safe. Many contractors are not bidding at all. At the same time, sufficient work is coming out to keep most structural shops busy to the limit of drafting forces and mill backlogs of shapes continue to expand. Shape producers generally are booked well into February and are endeavoring to expand production, now estimated at about 300,000 tons per month. Facilities are available for a substantial increase but labor shortage and continued diversion of steel to other work are retarding expansion.

New York — Scarcity in shapes continues, with producers apparently having

difficulty getting shipments up much above 300,000 tons a month, which has been about the average for the year to date, according to trade estimates.

Chicago — Mill output of structural shapes has decreased on account of the coal strike and carryovers are increasing. With rolling schedules already congested from heavy order backlogs, new business commands no better than January delivery on large shapes and February on small. Fabricators have work to keep them engaged the balance of the year. Reports are that several large building projects are being postponed indefinitely because prices quoted on construction range 20 to 60 per cent in excess of estimates. New inquiry for fabricated steel has fallen sharply, and current awards are light.

Boston — Active inquiry for structural steel approximates 1500 tons, including 400 tons for a bridge in New Hampshire. With substantial volume held up for estimates, due to uncertain costs and shortage of draftsmen, district fabricating shops have slightly heavier backlogs of small tonnages. Plain material deliveries are further extended with most mills and a leading producer is sold through first quarter on most sizes. Considerable utility construction pends with Boston engineers, who have substantial contracts outside this district. Pitney Bowes Co., Stamford, Conn., will require a substantial tonnage for a plant addition.

Cleveland—Shortage of skilled workmen in the detailing and estimating departments of structural mills continues to restrict the amount of business that c be handled. Although many mills c tinue reluctant to accept new ord at least one interest is still offering F ruary and March delivery on p material and second quarter on fa cated shapes.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 207

Pittsburgh — Loss in reinforcing production ranges from two to five we due to the coal strike, further tighte the already short supply and in s instances seriously retarding recon sion expansion programs. Future ings also have been affected, as the allotted for November and Decem production schedules has been red 20 to 25 per cent in an effort to m up the ground lost in merchant ca bar output. It now appears probable shipments scheduled for November not be made until late December other production correspondingly pu back. Fabricators are seeking pro tion on mill deliveries as far ahea second quarter, but in most insta producers are not making definite d ery promises. With demand wel excess of output, and production s behind schedule, producers have forced to ration tonnage among war customers.

Pig Iron . . .

Pig Iron Prices, Page 209

With resumption of coal shipm and larger coke supply blast furn have returned to pig iron produc and supply is fairly well matched needs. Inventory restrictions are an to distribution and in general it is expected that preference ratings wil necessary to keep consumers supp Foundries have been able to continue erations in spite of shortened supply

Pittsburgh — Pig iron production covered rapidly last week but it will until about mid-week before pre-s volume will be reached. There 39 blast furnaces now active, compa with 27 early last week. Prior to coal strike about 47 out of the distr 54 furnaces were in blast. Direc No. 4 to PR-28, permitting the gran of CC ratings to producers of malle and gray iron castings, including iron soil pipe, for their purchases capital equipment, is expected to e dite expanding production programs these interests. Shortage of these ings are said to be seriously retard manufacturers' reconversion progress output of engine-block castings, prin presses, tire-making machinery, oil b ers, etc. Pig iron inventory limitat remain on a maximum 30-day basis, cording to the latest amendment to 32. While the pig iron shortage is acute, it could easily become so if ventory restrictions were lifted. foundry in this district has been for to curtail operations due to lack of i

New York — November melt may off slightly, due to extra holidays and shorter month. At present coke is in ter supply and pig iron is coming out adequate volume.

St. Louis — Steelmaking pig iron s ply continues fair, despite a recent bl shutdown by the district's largest p ducer. Foundries are hard pressed

in some cases are increasing scrap consumption. Inventories are low and deliveries lag. Sellers have adopted an unofficial allocation system.

Philadelphia — With pig iron production recovering from effects of the soft coal strike consumers are fairly comfortable and unless there are further labor disturbances no shortages appear likely. However, there is concern over a possible steel strike, although this would automatically cut consumption as well as production and would likely apply to foundries as well as mills, were trouble to continue long.

Boston—Due to tonnage lost during the coal strike deliveries of pig iron from Buffalo are more extended and some October tonnage is undelivered. Steelworks inventories, with possibly one exception, are barely 30 day or slightly below. Few foundries are in better position. Consumers in a few cases have been asked to reduce requirements. Melt in New England approaches 25,000 tons per month and because of labor shortages and tightness in iron supply chances for any material increase in the near future are slim. A stove plant at Taunton, Mass., is operating full on a seven-day week schedule, but this is an exception. Castings requirements for machine tools hold beyond expectations.

Chicago — Several foundries in this area narrowly averted curtailment in operations because of pig iron shortage, a situation created with banking of blast furnaces during the coal strike. Currently, only 26 of the district's 41 blast furnaces are producing, compared with 29 when the mine shutdown occurred. Seven stacks have resumed since the strike ended; resumption of the others depends upon coal receipts. Despite the upturn, pig iron is critically short and with inventories near exhaustion foundries are not out of danger.

Pig Iron Preference Ratings Issued in Special Cases

In clarifying the effect of an amendment to Priorities Regulation 3, issued Oct. 22, the War Production Board emphasized that removal of pig iron and nine other products from list A of the regulation does not affect the normal buyer-customer relationship existing now and does not mean that a preference rating is required to obtain any of the affected products.

The action merely makes possible the assignment of preference ratings in specific cases where the products could not be obtained for reconversion purposes on an unrated basis in accordance with terms of Priorities Regulation 28.

A user unable to obtain supplies of pig iron, for instance, may apply to WPB for assistance, and, if necessary for a preference rating under the terms of PR-28. The same procedure applies to pig iron for malleable and gray iron castings under direction 4 to PR-28, issued Oct. 25.

Scrap . . .

Scrap Prices, Page 210

Scrap scarcity continues in nearly all districts and melters seeking additional tonnages to replace pig iron losses from the coal strike have difficulty. Inventories are small and apprehension is held that winter shortages may be severe.

Pittsburgh — Scarcity of heavy melting steel and cast scrap shows no tendency to improve, with brokers finding it difficult to meet current commitments. Up to $1 freight equalization continues to be paid for machine shop and short shoveling turnings. Heavy melting steel shipments are somewhat heavier with $1.50 freight equalization being paid. Increased pig iron prices have made it possible for foundries to reach further afield for cast scrap paying as high as $5.50 freight absorption.

Chicago — Demand for scrap holds steady and prices are firm at ceiling. As would be expected, the recent coal strike has strengthened scrap requirements, for steelmakers have been forced to lean heavily on scrap to offset lack of hot metal. Chief interest is in the better grades of heavy melting material, and this is unavailable in quantities desired. Shipments are being well maintained. An important steelmaker here has just purchased 35,000 tons of scrap, mainly open hearth, some baled machine shop turning, and a small amount of electric furnace items.

Boston — Prices are firm at ceiling, with buying up slightly. Alloy-free turnings are scarce. Long-cycle scrap also is scarce, most having been liquidated. Yards still lack sufficient labor. More material is expected from terminated contracts.

Philadelphia — Notwithstanding the

troubled labor outlook most scrap buyers are covering actively, as winter is approaching and stocks are low. Only one steel mill in this district is out of the market on melting steel, though it is pressing actively for borings and turnings. However, the trade is weighing carefully effects of a possible steel strike on prices. Some melting steel consumers believe any prolonged disturbance would soften prices, the theory being that continued accumulation of supply would force the hand of weaker sellers. Others point to the possibility that unless the strike should be prolonged sellers would sit tight because of prospects for an active market. At the moment sellers have no heavy accumulations of prepared scrap, though unprepared material is increasing. An additional 12,000 tons of landing mat scrap is offered at Norfolk, Va., following recent sales of about 55,000 tons at eastern ports. Considerable reconversion scrap is coming out from various plants. Prices on landing mat material have held well because of high quality.

Cleveland — Scrap scarcity continues, mills accepting all offerings and in need of more than can be obtained. Considerable low phosphorus scrap, normally sold for electric furnace consumption, is being bought for open-hearth melting, at considerably higher price. This is depleting supply for electric furnace melters when present labor difficulties permit resumption of normal rate of operation. Borings and turnings are good demand and are scarce. Pri hold ceilings in all cases.

New York — Scrap buying is well tained, consumers trying to build inv tories before winter. This appare more than offsets hesitancy in buy because of possibility of a steel str Demand for cast grades and turni exceeds supply. War termination s is increasing but prices are lower as m yards have more than they can proc Last barge shipments for Lackawa N. Y., for the season are now enro Movement to eastern Pennsylvania to Sparrows Point is good.

St. Louis — Scrap shipments are proving but continue at least 20 cent under normal. Shipments to Chicago district have practically di peared, except for a few turnings. reserves are 45 to 90 days but found are still short. Some new tonnag being placed on a 30-day basis as orders run out. Prices are at ceili Processing manpower continues s No surplus war material has appe here as scrap and little is expected fore January. Some improvement scrap rails and heavy melting stee forecast by that time as railroads ge habilitation programs under way.

Warehouse . . .

Warehouse Prices, Page 208

Boston—Extended mill deliveries tribute to active buying from w houses. Inventories of flat-rolled p ucts, galvanized sheets especially, out of balance, with no improvemen mill replacements. While some s jobbers have relatively good ov stocks, most are out of balance, lighter gages especially short. W houses show more interest in sur stocks and a Worcester district distr tor bought a substantial tonnage of zinc coated sheets at Cranston, R. I. mand for carbon steels is uniformly h with plates lagging somewhat, but mand for alloys is slow. Most w houses have substantial inventories o loys. In spreading tonnage as wi as possible among consumers, wareh volume frequently is shaved.

Chicago — Steel warehouses caught between steadily diminishing ventories and reduced and unsteady ceipts from mills. At least ano week will elapse before steelmaking erations reach full capacity, barring ther labor trouble. Warehouses tinue to face heavy inquiry, some which are of mill size. Inquiry vol is not a fair indicator of business to because seldom can the distributor nish all the items sought and the sumer is obliged to shop elsewh

Los Angeles — Warehouse steel or show an upturn. Some sales are m contingent on mill delivery. Repl ments are at a faster rate. Alloy dem is greater than at any time since end of the war. Galvanized orders h declined, relieving pressure. While liveries are not entirely satisfactory real handicaps have appeared.

Canada . . .

Toronto, Ont.—Consumers show c siderable interest in iron and steel m kets and while numerous inquiries

appearing, most buyers place direct orders without much discussion. Supply remains tight on most lines of finished steel, and there is not much prospect of easing for three or four months. Steelmakers continue to accept orders on the basis of prices prevailing at time of shipment. No improvement is reported in steel production although possibilities are favorable for betterment with the turn of the year, when it is expected that much repair work now under way will have been completed.

Current orders, however, are almost exclusively for first quarter delivery and most producers are not accepting orders beyond the end of March. While sheet production is being maintained, demand is growing and output is not sufficient to meet all requirements.

Wire and nails are tight and a rather serious shortage of nails has developed in the past couple of weeks. Building trades have been seeking larger quantities of nails, but with most supply being directed to government Wartime Housing, other consumers are unable to obtain sufficient for their needs. Wire is hard to get and large orders are piling up in the hope of delivery in better quantity after the turn of the year.

Merchant pig iron sales held around 7500 tons for the week. The shortage of scrap, however, has stimulated demand for foundry iron and these grades show volume of about 5000 tons in the week, with malleable accounting for about 1500 tons and basic 500 tons. Scrap receipts are well down from the week's average and a serious shortage has developed. Dealers state that incoming scrap is not sufficient to keep their yard workers fully engaged, and there is little prospect of early improvement. Industrial scrap is rapidly drying up, but some shearings still are being made from cleanup of war plants. Rural districts have little to offer and only occasional offerings are being made by automobile wreckers. Consumers are making special efforts to obtain scrap, and steel mills now report difficulty in obtaining sufficient for daily needs and little or nothing is going into stock for winter.

Steel in Europe . . .

London — (*By Radio*) — Most steelworks in Great Britain are booked fully to the end of the year. Shipbuilding calls for increasing tonnages of plates and shapes. Manufacturers of railway rolling stock are heavily engaged as carriers rehabilitate. Sheet mills are sold ahead solidly for six months. Some improvement in demand for heavy structurals is apparent

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

[illegible] tons, highway beam and girder bridges, Cameron, Tex., for state highway commission, to Mosher Steel Co., Houston, Tex.

[illegible] tons, warehouse, Battle Creek, Mich., for Kellogg Co., to Duffin Iron Co., Chicago; building Mid-Continent Co., Chicago, contractor; bids Oct. 26.

[illegible] tons, plant, Kankakee, Ill., for A. O. Smith Corp., to Wisconsin Bridge & Iron Co., Milwaukee; B-W Construction Co., Chicago, contractor.

[illegible] tons, factory building, Chicago, for Stork-Rose Furniture Corp., to American Bridge Co., Pittsburgh; A. L. Jackson Co., Chicago, contractor.

300 tons, Bell Telephone Co. exchange building at Lansdowne, Pa., to Bethlehem Steel Co., Bethlehem, Pa., through David M. Hunt, Philadelphia, contractor.

240 tons, main office, Peoria, Ill., for Illinois Bell Telephone Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.; V. Jobst & Sons, Peoria, Ill., contractor.

200 tons, warehouse, Jackson, Miss., for Merchant Co., to Mississippi Steel & Iron Co. Inc., Jackson, Miss.

Unstated, crane portal base, Puget Sound navy yard; to Washington Iron Works, Seattle.

STRUCTURAL STEEL PENDING

3000 tons, office building for du Pont interests at Wilmington, Del.; Turner Construction Co., New York, engineer.

800 tons, expansion to proving grounds, Milford, Mich., for General Motors Corp.; bids Oct. 23.

680 tons, new building, Indianapolis, for E. C. Atkins & Co.; bids Oct. 22.

560 tons, building, Kankakee, Ill., for Armstrong Cork Co.; bids Nov. 2.

525 tons, Immaculate Conception School, East Thirteenth St., Manhattan; George A. Fuller Co., general contractor.

450 tons, addition to nylon salt plant, Orange, Tex., for E. I. du Pont de Nemours & Co. Inc.

420 tons, Ortho Pharmaceutical Corp., Bridgewater Township, N. J.; John W. Ryan, New York, contractor.

400 tons, viaduct for Boston Elevated Railway

Co., Sullivan Square, Boston.

400 tons, bridge at Strafford, N. H.

250 tons, plant for Burnham Boiler Co., Irving-

150 tons, building for Baltimore Transfer Co., Jersey City, N. J.; bids asked.

120 tons, alterations, motion picture theater, Broadway and 65th St., New York; M. Shapiro & Sons Co., contractor.

Unstated, dormitory, Marymount College, Tarrytown, N. Y.; bids Nov. 10, through Eggers & Higgens, New York.
ton, N. Y., to be located at Lancaster, Pa.

Unstated, fishways on Fraser river, B. C.; bids to International Pacific Fisheries Commission, New Westminster, B. C., Nov. 21.

Unstated, steel tower for Navy at Port Angeles, Wash.; contract to W. G. Clark Co., Seattle.

Unstated, state highway bridge over Wahkiakum river, Washington; bids soon to highway commission, Olympia, Wash.

REINFORCING BARS . . .

REINFORCING BARS PLACED

321 tons, wire mesh, FA route 5, Secs. 18-R and 17-R-1, McLean county, Illinois, for Illinois state highway commission, to Laclede Steel Co., St. Louis, through Edgar W. Zimmerman, Chicago; I. D. Lain Co., Springfield, Ill., contractor; bids Sept. 14.

200 tons, paint shop, La Grange, Ill., for Electro-Motive Division, General Motors Corp., to Olney J. Dean Steel Co., Chicago.

REINFORCING BARS PENDING

1400 tons, Elliott houses, Tenth Ave. and 24th St., New York, for City Housing Authority; no bids received Oct. 25; new date set for Nov. 7.

1300 tons, rack warehouse, building No. 14, Peoria, Ill., for Hiram Walker Inc.; bids Nov. 5.

1050 tons, Section 3, Laureltore sewer, Queens, New York; A. Capatano, Glendale, L. I., low on general contract.

1000 tons, building No. 4, Flint, Mich., for Buick Motor Car Division, General Motors Corp.

300 tons or more, addition to Seattle plant of Sears, Roebuck & Co.; Sound Construction & Engineering Co., general contractor.

200 tons, plant addition, Ehlers Coffee Co., Brooklyn, N. Y., bids Nov. 1.

RAILS, CARS . . .

RAILROAD CARS PLACED

Boston & Maine and Maine Central, 16 deluxe stainless steel coaches, four restaurant-lounge and four coach-baggage, to Pullman-Standard Car Mfg. Co., Worcester, Mass., shops.

New Orleans Public Service Co., 50 trolley coaches, to St. Louis Car Co., St. Louis.

Southern Pacific, 50 all-steel cabooses, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

New York Central, coaches for 14 trains; bids Nov. 27.

PIPE . . .

CAST IRON PIPE PENDING

125 tons, Tracyton, Wash., system improvement; bids in.

100 tons, 6 and 8-inch Class 150, for Raymond, Wash.; bids Nov. 5.

Unstated, 8000 feet 2 to 6 inch, Oak Grove, Oreg.; bids Nov. 12.

STEEL PIPE PLACED

150 tons, 30 to 60-inch, for pumping station, Torresdale, Pa., to American Locomotive Co.,

New York, through James M. Driscoll Co., Philadelphia.

PLATES . . .

PLATES PENDING

853 tons, steel sheet piling, bulk at Westport, Wash.; bids to Port of Grays Harbor, Aberdeen, Wash.

Contracted, three steel barges for Alaska owners; contract to Weldit Tank & Steel Co., Bellingham, Wash.

Contracted 178-foot steel freighter for Puget Sound Freight Lines, Seattle; contract to Reliable Welding Works, Olympia, Wash.

Conference Seeks Means To Reduce Labor Disputes

(*Concluded from Page* 96)

Industry in these calculations were set as follows on the basis of the period 1936-1939 equals 100:

Year	Sales	Profits (Before federal taxes)
1939	144	178
1940	130	169
1941	172	257
1946	158	194
1947	247	304
1948	269	331

The report stated that in the event technological improvement developed more rapidly than now can be foreseen, the profits indicated above would be adjusted so that prices could be lowered without reducing profits.

Under the conditions enumerated, the prospects for success of the labor-management conference do not appear to be bright. While wages and prices are not included in the agenda, they are likely to be injected into it by the delegates. The tension in labor-management relations now and in recent months is not conducive to the formulation of a fair and workable code for the minimization of disputes.

The agenda of the conference includes such topics as acceptance of collective bargaining by employers, acceptance by employees of management's right to direct, acceptance by both of the machinery to settle disputes, and preventing of jurisdictional disputes.

Chairman of the conference will be Chief Justice Walter P. Stacy of the North Carolina Supreme Court. Secretary of Labor Lewis B. Schwellenbach and Secretary of Commerce Henry Wallace will represent the government.

Management delegates to the conference are:
Edward N. Allen, president, Sage-Allen & Co., Hartford, Conn.
Walter E. Callaway Jr., president, Callaway Mills, La Grange, Ga.
A. W. Clement, president, Pennsylvania Railroad.
John Holmes, president, Swift & Co., Chicago.
C. R. Hook, president, American Rolling Mill Co., Middletown, O.
Eric A. Johnston, chairman of the board, Washington Brick and Lime Company, Spokane, Wash.
George H. Love, president, Consolidated Coal Co., Pittsburgh.
Ernest Mosher, president, Russell Harrington Cutlery Co., Southbridge, Mass.
Edward P. Palmer, president, Senior & Palmer Inc., New York.
H. W. Prentis Jr., president, Armstrong Cork Co., Lancaster, Pa.
W. M. Rand, president, Monsanto Chemical Co., St. Louis.
Louis Rothenburg, president, Servel Inc., Evansville, Ind.
Otto A. Seyferth, president, West Michigan Steel Foundry Co., Muskegon, Mich.
H. W. Steinkraus, president, Bridgeport Brass Co., Bridgeport, Conn.
E. J. Thomas, president, Goodyear Tire & Rubber Co., Akron.
Charles E. Wilson, president, General Electric Corp., Schenectady, N. Y.
Harry Woodhead, president, Consolidated Vultee Aircraft Corp., San Diego, Calif.
Charles E. Wilson, president, General Motors Corp., Detroit.

Labor delegates, AFL:
William Green, president.
George Meany, secretary-treasurer.
Harry C. Bates, president, Bricklayers, Masons and Plasterers International Union of America, Washington.
Daniel J. Tobin, president, International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America, Indianapolis.
William L. Hutcheson, president, United Brotherhood of Carpenters and Joiners of America, Indianapolis.
David Dubinsky, president, International Ladies Garment Workers Union, New York.
George Harrison, president, Brotherhood of Railway Clerks, Cincinnati.
Matthew Woll, vice president, American Federation of Labor, New York.

Labor delegates, CIO:
Philip Murray, president.
R. J. Thomas, president, United Automobile Workers of America, Detroit.
Sidney Hillman, president, Amalgamated Clothing Workers of America, New York.
Emil Rieve, president, Textile Workers Union of America, New York.
Reid Robinson, president, International Union of Mine, Mill and Smelter Workers, Chicago.
Albert J. Fitzgerald, president, United Electrical, Radio and Machine Workers of America, New York.
John Green, president, Industrial Union of Marine and Shipbuilding Workers of America, Camden, N. J.
Lee Pressman, general counsel, CIO.

United Mine Workers of America will be represented by John L. Lewis, president.

The railway brotherhoods will be represented by T. C. Cashen, chairman, Railway Labor Executives Association, Buffalo.

CONSTRUCTION AND ENTERPRISE

MICHIGAN

DEARBORN, MICH.—Transmission & Gear Co., 10421 Heggerty Rd., has let contract to Cooper Construction Co., 572 Maccabees Bldg., Detroit, for a plant building estimated to cost $70,000.

DETROIT — Schwarb Foundry Co., 22522 Hoover St., has let contract to A. O. Misch, 806 Ford Bldg., for a foundry addition costing about $100,000.

DETROIT—Metal Mouldings Corp., 14451 West Chicago St., has let contract to Cooper Construction Co., 572 Maccabees Bldg., for a one-story plant addition, to cost about $40,000.

DETROIT—Parker Majestic Inc., 147 Jos Campau Ave., has been incorporated with $50,000 capital to manufacture tools and apparatus, by John W. Parker, same address.

DETROIT—Revere Industries Inc., 7914 Mack Ave., has been incorporated with $50,000 capital to manufacture automotive parts and equipment, by H. D. Weiske, 1307 Somerset Rd., Grosse Pointe, Mich.

DETROIT—Western Screw Products Co., 5259 Western Ave., has been incorporated with $50,000 capital to manufacture screw machine products, by Richard R. Paul, 7539 Hartwell Ave., Dearborn, Mich.

GROSSE POINTE, MICH.—Metal Industries Inc., 20665 Vernier Circle, has been incorporated with $3000 capital to do general sheet metal work, by George A. Voight, 1915 Van Antwerp Ave.

IRON RIVER, MICH.—Gibbs City Lumber Co. is having plans made for three large dry kilns for processing lumber.

MUSKEGON HEIGHTS, MICH. — Sterling Foundry Co., Hovey and Park Sts., has been incorporated with $50,000 capital to manufacture brass, bronze and aluminum castings, by Ernest Smith, 620 Hoyt St.

MASSACHUSETTS

FRAMINGHAM, MASS.—Framingham Pattern Works, Mellen St., has let contract to P. J. Cantwell & Son, 644 East Fourth St., South Boston, Mass., for a two-story 80 x 120-foot plant costing about $50,000.

CONNECTICUT

BRIDGEPORT, CONN.—Bullard Co., 286 Canfield Ave., has let contract to Otto F. Burghardt, 871 Central Ave., for a machine shop building to cost over $40,000. A. D. Crosset, 512 Fifth Ave., New York, is engineer.

NEW HAVEN, CONN.—Brown Machine Co., Thompson Ave., has let contract to F. P. Sullivan Inc., 110 Tyler St., East Haven, for a one-story 100 x 100-foot plant estimated to cost about $45,000. L. F. Caproni, 1221 Chapel St., is engineer.

NORWALK, CONN.—Ericsson Screw & Machine Co., 25 Lafayette Ave., Brooklyn, N. Y., has plans by Fletcher Thompson Inc., 211 State St., Bridgeport, Conn., for a one-story 101 x 165-foot plant, to cost about $70,000.

ROCKY HILL, CONN.—Hartford Rayon Corp., Dividend St., is having plans drawn by Buck & Buck, 650 Main St., Hartford, Conn., for a plant addition to cost about $40,000.

OHIO

AKRON—Marco Mfg. Co. has been incorporated with $5000 capital and 100 shares no par value to manufacture patterns for mechanical products, by Marcus B. Andrews, 320 M bourne Ave., and associates.

AKRON—United Industries Inc. has been corporated with $500 capital and 250 sh no par value to manufacture tools, dies, and fixtures, by Rae E. Berwin, 714 Luc St., and associates.

CLEVELAND—Precision Castings Inc., J. Millspaugh, general manager, 12600 E Rd., is building a one-story unit to house additional die casting machines, at cos about $175,000. (Noted Oct. 22.)

CLEVELAND—Reynard Tool & Gauge 3539 West 25th St., will build a one-s 75 x 150-foot plant on Brookpark Rd. cost about $45,000, in addition to a 3 90-foot building costing $20,000 at the s location.

NEW YORK

BUFFALO—National Aniline Division of A Chemical & Dye Corp. plans a new p costing $2 to $3 million, including eq ment.

ROCHESTER, N. Y.—American Brake Co. has started erection of a two-story addition covering 54,000 square feet of space, to cost about $250,000. William Kelly Jr. is president of the Kellogg divi

PENNSYLVANIA

LANSDALE, PA.—Central Automatic Sprin Co., 243 East Ashmead St., Philadelphi having plans drawn by R. B. Bencker, Chestnut St., Philadelphia, for a manu turing plant, additions and alteration cost about $40,000.

PITTSBURGH—Mine Safety Appliances J. S. Beggy, vice president, Braddock is having plans drawn by Prack & I 517 Martin Bldg., for a six-story plant cost over $65,000.

ILLINOIS

BELLWOOD, ILL.—Automatic Device C 530 South Throop St., Chicago, plans a story manufacturing plant to cost over 000.

CHICAGO — Simonsen Metal Products 4444 West Chicago Ave., has let contra Chicago Industrial Construction Co., West Wacker Dr., for a two-story 12 250-foot plant addition costing about $ 000. J. O. Mitchell, 105 West Adams St architect.

ELGIN, ILL.—Majestic Radio & Telev Corp., 2600 West 50th St., Chicago, let contract soon for superstructure of to cost about $750,000. A. Epstein, 2 West Pershing Rd., Chicago, is archi (Noted Aug. 27).

INDIANA

WHITING, IND.—Stone & Webster E neering Corp., Boston, has contract for sign and construction of a steam electric erating station at the Standard Oil Co. finery here, including 100,000-kw h pressure topping turbine generator unit two steam boilers with capacity of 300, pounds per hour at 1350 psi.

DELAWARE

WILMINGTON, DEL.—Hercules Powder plans an organic chemicals and resin plant a 100-acre site near Burlington, N. J.

MISSOURI

KANSAS CITY, MO.—Butler Mfg. Co., Ka City, Mo., and Minneapolis, manufacturer steel buildings, has bought patents manufacturing rights of steel building d sion of Globe-Wernicke Co.

ST. LOUIS—Sunnen Products Co., 7900 M chester Ave., manufacturer of precision h and pinhole grinders and automotive to has let contract for a one-story plant ad tion 55 x 110 feet.

ST. LOUIS—Monsanto Chemical Co., 1700 South Second St., will let contract soon for a $1,500,000 plant for manufacture of synthetic caffeine.

ST. LOUIS—War Department has let contracts for alterations and renovation of the St. Louis Ordnance plant at 4300 North Goodfellow Blvd. for use by the St. Louis administration center of the Army Service Forces. General contract has been let to Fruco Construction Co., 1706 Olive St., St. Louis, at $1,338,236 and electrical work to S. C. Sachs Co., 2022 North Ninth St., St. Louis at $293,850.

ST. LOUIS—Ford Motor Co., Dearborn, Mich., will take bids Nov. 15 for a one-story assembly plant 522 x 1485 feet and a one-story office building 170 x 312 feet, to cost about $8 million. Albert Kahn Associated Architects & Engineers Inc., New Center Bldg., Detroit have drawn plans.

MINNESOTA

MINNEAPOLIS—Penn-Greg Mfg. Co., 1115 Hennepin Ave., manufacturer of built-in metal mail boxes, plans new one-story plant.

MINNEAPOLIS—LeJay Mfg. Co., 2900 Emerson Ave. South, manufacturer of electric motors, generators and welders, has let contract for a one-story plant addition, increasing size from 80 x 80 to 120 x 120 feet. Additional machinery will be installed.

MINNEAPOLIS—American Wicker Works, manufacturer of seating for buses and trucks, has let contract for a one-story plant 100 x 150 feet at 26th St. and 32nd Ave. South.

MINNEAPOLIS—Kausel Foundry, 1726 Broadway, has let contract to Charles Schleich for a one-story foundry addition 60 x 100 feet.

MINNEAPOLIS—Thorwin Co., metal stampings manufacturer, has let contract for a one-story plant 60 x 80 feet, at 3400 East 42nd St.

MINNEAPOLIS — Woodmark Mfg. Co. and Lincoln Tool & Die Co., associated companies, have let contract to Leck Construction Co. for a one-story plant on Natchez Ave. in St. Louis Park.

MINNEAPOLIS—William H. Zeigler Co. Inc., distributor of construction and industrial machinery, will let contracts soon for a one and two-story shop, warehouse and office building to cost about $350,000.

MINNEAPOLIS—Cheney Foundry, 1118 South Third St., has let contracts for a one-story foundry addition 30 x 52 feet.

SAVAGE, MINN.—Continental Machines Inc., 1301 Washington Ave, South, Minneapolis, manufacturer of contour sawing machines, hydraulic surface grinders, band filing machines, etc., has let contract to Leck Construction Co., Minneapolis, for a one-story plant 240 x 380 feet and 50 x 60 feet.

ST. LOUIS PARK, MINN.—Automatic Screw Products Co. has let contract for a one-story machine shop.

ST. PAUL—Eckart Mfg. Co., 844 Seal St., agricultural implements, is building a one-story plant 42 x 118 feet.

KANSAS

GRAHAM, KANS.—Cities Service Gas Co., Oklahoma City, Okla., will build gas compressor station here, at cost of about $50,000.

TEXAS

DALLAS, TEX.—C. E. Doolin, 1405 North Haskell St., has let contract to W. A. Barber, 601 North Marsails St., for a machine shop unit costing about $110,000.

SHERIDAN, TEX.—Shell Oil Co., Shell Bldg., Houston, Tex., plans a recycling plant here to cost about $3 million.

IOWA

FORT DODGE, IOWA—Horn Mfg. Co., manufacturer of folding partitions for buildi will let contract soon for a one-story pl 160 x 320 feet. Frank Griffith is architect

SANBORN, IOWA—City, Dr. J. M. Ea city clerk, will take bids Nov. 15 for a po plant 45 x 73 feet, diesel engine genera unit, switchboard and distribution syst Buell & Winter, 508 Insurance Excha Bldg., Sioux City, Iowa, are consulting gineers. City has voted $130,000 for pro

SIBLEY, IOWA—City, R. D. Stewart c will take bids Nov. 7 for 2500-kw tu generator, surface condenser and access for municipal power plant. Estimated cost $75,000. R. D. Thomas & Associ 1200 South Second Ave., Minneapolis, consulting engineers.

CALIFORNIA

ALHAMBRA, CALIF.—Rueland Electric C building a plant at 3001 West Mission to cost $25,000.

BAKERSFIELD, CALIF.—Industrial Powe Equipment Co. is building a shop add 81 x 101 feet at 25 Union Ave., to $15,000.

CHULA VISTA, CALIF.—Continental I neering Co., has let contract to B. O. La 1340 E St., San Diego, Calif., for a 140 x 185 feet, costing about $24,000.

FRESNO, CALIF.—Paxton Machines Inc. been incorporated with 10,000 shares c par value, represented by Wild, Carso Reeve, Helm Bldg.

GLENDALE, CALIF.—Williams Radiator has let contract to Buttress & McCl 1013 East Eighth St., for a factory bui 82 x 82 feet, to cost about $18,000.

LOS ANGELES—Melkas Machine Tool 6209 Wilmington Ave., is having drawn for a machine shop, 60 x 100 W. M. Bostock, 2534 Live Oak Ave., H ington Park, Los Angeles, is architect.

LOS ANGELES—Refrigerator Manufact Inc. has been incorporated with $2 capital and is represented by C. E. Spe 458 South Spring St., Los Angeles.

LOS ANGELES—Mine & Mill Machinery has been incorporated with $25,000 ca represented by T. G. Dalton, 215 West St.

LOS ANGELES—Associated Metal & Iron has been incorporated with 1000 shares c par value, represented by Abner Ware 608 South Hill St.

LOS ANGELES—Arlington Sheet Metal has been incorporated with $25,000 ca represented by T. G. Dalton, 215 West St.

LOS ANGELES — California Metal Pro Inc. has been incorporated with $2 capital, represented by Benjamin Chi 548 South Spring St.

SAN DIEGO, CALIF.—Bobbi Motor Car has been incorporated with $100,000 ca to manufacture automobiles, represente Donnelly & Wood, 1400 Bank of Am Bldg.

VERNON, CALIF.—Electric Tool & S Co., 5136 South Santa Fe Ave., is ha plans drawn for a new plant. Louis C. K and Lee B. Kline, 555 Chamber of C merce Bldg., Los Angeles, are architects

WASHINGTON

PASCO, WASH.—City is having plans d by John W. Cunningham & Associates, land, Oreg., for a proposed $230,000 f tion plant.

SEATTLE—Plans are being prepared fo plant for Wentzler Machine Shop, Twelfth Avenue, to cost $25,000.

WALLA WALLA, WASH.—Howard S. Wr Co., Seattle has contract for quick freez plant, 170 x 380 feet for Birdseye Division General Food Corp., including boiler ho shop and compressor department.

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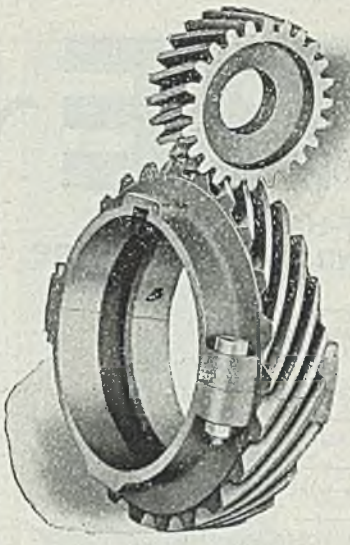

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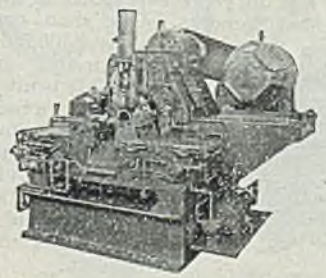

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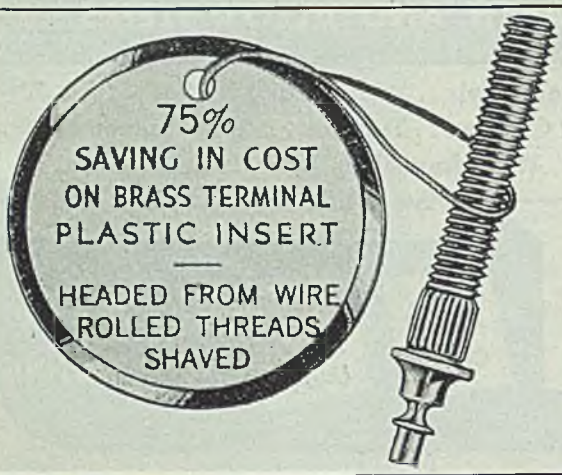

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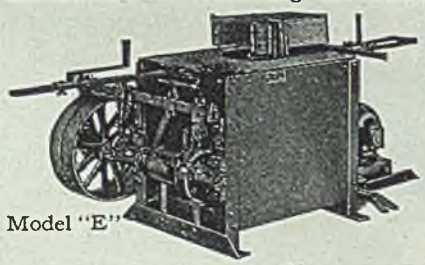

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24" BULLARD New Era Vertical with one swiveling turret head and one side head. AC or DC motor drive.

42" BULLARD New Era Vertical with one swiveling turret head and one side head. AC or DC motor drive.

NO. 1 PUTNAM Vertical Car Wheel Boring Mill with side head for hub facing and hoist. AC or DC motor drive.

48" NILES-BEMENT-POND Car wheel Boring Mill with hoist. AC or DC.

100" NILES-BEMENT-POND Vertical with two swiveling heads, Power Rapid Traverse. AC or DC motor drive.

120" BETTS Heavy Vertical with two swiveling heads, Power Rapid Traverse, AC or DC motor drive.

120" NILES-BEMENT-POND Vertical with two swiveling heads, Power Rapid Traverse. AC or DC motor drive.

120" CINCINNATI Massive Pattern Vertical with two swiveling heads, Power Rapid Traverse. AC or DC.

10'-16' CINCINNATI extension Type Vertical with two swiveling heads, Power Rapid Traverse. AC or DC.

NO. 32 3¾" Bar LUCAS Horizontal table type boring, drilling, and milling machine, power rapid traverse. AC or DC motor drive.

4½" Bar NILES-BEMENT-POND horizontal table type boring, drilling and milling machine, duplex control. AC or DC drive.

5½" Bar NILES - BEMENT - POND Heavy floor Type Horizontal Boring, Drilling, Milling Machine, AC or DC.

RADIAL DRILLS

4' HAMMOND High Speed sensitive drill, lever feed with tapping attachment, AC or DC motor drive.

5½' AMERICAN Full Universal Triple Geared with tapping attachment. Single pulley belt drive or AC or DC.

6' CARLTON Plain 15" round column with DC motor on arm, tapping attachment.

8' NILES-BEMENT-POND "Right Line". Plain with 230 volt DC motor on arm, tapping attachment.

GRINDERS

12" O.S. WALKER single stroke surface grinder with 12" dia. magnetic chuck and 7½ H.P. AC or DC motor.

NO. 16 BLANCHARD High Power Vertical surface grinder with 26" magnetic chuck and 20 H.P. AC or DC.

NO. 1 BESLEY disc grinder with two 12" dia. steel discs and two plain tables, belt drive through countershaft.

LATHES

27"x12' AMERICAN 8 speed geared head, 96" between centers. AC or DC.

42"x36' PUTNAM Geared Head, 25' between centers. Quick change gear box. AC or DC motor drive.

48"x30' BRIDGEFORD 9 speed geared head, 20' between centers. Triple geared internal face plate drive.

48"x20' NILES-BEMENT-POND Extra Heavy Geared Head, 11'5" between centers. Power cross and angular feed to compound rest. Semi-quick change gear, taper attachment.

48"x59' BRIDGEFORD Boring and turning with 9 speed geared headstock, turning carriage with compound rest, AC or DC motor drive.

NO. 4 PUTNAM Extra Heavy Center Drive Axle Turning Lathe with two carriages. AC or DC motor drive.

27" Swing 98" Centers BRIDGEFORD Plain Turning Lathe for car axles or heavy forgings, two carriages and tool rests. Single pulley belt drive or AC or DC motor drive.

42" PUTNAM Heavy Double End Car wheel lathe. Equipped with overhead hoist for loading wheels and axles.

72"x77' (65' - 6" centers) NILES-BEMENT-POND heavy geared head lathe. Two carriages with compound rests, power cross and angular feed. Power rapid traverse, taper attachment.

MILLERS

NO. 2 CLEVELAND plain, table 13" x 50" B&S Taper No. 11. Single pulley belt drive or AC or DC motor.

NO. 3B BROWN & SHARPE Plain with double overarm table 14"x60" with 7½ HP, AC or DC motor.

NO. 4 CINCINNATI High Power Plain. Power rapid traverse table 16½"x64". Single pulley belt drive or AC or DC.

NO. 5B BROWN & SHARPE Plain, Power rapid traverse, table 22"x81". AC or DC.

No. 3 CINCINNATI High Power vertical, power rapid traverse, table 59" x 13", single pulley belt drive or motor drive.

NO. 1½ KNIGHT vertical milling and drilling with power longitudinal feed to tilting table. Table 7½"x29", AC or DC.

NO. 4 CINCINNATI High Power Vertical, Power rapid traverse. Table 16½"x64". Single pulley belt drive.

24"x24"x12' INGERSOLL Horizontal Spindle Slab Miller with adjustable rail.

30" x 30" x 10' NEWTON Horizontal Spindle Slab Miller with adjustable rail, table 27"x11'. AC or DC motor.

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PLANERS

36"x36"x14' PUTNAM Heavy with two heads on rail. 230 Vo reversing type planer motor.

38"x38"x14' OHIO Heavy with heads on rail and one side 230V DC reversing type planer

48"x48"x16' NILES - BEMENT - Heavy with two heads on rail an side heads. 230V DC reversing planer motor and control.

48"x48"x18' G.A. GRAY Spiral with two heads on rail and on head. AC motor drive with sel tained countershaft.

48"x48"x24' NILES - BEMENT - Heavy with two heads on rail an side heads. 230 Volt DC rev type planer motor and control.

48"x48"x32' G. A. GRAY Spiral with two heads on rail and tw heads. 230 Volt DC reversing planer motor and control.

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48"x48"x20' F. R. PATCH Heav two heads on rail and two side 230V DC reversing type moto control.

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72"x72"x20' NILES - BEMENT - Extra Heavy, two heads on ra two side heads, 230 Volt DC rev type planer motor and control.

84" Widened to 98"x32"x42' 8 WARK Extra Heavy, two rail and two side heads. 230 Volt D versing type planer motor and c

16'x10'x30' BETTS heavy, two he rail and two sideheads, forced lubrication. 230 Volt DC re type planer motor and control.

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ENGINEER: BY FIRM FABRICATING AND converting steel strip and sheets. Capable of assuming responsibility for production on processing units; also analysis and design leading to improved quality, increased production and lower costs. Must be able to make drawings, follow manufacture and installation of redesigned equipment. Address Box 271, STEEL, Penton Bldg., Cleveland 13, O.

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