STEEL

The Magazine of Metalworking and Metalproducing

Vol. 116, No. 21 May 21, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Contour Hardening of Steel Gear Teeth

Electronic Drives on Winding Reels for Metal Strip

Determining Electric Furnace Capacity

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STEEL
May 21, 1945

What Do You Think?

A committee headed by Senator O'Mahoney asked 100 steel companies this question: "What level of postwar steel demand do you anticipate?" Inland Steel Co. replied that it estimates an average demand for ingot steel of approximately 54,000,000 net tons for the 30-year period between 1945 and 1975.

This figure affords a basis for fascinating study and speculation. Is it too high, too low or about right?

First, how does it compare with past demand? The 30-year period from 1910 to 1939, inclusive, should provide a fair indication of pre-War II demand. It includes the high output of World War I but this is offset by the abnormally low output of the early thirties. During these 30 years, the production of steel ingots averaged about 41,000,000 net tons annually. Against this average, Inland's estimate of 54,000,000 tons for 30 postwar years represents an increase of 32 per cent or 13,000,000 tons annually. This makes the Inland estimate look reasonable.

However, if one charts a curve of steel ingot production from 1895 to 1944 and then draws a straight trend line midway between its peaks and valleys, he will find that the trend line has risen a little more than 50,000,000 tons in 50 years. Then if he extends this line at the rate of an increase of a million tons a year through 1974, it traces a production of steel ingots which averages more than 70,000,000 tons annually for the 1945-1974 period. Under this test, Inland's estimated average of 54,000,000 tons seems too low.

But how about population? Dividing average population from 1910 through 1939 into average production in that period, one gets a per capita consumption of about 735 pounds annually. Divide average projected population from 1945 through 1974 into Inland's estimated average demand of 54,000,000 tons and the answer is about 770 pounds per capita per year. This increase of only 35 pounds makes the Inland figure appear to be conservative.

However there are other factors to be considered. The quality of steel is being improved steadily. Alloy steel is being used more extensively. Better design permits steel to be used more effectively. Marked advances in forming, heat treating, processing and machining permit steel to be used more economically. In many ways, technological progress may make it possible for 54,000,000 tons of ingots in the future to render the service which required 60,000,000 tons or more in the past.

These intangibles make Inland's estimate seem highly plausible.

CO-ORDINATE, SIMPLIFY! From now on representatives of industry and federal agencies will encounter a running barrage of debate regarding government controls. OPA has announced pricing policies for the transition period as follows: 1. Continued prevention of inflation. 2. Make possible full production. 3. Encourage full employment. 4. Relax controls over prices as the dangers of inflation fade.

Almost everybody will agree that this statement of policy is sound, yet OPA administrators will have to be expert tight-rope walkers if they are to carry out these policies satisfactorily. If they set prices too high, inflation may get out of hand and reconversion will be disrupted. If they set prices too low they will discourage production and cause unnecessary unemployment.

Also, OPA action alone cannot be effective; there must be co-ordination between the decisions of OPA and those of WLB, WPB and WMC. Need of this co-ordination is seen in the case of machine tools. WPB has granted priority ratings so that certain manufacturers can get needed tools, but in order to deliver them in time, builders need relief from

(OVER)

other agencies. Unwinding the snarl of federal controls will be difficult at best, but the job can be made easier if efforts to co-ordinate and simplify them can go hand in hand with a program of gradual abandonment. —pp. 77, 80, 84

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STAMP OF APPROVAL: Experience of industrial corporations with renegotiation of contracts has been so varied that it is impossible at this time to generalize as to the success or failure of this method of controlling profits. Officers of some companies which have gone through renegotiation think they have received a fair deal, others are convinced they have been gypped.

A consultant who has studied this problem thoroughly believes that manufacturers subjected to renegotiation can capitalize their experience. As one official expressed it, "Renegotiation is an official stamp of approval. It means a great deal now; it may mean even more at some future date."

Many laymen and a considerable number of industrial employes still believe that war contractors are making unduly large profits on war work. The consultant points out that renegotiation affords a company a sound basis of fact with which to combat this misconception. This may suggest to some manufacturers an idea for public and employe relations which might prove to be highly advantageous. —p. 90

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TOOLS FOR SECURITY: At a regional meeting of the National Machine Tool Builders' Association, William P. Kirk made a point concerning government-owned surplus machine tools which deserves careful consideration. He proposes that the government retain intact a substantial supply of machine tools of the types particularly needed for the production of war materiel.

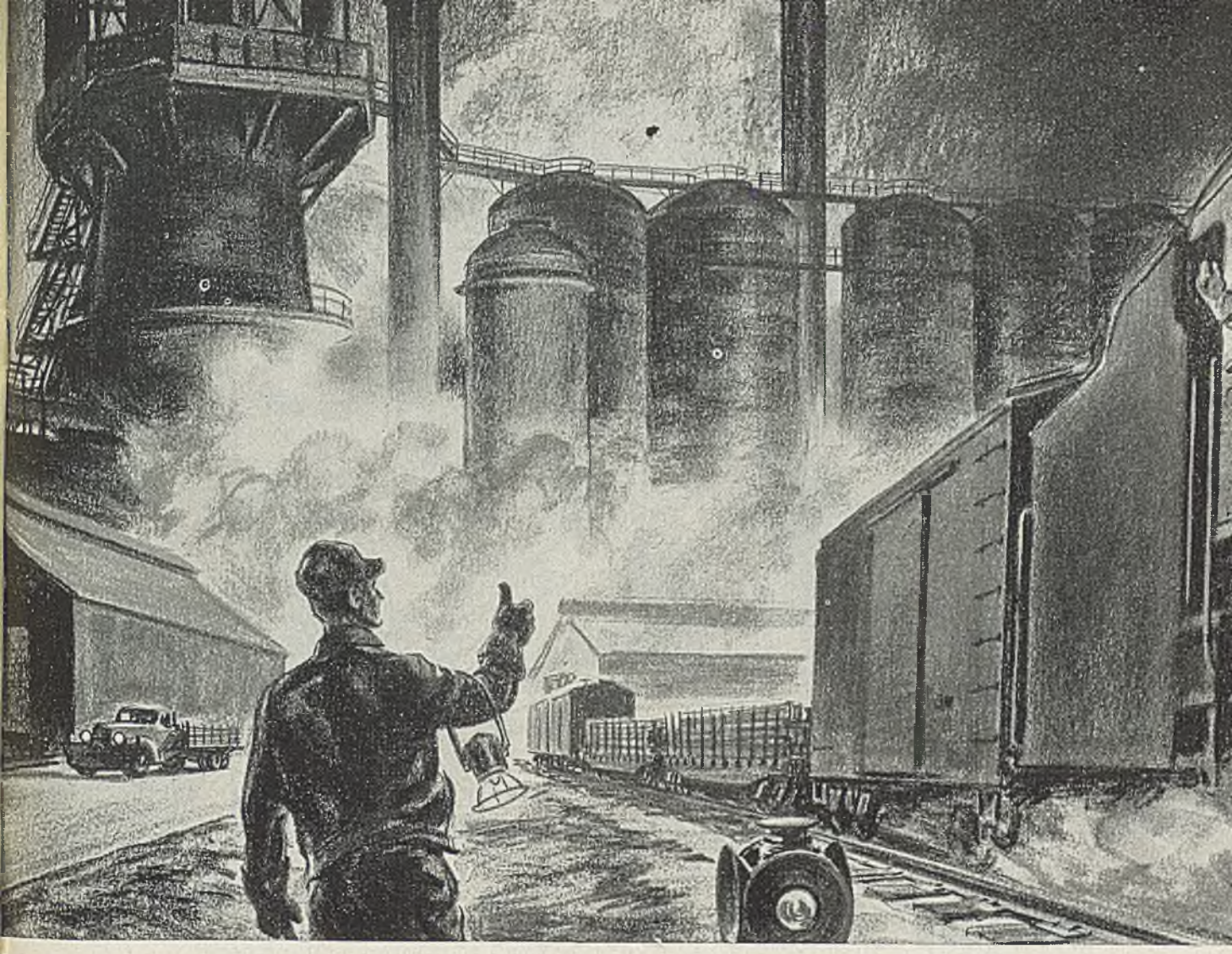
"Machine tools cannot be made overnight," said Mr. Kirk. "We recall those days early in this war when we were charged with being the bottleneck to war production. We broke our necks to break that bottleneck. Fortunately we were given time to do that. The aggressor struck first some place else. What if he had struck here first?"

This line of thinking is sound and timely. In World War I and II this nation had time for preparation. If there is a World War III, it is almost certain we will have no time to prepare. We should be ready with machines and munitions. —p.84

SIGNS OF THE TIMES: United States commercial airlines have rung up a superb war record. On war routes overseas and at home their achievements include (p. 100) 2,696,316,089 passenger miles, 707,052,264 ton miles, 308,919,761 transport miles and 1,828,007 transport hours flown . . . . Up to V-E Day federal-owned property valued at $1,575,000,000 had been declared surplus. Sales have reduced this to a present inventory of about $1,300,000,000 (p. 86), over half of which consists of 14,000 unsalable damaged and obsolete planes . . . . Now that the war in Europe is over, it is possible to reveal how the United States government, in order to get around a technicality, called upon United States Steel Corp. to buy a $36,000,000 accumulation of surplus ordnance from United States arsenals (p. 94) and to sell it to England and France. The Corporation bought it and sold it to our Allies at the purchase price at the critical time of the evacuation from Dunkerque . . . . New wage schedules in plants reconverting to civilian production must be filed with WLB before or when installed, but approval by WLB will not be necessary before the rates go into effect. If adjustment of the rates is ordered by WLB after it has examined the schedules (p. 80) such adjustment will not be retroactive. At last, here is one thing that is not retroactive! . . . . WPB Chairman Krug estimates about 2,500,000 tons of steel will be released from direct war use in the third quarter. Apparently July 1 will be an important date in reconversion (p. 77); CMP will be open-ended at that time . . . . July 1 also is the date when WMC hopes to have reclassified all labor areas (p. 80) and after which relaxation of manpower checks on new civilian production can be expected . . . . Steel ingot output in April was 7,308,579 tons (p. 83), a drop of 400,000 tons from March production due to the shorter month and coal shortage . . . . American Iron & Steel Institute has brought out a new quarterly magazine entitled "Steelways" (p. 82) which will deal with uses of steel . . . . An official of Ford Motor Co. has hinted that the company may eliminate the traditional yearly model changeover (p. 93) in favor of a continuous system of introducing improvements as they are developed.

E. L. Shaner

EDITOR-IN-CHIEF



Round-the-Clock Carloading at Inland

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RYERSON CERTIFIED STEELS

RYERSON STEEL

The war goes on! These Navy and Coast Guard-manned craft are silhouetted against a dazzling sea and an ominous sky as they push toward Japanese shores. NEA photo

Pattern for Period One Evolving

Many wartime restrictions revoked or modified to open path for return to limited civilian production. Steel industry to spend $200 million for reconverting facilities. Auto industry expects to build 200,000 passenger cars in last half. Materials shortages may be limiting factor

GENERAL policies which will govern partial reconversion to civilian goods manufacture until the final defeat of Japan now have been outlined by government authorities.

Industrialists have been told what they may expect in the way of reconversion pricing, wage controls, manpower checks and restrictions on materials.

War contracts are being pared down, although at a milder rate than many, including War Production Board planners, had anticipated. A large number of controls over materials and restrictions on the production of peacetime items have been revoked and about 100 more are scheduled to be lifted within the next two months.

Steps have been taken to help plants switching over to civilian goods obtain tools and materials. The Controlled Materials Plan will be open-ended July 1 and manufacturers may place orders for the controlled items—steel, aluminum and copper—now for July delivery.

These moves do not mean that the way for reconversion is open. Many obstacles must be overcome before volume output of peacetime items can start. Many materials will continue in short supply. Machine tool backlogs now average about 8 months and deliveries of some types, of course, will require much longer. Bottlenecks will develop in some components and parts. And the policies enunciated by the government agencies are only broad outlines; delays are likely when the manufacturer attempts to apply these generalities to his own particular case.

Preparation for the resumption of peacetime manufacture, however, is getting under way and many companies are looking forward to July as the actual starting point. July 1 is the date for open ending the CMP, further relaxation of manpower controls, beginning of special priority assistance to small producers.

Sufficient steel will be available to take care of requirements for the war against Japan, provide material for war-supporting industries and for reconversion, steel producers have promised.

J. A. Krug, War Production Board chairman, estimates about 2,500,000 tons of steel will be released from direct war use in the third quarter. Two million tons of this would be assigned to essential civilian production while the remaining half million tons would be "free" steel to be used in making washing machines, vacuum cleaners, typewriters, smaller electrical gadgets and other consumer goods without control.

Steel sheet will be the biggest worry during the third quarter and will continue tight longer than steel generally. Sheets will be in heavy demand as soon as production of civilian items such as automobiles, refrigerators, washing machines and similar goods, gets under way. Many of the large continuous sheet mills were converted to plate mills early in the war and some time will be required to convert them back to sheet-strip mills.

However, some mills already have been reconverted and the steel industry is planning to spend $200 million for reconverting its facilities to handle civilian demand, according to the American

Iron & Steel Institute. This does not include expenditures of companies planning to broaden their operations.

A good part of the $200 million will be spent on reconverting the sheet-strip mills.

The steel industry's estimated cost of reconversion is less than 10 per cent of the total spent since 1940 by the industry and the government for expansion for war production. In the past 4½ years the steel companies have spent $1210 million of their own funds while the government has provided $1095 million for war expansion.

While cancellations of steel orders have been increasing since V-E Day, they have not yet reached the volume anticipated by leaders in the industry. Cancellations of war orders are expected to increase as the year progresses and at least one large producer is taking orders for steel for civilian goods with no priorities for delivery after July 1. This producer is not making any delivery promises, but is taking orders on good faith and will make delivery as early as possible. Another producer is making ingots to be used for rolling automobile steel, although this has not yet been scheduled for rolling.

How much civilian goods production will be possible this year will depend to large extent on cutbacks in the war production program and the manpower, facilities and materials thus freed. However, Henry P. Nelson, auto reconversion chief for the WPB, estimates that more than 200,000 new automobiles will be built this year and that 400,000 will be produced in the first quarter of 1946. Restriction on the production of automobile replacement parts will be lifted immediately and efforts will be made to increase output of civilian trucks, while maintaining military truck production at high levels.

Hope Requirements Will Decrease

Cutbacks in the military program to date have resulted in a third quarter procurement schedule of $13,766 million, compared with an estimated schedule of $13,525 million. WPB officials are hopeful that further survey of requirements may lower the currently scheduled third quarter program.

Military production in the first three months this year amounted to $14,452 million and output during the second quarter is expected to run about $14,375 million.

Contract cancellations so far since V-E Day have been more in the nature of a trickle rather than the flood which was expected in some quarters.

Termination by the War Department of its contract with Studebaker Corp. for production of B-17 Flying Fortress engines and parts will result in a complete shutdown of the company's aviation plant at Chicago. Approximately 2600 workers will be laid off at Chicago and an additional 5000 will be affected at the Ft. Wayne and South Bend, Ind., plants of Studebaker Corp.

Buick Aviation Engine plant of General Motors Corp. at Melrose Park, Ill., is still laying off 4000 employes as a result of cancellation of orders for B-24 Liberators.

Pressed Steel Car Co., Chicago, is readjusting schedules to accommodate a substantial reduction in its tank output. Company's cutback is reported to involve 1500 to 2000 tanks, the equivalent of 3½ to 4½ months' output.

Indications that automotive companies are expecting cancellations of tank programs is seen in the layoff of 1100 workers at General Motors' Fisher Body plant No. 1 in Flint, Mich., and 200 at the Fisher Grand Blanc, Mich., plant and also for Chrysler and other plants. The imminency of such cutbacks has intensified pressure on War Manpower Commission officials to have Detroit reclassified as a group 3 labor area. This would mean that manpower controls would be optional at the discretion of the area director, instead of mandatory as at present under the group 2 classification. Most of the pressure has been coming from the United Automobile Workers-CIO, whose leaders contend the area's problem already is one of unemployment rather than of labor shortage.

18,500 Jobs Available at Detroit

Edward L. Cushman, Detroit area WMC director, maintains he still has 18,500 unfilled job openings, of which only 3000 are for common labor and the remainder for 700 different types of skilled and semiskilled workers.

The Flint and Muskegon, Mich., areas have been reclassified from group 2 to group 3 areas. Chiefly responsible were the Fisher layoffs at Flint and layoffs by Continental Motors Corp. and Borg-Warner's Norge Division at Muskegon.

Operations of the Gary, Ind., armor plate plant of Carnegie-Illinois Steel Corp. were suspended May 14 and 500 of the 570 remaining employes are being laid off. Employes were told to take vacations last week and to report again May 21. If sufficient orders are received in the meantime, the plant will be put into operation. Otherwise, the men will be released to seek employment in other plants.

The War Production Board has been keeping its promise to revoke or modify restrictions on the use of materials and facilities following the fall of Germany. One of the most important of these was the revocation May 16 of M-126, the conservation order issued in May, 1942, to stop the use of iron and steel in several hundred less essential civilian articles. This blanket order cut completely across the civilian economy, eliminating the use of steel in items ranging from advertising accessories to wine coolers.

At the same time, due to requirements of the armed services for alloys used in the production of stainless steel, controls of stainless steel formerly exercised through M-126 and other limitation and conservation orders have been maintained through issuance of Direction 2 to M-21. The new direction provides stainless steel may not be processed or fabricated except:

1. On an authorized Controlled Materials Plan production schedule.
2. When obtained from consumers' idle and excess inventories as stipulated under the provisions of Priorities Regulation No. 13.
3. When the metal was in the consumer's plant prior to May 12, 1945.
4. When obtained from steel warehouses as provided in CMP Regulation 4.

While many limitation orders have been revoked, the WPB Steel Division has warned consumers to check with orders formerly cross referenced with M-126 to ascertain what limitations still apply.

About half of the limitation, conservation and other orders have been or soon will be revoked.

Recent Revocation Actions

Recent revocation actions are those removing the controls on the manufacture of typewriters, 35-millimeter motion picture projection equipment, commercial laundry dry cleaning and tailor pressing equipment, scale, floor sanding equipment, photographic equipment, office machinery, many types of heating equipment, commercial cooking and plate warming equipment, utility construction up to $25,000, and many other items (see page 89).

Giving the green light to certain civilian production has prompted WPB to

United States supplies are unloaded at Borneo as a new drive starts against the Japanese. A portable steel pier facilitates the movement of vehicles and equipment from ship to beaches. NEA photo

set up certain new reconversion controls. While WPB is prepared to relax its rules governing the acquisition of materials as rapidly as the supply permits, it will move to prevent hoarding, pre-emptive buying or buying ahead of need of production.

Under Priorities Regulation 1 and Controlled Materials Plan Regulation 2, a manufacturer in anticipation of starting or resuming civilian production is permitted to receive the minimum amount of material needed for the first 30 days of production, provided no priorities assistance or allotment symbol is used to get the material. The board reiterated that its inventory regulations limiting receipts of materials still apply whether or not the material is acquired with priority assistance or whether it is for civilian or war production.

In other words, material must be diverted first to fill rated orders before it can go to a manufacturer without a priority rating. When a manufacturer's contract has been reduced or canceled, the new inventory regulation permits him to accept further deliveries of parts or components already produced or in production at the time of the cutback if the manufacturer who supplies him with such products or components cannot use the particular items to fill other orders on his books.

As industry moved back toward a civilian economy the first announcements of new products and postwar expansion of facilities for peacetime production began to appear. Among these were the announcement by General Motors Corp. that its Chevrolet Division will produce a new lightweight and more economical car. The project is still in the idea stage.

International Harvester Co. last week announced it will spend $100 million or more for new farm machinery plants when construction conditions permit. Projects include a tractor plant on the Mississippi river between Alton and Wood River, Ill., and a farm implement plant at Memphis, Tenn., and possibly a farm machinery plant and a tractor plant on the West Coast. Latin American expansion also is being considered.

Electric Range Production Falls Short of Program

War Production Board authorizations assigned for production of electric ranges in second quarter of 1945 total 23,372 and in third and fourth quarters, 22,597 per quarter. These compare with 25,209 produced in first quarter and 35,000 set up in the 1945 quarter program. WPB is considering a proposal to provide in the third quarter material for 56,000 ranges in addition to that needed to fulfill the quarterly program.

A total of 567,409 nonelectric cooking stoves and 637,506 nonelectric heating stoves was produced in the first quarter of 1945.

U.S. Steel Annual Report Shown in "Movie" Form

Stockholders of the United States Steel Corp. at their recent annual meeting were shown a motion picture which translates visually the data contained in the corporation's annual financial report. In addition to showing how ownership of the corporation is held by hundreds of thousands of persons in all walks of life, the film gives an intimate insight into the vast operations entailed in producing steel and various materiel for the war program, and graphically shows the disposition of corporation income from sales. The picture was produced with a view to simplifying and translating in the most easily understood way the detailed financial and production data provided in the corporation's formal annual report. The film now is being shown to employes and later will be made available for showing to the general public.

Present, Past and Pending

RAILROADS PLACED ON PRODUCTION URGENCY LIST

WASHINGTON—Railroads, steel drums and pails, have been placed on the National Production Urgency List. This places the entire railroad industry on a par with the most urgent war production.

CAN MANUFACTURERS' STEEL ALLOTMENTS FROZEN

WASHINGTON—No additional steel will be allocated can manufacturers for second quarter, War Production Board officials state. Third quarter allocations have not yet been decided, but indications are that these will be adequate only for producing cans for perishable foods and for products for the armed services.

CHICAGO BRIDGE TO COMPLETE LST CONTRACT JUNE 22

CHICAGO—Chicago Bridge & Iron Co. will complete its 157th LST and will fulfill its contract for construction of these craft when it delivers the last vessel June 22 from its Seneca, Ill., shipyards.

GRAY IRON CASTING DEMAND TO CONTINUE HEAVY

WASHINGTON—Peak gray iron casting production will be required for a considerable period to meet expanded demands for war against Japan. Output totaled 857,616 tons in March, largest since 1941.

STRIKE ENDS AT BETHLEHEM STEEL LACKAWANNA PLANT

BUFFALO—Strike which entirely halted steel production and sharply curtailed rolling operations at the Bethlehem Steel Co.'s Lackawanna plant, Lackawanna, N. Y., ended late last week.

STUDEBAKER TO BUILD $1,500,000 AUTO BODY PLANT

SOUTH BEND, IND.—Studebaker Corp. has received government approval to erect a $1,500,000 auto body plant which will replace certain existing capacity.

LUKENS STEEL BLAMES OPA FOR LOW EARNINGS RATE

COATESVILLE, PA.—Robert W. Wolcott, president, Lukens Steel Co., in the company's annual report, says OPA policy is responsible for the relatively poor earnings of the company in the first half of its 1945 fiscal year. He based his opinion on OPA's "procrastination and unwarranted delay" in acting upon the steel industry's request for price relief.

C. D. MARSHALL, BETHLEHEM STEEL DIRECTOR, DIES

PITTSBURGH—C. D. Marshall, 77, director, Bethlehem Steel Corp. and a founder of McClintic-Marshall Construction Co., which was acquired by Bethlehem, died at his home in Chester County, Pa., May 16.

L. E. CREIGHTON RESIGNS FROM WPB STEEL DIVISION

WASHINGTON—L. E. Creighton, assistant director in charge of alloy and ferroalloy steel, Steel Division, War Production Board, has resigned.

NWLB'S STEEL COMMISSION RULES ON WAGE DISPUTES

WASHINGTON—National War Labor Board's Steel Commission has ruled it will not handle disputes or voluntary applications of overall stabilized wage rate structures submitted to it "piecemeal."

Manpower Controls To Be Relaxed

Forty-eight-hour week in steel industry revoked. All labor areas will be reclassified by July 1

PROGRESSIVE easing of manpower controls to the end of the Japanese war when they will be abolished is foreshadowed in events since V-E Day.

Cutbacks in war contracts, delays in changing over to the production of civilian goods, and the return of many thousands of servicemen to the labor force is expected to change a critical manpower shortage into a situation where 2,500,000 face unemployment in the next year.

The manpower controls, never popular with either management or labor and not too ably administered, will become increasingly difficult to enforce as the labor shortage turns into a surplus. The War Manpower Commission may be one of the first war agencies to have its wings clipped. Evidence of this is the move of the House Appropriations committee to cut the WMC budget from a proposed $93 million to $62 million.

Paul V. McNutt, WMC head, already has announced a program for the gradual relaxation of controls.

By July 1 all labor areas in the country will be reclassified. Until then, manpower controls in the less critical areas (groups 3 and 4) may be lifted at the discretion of the area directors. In the more critical areas (groups 1 and 2) employment stabilization programs, employment ceiling programs, priority referral for males and the 48-hour week will be maintained.

If unemployment is appearing in groups 1 and 2 areas before July 1, the area directors may make use of "blanket" or open referral cards.

After July 1 some relaxation of manpower checks on new and expanded civilian production will be made. When all areas have been reclassified on a new basis, all manpower programs in group 2 areas will be made optional at the discretion of the area manpower directors.

After July 1, group 1 areas will be those in which manpower controls are continued; group 2 areas will be those in which controls are optional; and groups 3 and 4 areas will be those in which all controls will be abandoned.

A program is being worked out to clear the way for plants employing fewer than 100 persons to resume or expand civilian production. A similar plan is in the making for larger plants in loose labor areas.

Explaining the WMC's modified transition program between now and July 1, Mr. McNutt said workers will be required to obtain statements of availability in groups 1 and 2 areas. After July 1, statements of availability will be necessary in group 1 areas and may be required in group 2 areas.

The 48-hour week will be maintained for establishments in all group 1 areas with, as now, exemptions for individual plants. In group 2 areas the 48-hour week will be optional with the areas directors.

The 48-hour week will be revoked in the steel industry, making steel plants subject to the same work-week as other plants in the areas in which they are located.

Soldiers winning discharges under the Army's point system soon will be augmenting the labor force. Above, a corporal at Fort Dix, N. J., tries on a civilian coat to accustom himself to his new civilian role after 51 months in the Army. NEA photo

Labor Board Places Chips on Collective Bargaining To Fix Reconversion Wages

WAGE rates in plants reconverting to the production of civilian goods are to be set by collective bargaining. The new rate schedules must be filed with the War Labor Board before or at the time they are installed, but approval by the WLB will not be necessary before putting the new scales into effect.

The board will examine the rates and if it finds they are either too high or too low to conform to the economic stabilization act, adjustments will be ordered. Such adjustments will not be retroactive.

This is the essence of WLB's policy on reconversion wages as outlined by Dr. George W. Taylor, chairman of the board. Dr. Taylor in announcing the board was putting its chips on collective bargaining said the aim was to hasten the process of getting plants whose war work has ended into peacetime work.

In reviewing wage schedules the board has two duties to perform, Dr. Taylor said. One is to see there is no general raising of wages and the other is to see there is no general lowering of wages.

The WLB will continue in operation as long as the war lasts, Dr. Taylor declared.

"Since the no-strike pledge holds, a mechanism has to be available to decide disputes, since they are not going to be determined by economic force."

Plants which do not have to reconvert will not have to change their wage schedules nor file them with the board.

Dr. Taylor explained that reconversion will necessitate numerous changes in wage rates in plants reconverting. An automaker who has been making tanks, for example, will have had no rate for upholsterers during the war period.

Reconversion Pricing Designed To Encourage Output, Prevent Inflation

Most civilian goods to be returned to market at 1942 retail prices, although manufacturers may be allowed increases to compensate for higher materials, parts and labor costs. Controls to be lifted as inflation dangers fade

RECONVERSION pricing policies under which most peacetime goods returning to the market will sell at 1942 retail prices, but which may provide many manufacturers with increases to compensate for advances in the costs of raw materials, parts and labor, have been outlined by Chester Bowles, price administrator.

The reconversion pricing problems, Mr. Bowles points out, centers largely in the metal-using industries in the consumer-durable-goods field. In 1941 when these goods were last in production they accounted for 8½ per cent of consumer expenditures. Of the remaining items that have continued to be available during the war, more than 90 per cent now have ceiling prices and a few other goods or services are exempt from price control.

"It is important that price control policies during the coming year enable business and labor to expand production of civilian goods just as rapidly as the easing off of war demands makes possible. Nothing will more surely smother the fires of inflation than an avalanche of civilian goods and services," the OPA chieftain said.

Designed To Meet Four Objections

Pricing policies during the transition period are being designed to meet four objectives:

1. Continued prevention of inflation. Nearly half the inflationary price rise of the last war came after the armistice. OPA officials contend inflationary pressures now are vastly greater than in 1919 and that we are entering one of the most dangerous periods of the emergency.

2. Make possible full production. Prices will not be allowed to stand in the way of manufacturers anxious to make products for which the public is waiting.

3. Encourage full employment.

4. Relaxation of controls over prices as the dangers of inflation fade.

OPA views the accomplishment of these objectives as an exceedingly difficult task. If prices are set too low, production will be restricted with resultant unemployment. If prices are set too high, inflation will result and rapid and orderly reconversion will be disrupted. If OPA is too slow in fixing reconversion prices, business men will be discouraged and uncertain.

The price agency's aim will be to create a flexible program that will permit quick decisions, as many as possible in its field offices.

The manufacturer turning from the production of war materials to peacetime products may face one or more of the following four pricing problems:

1. How to price products he made before the war and which other manufacturers have continued to produce through the war.

2. How to price products that he made before the war, but which have been out of production during the emergency.

3. How to price new models of the same products he was making when he converted to war work.

4. How to price products he had not been making before the war.

The fourth problem, prices for products being made for the first time, is one with which OPA has been dealing throughout the war. In this case the manufacturer must apply to OPA for ceiling prices in line with those of its competitors for the most nearly comparable products.

NEW PRICE SCHEDULE

New price schedule on carbon steel products is expected to be announced by the Office of Price Administration no later than May 23. While official word is lacking, it is understood increases, including interim advances allowed in January, will be effected ranging from $2 to $7 per ton on the various products. A number of products on which no interim price relief was granted has been added to the list, it is said. Effective date of the new schedule was reported to be May 24.

It was reported in the trade, but lacking official confirmation, that OPA had recommended the following product increases: Semi-finished steel $2 per ton; tube rounds and billets $4; plates $2; heavy rails $3; light rails $5; tie plates $3; bars $2; wire rods $3; manufacturers wire $3; nails and staples $7; barbed wire $2; bale ties $7; enameling and electrical sheets $2; formed roofing and siding $2; galvanized sheets $4; hot-rolled sheets $2; and spikes $5.

In situations where the manufacturer is reconverting to the same models he produced before the war, price ceilings already exist—usually at the March, 1942 level. Provisions are included in the OPA program for obtaining increases where material and labor costs have increased.

When the manufacturer is coming out with new models, new ceilings must be calculated. This will be done according to pricing methods which soon will be issued in detail by OPA. Prior approval of these prices by OPA will not be required but the ceilings for the new models calculated in this way must be filed with OPA a short time before the manufacturer begins to sell them.

Availability of existing ceiling prices and of automatic pricing methods means that application to OPA will seldom be necessary except where an industry or an individual firm is seeking an increase in the level of its ceiling prices. OPA plans to concentrate its efforts on the problems of those industries and companies which believe they will be unable to produce under the existing ceilings.

Industry-wide adjustments for products which have been out of production during the war pose a difficult problem because of a lack of actual, current operating experience for determining what production cost will be. Production costs in the initial stages of reconversion will undergo a temporary bulge as a result of low volume and changeover problems, and these high initial costs will not be used by OPA in determining ceiling prices.

Many Important Changes Occurred

However, many important changes in costs have occurred since these goods were last produced. Offsetting these increases in production costs may be a huge pentup demand inviting a high volume of production and increased productivity from men and facilities through experience gained during the war.

"If a reconverting industry requests us to re-examine its prices, we will start with its costs and prices in the last period of normal production—usually 1941 or some part of it. We will take those costs and adjust them upward for two factors—first, lawful increases in materials and parts prices, and second, lawful increases up to this time in basic wage-rate schedules of factory workers. To the 1941 costs so adjusted, we will add in place of the 1941 profit margins the more nearly representative peacetime margin received in 1936-1939.

"The excess of the resulting figure over 1941 prices will be expressed in terms of an industry-wide 'increase factor.' This will be a percentage figure by which any manufacturer in the industry may increase his 1941 price or prices. He will then compare the result with his existing ceiling price (which is usually his 1942 price). If the 1941

(*Please turn to Page* 198)

Steel Products Shipments in March Heaviest of Year

Exceed short February and weather-bound January. Three-month total less than last year by over 800,000 tons. Most products show substantial gain over two prior months, bars and plates making greatest improvement

STEEL shipments in March, as reported to the American Iron & Steel Institute, were the largest for this year totaling 6,179,452 net tons, compared with 5,184,498 tons in February, a shorter month, and 5,435,647 tons in January, of comparable length.

During 1944 the companies represented in the accompanying tabulation represented 99 per cent of total output of finished rolled steel as reported to the Institute. Maximum annual potential capacity in this table represents the total tonnage of each product that could be produced under full operations. For types of rolling mills producing more than one product full capacity for each product is shown.

March shipments of sheared and universal plates were 787,595 tons, with production at 53.6 per cent of capacity, compared with 713,634 tons at 52.1 per cent in February. March shipments of hot-rolled sheets were 633,572 tons at 75.3 per cent of capacity, compared with 517,776 tons at 71.2 per cent in February.

Shipments for three months this year aggregated 16,803,685 tons, compared with 17,614,955 tons in the comparable period in 1944.

Lend-Lease Shipments to Russia To Be Cut

Test for future lend-lease shipments to Russia from this country will be "adequate information regarding the essential nature of Soviet military supply requirements" and their importance as compared with competing demands, according to Under Secretary of State Grew.

Last week he predicted "substantial reductions" in current deliveries but stressed that deliveries meeting the test will continue to go forward.

A total of 5,346,000 short tons of war materials was shipped from the Western Hemisphere to the Soviet Union during the nine months ended March 31, representing 10 per cent more than was promised under terms of the fourth protocol which expires June 30, 1945.

During March, the Soviet Union received $337 million of lend-lease aid, or 35 per cent of the total to all of our allies. This compares with $446 million, or 30 per cent, in February.

New Magazine Issued by Iron & Steel Institute

A quarterly magazine, entitled *Steelways*, has been brought out by the American Iron & Steel Institute, 350 Fifth avenue, New York. The publication will be devoted primarily to discussion of the uses of steel rather than the techniques of steel making and will be circulated among colleges, libraries and similar institutions, and among editors, educators and others.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period MARCH - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	48	1	xxxx	xxxx	xxx	862,401	205,523	xxxx	xxx	2,247,926	546,672
Structural shapes (heavy)	11	2	9,580,550	284,786	37.9	295,729	xxxx	805,466	36.7	816,127	xxxx
Steel piling	3	3		23,399		25,359	xxxx	62,015		63,904	xxxx
Plates (sheared and universal)	27	4	17,841,320	812,553	53.6	787,595	52,059	2,333,308	53.0	2,287,803	146,740
Skelp	6	5	xxxx	xxxx	xxx	75,649	38,894	xxxx	xxx	191,645	116,443
Rails—Standard (over 60 lbs.)	4	6	3,669,000	195,919	62.9	194,839	xxxx	567,394	62.7	558,921	xxxx
—All other	5	7	512,000	14,898	34.2	17,079	xxxx	42,921	34.0	45,636	xxxx
Splice bars and tie plates	12	8	1,745,960	67,017	45.2	67,362	xxxx	191,365	44.4	195,967	xxxx
Track spikes	10	9	349,400	13,194	44.4	14,645	xxxx	38,317	44.5	40,184	xxxx
Hot Rolled Bars—Carbon	35	10	xxxx	793,819	xxx	633,856	102,023	2,198,902	xxx	1,718,827	270,886
—Reinforcing—New billet	13	11	xxxx	57,347	xxx	54,424	xxxx	159,780	xxx	151,695	xxxx
—Rerolled	13	12	xxxx	6,065	xxx	6,356	xxxx	17,017	xxx	20,434	xxxx
—Alloy	24	13	xxxx	290,099	xxx	213,143	31,303	808,843	xxx	591,891	72,245
—Total	45	14	22,201,700	1,147,330	60.8	907,779	133,326	3,184,542	58.2	2,482,847	343,131
Cold Finished Bars—Carbon	23	15	xxxx	161,673	xxx	161,324	xxxx	448,231	xxx	446,377	xxxx
—Alloy	24	16	xxxx	41,388	xxx	38,467	xxxx	115,990	xxx	105,748	xxxx
—Total	31	17	2,961,910	203,061	80.7	199,791	xxxx	564,221	77.2	552,125	xxxx
Tool steel bars	17	18	273,010	13,197	56.9	13,181	xxxx	35,351	52.5	35,527	xxxx
Pipe and Tubes—Butt weld	16	19	2,165,520	127,437	69.3	135,550	xxxx	351,016	65.7	351,278	xxxx
—Lap weld	9	20	830,200	44,184	62.6	49,360	xxxx	129,649	63.3	131,410	xxxx
—Electric weld	11	21	1,380,900	78,963	67.3	80,633	xxxx	229,402	67.4	227,300	xxxx
—Seamless	15	22	2,975,700	204,792	81.0	232,194	xxxx	590,695	80.5	625,551	xxxx
—Conduit	7	23	187,000	5,824	36.7	7,878	xxxx	18,937	41.1	22,128	xxxx
—Mechanical tubing	12	24	1,160,200	71,782	72.8	71,974	xxxx	210,541	73.6	205,319	xxxx
Wire rods	27	25	7,266,670	411,642	66.7	122,866	36,287	1,156,334	64.5	320,818	106,120
Wire—Drawn	41	26	5,664,690	325,540	67.6	198,822	6,938	935,642	67.0	556,535	25,605
—Nails and staples	19	27	1,253,360	52,868	49.6	53,361	xxxx	152,957	49.5	150,407	xxxx
—Barbed and twisted	15	28	539,610	19,651	42.9	20,551	xxxx	60,087	45.1	58,807	xxxx
—Woven wire fence	16	29	1,113,860	31,949	33.8	33,794	xxxx	97,065	35.3	95,333	xxxx
—Bale ties	12	30	149,780	6,544	51.4	7,304	xxxx	18,318	49.6	19,287	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	50,719	697	xxxx	xxx	120,004	779
—Chemically treated	8	32	465,000	10,835	27.4	12,516	xxxx	32,343	28.2	28,889	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,793,850	170,641	52.9	195,407	xxxx	508,666	54.4	528,646	xxxx
—Electrolytic	10	34	2,231,850	74,303	39.2	92,657	xxxx	208,734	37.9	204,411	xxxx
Sheets—Hot rolled	29	35	19,197,320	1,228,276	75.3	633,572	46,120	3,454,364	73.0	1,691,029	99,386
—Cold rolled	12	36	7,131,460	393,702	65.0	240,548	xxxx	1,088,126	61.9	626,742	xxxx
—Galvanized	16	37	2,915,130	148,220	59.8	156,308	xxxx	444,488	61.8	434,361	xxxx
Strip—Hot rolled	24	38	7,055,390	245,596	41.0	154,904	27,453	694,123	39.9	431,153	67,855
—Cold rolled	35	39	3,119,850	130,509	49.2	121,386	xxxx	364,148	47.3	337,485	xxxx
Wheels (car, rolled steel)	5	40	319,400	27,077	99.8	28,230	xxxx	75,378	95.7	73,714	xxxx
Axles	6	41	408,170	13,003	37.5	14,302	xxxx	35,366	35.1	35,142	xxxx
All other	5	42	176,290	3,250	21.7	3,207	xxxx	9,390	21.6	9,324	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	6,179,452	547,297	xxxx	xxx	16,803,685	1,452,731
Effective steel finishing capacity	152	44	57,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	98.5%	xxxx	xxxx	xxx	92.5 %	xxxx

Shorter Month Reflected in Ingot Decline

Work stoppages at coal mines also contribute to drop of 400,000 tons in April production of steel

STEEL ingot production in April was about 400,000 tons less than in March, partially due to the shorter month and also because of work stoppage in some coal mines, the American Iron & Steel Institute, New York, reports.

Ingots and steel for castings reported to the institute for April totaled 7,308,579 net tons, compared with 7,707,965 tons in March and with 7,593,688 tons in April, 1944.

During April steel plants operated at an average of 93 per cent of capacity, against 95 per cent in March.

An average of 1,703,631 tons of steel was produced per week during April, compared with 1,739,947 tons per week in March and 1,770,090 tons per week in April, 1944.

In the accompanying tabulation the institute has revised all figures for 1944 and for first quarter of 1945.

STEEL INGOT PRODUCTION STATISTICS

	Estimated Production—All Companies								Calculated weekly production, all companies Net tons	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.		
Based on reports by companies which in 1944 made 97.9% of the open hearth, 100% of the bessemer and 86.7% of the electric ingot and steel for castings production										
1945										
Jan.	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,687	4.43
Feb.	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90.8	1,663,647	4.00
Mar.	6,927,377	96.9	398,351	79.8	382,237	82.4	7,707,965	95.0	1,739,947	4.43
1st qtr.	19,364,034	93.3	1,124,640	77.6	1,080,103	80.2	21,568,777	91.6	1,677,199	12.86
Apr.	6,546,340	94.5	372,903	77.2	389,336	86.7	7,308,579	93.0	1,703,631	4.29
1944										
Jan.	6,770,423	97.2	439,551	85.4	382,629	84.4	7,592,603	95.7	1,713,906	4.43
Feb.	6,410,914	98.5	409,781	85.2	373,314	88.1	7,194,009	97.0	1,737,683	4.14
Mar.	6,977,466	100.1	455,368	88.5	393,423	86.8	7,826,257	98.6	1,766,649	4.43
1st qtr.	20,158,803	98.6	1,304,700	86.4	1,149,366	86.4	22,612,869	97.1	1,739,451	13.00
Apr.	6,789,422	100.6	437,472	87.8	366,794	83.5	7,593,688	98.8	1,770,090	4.29
May	6,879,253	98.7	437,444	85.0	385,879	85.1	7,702,576	97.1	1,738,730	4.43
June	6,463,049	95.8	419,699	84.2	351,509	80.1	7,234,257	94.1	1,686,307	4.29
2nd qtr.	20,131,724	98.4	1,294,615	85.6	1,104,182	82.9	22,530,521	96.7	1,731,785	13.01
1st hlf.	40,290,527	98.5	2,599,315	86.0	2,253,548	84.7	45,143,390	96.9	1,735,617	26.01
July	6,743,812	96.6	415,543	80.9	339,032	74.6	7,498,387	94.3	1,696,468	4.42
Aug.	6,715,835	95.9	429,672	83.5	353,406	77.6	7,498,913	94.1	1,692,757	4.43
Sept.	6,501,944	96.1	398,058	80.1	335,109	76.2	7,235,111	94.0	1,690,446	4.28
3rd qtr.	19,961,591	96.2	1,243,273	81.5	1,027,547	76.2	22,232,411	94.1	1,693,253	13.13
9 mos.	60,252,118	97.7	3,842,588	84.5	3,281,095	81.8	67,375,801	96.0	1,721,405	39.14
Oct.	6,860,921	98.0	420,105	81.6	339,859	74.7	7,620,885	95.6	1,720,290	4.43
Nov.	6,572,454	97.0	403,908	81.0	302,357	68.6	7,278,719	94.3	1,696,671	4.29
Dec.	6,678,460	95.6	373,322	72.7	314,388	69.2	7,366,170	92.6	1,666,554	4.42
4th qtr.	20,111,835	96.9	1,197,335	78.4	956,604	70.8	22,265,774	94.2	1,694,503	13.14
2nd hlf.	40,073,426	96.5	2,440,608	80.0	1,984,151	73.5	44,498,185	94.2	1,693,878	26.27
Total	80,363,953	97.5	5,039,923	83.0	4,237,699	79.0	89,641,575	95.5	1,714,644	52.28

The percentages of capacity for 1944 are calculated on weekly capacities of 1,572,755 net tons open hearth, 116,182 net tons bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944 as follows: Open hearth 82,223,610 net tons, bessemer 6,074,000 net tons, electric 5,350,880 net tons. Beginning July 1, 1944, the percentages of capacity operated are calculated on weekly capacities of 1,580,042 net tons open hearth, 116,182 net tons bessemer and 102,757 net tons electric ingots and steel for castings, total 1,798,981 net tons; based on annual capacities as follows: Open hearth 82,604,600 net tons, bessemer 6,074,000 net tons, electric 5,372,150 net tons.

For 1945 percentages are calculated on weekly capacities of 1,614,338 net tons of open hearth, 112,658 tons of bessemer and 104,640 tons of electric ingots and steel for castings, total 1,831,636 tons; based on annual capacities as of Jan. 1, 1945 as follows: Open hearth 84,171,590 net tons, bessemer 5,874,000 tons, electric 5,455,890 tons.

Warehouse Sheet Volume Is Restricted by WPB

War Production Board last week restricted the tonnage of steel sheet and strip that warehouses may order from steel-mill scheduled rollings.

Direction 1 to Order M-21 provides that warehouses, beginning with tonnage to be delivered in the third quarter of 1945, must limit orders for any quarter for hot-rolled carbon sheet and strip to 25 per cent of their purchases from mill scheduled rollings during the year 1944. Cold-rolled strip purchases for any one quarter are limited to 30 per cent of 1944 purchases. This, in effect, holds warehouse purchases from mill scheduled rollings to 100 per cent of 1944 levels on hot-rolled sheet and strip and 120 per cent on cold rolled.

Previously there were no restrictions on tonnages of specific steel products that warehouses could order, provided the total deliveries did not exceed those of a corresponding period of the previous year.

Warehouses have an alternative from the above restrictions in that they may order up to 60 tons of combined hot-rolled and cold-rolled strip in any quarter. This provision is designed to accommodate on a limited basis the needs of warehouses that, during 1944, for one reason or another, did not purchase sheets and strip from producers.

The direction provides further that within the allowable tonnages mentioned a warehouse can order in any quarter, beginning with the third quarter, up to 12½ per cent of its 1944 purchases of hot-rolled pickled (acid dipped) carbon-steel sheets or strip, or 30 tons, whichever is greater.

All orders in excess of the amounts stated which have been placed by warehouses on mills for delivery beginning with the third quarter of 1945, must be canceled immediately or deferred to a later quarter, WPB said.

Nonintegrated Steel Casting Firms Get NWLB Decision

National War Labor Board's recent decision in the dispute between the United Steelworkers of America (CIO) and 12 nonintegrated steel castings companies employing 27,000 wage earners followed substantially the board's directive orders in the basic steel and iron ore cases, denying the union's demands for:

A 17-cent general wage increase above the Little Steel formula, a guaranteed annual wage, a joint fund for members in the armed forces, and elimination of geographical wage differential.

Refusing to order sick leave and group insurance plans, but ordering night-shift differentials, correction of intraplant inequities, more liberal vacation allowances, and standard voluntary maintenance of membership and check-off. Dismissal pay was denied "on facts in these cases," although the board stated it would approve reasonable severance pay plans that are agreed to.

Shift differentials ordered were five cents an hour for the second shift and 10 cents for the third shift.

The vacation plan ordered is one week after one year of service and two weeks after five years, industry members dissenting. The correction of intraplant inequities is to be effected through collective bargaining with agreements subject to approval of the board.

The companies covered by the order are: American Steel Foundries, Chicago; Continental Foundry & Machine Co., East Chicago, Ill.; Electric Steel Castings Co., Indianapolis; Fort Pitt Steel Casting Co., McKeesport, Pa.; Mackintosh-Hemphill Co., McConway & Torley Co., Reliance Steel Casting Co., and United Engineering & Foundry Co., all of Pittsburgh; National Erie Co., Erie, Pa.; National Malleable & Steel Castings Co., Cleveland; National Roll & Foundry Co., Avonmore, Pa.; and the Symington-Gould Corp., Rochester, N. Y.

Easing of Machine Tool Controls Facilitates Economic Adjustments

Transition to peacetime production aided by the granting of priority ratings to certain civilian consumer goods industries, eastern regional meeting of National Machine Tool Builders' Association told

IN ONE of its series of regional meetings taking the place of the national meeting ordinarily held at this time of the year, the National Machine Tool Builders' Association brought together its members in western and southern New England, New York, New Jersey and Pennsylvania May 15. This meeting, limited to 50 under the ODT ruling, was held at the Waldorf-Astoria in New York. It was repeated the following day at Worcester, Mass., for the benefit of New England builders in that region.

Keynote speaker was Joseph L. Trecker, president of the association and executive vice president, Kearney & Trecker Corp., Milwaukee. Taking as his subject, "The Machine Tool Picture Today," Mr. Trecker pointed out that manufacturers of certain types of consumer goods, such as automobiles, now are being granted priority ratings by the War Production Board for critical machine tools necessary for effecting conversion from war materiel to civilian products. This will lessen materially the time required for conversion, he said.

The extent to which layoffs and unemployment can be avoided during the transition period between now and the collapse of Japan will depend largely on the speed with which the machine tool industry can turn out these critical machine tools required for conversion, Mr. Trecker stated. He added, "Our speed of performance, in turn, depends largely upon support given us in this direction by the War Production Board as to priorities and materials, and by the War Manpower Commission and the draft boards as to personnel.

"It is vital that the machine tool industry be allowed not only to retain—but also to increase—its forces of engineers, designers and draftsmen. If the 'green light' just turned on by the War Production Board signaling manufacture of certain machine tools for conversion use is backed up by further constructive actions on the part of other governmental agencies, we are confident that—even though we already have been delayed in getting off to a proper start—our industry still will be able to meet the urgent requirements of reconversion just as successfully as we already have meet the urgent demands of the war program."

William P. Kirk, first vice president of the association and vice president, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn., dealt with the subject, "Disposal of Surplus Machine Tools." He made a strong plea for retention by the armed services of an ample share of government-owned surplus machine tools after hostilities cease.

"If in future years," said Mr. Kirk, "our nation is to remain in a position to defend itself quickly against any possible aggressor, it is imperative that there be retained intact in this country a substantial supply of machine tools of those types particularly needed for production of war materiel.

"Remember this—machine tools cannot be made overnight. Those of us in the industry recall very distinctly those days early in this war when we were charged with being the bottleneck to war production. We broke our necks to break that bottleneck! Fortunately, in this war we were given time in which to do that. The aggressor struck first some place else. What if he had struck here first? What if we had suffered the fate of Belgium or Holland?

"Had that happened, where would we have been with our war production program? Before we even could have begun to produce the guns and planes and tanks required, we would have had to make the machine tools on which to make them—and there just wouldn't have been time!

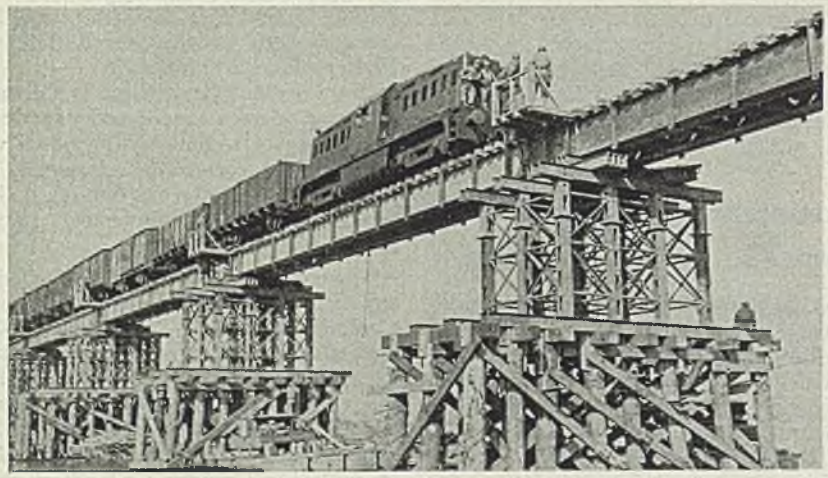
"Therefore, let us hope that those people in our government who have the final authority as to disposition of government-owned machine tools will set aside—on behalf of possible future requirements of national defense—a sufficient share of those machines, especially those which are particularly adapted to munitions manufacture. Thereby it will be assured that our United States will have ready at hand for instant use in case of war emergency an ample supply of standby machine tools. The best guaranty of peace for America is continuation of its ability to defend itself."

Reports on Government Relations

James Y. Scott, immediate past president of the association and president, the Van Norman Co., Springfield, Mass., gave a report of the Government Relations Committee of which he is chairman. He emphasized the importance of keeping everlastingly at the powers-that-be in Washington—including congressmen—so that all will be well informed as to the special problems of the machine tool industry and its importance to the national well-being of America.

Other speakers on the program included: James A. Wright, assistant sales manager, the Van Norman Co.; E. Payson Blanchard, sales manager, the Bullard Co., Bridgeport, Conn.; Tell Berna, general manager of the Association; and Harry Magdoff, editor of the *Survey of Current Business*.

Mr. Wright, who until recently was assistant director, Tools Division, War Production Board, Washington, reported on current activities of that division. Mr. Blanchard discussed sales and advertising on the premise "that an era has just come to an end and that selling must now begin." Tell Berna covered recent rulings on contract termination, certificates of non-necessity and various OPA rulings dealing with machine tools. Harry Magdoff, who spoke informally, mentioned the impending 7,000,000 car and light truck market as presaging considerable machine tool activity for quite a while to come.



CROSSING THE RHINE: A Transportation Corps train, pulled by a Whitcomb 65-ton diesel-electric locomotive, moves across a 1752-foot single track bridge erected in ten days by Army units. Signal Corps photo

Mill Guides and Rolls Discussed By Steel Engineers at Meeting

Several major papers presented at sectional meeting of Association of Iron & Steel Engineers in Pittsburgh, May 14. Quality control testing of semifinished steel bars among topics described in paper

MAJOR papers on mill guides and on roll manufacture and application featured the Pittsburgh district section meeting, Association of Iron & Steel Engineers, May 14, at Pittsburgh.

W. F. Hoffman, assistant superintendent, roll shop, Aliquippa works, Jones & Laughlin Steel Corp., Aliquippa, Pa., in a paper on mill guides, described in detail the various types of guides now available and their application. He presented data on proper design of guides as well as a description of the materials used in their manufacture and the effectiveness of each. Considerable part of the paper was devoted to twist guides including both conventional type and some special types.

Special problems entailed in use of continuous merchant mills were discussed. The principal problem here is to provide for quick adjustment of the guides for any one of several dozen different sizes of steel which might be rolled in any given turn. One of the chief difficulties of continuous mill guides has been scratching. Use of hard alloy cast guides or guides with hard alloy replaceable inserts provides one acceptable answer to the problem.

Discusses Roll Problems

Roll manufacture and application of iron, alloy steel and carbon steel rolls was covered in a paper by A. E. Murton, manager, roll department, Continental Foundry & Machine Co., Pittsburgh. Mr. Murton devoted a large part of his discussion to the manufacture of chilled iron rolls and their application in steel rolling practice, stating it is generally accepted that iron rolls will finish rolled steel better than either carbon or alloy steel rolls. However, the relatively weak iron rolls cannot be used in any passes where a higher strength is necessary to impart the required pressure. The features most desirable in a roll are ductility and shear resistance. However, these must be combined to best possible advantage with resistance to abrasion or wear, and in some cases it becomes necessary to sacrifice both shear resistance and ductility for better wear resistance.

Controlling quality on semifinished steel is a difficult problem in most plants. Procedure followed at the Youngstown Sheet & Tube Co., Youngstown, O., was outlined in a paper entitled, "Quality Control Testing of Semifinished Steel Bars," by Earl W. Mahaney, metallurgist, and D. W. Lloyd, superintendent of rolling mills for that company. Several standard open-hearth practices were changed as a result of a study and bloom conditioning practices were tightened while a number of important changes in bar mill roll design were effected. These changes resulted in a drastic cut in the amount of defective material. The amount of defective material has been reduced approximately 40 per cent below the normal established during 1943.

Modern design and performance of cooling beds and transfers were discussed by C. L. Raisig, mechanical engineer, Mesta Machine Co., Pittsburgh. He said the cooling bed has become increasingly important as special handling becomes necessary with different steels. Flexibility is the most important requirement, plus ability to keep product straight.

Since in many cases the heating furnace is the production bottleneck and a good heater can boost production, a paper by L. T. Pearsall and J. L. McHugh, Jones & Laughlin Steel Corp., Pittsburgh, on training of heaters and the use of automatic controls on continuous furnaces was particularly timely. The paper dwelt principally with the training program necessary to provide instruction for a worker to obtain maximum performance from a heating furnace. The importance of proper instruction in the plant was stressed in the paper.

Warehouse Group Elects Officers for Coming Year

Re-election of Walter S. Doxsey as president of the American Steel Warehouse Association was announced in Chicago last week following a meeting of the directors of the organization. This meeting was held in lieu of the annual convention which had been called off in conformity with the Office of Defense Transportation's ban on national conventions in wartime.

Others elected were: Vice presidents, F. C. Flosi, A. M. Castle & Co., Chicago, and E. M. Jorgensen, Earle M. Jorgensen Co., Los Angeles; treasurer, L. B. Worthington, United States Steel Supply Co., Chicago.

In addition to the officers the following were elected to serve on the executive committee: C. H. Bradley, W. J. Holliday & Co., Indianapolis; Lester Brion, Peter A. Frasse & Co. Inc., New York; E. D. Graff, Joseph T. Ryerson & Son Inc., Chicago; P. O. Grammer, Grammer Dempsey & Hudson Inc., Newark, N. J.; A. W. Herron Jr., Jones & Laughlin Steel Corp., Pittsburgh; Richmond Lewis, Charles C. Lewis Co., Springfield, Mass.; F. Pidgeon, Pidgeon-Thomas Co., Memphis, Tenn.; G. L. Stewart, Edgar T. Ward's Sons Co., Pittsburgh; and H. E. Williams, Williams & Co., Pittsburgh.

POSTWAR PREVIEWS

RECONVERSION— Pattern for Period I evolves as war agencies begin lifting many wartime restrictions. Some civilian production to start in July. General pricing, manpower, wage, and production policies outlined. See pages 77, 80, 81.

SURPLUS PROPERTY— Victory over Germany accentuates disposal problem. Immediate determination of selling policies and prompt inventorying of surpluses needed. See page 86.

AUTOMOBILES— Steel will be ready when needed for new cars, producer promises. Revival of prewar competition seen. See page 93.

WEST COAST— Utilization of western states' $3 billion wartime expansion in postwar era studied. See page 99.

INDUSTRIAL BRUSHES— Improvements in design and manufacture expected to result in an ever-widening market for industrial brushes installed as integral parts of automatic machines for cleaning metals and other materials. See page 106.

HARDENING "MOLY" STEEL— Recent heat treating development to carry over into peacetime production is an improved protective atmosphere that resists high temperatures used to harden molybdenum hacksaw blades. See page 109.

V-E Day Accentuates War Surplus Disposal Problem of Government

Immediate determination of selling policies and prompt inventorying of surpluses required to bring usable materials and supplies to market at earliest possible date. Much of the total surplus not thought marketable

SURPLUS war property disposal looms as a much more pressing problem before the nation now that the war in Europe has been brought to a successful conclusion. Just how the thousand and one items of equipment and supplies, and facilities of myriad kind, both here and in Europe, will be ultimately disposed of is a question which will tax the best brains in government and private industry for some time to come.

Present inventory of property declared surplus totals about $1,300,000,000, according to the Surplus Property Board. Over half of this, however, consists of more than 14,000 non-salable damaged or obsolete planes of every description. Surplus motor trucks, etc., are comparatively small at this stage. Up to V-E Day, according to the board, approximately $1,575,000,000 of federal property had been declared surplus and of this total approximately $265 million had been disposed of.

That there will be differences of opinion over method of disposal and policy governing surplus sales is certain, especially should the marketing of the various surpluses tend to interfere in any degree with resumption of normal business by private industry upon which the burden rests for providing broad and expanding employment as the war production machine runs down.

"No matter what you do in disposing of surpluses, there will always be a minority who will say you did the wrong thing, no matter which horn of the dilemma you have chosen," Bernard M. Baruch, co-author of the Baruch-Hancock report on war and postwar adjustment, said last week.

Mr. Baruch urged immediate determination of all current surpluses in order that they may reach the market at the earliest possible date, and suggested the possibility of establishing "digging committees" to work with the armed services and procurement agencies in digging out surplus materials, especially critical items.

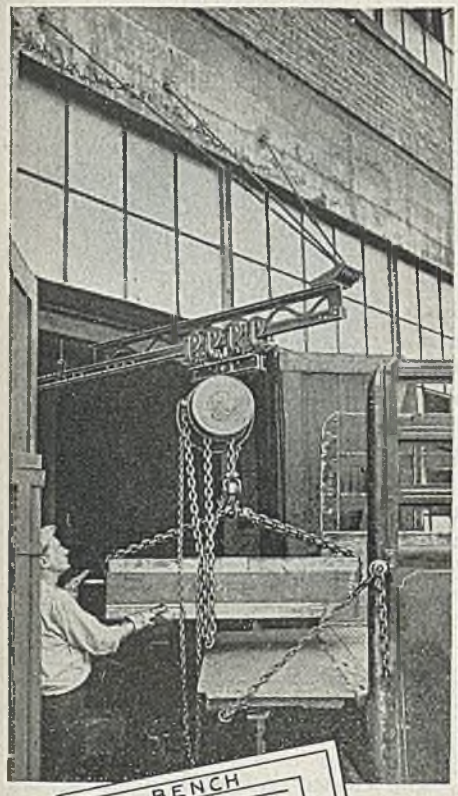
As a general thing the overall prospect is not viewed as unduly alarming. For one thing much of the surplus will never come onto the market to compete with the products of private industry for customer favor. It will be practically impossible to fit a considerable part of it into civilian use, and, in time, after marketing possibilities have been fully explored, no doubt will be scrapped. Indicative of this is the fact that in authoritative quarters it is said the total marketable surplus will not exceed $5 billion, though estimates of the actual surplus have ranged as high as $100 billion.

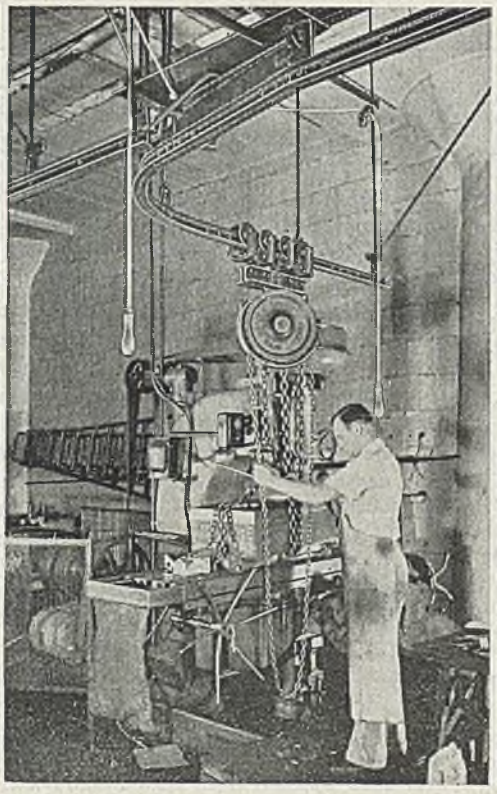
To Market Everything Salable

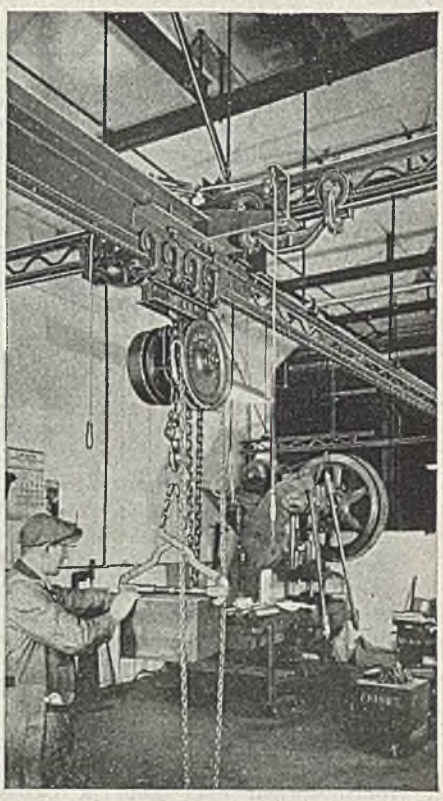
This does not mean that government agencies handling disposal will be profligate in sending material to the junk pile. On the contrary, it is the stated policy of the various disposal groups to market everything and anything that is salable. In some cases military equipment which on first view might seem impossible of utilization in civilian life after closer study may be found adaptable. For example, there is the case of a manufacturer in New England who recently purchased a large quantity of discarded gas masks. The civilian market for gas masks obviously is extremely limited so that one would naturally lift a quizzical eyebrow at this sale. However, the manufacturer knew what he was doing. And the ingenuity and initiative of this fellow provides some idea of how some of the huge surplus is going to be disposed of. This manufacturer fashioned the hose of the gas masks into bicycle handle bar grips. The filter cans he made into powder puff containers for milady's boudoir, the goggles were fixed up so that they could be used as utility goggles by anyone, and the remainder of the gas masks he made into play kits for junior. Talk about using everything but the squeal of the pig in the packing industry, the utilization of these gas masks makes for the ultimate in something or other.

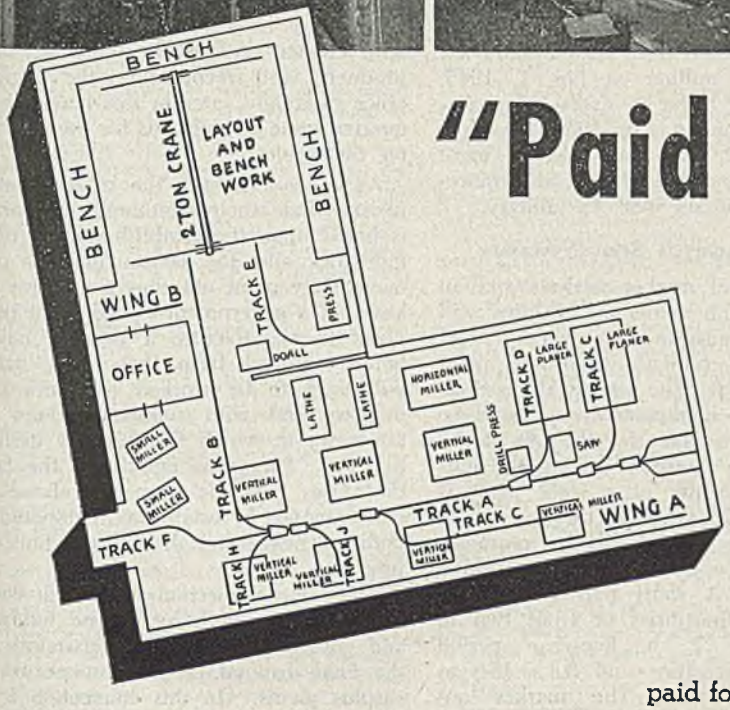
Among major disposal problems is the disposition of the thousands of government-owned machine tools acquired for war production. In the past four years it is said at least one million tools have been produced. Thousands of them will be surplus when the war

GERMAN INDUSTRIALIST FREED: Fritz Thyssen, former German steel man who supported Hitler in his rise to power only to split with the Nazis at the outbreak of the war, is shown above with his wife as they were released from a German concentration camp by the victorious Allies. Following his split with Hitler, Thyssen's huge steelworks and other property were reported confiscated. Signal Corps radio-telephoto from NEA









"Paid for Itself... Time and Again..."

"THIS system", says the owner, "has paid for itself time and again. Skilled die-sinkers and tool makers now work at their trade and spend little time lifting and straining to get blocks into the machines". Two ton die blocks in this small shop are handled overhead by American MonoRail. When this system was first installed it represented only a small part of the present track. Now, practically all manual handling has been entirely eliminated and every move from one machine to the other is done by American MonoRail.

An American MonoRail engineer will show you how to handle your products in less time and for less money.

THE AMERICAN MONORAIL COMPANY

13102 ATHENS AVE. CLEVELAND 7, OHIO

is over, though the exact number is not known. Before anything can be done in disposing of this equipment a survey or inventory will have to be made.

It is said that most government-owned machine tools, viewed broadly, on the basis of relative use are figured the equivalent of 15 years of age. At the same time the average age of tools in private industry is placed between 15 and 25 years. It is clear, therefore, that despite the tremendous production of machine tools the past few years, from the standpoint of age in relation to use, much equipment in the nation's plants, both private and government-owned, is well along the road to obsolescence.

Another major disposal discussion in Washington at this juncture in the global war concerns ultimate disposition of the huge government-owned industrial plant which has been erected throughout the country since 1940.

Generally it is expected there will be a scramble for the more desirable plants. In the steel industry an interesting contest for control of the $196 million government-owned steel plant at Geneva, Utah, is reported developing already. Three steelmakers, the United States Steel Corp., Colorado Fuel & Iron Corp., and the Kaiser Co. Inc., some time ago notified the Defense Plant Corp. of a desire to negotiate for acquisition of this plant by lease or purchase. Significantly two of these companies, Colorado Fuel & Iron and Kaiser, are producers whose steelmaking activities are solely in the West, while the United States Steel Corp., though operating plants on the Pacific Coast, is looked upon as an eastern producer.

In his recent progress report on war plant disposal Sen. Joseph C. O'Mahoney emphasized that although negotiations had already started for disposal of the Geneva plant, this should not be looked upon as furnishing the basis for the conclusion that war work at Geneva was drawing to a close. Geneva has been an important cog in production for the Pacific war since it started operations.

Disposal Should Be Planned Now

Despite the assurance of operations into late 1945 at least, it is realized steps should be taken now looking to ultimate disposal of the property when its war work is done so that unnecessary delay will be avoided in transferring control. As Senator O'Mahoney says, negotiations must be undertaken now because of the magnitude of the task of framing policy for the plant's utilization. Not only is it necessary to determine how the plant will be operated and managed, and by whom, but it also is essential that prospective purchasers or operators know what markets can be developed for the products of the plant, and what type of products can be economically produced in it for the civilian market.

This urgency for market study is obvious when the overall productive capacity of the steel industry is considered. Since Jan. 1, 1940, ingot capacity has been boosted from 81.6 million net tons to 95.5 million on Jan. 1, 1945. This capacity is far in excess of peacetime requirements. In 1939 less than two-thirds of the then-existing ingot capacity was needed to meet all requirements, civilian as well as military.

Market Analysis Seen Necessary

Only careful market analysis and an analysis of the available facilities will produce the answer as to whether, and how, any government-owned steel plant can be utilized. The United States Steel Corp. feels a market analysis should be made for each plant for the life of the investment in question, stating the normal economic life of a steel plant is from 20 to 25 years. This analysis, it holds, should be detailed by products, and should be broken down into three periods: 1, A short period following cessation of hostilities of from two to three years; 2, a five-year period following thereafter; and 3, a 15-year period after that. The market analysis, it says, should show what demands will arise for these different periods for durable and consumer goods as well as for all classes of export trade. Finally, it must include a study of whether the estimated postwar markets can be reached competitively by other plants. Study of facilities, Senator O'Mahoney was informed, should include the rate of capacity, availability of raw materials, source and cost of assembly, suitability of existing facilities, need for additional capital expenditures to reconvert or add to existing facilities, probable operating costs when running at 50, 75 and 100 per cent, and present and anticipated freight rates from the plant to markets for each product produced to each destination.

In its study of the disposal problem Senator O'Mahoney's committee, sensitive of the fact that the Geneva plant, as well as other government-owned properties, may have to close down unless large civilian markets are found for their products, and recognizing the importance of freight rates in this connection, queried some 50 railroads for their views on the subject.

As a general thing the railroads emphasize that their continued prosperity is based upon the establishment of new industries and the continuance of old ones. They point out that if a buyer or lessee of a government-owned plant proposes to manufacture a product never before shipped from that point, rates will have to be worked out with the industry and with connecting lines to territories to which the industry desires to ship. They also emphasize the fact that rates must be properly related to those enjoyed by established competitors, both on raw materials and the finished products.

There is no question that much work must be done both by private industry and government agencies preparatory to the final disposal of government-owned surplus plants. In this connection it is important to note that the Reconstruction Finance Corp., which has been designated to handle the disposal of aircraft, industrial plants, and special and producers' goods, last week announced the establishment of an Office of Surplus Property.

Hans A. Klagsbrunn has been appointed director of the new office. He has been associated with the RFC since 1933 in various administrative and legal capacities, and is also executive vice president and member of the board of Defense Plant Corp., the RFC subsidiary that built the majority of the government-owned war plants.

Joseph P. Woodlock has been named executive director of surplus property. Mr. Woodlock was formerly associated with the B. F. Goodrich Co., and later with the Crucible Steel Co. of America.

SUCCEEDS NELSON: Edwin A. Locke Jr., formerly executive assistant to Donald M. Nelson, has been appointed to succeed Mr. Nelson as the President's special representative to China and as head of the mission to China appointed by President Roosevelt last summer. Mr. Nelson, former chairman of the War Production Board, resigned from the government service, effective May 15, and suggested Mr. Locke be made his successor.

Mr. Locke is a native of Boston, a graduate of Harvard University, and before joining Mr. Nelson in Washington in 1940, was connected with the Chase National Bank, New York.

EDWIN A. LOCKE JR.

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

INSTRUCTIONS

IRON AND STEEL: Use of steel is prohibited by order M-126 in manufacture of certain items, except as permitted under some other order. If the "other" order is revoked, the use of steel in the manufacture of articles formerly covered by the exception and by the revoked order is not restricted by M-126.

SHEET ALUMINUM: The 30-day inventory limits on sheet aluminum have been modified through cancellation of direction 21 to CMP regulation No. 2. Control of sheet aluminum inventories remains under CMP regulation No. 2.

ALUMINUM FOIL: Permission to use MRO ratings and symbols to purchase processed aluminum foil for wrapping purposes, previously restricted to manufacturers of certain types of cheese, has been extended to all persons who conduct businesses listed in schedule A to CMP regulation No. 5, and who need aluminum foil for their own use.

INVENTORY CONTROLS: Stockpiling is now permitted by allowing a person to receive, in anticipation of starting or resuming civilian production, the minimum amount of material he would need during the first 30 days of production, provided no priorities assistance or allotment symbol is used to get the material. Regulations limiting receipts of material still apply, however, whether or not the material is acquired with priorities assistance, and whether it is for civilian or war production. Directions under Priorities regulation No. 1 and CMP regulation No. 2 provide additional exceptions from inventory restrictions, relating to continued receipts of special items after contract cutbacks.

PRIORITY RATINGS: A supplier may deliver a material or product substantially earlier or in greater quantities than called for by a customer's order only if such changed deliveries will not give the customer more than a permissible inventory as established in priorities regulation No. 1.

Suppliers of complete products, as well as spare parts for these products, may not accept orders for complete products if these orders cannot be filled without interfering with previously accepted orders for parts bearing equal or higher ratings. In arranging shipping schedules under the various WPB scheduling orders, a supplier may not schedule an order for complete products for shipment on a date that would interfere with delivery of previously accepted orders for parts bearing equal or higher ratings.

MRO RATINGS: Manufacturers of containers may now procure needed fittings under MRO blanket ratings. The fittings in question are those listed in schedule A of order P-152. Intercommunication systems and public address systems may not be sold on the basis of MRO ratings.

REPAIR PARTS: Following refrigeration repair parts may not be bought by repairmen with the AA-3 rating assigned by CMP regulation No. 9-A: Refrigeration condensing units, low side units (such as unit coolers), cabinets or other insulated inclosures, in addition to the prohibition already established for specified types of radio repair parts and for paint.

REVOCATIONS

The following orders have been revoked by WPB:

L ORDERS

FURNACES: Order L-22 which established simplified practices in the manufacture of furnaces. (L-22)

VENDING MACHINES: Order L-27 which prohibited production of all coin and token-operated merchandise vending machines, except sanitary-napkin-vending devices produced under specific authorization from WPB, automatic restaurants and postage vending machines. (L-27)

MUSICAL INSTRUMENTS: Order L-37-a which controlled production and repair of musical instruments and accessories. (L-37-a)

TYPEWRITERS: Order L-54-a which restricted production and delivery of typewriters. (L-54-a)

METAL PLASTERING BASES: Order L-59-b which restricted manufacture and restricted sale and delivery of metal plastering bases and accessories. (L-59-b)

HEATING EQUIPMENT: Orders restricting the production of oil burners (L-74), coal stokers (L-75), floor and wall furnaces (L-173) and cast iron boilers (L-187). (L-74, 75, 173, 187)

METAL WINDOWS: Order L-77 which restricted sale, delivery and production of metal windows. (L-77)

FLUORESCENT LIGHTING FIXTURES: Order L-78 which governed manufacture and distribution of fluorescent lighting fixtures. (L-78)

TOYS AND GAMES: Order L-81 which controlled the use of critical materials in production of toys and games. (L-81)

COMMERCIAL LAUNDRY, DRY CLEANING AND PRESSING EQUIPMENT: Order L-91 which controlled production and distribution of commercial laundry, dry cleaning and tailors' pressing equipment. (L-91)

CUTLERY: Order L-140-a which restricted production of various types of cutlery. (L-140-a)

ELECTRIC FUSES: Order L-161 which restricted production of electric fuses. (L-161)

COMMERCIAL COOKING AND FOOD WARMING EQUIPMENT: Order L-182 which limited production of commercial cooking and food and plate warming equipment. (L-182)

SCALES, BALANCES AND WEIGHTS: Order L-190 which governed production and distribution of scales, balances and weights. (L-190)

SPROCKET CHAINS AND WHEELS: Order L-193-a which limited inventories and restricted deliveries of sprocket chains, sprocket chain attachment links and sprocket chain wheels. (L-193-a)

PORTABLE TOOLS: Order L-216 which provided for the simplification and standardization of portable tools, chucking equipment, mechanics' hand service tools, files, hack and band saws, vises and machine tools accessories. (L-216)

FLOOR MACHINES: Order L-222 which restricted production of floor sanding, finishing and maintenance machines; portable rug scrubbing machines; industrial vacuum cleaners; and blowers for cleaning purposes, and which controlled the distribution of some of these machines. (L-222)

POWERCYCLES: Order L-301 which governed production and sale of powercycles and parts for powercycles. (L-301)

MOTION PICTURE PROJECTION EQUIPMENT: Order L-325 which governed production and distribution of motion picture projection equipment, including sound and amplifying systems, for use in exhibiting 35 millimeter film. (L-325)

M ORDERS

COPPER: Orders which restricted the manufacture, delivery and installation of many copper products. After July 1, under revised CMP procedure, mills will be permitted to deliver copper controlled materials on orders not bearing CMP symbols, provided such deliveries do not delay the production and delivery of military and essential civilian orders. Such orders may be placed immediately for delivery after July 1. (M-9-c, M-9-c-1, M-9-c-2, M-9-c-4)

AMENDMENTS

The following orders have been amended by WPB:

M ORDERS

ANTIMONY: Purchasers of antimony metal and antimony oxide now must certify as to their need for a particular type of antimony. All users of the metal must substitute the antimony ore for the metal or oxide wherever possible. (M-112)

SCHEDULED PRODUCTS: Manufacturers no longer are required to file with WPB reports on operations and shipping schedules covering the following types of marine fittings which have been deleted from table 5 of order M-293: Rope sockets and rope thimbles; and the following types of safety and technical equipment which have been deleted from table 10: Dental handpieces and repair parts for all types of dental handpieces, carbon dioxide fire extinguishers of specified types. (M-293)

U ORDERS

UTILITIES: Electric, gas and water utilities have been authorized to construct additions to their facilities involving up to $25,000 worth of materials without restrictions from Office of War Utilities. All supplementary orders to U-1 have been revoked, including those governing line extensions to serve military facilities; rural line construction; extensions of services for approved building and housing projects; constructions standards for service extensions to domestic, industrial and commercial consumers; temporary service connections; and service to certain irrigation projects. Directions 1 and 3 to order U-1, which limited utility purchases and inventories of small transformers and watthour meters for residential and farm service extensions, have been revoked. (U-1)

PRIORITIES REGULATIONS

IDLE AND EXCESSIVE MATERIALS: Special sales of idle, excess and surplus steel, copper and copper-base alloy, or aluminum in controlled material forms now may be made to anyone without WPB authorization and without requiring the buyer to use a CMP allotment symbol or number. Special sales restrictions, however, on copper raw materials (refinery shapes and copper and copper-base alloy ingots) are retained, as are the export special sales restrictions on copper and copper-base alloy scrap. The amendment to order PR No. 13 removes restrictions that the regulation imposed on certain materials or products when sold as scrap. These are aluminum (new and used), iron and steel, automotive parts, automotive engines and components. (PR No. 13)

EXPERIMENTAL MODELS: Requirement that persons must obtain WPB authorization to spend more than $5000 in a single plant in any calendar month in making experimental models of products that they were not otherwise allowed to make under existing WPB orders and regulations has been removed. Restrictions on the distribution or experimental models for the purpose of promoting sales or creating consumer demand and on exhibition of models to the trade or to the public have been removed. (PR No. 23)

SMALL MANUFACTURERS: A new regulation, Priorities Regulation No. 27, has been issued which gives manufacturers who produce less than $50,000 worth of their own products per quarter a rating of AA-4 as an aid in obtaining materials. It also gives them the right to place orders now for delivery of controlled materials after July 1 by permitting them the use of a deferred CMP allotment symbol (Z-3). (PR No. 27)

Public Needs To Be Acquainted With the Facts on Renegotiation

Misconception of industry's war profits arising from adjustment of contracts widely held. Management has everything to gain by making known to labor and returning soldiers its earnings position

By PHILIP S. SHOEMAKER

TWO MEN walked through the gate toward the administration building. One plant guard asked the other, "Who are they? I didn't recognize them."

"You haven't been here long enough; they come only once a year," the second guard replied. "They're renegotiators. They come for the dough which the company makes by charging Uncle Sam too much for his plane parts."

How this plant guard came to know the nature of this annual visit is beside the point. He was, however, doing much harm. First, he was expressing a half-truth; second, he was voicing a criticism of his company, and third he was talking loosely before a stranger waiting in the gate-house.

What makes the whole episode more unfortunate is that this chap had been a marine in World War I. In that war industry is accredited, (or shall I better say, discredited?) with producing 23,000 millionaires. This guard doesn't think, apparently, that much change has been made in current war contract financing. Yet executives in government agencies and in industry know better. It also is important, however, that the men in the shops and the returning G.I.'s understand that industry has not profited from this war.

Workers Get Erroneous Impression

For a number of years the men in shops have seen tons of war goods leave their plants. By and large the majority probably feel certain that the company profits are many times greater than they actually are. Furthermore there is considerable feeling among the workers that renegotiation procedure is a reflection upon a company's integrity. This is certainly an erroneous impression.

These workers in manufacturing plants should be made acquainted with the facts. In addition the millions of G.I.'s who will be returning to industry in the not too distant future should have the truth on how industry conducted itself while they were away. As renegotiation is one of the newer, rather complicated functions that is associated with wartime production and industry earnings it is well to direct a searchlight of truth and education on this subject in the interests of management-labor good-will. In short it is timely and highly desirable that industry clarify its position to labor and to G.I. Joe on its wartime profits.

From 1919 to 1942, 168 measures were introduced in Congress to take profits out of war. The American Legion opposed war profits, and industry voicing similar feeling through the National Association of Manufacturers, applauded the motive which caused Congress to act to prevent war profiteering. On April 28, 1942 the Renegotiation act was adopted by Congress as the medium to control war profits of prime and subcontractors doing war work. This was to forestall public censure and ill-will that might arise if it were charged that industry profiteered in its war production.

Congress delegated the power to renegotiate to the President, who in turn delegated it to the Army, Navy, Defense Plant Corp. and RFC and the Maritime Commission. Each of these departments then delegated it to its own Price Adjustment Board.

Renegotiation Required

The Renegotiation statute requires examination of the costs and earnings of corporations holding government contracts or subcontracts for the prosecution of the war effort to determine if excessive profits have been realized, or are likely to be realized.

The Renegotiation act, however, applies only to prime or subcontractors making war products for the War, Navy, or Treasury, Defense Plant Corp. and the Maritime Commission.

The articles covered range the entire list—artillery, tanks, ships, planes, parachutes and even wooden sole sandals.

Any manufacturing concern either because of its inability to get into war business or because it chooses not to do so is entirely outside the jurisdiction of the price adjustment boards.

Likewise hotels, railroads, mines, mercantile concerns are not included, regardless of their indirect benefits from the wartime conditions.

The provisions for renegotiating war contracts were adopted for reasons that are not difficult to understand. Firms were asked by the government to make products that they had never made before—in some cases, indeed, products that had never been made before. The scale of production of these products has been beyond any previously known. It was impossible for the government, in letting these contracts, to know what these war weapons and accessories would cost to produce. It was often impossible for the companies themselves to know.

PHILIP S. SHOEMAKER

At present Mr. Shoemaker, author of the accompanying article on renegotiation, is active in industry as a government relations counselor and financial consultant with offices in Cleveland. Prior to going into this work he was in government service, chiefly with the Reconstruction Finance Corp.

It was of the first importance that the goods be produced without delay. The government negotiators, therefore forced to act half blindly, wanted to protect the government from being forced to pay excessive prices, and wanted to protect themselves from the accusation of letting contracts that would allow excessive profits. The result was the legal provisions permitting them to renegotiate contracts where it was apparent that excessive profits were being made.

Grave Questions Raised

But this was not the whole of the problem. The renegotiation of contracts even if we assume it to have been done most conscientiously by the government price adjustment boards, raises very grave questions of equity and of governmental procedure. The government contracts may be renegotiated if profits are "excessive." But there is no definition to guide the government's representatives concerning what constitutes "excessive" profits. Moreover, the government officials charged with the responsibility of renegotiating assert that no such definition or standard is either desirable or possible. If a company were permitted only to make a fixed return on its invested capital, or if it were permitted to make a maximum of 10 per cent above its costs, then, once such a rate of profit were passed, there would be no further monetary incentive for the company to make economies in production. The result, government officials agree, might be a great waste that could cost the government far more than any savings it effected by renegotiation, not to speak of

accompanying wastes of materials and manpower.

But the government does not or cannot apply a fixed standard of excessive profits; then, we confront difficulties of another kind. In that case, à different standard, depending on the decision of the government negotiators, is applied to each company. This is certain to raise suspicions and provoke charges of discrimination or favoritism.

It has been said of the Renegotiation act that "it was an imperfectly framed clause, perhaps well intentioned but certainly discriminatory and unjust; was enforced, not alone on newly rich war contractors, but upon established industries (such as the machine tool industry), which were already subject to high taxation and which were exposing their very futures to ruin in the over-production for war, of products that would stifle for years their postwar markets."

Government spokesmen counter by saying, "It is the best answer yet devised to that problem which has plagued every wartime President of the United States since George Washington. It has been called the best safeguard yet developed to see to it that the people's money is spent with intelligence and rigid economy and that they get a dollar's worth of value for every dollar spent."

Renegotiation Is Stamp of Approval

On one issue all can agree. For the companies which have been renegotiated it is a certification that the adjusted profits are satisfactory to the government.

As one manufacturer expressed it, "Renegotiation is an official stamp of approval. It means a great deal now—It may mean even more at some future date."

In general, industry is not at odds with the motives, which prompted the adoption of the statute, but with its administration. Industry consistently has held that the administration of these powers is rule by men rather than rule by law, in contravention of our long established constitutional method of government. The smaller the company the more likely it is to be at the mercy of arbitrary determination.

However, honorably and conscientiously the government representatives may act in this matter, in short, the renegotiation proceedings provide opportunities for favoritism, caprice and arbitrariness that ought not to exist.

That renegotiation has resulted in savings to the government is clear, though spokesmen for the War and Navy Departments have given the impression that these savings on net balances, are much greater than they are. Recently it was reported that as a result of renegotiation of war contracts in the past three years, contractors have refunded or agreed to refund more than $5800 million of excessive profits to the United States Treasury. It was stated that for the most part the cash refunds reflect renegotiation of prices for the business of contractors in 1942 and 1943, and the savings resulting from the authority to renegotiate war contracts are of three types: Refunds, price reductions under existing contracts, and contractors' voluntary price reductions on future contracts.

This makes exceedingly striking publicity, but corporation managements read this with tongue in cheek. Officially it is admitted, however, that a large part of this amount would have come back to the Treasury in excess profits taxes even if there had been no price adjustment law. This figure is the total renegotiation refund before taxes.

On another occasion, I was in a Pullman smoker one night listening to a group of shop-men enroute to their home office where an "E" award was to be made by the Army and Navy. It seemed that their good friend whom they greatly missed on festive occasions had recently changed his job to another plant. That day the newspapers had carried a front page story about the new management. "Just think," said one, "how Bill must feel with his new employer making $12 million profit on sales of $32 million in one year, while Bill sacrificed two sons, one killed in Normandy and the other in Italy."

The papers had not told the full story; namely, that of the $12 million profit, $10,800,000 had been repaid in income and excess profits taxes and that probably an additional $900,000 had been refunded through renegotiation. And so, the management and its entire personnel unwarrantedly bore the stigma of being war profiteers.

No one could ever compute the damage done to the morale of each and every man and woman in that organization.

Renegotiation proceedings may, indeed, be regarded as the equivalent of a special excess profits tax. In addition the excess profits tax is of a peculiar nature. The basis for imposition is not fixed. The rate of the tax is not fixed. The taxpaying corporation, in fact, not only cannot compute in advance what the tax will be; it is impossible even to know whether there will be a tax or not. The tax, moreover, is fixed in private negotiations. The taxpaying corporation may not know precisely what standards have been applied even after the assessment against it has been announced.

Time alone will tell whether the total net amount recovered through renegotiation by the government after adjustments for taxes will constitute an economic saving to the country or whether by crippling scores of small, but essential companies, the country may not be the ultimate loser.

Great Lakes Fleet Manned For Its Biggest Season

The Great Lakes fleet has again been manned successfully for what appears to be its biggest season in carrying iron ore, grain, and other war-essential traffic, Paul V. McNutt, chairman, War Manpower Commission, reported last week.

Thousands of men have answered the call for crews to man the fleet, and more than 460 vessels, adequately manned, are plying the Great Lakes. At least 14,000 licensed officers, skilled seamen and unskilled workers were recruited under the U. S. Employment Service.

So that the fleet can operate for war and reconversion purposes, WMC has applied all possible priority treatment to the fleet recruitment program. Within the Great Lakes industry, seamen are permitted to change jobs without statements of availability; gate hiring has been made permissible; and labor unions having collective bargaining agreements are permitted to refer prospective crewmen without going through USES. In addition, Great Lakes seamen off-shore are returned to lake ports without certification, and seamen who did not complete the 1944 season as crew members are permitted to leave other war jobs to return to the fleet, WMC announced.

Canada Places Order for Three Motor Cargo Ships

Orders for three motor cargo ships of 7500 deadweight tons each have been placed, the Munitions and Supply Department, Ottawa, Ont., Canada, announced. The ships and their diesel engines are the largest of their kind ever undertaken in Canada.

One of the ships will be built by Canadian Vickers Ltd., Montreal, Que.; another by Davie Shipbuilding & Repairing Co., Lauzon, Que.; and the third by Burrard Dry Dock Co., North Vancouver, B. C. Each will be 410 feet long, 59 feet in the beam, and will be propelled by a 6000-horsepower, four-cylinder diesel engine to be made by Canadian Vickers. Accommodation will be provided in each ship for 12 passengers.

Merchant Shipyards Turn Out 103 Ships in April

Thirty-two merchant shipyards turned out 103 ships with total of 1,004,071 deadweight tons during April, the Maritime Commission reports. They consisted of 34 Victory cargo ships, 8 Liberty cargoes, 8 C-type vessels, 2 colliers built on the Liberty hull design, 1 refrigerated cargo, 20 coastal cargo ships, 1 private tanker, 16 standard tankers, and 13 military type ships.

United Kingdom Increases Machinery Exports in 1944

Exports of machinery from the United Kingdom in 1944 valued at about $163,850,000 increased considerably compared with 1943 when foreign shipments were valued at $112,150,000.

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Ample steel tonnage will be available when automakers begin to turn out new passenger cars. Die shops speeding work on dies for heavy fenders, indicating new styling for larger cars. Ford spokesman proposes to eliminate yearly models

DETROIT

JULY 1, now six weeks away, is the date to circle on your calendar as the "Big Day." It will mean, officially at least, the green light for the auto industry to proceed with production preparations for passenger car output, relaxation of WPB controls, including the open-ending of CMP to permit steel shipments to civilian goods producers, modifying of employment controls by the WMC, and a number of other steps signifying official blessing to production for consumption instead of production for destruction.

Actually, there is to be no deferment of reconversion activity until this date; rather, there is a tacit understanding throughout industry and government that not much will be said publicly until that time. Meanwhile, more automobile steel orders are being booked and some limited tonnages of sheet and strip may even be on the rolling schedules. One thing seems fairly certain—there will be ample steel tonnage ready for car builders as soon as they require it. This was confirmed by B. F. Fairless, U. S. Steel president, here at a news conference.

Half a dozen of the larger die shops locally are speeding the completion of heavy dies for new fenders, hoods and other components for the various General Motors divisions, indicating the likelihood of entirely new front fender styling at least for Cadillac, Buick, Olds and Pontiac, and possibly new hood designs as well. Some of the local body die foundries are reported to be so clogged with automotive work they have difficulty handling rush war requirements which spring up suddenly.

May Eliminate Model Changeover

Reminiscent of the old days when Ford was the "lone wolf" of the industry and suggesting these days may return in the near future are statements made to the press by Ford sales manager, J. R. Davis, outlining his views on a possible Ford program in the months ahead. Of topmost significance was the proposal to eliminate yearly model changeovers and the production hiatus incident thereto, in favor of a continuous system of incorporating changes and improvements in designs as they are worked out.

Such a revolutionary change in automotive technique might be as the possible means of avoiding the temporary unemployment which always accompanies a model changeover, but it brings up another problem — moving stocks of cars accumulated by dealers when an important change in design or styling appears in the line. This would call for new merchandising methods, perhaps the department-store technique of marking down prices to clear the decks for improved models.

Interim model is the term being applied to the cars which will be ready probably late this summer as pilot jobs roll off assembly lines. It looks now as if Ford will be the first with interim models, since most of the major cutbacks thus far in automotive plants have been at Ford. Willow Run will be idle by July 31. Jeep production, running close to 5000 a month, likewise will be terminated by then. Reductions have been made in aircraft engine schedules at the Rouge Plant, as well as in tank engine schedules at the Lincoln plant. Cutbacks have been announced in armored car production and projected assemblies of the M-29 weasel personnel carrier at the company's plants.

Easing of steel directives should mean an early diversion of Ford steel mill tonnage to sheet and strip mill rolling for eventual use in automobiles. The gray iron foundry at the Rouge plant has ample capacity for an early start on engines, in fact it is whispered a line has already been set up for casting 6-cylinder engine blocks of a new design.

Another Ford spokesman says there will be more than 100 improvements and changes ready for the first cars off the life, more durable and efficient braking at one time or another, they include new bearing materials in engines, with longer life, more durable and efficient braking systems, better riding qualities through improved springs and suspension design, new shock absorbers, increased pressure and enlarged capacity oil systems, improved electrical systems, water pumps and engine ventilators. Steel circles report a new front axle design for Ford also in the works. A new and patented fast-action jack will be one of several new accessories. About 400 parts formerly made of natural rubber have been changed to synthetic, and will stay that way.

New service kinks also have been worked out by Ford engineers, including a single service engine which can be adapted to all models back to 1932. Refinements developed in replacement parts systems are said to forecast a 50 per cent reduction in service time and expense.

Throughout the duration of the war, Ford has co-operated with the rest of the automotive industry through its automotive council for war production, but it seems now that the company is reasserting its characteristic individualism and is striking out aggressively toward resumption of automobile production, chopping away complaints which the industry has voiced collectively, such as

PEACETIME MODELS: A light delivery pickup model for civilian use is coming off the Chevrolet truck assembly line, just ahead of an Army 4 x 2 unit. Truck production continues at a high rate, with limited production for civilian use and a large flow of military trucks

the textile shortage, paint shortage and what not. As one Ford spokesman is quoted saying—"A great fuss has been made recently about the textile shortage and the security of phthalic anhydride for enamels. We are ready with a number of satisfactory and easily available new materials for upholstery that will "sit" better than textiles—let us find and replace these short items. The industry did exactly that in 1941. We solved the problems of getting into the war and can solve those necessary to getting out."

That sounds like the old automotive spirit which has been considerably dimmed through the years of lush war production. If it is now being rekindled —and many are sure it is—then Detroit is in for some exciting days.

Underlying the trend is the future activity and scope of the Automotive Council for War Production. Under the capable and enthusiastic direction of George Romney, who is universally liked, the council represents an admittedly temporary welding together of all automobile manufacturers, plus about 160 parts manufacturers, plus some 200 tool and die suppliers. Each company contributes to the council's support, being assessed according to dollar volume of business, with minimum assessment about $50. The tool and die companies pay through their own association, the Tool and Die Manufacturers Association, guided by C. A. Cahn. The parts companies remit assessments directly to the council, since only about 40 per cent of the membership of the Automotive and Aviation Parts Manufacturers Association, or some 160 companies out of 400, participate in the ACWP. Frank Rising is general manager of the parts group.

Some Believe Council Will Continue

Ostensibly slated to disband at the final end of the war, or on V-J Day, there are many who feel Mr. Romney is drawing up elaborate plans for continuing the council, probably changing its name, but providing the same essential services, such as information on manpower, a tooling service, a Washington information service, committee activity, etc. The council's staff has been reinforced and expanded steadily during its existence. A reversion to the old status of the Automobile Manufacturers Association probably would involve an appreciable hike in financial support from the membership, considering that all the parts companies and tool and die interests would suspend their participation.

It may well be that the car builders would be perfectly willing to accept this assessment. General Motors, of course, is the principal contributor now and C. E. Wilson, GM president, has been an ardent booster for the council's program. He could probably make a good case for the other manufacturers to go along, with the above-noted exception of Ford, which, prior to the war did not take part in affairs of the AMA.

It is doubtful whether the parts firms will care to continue in council activities. With the possible exception of the larger body companies and a few of the big-time parts suppliers, most of these companies feel that their own problems call for consultation and action in their own association, and that there is an awkwardness in co-operative action with the auto manufacturers, which are, after all, their customers and susceptible to all the common pressures which customers can bring on suppliers.

Further opinion has been voiced that the council will continue in its present form for about six months after V-J day, to wind up all its wartime activities and to point the way for peacetime progress. It should not be inferred there has been anything but the most cordial and enthusiastic co-operation between all groups represented on the council since its organization, but whether it can or should survive the rigors of peacetime competition remains to be seen.

Martin-Parry Stock Watched

Those familiar with the close Detroit connections of Martin-Parry Corp. have been watching with interest the sudden spurt in this company's common stock, coinciding with announcement of the appointment of E. F. Fisher as member of the corporation's board of directors. It might signify the investment of funds by Fisher & Co. in the up-and-coming Martin-Parry Corp., as well as the imminence of expanded activity by the company.

Speaking of the Fisher brothers, as most everyone is in Detroit these days, some observers are scouting the possibility of a tie-up with Fruehauf Trailer Co. There is good basis for this belief on the grounds of recent personnel shifts at Fruehauf. First, H. F. Howard, former Chevrolet manufacturing manager at Flint, went with Fruehauf as general manager, and later three top Fisher Body buyers resigned to take over Fruehauf purchasing activities.

Incidentally, Fruehauf has been placed on probation until July 24 by the regional compliance commissioner of the WPB for alleged violations of CMP regulations. During 1944 the company was found to have accepted delivery of items of controlled materials by virtue of which its inventory became greater than the quantity of such items required during the succeeding 60-day period. This inventory was said to be in excess of a practicable working inventory reasonably necessary to meet deliveries. However, there was no intent by the company to impede the war effort or to divert critical material to nonessential uses.

Tony Weitzel, back-page columnist for the *Detroit News* and peripatetic scoop expert, tells his readers a group of Chicago financial interests, including a prominent publisher, has piled up a "kitty" of about $120 million for production of a brand new motor car in the windy city. Weighing about 1900 pounds, the car would have steel body, aluminum top, 4-cylinder x-type air-cooled engine mounted in the rear integrally with the transmission in an easily-removed 390-pound unit. Backers say they would like to build 250,000 copies in the first year of production to sell for about $875. They are reported "on the make" for Detroit engineering and production talent, although their identity has not been disclosed.

General Motors is spending $1,264,000 in renovating and re-equipping its South Gate, Calif., plant for assembly of Buick, Olds and Pontiac models, work scheduled for completion by Sept. 1.

How U.S. Steel Figured in Arms Transfer to Britain

How U. S. arms aid was made available to England and France in the dark hours after the Dunkerque evacuation was related last week by Irving S. Olds, chairman, United States Steel Corp. at a Detroit news conference.

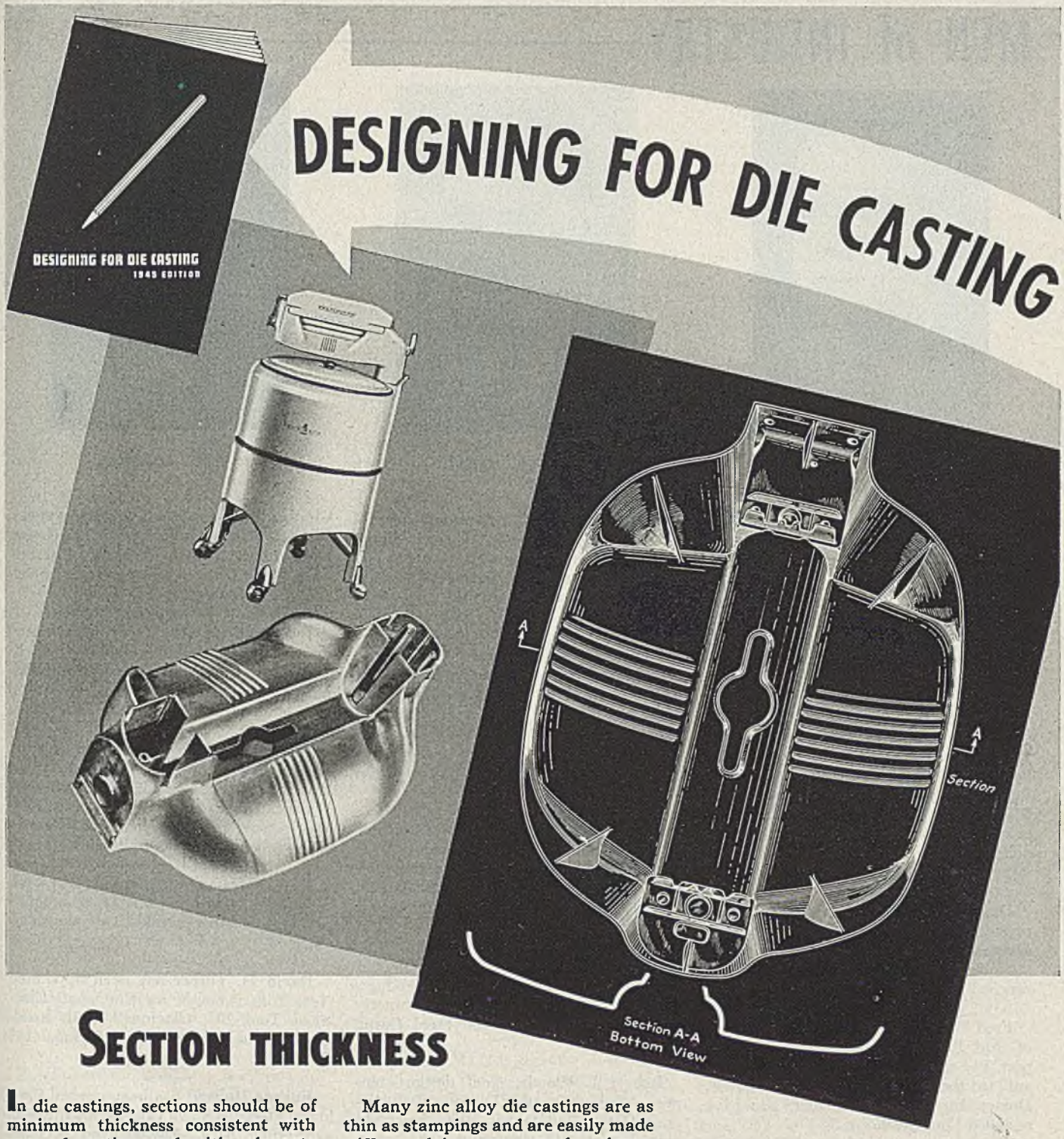
In June, 1940, a call came to Mr. Olds' office from General Wesson, chief of ordnance in Washington, asking Mr. Olds and B. F. Fairless, president, to be in Washington the next day. Perplexed, the two steel men immediately went to Washington and in the general's office were asked whether they would be interested in buying an accumulation of surplus ordnance from various U. S. arsenals. They were shown typewritten lists covering 40 or 50 sheets listing in detail thousands of items including pistols, rifles, machine guns, ammunition, etc., with an appraisal totaling, as General Wesson said, the trifling sum of about $36 million.

Messrs. Olds and Fairless were told by General Wesson a ready market could be found for the material in Britain and France. According to statute, Ordnance could sell the material only by having a signed order from the Secretary of War, declaring the items surplus. This order the general produced, and said U. S. Steel had been selected for three reasons: (1) It was felt the corporation would not refuse; (2) the sum of $36 million would be a trifling matter on the corporation books; and (3) the corporation had shipping facilities which might expedite delivery.

The corporation's board of directors at a meeting the next day unanimously approved the deal on condition the material would be sold for exactly its purchase price, and full publicity would be given the transaction.

Notified of the board's action, General Wesson expressed his pleasure and added it was particularly fortunate since he had instructed all his arsenal chiefs to consign the material to seaboard in care of U. S. Steel.

Thus U. S. Steel played its part in legitimatizing the transfer of what later proved to be $43 million worth of vitally needed ordnance material to Britain and France at a critical moment in history.



SECTION THICKNESS

In die castings, sections should be of minimum thickness consistent with ease of casting and with adequate strength and stiffness, because:

1. *This minimizes the weight of metal required, helping to lower cost.*
2. *Thin sections cool rapidly in the die, helping to shorten the casting cycle.*
3. *Thin sections are stronger, in proportion to their thickness.*
4. *Surface smoothness is apt to be better than on heavier sections.*

Many zinc alloy die castings are as thin as stampings and are easily made stiffer and in more complex shapes than feasible in one-piece stampings—witness the above zinc alloy die cast washing machine wringer frame with wall sections as thin as .045".

For more detailed information on this and other considerations which will enable you to get the most for your die casting dollar, ask us—or your die casting source—for a copy of DESIGNING FOR DIE CASTING.

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MEN of INDUSTRY

WALTER H. GEBHART

HERBERT L. MAUSK

JOHN A. COMSTOCK

Walter H. Gebhart has been elected vice president, Henry Disston & Sons Inc., Philadelphia. Since 1943, Mr. Gebhart has been general domestic sales manager of the company.

—o—

Norris Boehmer and **Clarence Barbre** have been advanced to the rank of manufacturing superintendent at Monsanto Chemical Co.'s plant at Monsanto, Ill., filling the vacancy caused by the death of **Robert M. Sanford. E. W. Lieben, W. Neil** and **R. L. Miller** have been advanced to the rank of operating superintendent at the same plant. **Henry V. Moss** has been transferred from the company's research laboratory at Carondelet, Mo., to Anniston, Ala., as supervisor of inorganic research.

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David A. Meeker has been elected president, Hobart Mfg. Co., Troy, O., succeeding **John M. Spencer. Edward S. Johnston** was elected vice president, succeeding Mr. Meeker.

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Fred Grotts has resigned as president of Fort Pitt Steel Casting Co., McKeesport, Pa. **H. H. Nicholson**, former assistant to the president, and **Thomas F. Dorsey**, former sales manager, also have resigned their positions.

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D. R. Stamy has taken on additional duties of manager, sales department, Standard Products Co., Detroit. He is also vice president and general sales manager of the company.

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Westinghouse Electric Corp., Pittsburgh, has elected the following three vice presidents: **L. H. Lund**, treasury department; **William E. Miller**, law and patent departments; and **Ralph C. Stuart**, Lamp Manufacturing and Lighting Equipment divisions. The company has made the following appointments: **Frank W. Godsey Jr.**, manager, New Products Division, replacing **G. H. Woodard** who has been transferred to South Philadelphia, Pa., as manager of the company's Aviation Gas Turbine Division; **Charles W. MacLean**, assistant director, education department; **Charles E. Young**, former supervisor of economic research, as manager, statistical research department; **Gerard H. Welch**, assistant to the manager, Switchgear and Control Division.

—o—

Herbert L. Mausk has been appointed manager of railway sales, National Malleable & Steel Castings Co., Cleveland. **George R. Farrell** has been appointed Cleveland district sales manager, succeeding Mr. Mausk. The Cleveland territory will be extended to include the Pittsburgh district.

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Frank E. Wartgow, manager, employes' suggestion system, American Steel Foundries, Chicago, has resigned to become supervisory engineer, Hasbrouck Haynes Engineers, Chicago, business consultants.

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Henry W. Davis has been appointed warehouse manager, Tin Mill Products Corp., Pittsburgh. He was formerly associated with Follansbee Steel Corp., Pittsburgh.

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Robert J. Woods, chief design engineer, Niagara Frontier Division, Bell Aircraft Corp., Buffalo has been appointed special technical adviser to the company's president.

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Dr. Maxwell Gensamer, staff member at Carnegie Institute of Technology, Pittsburgh, has been appointed professor of metallurgy and head of mineral technology, Pennsylvania State College, State College, Pa.

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William F. Ball has been appointed to the sales department of Wood Shovel & Tool Co., Piqua, O., to act as field service manager.

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Arthur G. Pearson, National Broadcasting Co. Inc., has been elected president, Purchasing Agents Association of Chicago, succeeding **Henry C. Bauer**, Revere Copper & Brass Inc.'s Dallas Division, Chicago. **C. L. Otremba**, Montgomery, Ward & Co., and **William A. Macnider**, Hills-McCanna Co., both of Chicago, were elected first and second vice president, respectively.

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John A. Comstock has been appointed director of research and metallurgy, H. K. Porter Co. Inc., and subsidiaries, Pittsburgh. He will head the centralized testing laboratory in that city.

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William J. Wardell, vice president and comptroller, American Can Co., New York, has been elected a director. Mr. Wardell joined the organization in 1904 and became controller in 1941. He was elected vice president in 1944.

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N. S. Peterson, vice president of SKF Steel Inc., New York, has been appointed executive vice president of the company.

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David H. Turner has been appointed New York manager for Cincinnati Electrical Tool Co., Cincinnati, with headquarters in the Singer building, 149 Broadway.

—o—

Eugene Holland has been elected president, Florence Stove Co., Gardner, Mass., succeeding **R. L. Fowler** who becomes chairman of the board. **William T. MacKay**, assistant vice president in charge of the Kankakee, Ill., plant has been elected a vice president; **Albert E. Luke**, treasurer, and **George B. Colburn**, a vice president, have been elected to the board of directors.

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William H. Baker, executive assistant to **Edward H. Moll**, vice president, resigned, has been named works manager, American Bosch Corp., Springfield, Mass., under **Walter Dow**, vice president.

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Paul Hetenyi has been elected president, Solar Mfg. Corp., New York, succeeding **Otto Paschkes** who has assumed the newly created position of chairman of the board. **Wickham C. Harter**, secre-

WILLIAM J. TURNBULL

O. J. HORGER

MOWRY E. GOETZ

tary, was made vice president as well. **James I. Cornell,** chief engineer, was elected second vice president.

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William J. Turnbull has been appointed assistant director of procurement, the Glenn L. Martin Co., Baltimore.

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Maj. David R. Webster has resumed his duties as sales manager, Reznor Mfg. Co., Mercer, Pa.

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Logan Kennedy has been named fleet engineer, Perfect Circle Co., Hagerstown, Ind.

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Lieut. Col. Philip G. Murphy has been elected president, Stimpson Computing Scale Co., Louisville, Ky.

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Malcolm S. Clark has been elected chairman of the board of directors, Jacobs Aircraft Engine Co., Pottstown, Pa.

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Francis E. Fairman Jr. has been named manager, Peerless Pump Division, Food Machinery Corp., San Jose, Calif.

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Dr. Robert C. McMaster has been appointed to the staff of Battelle Institute, Columbus, O., and assigned to its division of industrial physics.

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J. C. Rowold, vice president, Mack-International Motor Truck Corp., Long Island City, N. Y., has been appointed manager of Mack's Pacific Coast Division. He replaces **J. A. Stoner** who has retired after 28 years service with the Mack organization.

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W. H. Ross has been appointed district manager of Michigan and northern Ohio territory, Udylite Corp., Detroit.

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Henry Dusenbery Jr. has formed a new company, Dusenbery Engineering Co., Madison, N. J., for the fabrication of pressure vessels and containers for the process and chemical industry. He was formerly assistant general manager and plant superintendent, Madison Iron Works Inc., Madison, N. J.

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O. J. Horger has been appointed chief engineer, Railway Division, Timken Roller Bearing Co., Canton, O. **C. L. Eastburg** has been appointed assistant chief engineer and **P. C. Paterson** has been named service manager both of the same division. Directors of Timken have elected **Albert L. Bergstrom,** vice president of all engineering.

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William C. Rodgers has been appointed director of research and development, Gray & Foster Engineering Co., Brandon, Vt. He was formerly works engineer, Bakelite Corp., Bloomfield, N. J.

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J. Allen Ferguson has been elected vice president and assistant to the president, Barcalo Mfg. Co., Buffalo.

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Brice R. Freeman has been appointed director, industrial relations, Warren City Mfg. Co., a subsidiary of Graham-Paige Motors Corp., both of Detroit.

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Charles B. Wiggin, director and a member of the executive committee, National Can Co., New York, has been elected treasurer of the company.

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David Greene has been elected vice president, Magor Car Corp., New York, and **W. P. Smith** has been elected vice president of Magor Car Export Corp., also of New York.

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H. M. Cowart, P. H. Neal, Preston H. Haskell Jr., and **A. G. Overton** have been elected vice presidents, Alabama By-Products Corp., Birmingham, Ala.

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Harry J. Hadden has been appointed purchasing agent, Chicago & Illinois Midland railway, with jurisdiction over the purchases and stores departments.

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John A. Goundrey has been appointed works manager for Diamond Iron Works Inc. and its subsidiary, Mahr Mfg. Co., both of Minneapolis. He was previously production manager, Tank Division, Federal Machine & Welder Co., Warren, O.

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Mowry E. Goetz has been appointed assistant to the vice president in charge of operations, Republic Steel Corp., Cleveland. For the past five years, Mr. Goetz has been manager of Republic's Chicago district. He has been associated with Northwestern Steel & Wire Co., Sterling, Ill., as general superintendent, and earlier with Jones & Laughlin Steel Corp., as superintendent of the open hearth and rolling mill departments at the Aliquippa works. He joined Republic in March, 1940.

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Wilfred S. Cowan has been appointed farm sales manager, Westinghouse Electric Supply Co., Chicago.

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Leo A. Santry has been appointed product manager on B-K vacuum power brakes and Bendix brakes, Bendix Products Division, South Bend, Ind., Bendix Aviation Corp., Detroit.

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Commander R. E. W. Harrison has returned from the Navy to assume his former post of vice president and sales manager, Chambersburg Engineering Co., Chambersburg, Pa.

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A. W. Freese has been appointed works manager, radio plant, Crosley Corp., Cincinnati. He was previously vice president and works manager, Majestic Radio & Television Corp., Chicago. His next previous position was secretary and general works manager, Zenith Radio Corp., Chicago.

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J. J. Huether has been appointed assistant manager, Industrial Divisions, General Electric Co., Schenectady, N. Y., and **W. A. Wirene** has been appointed manager, Industrial Materials Division, Industrial Divisions of the company.

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A. L. Perdue has been appointed northern California district representa-

T. A. HAVENS JR.

Who has been appointed tungsten engineer, Wickwire Spencer Metallurgical Corp., noted in STEEL, May 7, p. 94.

ERNEST C. LOW

Who has been named vice president in charge of sales, John A. Roebling's Sons Co., Trenton, N. J., as noted in STEEL, May 7, p. 95

KEEN JOHNSON

Who has been elected vice president of the Reynolds Metals Co., Richmond, Va., as reported in STEEL, May 7, p. 95.

tive for Oliver Iron & Steel Corp., Pittsburgh. He joined the Navy in June, 1942, and was retired from active service in early 1945.

—o—

Joseph L. Mullin has been promoted from general superintendent of foundries, American Brake Shoe Co.'s American Manganese Steel Division, Chicago Heights, Ill., to vice president in charge of operations. He has been associated with the manganese steel industry since 1914 when he joined the Edgar Allen Manganese Steel Co., forerunner of the present Brake Shoe division.

—o—

Glenn S. Cashdollar, resident manager, Grand Rapids Stamping Division, Fisher Body Division, General Motors Corp., Detroit, and director of Grand Rapids artillery carriage section since January, 1942, has been appointed assistant general factory manager of all Fisher Body fabricating plants with headquarters at Detroit. **F. B. Harrington** succeeds Mr. Cashdollar as resident manager of the stamping division.

OBITUARIES . . .

Dr. E. W. Engle, 57, research and consulting metallurgist for Carboloy Co. Inc., Detroit, died recently in that city. Recognized authority on tungsten and tungsten carbides, Dr. Engle joined Fansteel Products Co. in 1916, first as a chemist and metallurgist, later as chief engineer, a position he held until 1932. From 1935 to 1937, he was associated with Union Wire Die Co., developing processes for hot pressing of carbides for the manufacture of tungsten carbide dies. When that company was purchased by Carboloy in 1937, he became research and consulting metallurgist for Carboloy.

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William J. Henderson, 45, associate professor of structural engineering, Purdue University, Lafayette, Ind., died May 10 in that city. He had been employed by Bethlehem Steel Co., Bethlehem, Pa., prior to joining the university in 1929.

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Ben R. Mayne, 56, president, Industrial Stamping & Mfg. Co., Detroit, and vice president, General Foundry & Mfg. Co., Flint, Mich., died in Detroit recently.

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George L. Avery, 66, president, Hunter Lumber Co., Chillicothe, Ill., and formerly secretary, Avery Harvesting Machine Co., Peoria, Ill., died May 11.

—o—

Emil C. Traner, 68, supervisory board chairman, Borg-Warner Corp.'s Rockford Clutch Division, Rockford, Ill., died in that city May 7. He retired last November as president and general manager of the Rockford Clutch Division, formerly Rockford Drilling Machine Division of the corporation.

—o—

Harold F. Barnes, 47, manager, Sales Promotion Division, General Electric lamp department, Nela Park, Cleveland, died May 8.

—o—

William Niland, 34, assistant superintendent, Buffalo Steel Co., Tonawanda, N. Y., died recently.

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William E. Timmerman, 76, who retired three years ago as secretary-treasurer, C. F. Pease Co., Chicago, died recently in that city.

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Wilson J. Tallman, president, National Tool & Machine Co., Rochester, N. Y., died May 11 at his home in that city.

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Frank S. Eagle, 34, assistant manager, rolled products sales, Colorado Fuel & Iron Corp., Denver, died May 7 in New York while en route to Boston.

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Karl R. Kopanka, 53, manufacturing manager, Sealed Power Corp., Muskegon, Mich., died recently. He was vice president in charge of production, Accuralite Co. when that company became a subsidiary of Sealed Power in 1932.

—o—

Mark H. Beam, 84, president and founder, Eureka Iron Works, Elizabeth, N. J., died May 8 in East Orange, N. J.

—o—

James Garrett Baer, 48, general manager, Missouri Bridge & Iron Co., St. Louis, died at St. Mary's hospital in that city recently.

—o—

Edmund A. Doyle, 64, consulting engineer for the Linde Air Products Co., unit of Union Carbide & Carbon Corp., both of New York, died recently in that city. Mr. Doyle was president, American Welding Society, New York, in 1930-31.

—o—

Charles G. Heydon, 65, engineering sales representative, Wright-Austin Co., Detroit, died recently in New York.

—o—

Albert R. Johnson, 60, president, Sola Electric Co., Chicago, died May 12 in that city.

—o—

Guilford Duncan, 67, president, Ludlow-Saylor Wire Co., St. Louis, died May 9 at St. Luke's hospital in that city.

—o—

Alpha M. Brown, 71, president, Brown Tool Co., Cleveland, died May 15 in that city.

—o—

David V. Shaw-Kennedy, 50, director and member of the executive committee, Elastic Stop Nut Corp. of America, Union, N. J., and American Gas Accumulation Co., Linden, N. J., died May 12 at Narragansett, R. I.

West's $3 Billion War Expansion And Future Utilization Analyzed

Survey shows large proportion of new facilities are potentially useful in peacetime. Prospects for electrical and light machinery industries bright. Difficulties seen in converting large aircraft factories to production of civilian products

SAN FRANCISCO

MORE attention is being given to the problems and opportunities which lie in new industrial facilities which have mushroomed over the 11 far western states during wartime.

The research department of the California Chamber of Commerce has completed a survey of the wartime expansion, showing that more than $3 billion have been invested by the government and private companies.

A number of facilities were designed originally only for wartime use and were expected to be junked at war's end. However, most of the new facilities are potentially useful in peacetime.

Without attempting to forecast disposal policies, Edward F. Landels, chairman of the statewide committee on surplus property disposal of the chamber, has reviewed, by principal industries, the investment in war plants and has attempted to outline probable consequences of their continued operation on the West's economy.

Regarding the iron and steel industry, Mr. Landels estimates the wartime investment in new facilities at $388 million in the 11 western states, of which $45 million is private capital. California alone has $150 million of new facilities, of which all except $33 million were financed by the government. Most of the $388 million investment is in the Geneva and Fontana plants. Mr. Landels comments that postwar operation of the Geneva and Fontana plants will affect the cost of steel to be delivered on the West Coast and in turn that will influence the future industrialization of the Far West.

Some Plants in Poor Locations

Of the total national expansion in nonferrous metal facilities, approximately 32 per cent has been in the western states. Out of a total investment in the West of $448 million, approximately $51 million has been privately financed. Because of wartime expediency, a number of the light metal plants (aluminum and magnesium) were built in poor economic locations and indications are they will have difficulty in competing for postwar markets.

Concerning aircraft engines and parts facilities, Mr. Landels says:

"In this field the 11 western states have about 9 per cent of the nation's total. California has about 6.6 per cent. Of the $300 million total for the West, $84 million was privately financed.

"Many of the plants are very large. What may constitute a sound economic location for an airframe or engine plant may not be suitable at all for many other manufactures which require similar conditions of factory space and layout. Wide aisleways, high ceilings and long assembly lines are the rule in plants handling assembly of the heavier aircraft.

"Such plants are expensive to build, heat and maintain and would require considerably more investment than most industrialists would desire for ordinary types of manufactures. The larger aircraft industries probably will wish to occupy a percentage of their respective facilities equal to what their postwar business will warrant."

In the field of ship construction and repair, the West Coast has about 29 per cent of the country's total wartime expansion. Of the total investment in facilities of $614 million, about $581 million is federally-financed.

Reconversion of the shipbuilding industry, Mr. Landels believes, could be divided in two parts: First, disposition of ways, and second, conversion of prefabrication facilities. Some of the prefabrication plants may have possibilities for fabricating peacetime steel products, such as railroad cars and public and private works. Also, some of the facilities will be used for conversion and repair of merchant vessels.

The western states have only 3 per cent of the wartime expansion of machinery and electrical equipment facilities, the investment amounting to $25 million, of which $17 million was privately financed.

Regarding this field, Mr. Landels says:

"The shipbuilding program and the need for radio and radar equipment were responsible for most of the expansion throughout the country. Perhaps the West needs these facilities for an integrated, balanced postwar economy. Facilities for the manufacture of heavy machinery, such as reduction gears for ship propulsion, may offer a problem, depending on their location.

"The electrical and light machinery industries will have much to do in catching up on the deferred consumer needs of such durables as radios, vacuum cleaners, refrigerators, washing machines, business machines, etc. If prewar lines are offered as first models, conversion can proceed very rapidly. New models will require the time necessary for engineering, experimentation, planning and tooling."

One of the largest individual expansions in the West has been in the chemical, coal and petroleum industries. Investment has been about $405 million (14 per cent of the national total) of which $193 million were private funds.

In these facilities are included plants for making alcohol for synthetic rubber, catalysts for aviation gasoline, ferrous products, alumina for metals and base stocks for plastics.

Western States Council Steel Committee Issues Suggestions for Geneva, Fontana

LOS ANGELES

RECOMMENDATIONS for the operation of the Fontana and Geneva steel mills after the war have been drawn up by the steel committee of the Western States Council and will be forwarded to federal government disposal agencies. The proposals, announced by Kenneth T. Norris, president, Norris Stamping & Mfg. Co., contemplate management of the properties by private operators. The recommendations include:

1. Steel prices in the West must be lowered to a level comparable with prices paid in other industrial centers.

2. War-born mills must be turned over to private operators as soon as possible to keep them in continuous operation.

3. Private operators must make clear their price policies before being allowed to assume control; these policies should omit charges not based on actual costs.

4. Financing and valuation programs should be adjusted so that neither Geneva nor Fontana will have an advantage over the other from the standpoint of capital costs to the private owner.

5. Transfer of mills to private ownership without abolishing the present steel pricing formula would deprive industries and consumers of benefits they should get from private operation.

6. Steel producers wherever situated should, at the earliest possible moment, establish western steel prices based upon the cost of production at western mills.

7. For the Geneva mill to operate in the postwar period, freight rates on finished steel to western markets must be substantially reduced.

WING TIPS

United States Airlines have flown more than 2½ billion passenger miles on overseas war routes, carried war cargoes more than 600 million ton miles, while establishing new records in all domestic categories

AIRLINES of the United States have flown more than 2.5 billion passenger miles on overseas war routes, have rung up 600 million ton miles in transporting war cargo, and have performed a signal role in the prosecution of the war, it is revealed in a 3-year survey by the Air Transport Association of America.

Since Pearl Harbor, the Army and Navy have used a total of 193 airline planes and some 1200 airline pilots. In this period the contract carriers piled up the following impressive statistics:

Passenger miles flown by airlines under contract with ATC and NATS on overseas routes, 1942-1944, 2,581,903,999; ton miles flown in carrying cargo to foreign theaters of war, 603,137,283; transport miles flown on foreign routes, 246,832,-422; transport hours racked up overseas, 1,427,436.

While carrying on these extensive operations abroad for Air Transport Command and the Naval Air Transport Service, the commercial airlines devoted their home-front efforts largely to war transportation, racking up under direct contract with military forces additional figures on domestic routes operated for the military forces as follows:

Passenger miles flown under domestic war contracts, 114,412,093; ton miles flown, 103,914,981; transport miles, 62,-087,339; transport hours, 400,571.

The grand totals for both foreign and domestic war transport, consequently, stood as follows:

Passenger miles on war routes overseas and on war routes at home, combined, 2,696,316,089; ton miles flown, 707,052,-264; transport miles 308,919,761; transport hours, 1,828,007.

The airlines operating on overseas routes were as follows:

United and Consolidated on long routes in the Pacific; Northwest and Western to Alaska; American and Transcontinental & Western, across the North Atlantic; Northeast to Greenland; Pan American pioneered in the Central Atlantic, Pacific and Alaska; Eastern across the Caribbean to South America; and American Export to South America, Africa and Europe, and Pan-American Grace and Braniff to South America.

Other airlines sharing in domestic service directly for the military forces included:

All American, Braniff, Chicago and Southern, Colonial, Continental, Delta, Hawaiian, Inland, Mid-Continent, National, and Pennsylvania-Central.

Predicts 400-m-p-h Speed For Transport Airplanes

Transport airplanes will be operating on schedule at speeds up to 400 miles an hour within the next five years, William Littlewood, vice president, engineering, American Airlines Inc., told the aviation forum sponsored by the Chicago Association of Commerce and the University of Chicago, May 8.

New types of airplanes which may become available in one to three years from now will be of conventional arrangement, but will be refined from the prewar transports, as well as somewhat larger and superior in performance, comfort and economy, he predicted. Thereafter it is reasonable to assume that, with the tremendous amount of energy being devoted to the power plant revolution, there may well be a growing preponderance of aircraft of radically different type so that in 10 to 15 years a present day airplane may appear old-fashioned.

Airplanes of varying size and performance characteristics will be needed in the postwar period, each designed to fill a narrow range of operating requirements, Mr. Littlewood said. These would run from a two-engine airplane of 15 to 20-passenger capacity for short-range operations, to long-range over-ocean and transcontinental airplanes in the 125,000 to 200,000-pound gross weight class. At least one airplane designed expressly for the handling of freight will be needed if there is to be the hoped for development of air cargo traffic. There is also a real need for a vehicle which will do the things which are characteristic of the helicopter.

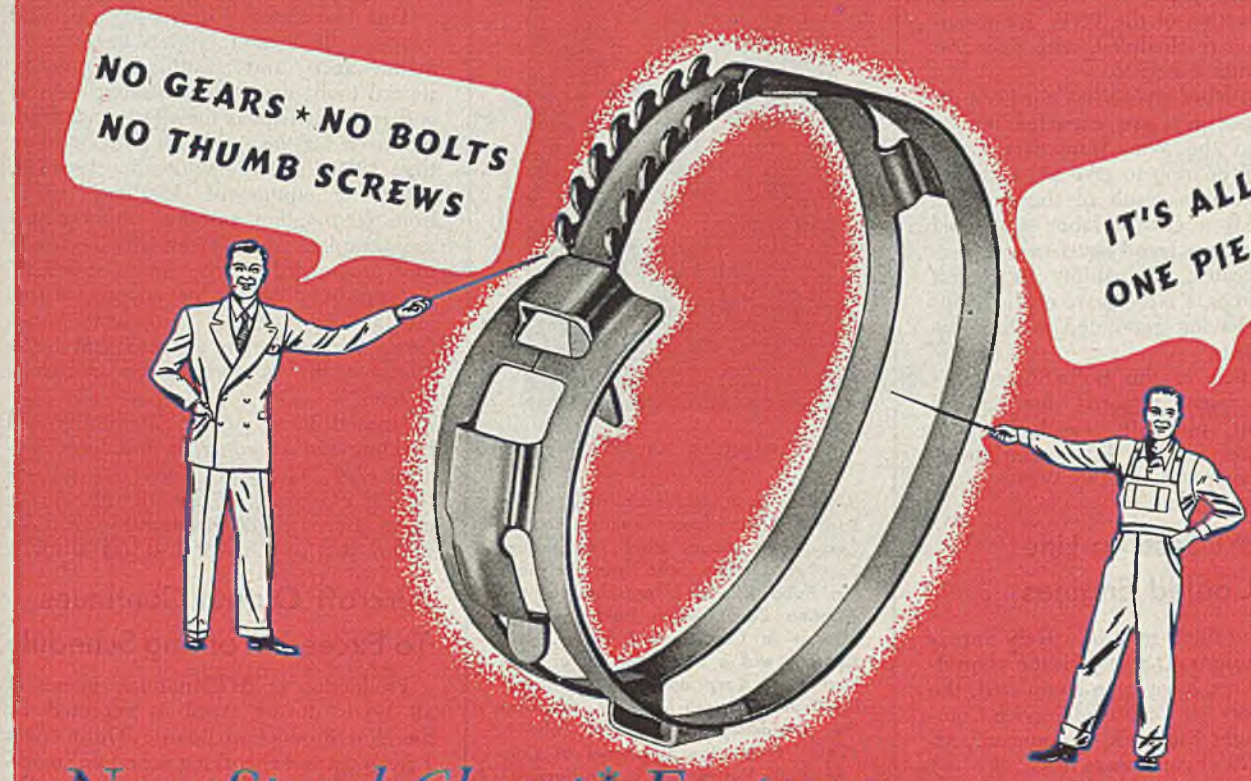
Mr. Littlewood disputed the forecasts of lower operating costs for air lines in the next five years. Operators have applied their best abilities to the study of these costs, and "I know of nothing in such studies to justify conclusions of rates of 2½ cents per passenger mile, or 5 cents per cargo ton mile, or any reasonable facsimile thereof, during the period in question," Mr. Littlewood asserted. "It will be a growth period inviting correspondingly high costs of operation," he concluded.

FOR LIGHTER AIRCRAFT: Increasing use of magnesium to lighten aircraft weight has enabled Superfortresses to carry added bomb loads against Japan. A core assembly operation, one of the important steps in casting the metal, is shown above in the plant of Bendix Aviation Corp.'s Eclipse-Pioneer foundries at Teterboro, N. J.

Aircraft Engine, Parts Programs Are Canceled

Contract for production of Rolls-Royce VE-1650 12-cylinder liquid-cooled aircraft engines at plant of Continental Aviation & Engineering Corp., Muskegon, Mich., has been terminated and output will cease May 31 or soon thereafter, according to announcement by the Air Technical Service Command, confirming reports carried in STEEL, March 12, page 90. The cancellation is part of an overall adjustment and rescheduling of aircraft engines and spare parts totaling $56 million at this plant. The Rolls-Royce engine is identical with the one being produced in quantity by Packard at Detroit, and is used to power the P-51 Mustang fighter plane, which also has been cut back. Approximately $10 million worth of spare parts for the engine, scheduled for production by Continental,

Man-What a Hose Clamp!



New Speed Clamp* Features

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In Canada: Wallace Barnes Co., Ltd., Hamilton, Ont. In England: Simmonds Aerocessories, Ltd., London

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Speed Nuts PATENTED Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

have been canceled immediately.

The Pratt & Whitney R-1340 engine, slated to start into production in June at the Muskegon plant, has been canceled, while production of the P&W R-985 engine is being rescheduled, with only 166 of these units canceled.

Extent of labor layoffs has not been divulged, but they are expected to be gradual and the War Manpower Commission is preparing to give aid to workers released as a result of the cutback. Muskegon is a critical labor area, and some plants have faced restriction of production because of inability to recruit working forces, a large share of the available labor having gravitated to the Continental plants.

Cancellation of the Rolls-Royce contract has been rumored for several months, but apparently was held up in the machinery of the Production Readjustment Committee of the WPB.

Superfort Tests In-Line Liquid-Cooled Engines

Successful flight tests of a B-29 Superfortress equipped with in-line liquid-cooled engines have been completed, the Headquarters Air Technical Service Command, Wright Field, O., announced. Allison V-3420 engines were used.

Object of the experiments was to give additional flight data and experience in the use of in-line liquid-cooled engines as applied to heavy bombardment aircraft. This type of engine has, for the most part, been used on fighter aircraft. It is the policy, however, of ATSC engineers at Wright Field to explore every possibility and the important data obtained are translated into future designs.

Essentially, the test plane is the same as a B-29 except engine mountings. Installation of the Allison engines was made at the Cleveland plant of the Fisher Body Division of General Motors Corp.

Supply Unit Has World's Biggest Distribution Job

Keeping aviation supplies and spare parts flowing to American aircraft all over the world is the greatest distribution enterprise in history.

This vast job, conducted by the Supply Division, Air Technical Service Command with headquarters at Wright Feld, O., calls for stocking and shipping of more than 620,000 different items. By comparison, world's largest commercial mail-order organization, handles only 150,000 items. Value of the merchandise and problems of delivery are not comparable.

The Supply Division, ATSC, must estimate the number of spare parts and supplies the AAF will need, authorize their purchase, classify them by an intricate system which the size of the organization has made necessary, store them in appropriate locations and arrange for high-priority distribution to all parts of the world.

IRVING B. BABCOCK

Who has been elected chairman of the board, Consolidated Vultee Aircraft Corp., San Diego, Calif., succeeding Tom M. Girdler, who has resigned. Mr. Babcock also is president of the Aviation Corp., which holds a large interest in Consolidated Vultee. He formerly was a vice president of General Motors Corp. and president of Yellow Truck & Coach Mfg. Co., assuming the presidency of Avco on Feb. 1, 1945. Other top personnel of Consolidated Vultee will be unchanged

Engaged in ATSC supply activities in the United States are more than 65,000 civilians, approximately half of whom are women. Storage space used totals 60,220,000 square feet, the equivalent of a warehouse 75 feet wide and 150 miles long.

Movement of stock through these warehouses is rapid. For every airplane overseas, the Supply Division ships an average of six tons of equipment monthly. This includes items ranging in size from nuts and bolts to portable hangars. For every $100 America spends for a new airplane it sets aside $60 for spare parts and aviation supplies.

For storage and distribution the country is subdivided into 12 subordinate Air Technical Service Commands. Each of these includes a major air depot which stores thousands of different items of equipment for use on domestic aircraft. Scattered throughout the country, in addition, are more than 50 specialized depots, each of which deals exclusively in certain classes of AAF supplies.

Laboratory Develops Items That Improve Airplanes

Development of items that keep an airplane flying and improve its ease of operation is the work of 1000 engineers and technicians directed by a "gadget-minded" staff of engineering and administrative officers at the Air Technical Service Command's equipment laboratory, Wright Field, O.

This laboratory develops electrical systems, flight and engine instruments, maintenance and heating equipment, special tools, operational training devices and special weapons for all new airplanes produced for the Army Air Forces. More than 1200 items are under development.

Size of equipment developed varies from 6000-gallon gasoline trucks which are complete aircraft service stations to tiny one-eighth inch "grain-of-wheat" electric light bulbs for aircraft instruments. Purpose of equipment varies from simple training devices that teach pilots to fly, to complicated electronic systems.

Housed in a modern air-conditioned building and 12 accessory buildings covering 242,145 square feet, the laboratory is equipped to test aircraft equipment under conditions duplicating those in any part of the world at any altitude.

Aircraft Output Continues To Exceed Working Schedule

Production of 6412 military planes of all types during April is reported by the War Production Board. Output was 1 per cent over working schedule, marking second consecutive month that the aircraft industry has exceeded its schedule. While the number of planes manufactured in April was 9 per cent less than in March, the April airframe weight (excluding spares) of 73,600,000 pounds declined only 7 per cent from the previous month's total. This indicates the increasing emphasis on production of heavier models for the war against Japan.

GE Is Producing Jet Aircraft Engines for Navy

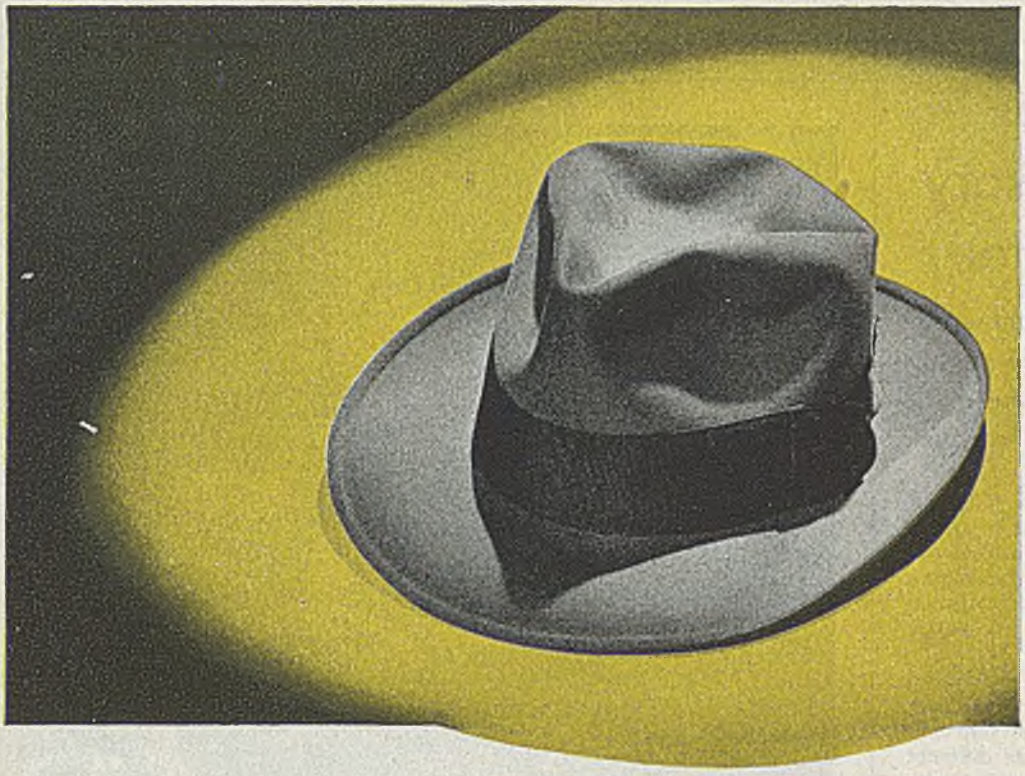
Jet propulsion aircraft engines now are being produced for the Navy by General Electric Co.

For reasons of military security, details concerning the Navy's program for use of these powerful G-E jet airplane power units cannot be revealed at this time.

Canadian Plant To Make Components for Corsairs

Fairchild Aircraft Ltd., Longueuil, Que., Canada, has become a subcontractor for major components for the U. S. Navy's Corsair shipboard fighter.

Fairchild, which for the last two years has been manufacturing Helldivers for the Navy, will produce cowlings, stabilizers, elevators, and wing flaps for the gull-winged Corsair, designed and produced by Chance Vought Aircraft Division, Stratford, Conn., of United Aircraft Corp. Corsairs are being used in both carrier and land-based operations against the Japanese.



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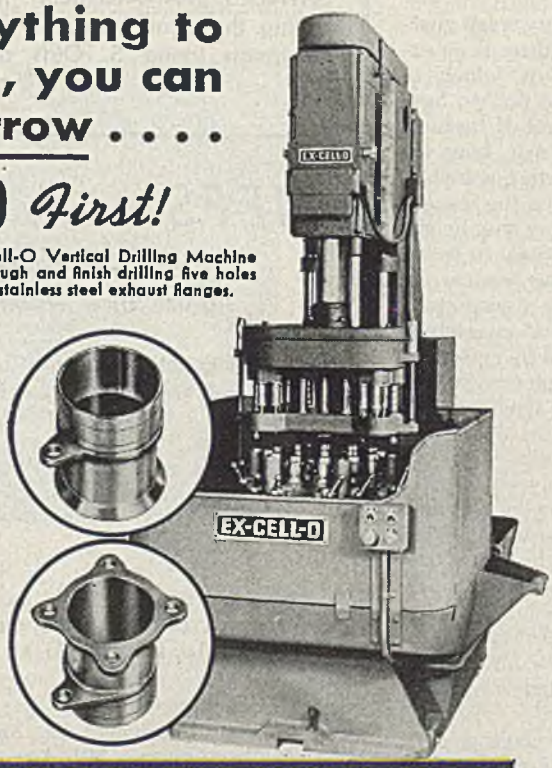

Ex-Cell-O Vertical Drilling Machine for rough and finish drilling five holes in stainless steel exhaust flanges.

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- Multiple Drilling and Other Special Purpose Machines
- Precision Thread Grinding Machines
- Precision Lapping Machines
- Broaches and Broach Sharpening Machines
- Continental Cutting Tools
- Tool Grinders
- Hydraulic Power Units
- Grinding Spindles
- Drill Jig Bushings
- Fuel Injection Equipment
- R. R. Pins and Bushings
- Pure-Pak Paper Milk Bottle Machines
- Aircraft and Miscellaneous Production Parts

45—73

Irving S. Olds Hits Compulsory Pay Guarantee

Only means to guarantee annual wage is to have steady demand from customers for employer's product, he says

CLEAR thinking or wise judgment about guaranteed annual wage proposals are not possible until there is a clear understanding of exactly what is being proposed, Irving S. Olds, chairman, United States Steel Corp., told the Economic Club of Detroit last week.

Mr. Olds said the term "guaranteed wage" is frequently employed to cover two things of an utterly different and contrasting nature and having far different potential consequences. One is a principle involving voluntary wage guarantee and the other compulsory guarantees.

Investigation in 1940 by the National Industrial Conference Board of 2700 companies disclosed that only 2.7 per cent had any sort of guaranteed wage plan and further that all voluntary plans in operation prior to 1929 and reviewed by the Board had been discontinued by 1940 with two exceptions.

On the score of compulsory wage guarantee plans, Mr. Olds said there is no experience in this country by which to judge them, the government not yet having gone so far in its control of business as to require that once a man hires his neighbor he must thenceforth indefinitely or for a given period assume the responsibility of regularly providing that neighbor with employment or money to spend regardless of the need for his services.

The only means to insure a guaranteed annual wage is to have a guaranteed steady or increasing demand by customers for the product of the employer. Such a demand is lacking in the steel industry which has been noted for the fluctuating character of its operating rate.

Advocates of a compulsory wage guarantee argue that if employers continue to pay wages at the same level, employes will continue spending at the same level and production will thus be continuously maintained. Mr. Olds called this theory a will-o'-the-wisp and said that to pay employes for not producing or for producing that which is not wanted is unsound on its face.

Adoption of compulsory wage guarantees, he said, might mean a definite step in the direction of an enforced planned economy under which the government eventually might have to dictate who works for whom; what specific wages would be paid to what specific workers; what is to be produced and at what price; and even what consumers should buy.

OWNERS, MANAGEMENT MEET: During the traditional luncheon following the annual stockholders' meeting of United States Steel Corp., Chairman Irving S. Olds discusses the corporation's prospects with three shareholders

BRIEFS . . . .

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

Borg-Warner International, Chicago, announced that under a changed system of distribution in South America, Trinidad, and Puerto Rico, offices and headquarters for that area will be located at Sao Paulo, Brazil, and a warehouse at Auburn, Ind., where export shipments will be consolidated.

—o—

A. Milne & Co., New York, has been named national distributor for wrought iron bars manufactured by A. M. Byers Co., Pittsburgh.

—o—

Monroe Auto Equipment Co., Monroe, Mich., has been given a fifth Army-Navy "E" award to be held for a full year, instead of the usual six months, because of its excellent production record.

—o—

Walker-Jimieson Inc., Chicago, radio and electronic distributors, has published a new edition of its "Industrial Availability Booklet" which shows items available on priority for immediate delivery from stock.

—o—

Firth-Sterling Steel Co., McKeesport, Pa., has added a number of sizes to its line of Firthite general purpose tools, and has issued a price list on Firthite-Tipped centers, now stock items.

—o—

Aulerich & Grimes is the name of a new firm at Dayton, O., which will represent the Progressive Welder Co., Detroit, in the western Ohio area.

—o—

Madison-Kipp Corp., Madison, Wis., reports that in an election at its plant union representation was turned down by a vote of 506 to 149.

—o—

Industrial Lining Engineers Inc., Edgeworth, Pa., announced appointment of the chemical engineering firm of F.

M. De Beers & Associates, 20 North Walker drive, Chicago, as their representatives in Illinois, northwest Ohio, Indiana, Michigan, Minnesota, Wisconsin, Iowa, and Missouri for corrosion and abrasion resistant equipment linings of synthetic rubber and plastics.

—o—

Owatonna Tool Co., Owatonna, Minn., manufacturer of gear and bearing pulling equipment for automotive and industrial applications, and hand tools, has been added to the organizations whose products are marketed abroad by Borg-Warner International, Chicago.

—o—

ACF-Brill Motors Co., Philadelphia, has shipped seven trolley coaches to the Des Moines Railways Co., Des Moines, Iowa. They are the first public transportation vehicles manufactured by the Philadelphia firm since 1942.

—o—

Acme Metal Products Co., Chicago, has purchased the former plant of the American Wire Fabrics Corp., Blue Island, Ill. The Acme company will occupy the Blue Island site Oct. 1.

—o—

W. B. Connor Engineering Corp., New York, has appointed the Harry A. Pillen Co., Cincinnati, and Allen, Mitchell & Co., Washington, to handle Dorex adsorption equipment and Kno-Draft diffusers.

—o—

John W. Cowper Co. Inc., Buffalo, has received a $100,000 contract for an addition to the Pittsburgh Corning Corp.'s plant at Port Allegany, Pa.

—o—

Niagara Falls Smelting & Refining Corp., Buffalo, has been sold to Continental Industries Inc., New York. Ernest Jarvis will continue as president and general manager of the Buffalo company.

—o—

Clark Mfg. Co., Cleveland, which for years has manufactured steam specialties sold under the name of "Strong Steam Specialties", announced it will deal directly with distributors and customers.

—o—

Johns-Manville Sales Corp., New York, recently honored Leslie A. Baldwin of Greenwich, Conn., vice president, on his twenty-fifth year with the company.

—o—

Rheem Research Products Inc. announced that the new address of its general office is Standard Oil building, Baltimore 2.

—o—

Curtiss-Wright Corp.'s plant at Buffalo will work on a sizable order of important parts for a naval airplane being manufactured at the company's Columbus, O., plant.

—o—

Whittaker, Clark & Daniels Inc., New York, has developed a substitute metalworker's crayon from a waste product of cuttings of natural crayons to help remove a crayon shortage.

CLARENCE M. FRAZIER

HENRY J. McKENZIE

Dayton-Dowd Co., Quincy, Ill., a long established pump company, has been purchased by Food Machinery Corp., and will become a branch of the Peerless Pump Division of Food Machinery Corp. Purchase of Dayton-Dowd brings to 15 the number of affiliated plants under control of Food Machinery, which services all branches with overall planning, engineering, research and financing. The Peerless Pump Division now has factories in Los Angeles, Quincy and Canton, O., and manufactures both horizontal centrifugal pumps and vertical turbine units.

Supervising all branches of Peerless Pump is Clarence M. Frazier. Henry J. McKenzie, who has been assistant manager of Peerless Pump, will have charge of the Quincy division.

Plan To Dispose Of Surplus Tools Given Approval

Cutting tool manufacturers to act as agents for government in disposing of surplus equipment

A PLAN for disposing of surplus cutting tools has been approved by the U. S. Department of Justice and the Surplus Property Board and contracts for disposal of equipment have been entered into between the Defense Plant Corp. and the Reconstruction Finance Corp. on the one hand and cutting tool manufacturers on the other.

Under this approved plan, the manufacturer who originally supplied the tools will act as agent for the DPC in disposing of surplus tools through normal trade channels. The plan, which follows in outline a plan proposed by the Cutting Tool Manufacturers Association, Detroit, is designed to speed tool disposal in an orderly fashion, eliminating speculation by requiring the sale of a minimum of one "surplus" tool for every three "new" tools of the same type produced by a manufacturer. There is no restriction on the maximum number of "new" tools that can be sold as long as one "surplus" tool is sold for every three "new" tools.

The plan is the first to be approved generally by both governmental agencies and industry and may serve as a model program for disposal of other types of surplus goods.

The cutting tools plan provides for efficient segregation through co-operation of the original manufacturer of tools into several classifications: For immediate resale; for reconditioning; for alteration; and for scrapping.

Among provisions of the plan are an allowance to manufacturers of appropriate charges for handling, reconditioning, and storage. It is understood that the plan also provides for allowing of normal trade discounts to distributors and other trade channels by the manufacturer in selling the surplus tools.

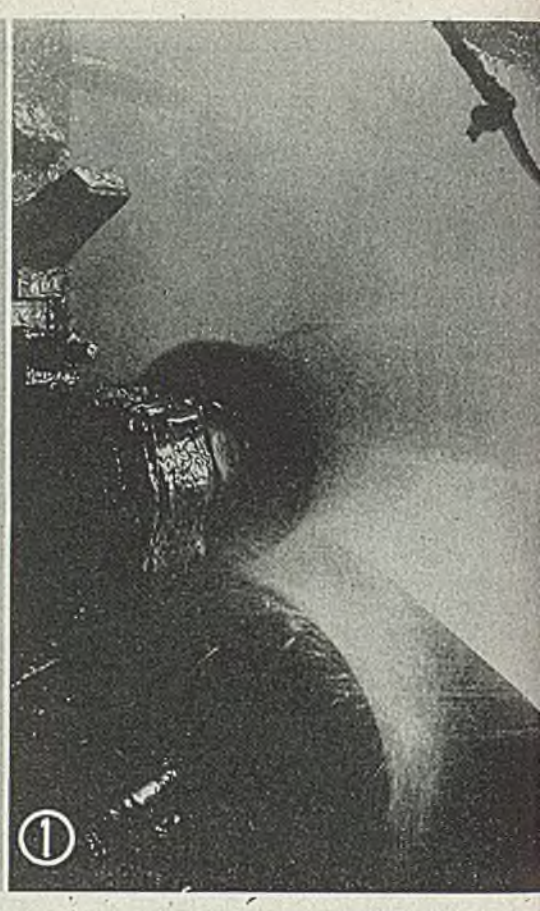
As a further insurance against increase in surplus tools, orders for new tools by the U. S. government or its branches will be filled first from such stocks of surplus tools as are available from the manufacturer-agent.

H. J. Merrick, executive secretary, CTMA, said: "Coming at this time, announcement of the plan should prove of major benefit. If reconversion should be accelerated, it will make immediately available through normal trade channels surplus tools otherwise frozen."

Industrial BRUSHES

Improvements in design and manufacture have resulted in increasing applications for cleaning metals and materials

By L. E. BROWNE
Associate Editor, STEEL

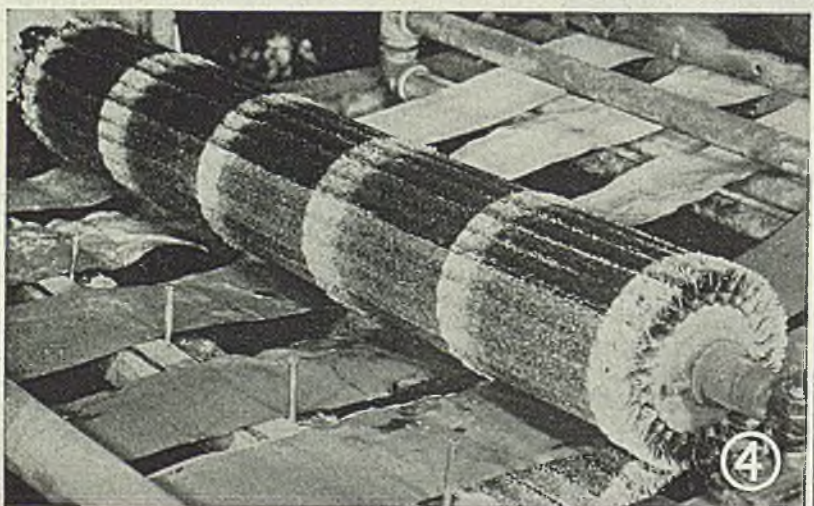


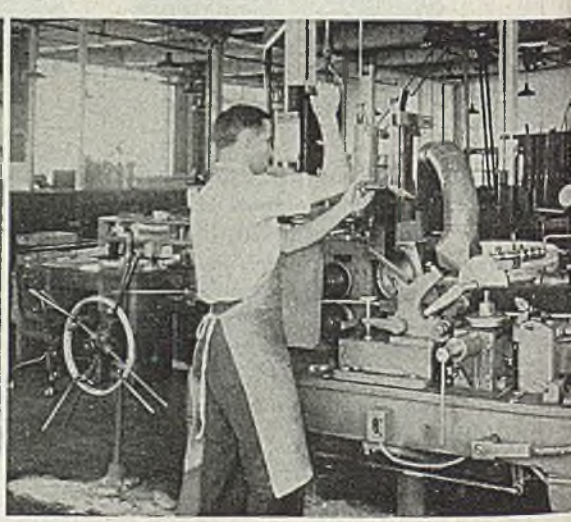
CONTRIBUTING to increasing application of mechanically-operated brushes by the steelmaking and metalworking industries are developments in design and fabrication which permit brushes to function as an integral part or fixture of automatic machines to which they are attached. Flexibility, with interchangeable and replacement features, has been attained to a marked degree. More uniform production, lower maintenance, reduced operating costs and simplification of machine design are noteworthy industrial brush improvements.

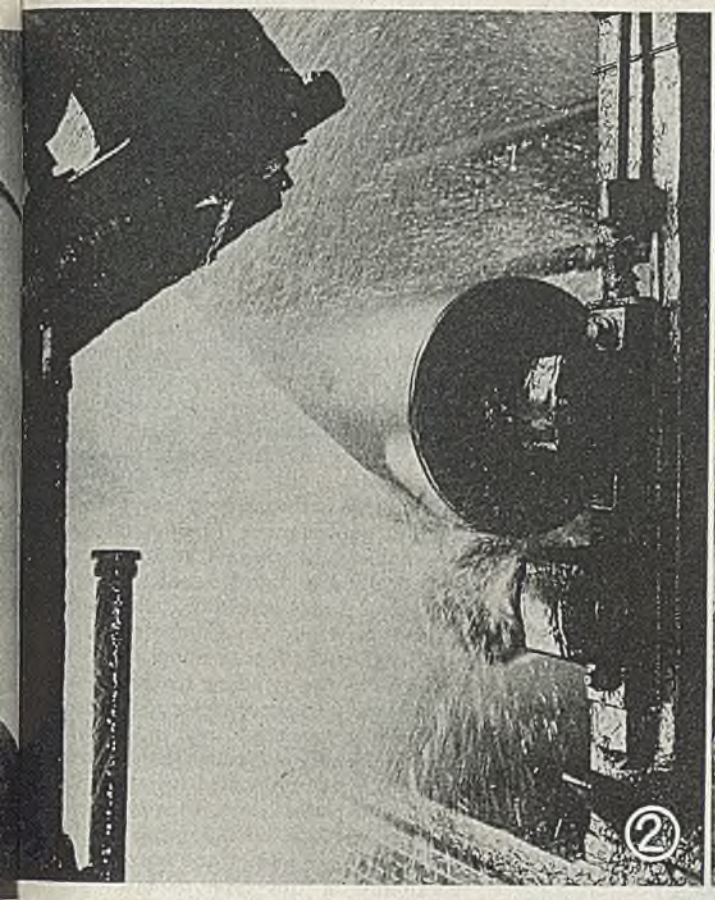
Brushes are primarily tools for cleaning metals and materials; automatic brushing is in most instances an auxiliary operation and an important one. Not being auxiliary, automatic features are desirable and widely used for a multiplicity of cleaning work. For machine brushes, a permanent metal core on which is wound steel-gripped brush filler strips has replaced many wooden cores, eliminating warpage and splitting.

The Industrial Division of the Fuller Brush Co., Hartford, Conn., forming narrow steel strip and wire in special roll forming machine, rolls brush material under heavy pressure into a continuous backing strip which may be shaped to any core or flange for machine application—cylindrical, spiral, circular, curved or flat. Backing metal is rustproof and can be produced in any length, feeding automatically from forming machine to core-winding unit. This brush construction is known as Fullergript.

Attachments for adjustments to machines are simple and replacement brush strips are easily installed. Strips can be radially coiled on metal cores in close or open formation, depending on the density of the brush required; many brush filler materials, including steel and bronze wire, hair or fibre, selected for any specific requirement, may be formed in the continuous strip. When the brush surface is worn down, cores are rewound. Faulty brushing, often caused by loose brush filler getting on work, is eliminated by the high pressure under which the steel strip and wire is folded and clamped, creating a secure vise-like filler setting. Also set in







a continuous strip and not in tufts, the steel-backed brush tends to wear more uniformly in many operations.

Ductility and elongation are prime requisites in strip and wire used in fabrication and assembly of backing; tests require steel be doubled and folded on its own diameter against the grain structure. For backing strips an electrogalvanized cold-rolled soft steel with No. 4 temper and edge hardness of 45-55 rockwell, is generally specified for standard requirements.

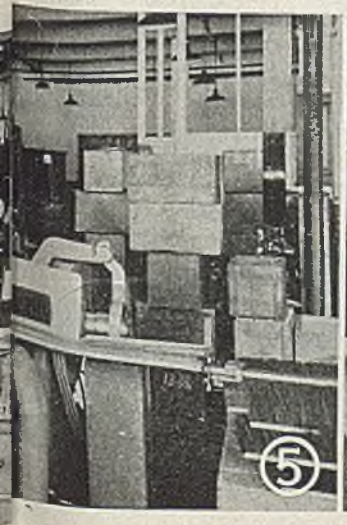
Round wire in the base of the steel grip is also electrogalvanized, brush quality, frequently No. 19 gage, although No. 16 and No. 14 sizes are also used in numerous assemblies. Also for twisted

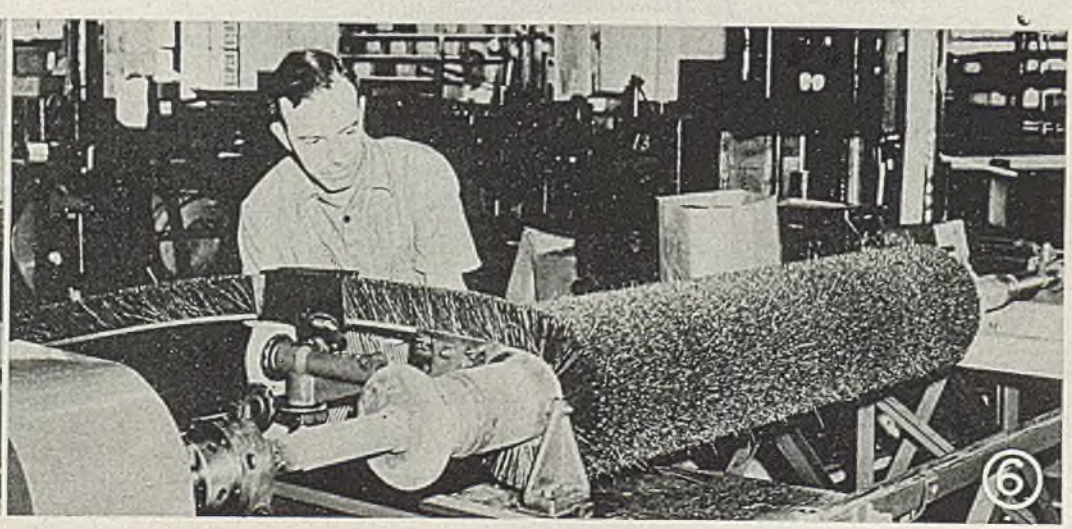
Figs. 1 - 3—*These unusual photographs taken in a large midwestern steel mill show strip entering the scrubber of a continuous strip mill (Fig.* 1*) and leaving the scrubber (Fig.* 2*). In Fig.* 3*, a brush has just been installed and is ready for use*

Fig. 4—*Pair of* 5*-inch tampico-filled brushes here are shown cleaning strip. Bristles in strip form are mounted on a cadmium-coated cast iron flanged roll*

Fig. 5—*Brush filler strip forming machine with steel strip reel in rear, showing contact with filler material and steel wire base at closing roll*

Fig. 6—*This cylindrical sheet and strip mill scrubbing brush is nearing completion in the plant of the Fuller Brush Co. The filled strip is fed directly from a forming unit like the one shown in Fig.* 5*. Core length of this brush is* 120 *inches; weight* 500 *pounds; finished brush length* 75 *inches and finished diameter* 12 *inches. About* 400 *feet of filled strip were required for this brush*





wire applications this grade is sometimes specified; too hard filler wire might scratch the metal finish in some operations. This wire can be wrapped around its own diameter.

Cadmium-coated backing material is used in some cases for improved finish, but most material is electrogalvanized before forming. Smallest flat coil used is ½-inch wide and 0.030-inch in thickness, ranging to ⅞-inch wide by 0.050-inch; experimental strips are being formed of material 1¼-inch by 0.0625. However, steel as thin as 0.025 is formed for some units, gage of material depending on applications.

For filler material, crimped untempered high carbon steel wire, in diameters 0.003 to 0.020-inch are used for some power brushes, also nickel silver for cleaning aluminum utensils. Phosphor bronze, brass, Monel metal and stainless wire are also used as fillers, the latter two in chemical and brass industries. Stainless steel fillers are used for scale removal after pickling operations.

Bronze wire as filler material, or mixed with hair and fiber, contributes materially toward elimination of static, notably in the leather tanning industry where power brushes are widely used. However, cleaning, and not static reduction, is the primary purpose. Bronze filler is also successfully used on brushes to remove scale from saw blades after pickling.

Most cores for refills are steel cylinders, many being seamless tubing. Other assemblies are sheared backing strip, screw attached to cast iron flange-ends, the latter frequently plated. Cores used for brushes in the food industry are generally aluminum with other materials being considered for postwar use.

A tampico-filled brush widely used in the steel industry for sheet scrubbing and finishing operations is wound on a 4½-inch OD seamless steel tube. Fed from a reel, narrow flat steel from which the backing strip is formed, first passes through two stamping and straightening rolls which also mark identification symbols on the metal. Two forming rolls then engage the steel strip and shape it into a rough U. A large disk and chain assembly just beyond the first form rolls, controls a hydraulic feed from the filler from a reel at right angle to the work, hopper directly above. A round wire, also from a reel at right angle to the work, is automatically fed into the base of the partially formed backing strip on top of the filling material. Immediately beyond the disk and meshed closely to the rate of filler deposit and wire feed, closing rolls press the steel at the top of the U-channel, clamping the filler into the metai, with the wire at the base tightly gripping the filler material also. This may be seen in Fig. 5.

Closing pressures vary with types of brushes, size and operational speeds, but are sufficiently high in all cases to firmly set and retain the filler in the backing strip. Beads at the top edge of the backing strip also aid in gripping the filler. Wire is straightened as it enters the backing channel over a grooved shoe or wheel. The finished steel holding strip is a modified triangle in most cases, but oval and flat shapes can be obtained with different closing rolls.

Filled strip is discharged continuously through a guide on the forming roll machine, but can be sheared at any point, automatically sealed at the ends to fit any core, special design or width. Filled backing strip may also be fabricated in a single length, 400 feet or more. Strip is fed direct to the winding machine and wound spirally to the core for cylindrical brushes; numerous types used in tin mills and other cleaning operations require from 165 to 400 feet of fabricated strip filler for coiling a completed brush. First two coils and the last two are usually welded to the core, securing the strip at the brush ends.

Flexibility of this type of brush assembly necessitates numerous refinements and variations for specific applications, but in general practice described is basic for backing strip fabrication. To meet some requirements other types of metal may be used, Monel backing and center wire for brushes in the brass industry for some operations. For winding on small

(*Please turn to Page* 142)

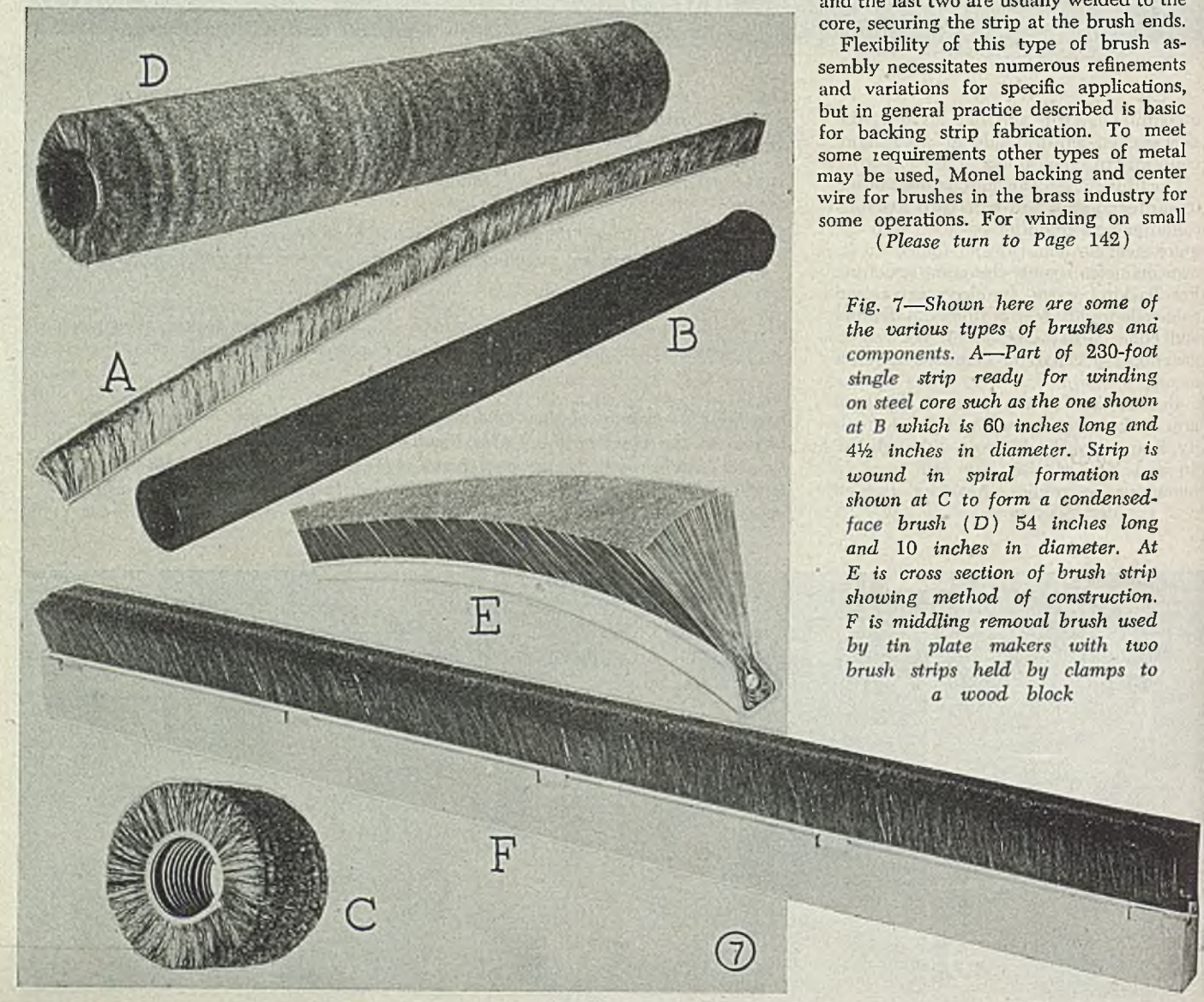
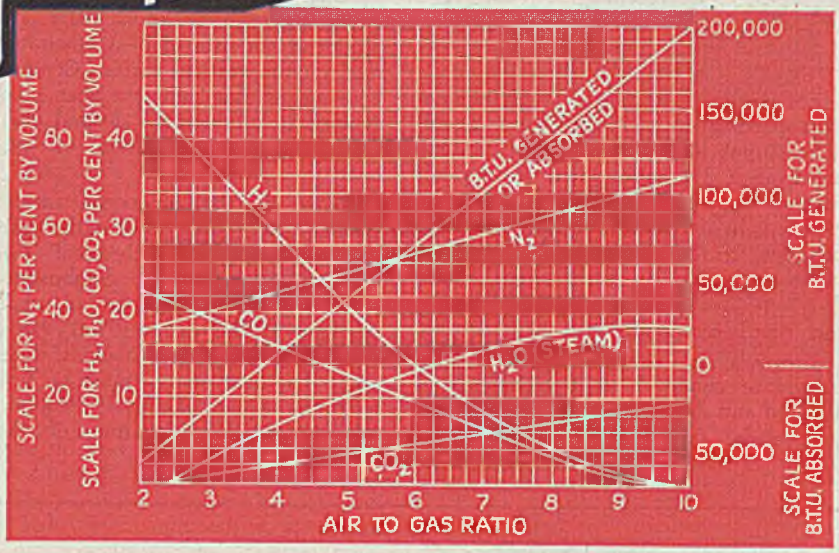


Fig. 7—Shown here are some of the various types of brushes and components. A—Part of 230-foot single strip ready for winding on steel core such as the one shown at B which is 60 inches long and 4½ inches in diameter. Strip is wound in spiral formation as shown at C to form a condensed-face brush (D) 54 inches long and 10 inches in diameter. At E is cross section of brush strip showing method of construction. F is middling removal brush used by tin plate makers with two brush strips held by clamps to a wood block

Improved Protective Atmospheres Avoid Decarburization in...

Hardening "Moly" Hacksaw Blades

By G. W. BIRDSALL
Associate Editor, STEEL



Analyses of protective atmospheres produced by Bellevue atmosphere generator at various air-gas ratios. See text for full explanation

OBTAINING desired maximum hardness in high carbon hacksaw blades made of molybdenum high speed steels involves heating to temperatures around 2250-2300 degrees Fahr. At these temperatures, it is no easy matter to avoid decarburization and resultant softening of the surface layers. Yet no softening whatever can be tolerated, for it would result in unsatisfactory performance of the saw blades.

Because the controlled or protective atmospheres usually employed tend to break down at these high temperatures the conventional method of furnace hardening these blades involves dipping them first in a solution which deposits a glass-like coating of flux over all the blade surface. This covering then serves to protect the steel from the atmosphere during heating prior to quenching.

Disadvantage of this procedure lies in the necessity of sand blasting the hardened blades to remove the flux coating, points out C. C. Gallagher, general manager, Bellevue Industrial Furnace Co., Detroit, in relating his company's experience in successfully solving this problem. When the hacksaw manufacturer originally sought to improve this operation, he was advised by his steel supplier that there was no other satisfactory method.

However, investigation of this problem at Bellevue resulted in development of a method that has been found to give the simplified operation sought, reports Mr. Gallagher. The key to the solution lies in an improved protective atmosphere which does not break down at the high temperatures employed.

Description of furnace and atmosphere generating equipment now successfully used to harden these molybdenum hacksaw blades without scaling or decarburization finds the main point of departure from conventional equipment to lie in the cracking unit which employs special materials along with a catalyzing agent.

But let's examine the furnace and generating equipment in detail because it has been found to produce good results throughout an unusually wide range of other atmosphere requirements merely by adjusting the fuel-air input ratio.

Furnace is of the tool room type, the work being placed in a silicon carbide muffle (no alloy). Muffle is heated at two sides, as well as on the top and the bottom by means of conventional gas burners. So far muffles have ranged up to 36 x 60 x 20 inches high, although most any size can be made.

The protective atmosphere is injected into the muffle through perforations in the hearth. The muffle entrance is sealed with a gas flame at the door so no air can enter during placing and removal of the work. As the protective atmosphere is inert, there is no danger of explosion. After the furnace is filled with the atmosphere, burning will not take place until it is allowed to escape into the room. A small pilot flame located at the point where the controlled atmosphere is allowed to escape insures positive ignition.

Temperatures up to 2450 degrees Fahr. are readily maintained in the working chamber.

Protective atmosphere is charged into the muffle at a rate of 10 cubic feet per hour input for every cubic foot of muffle capacity, providing 10 changes per hour.

Atmosphere generating equipment consists of a gas cracker unit with all necessary controls such as pyrometers, floscopes, fire traps, automatic valves, etc. A motor-driven Selas machine supplies any air-gas ratio desired. Natural fuel gas at 1000 Btu per cubic foot is employed, although manufactured gas can also be used. It is mixed with a certain amount of air as determined by the setting of the mixing machine and fed into the cracking unit.

This consists of a high nickel alloy steel retort (SAE-3515) which is heated externally by a small furnace built around it. Retort is operated at a normal temperature of about 1830 degrees Fahr. In the retort are a quantity of high-temperature porous refractory cubes which have previously been impregnated with a nickel nitrate solution and other materials, including a special catalyst.

When the operating temperature of 1830 degrees has been reached, the gas and air valves are opened and the mixing machine adjusted to supply the air-gas mixture desired. The heat of the retort assures complete combustion of the mixture and the catalyst in the retort effects the reaction which produces the controlled atmosphere, according to Mr. Gallagher. Before feeding this into the furnace muffle, it is passed through a short cooling tower to lower the temperature to approximately 250-300 degrees Fahr. This is done merely to facilitate safe handling through the con-

necting pipe to the furnace, since it is not necessary to cool the atmosphere to remove water, as the dew point of the water is so low it has no visible effect. Examination of the accompanying combustion diagram will show this.

Mr. Gallagher points out that this chart indicates the usual commercial range of air-gas ratios from 2 to 10 parts air to one of gas, although the available range runs from 100 per cent air to 100 per cent gas. Water vapor and carbon dioxide drop out completely at ratios of 2¼ to 1 and under. No free oxygen is evolved at any ratio.

For heat treating the molybdenum high-speed steel hacksaw blades, a still richer input mixture is employed, varying from a 1:1 ratio down to one-half part air to one of gas. Apparently, the nitrogen, hydrogen and carbon monoxide produced by this equipment at these low ratios result in an atmosphere which does not break down when used at the high muffle temperatures of 2300 degrees.

However, at leaner or richer mixtures, the chemical reaction balance is affected and decarburization of the hacksaw blades is experienced. It would appear that the combination of the gases produced in the 1:1 down to ½:1 ratios produces the only atmosphere whose overall reaction does not decarburize this sensitive steel.

Explaining the combustion chart further, Mr. Gallagher says, "These curves show what happens when natural fuel gas is combusted with varying air-to-gas ratios, extending from complete combustion to complete cracking.

"Complete combustion occurs when air-to-gas ratio is about 10:1. Gases produced and Btu of heat generated are read on the vertical scales. 'Combustion' here means that sufficient heat energy is evolved to produce the desired chemical reaction without addition of external heat.

"Now as the air-to-gas ratios get smaller (proceeding toward the left side of the chart), the chemical reaction changes from partial combustion, to partial cracking, and on to complete cracking at the extreme left where ratios are below 3:1. 'Cracking' here denotes that heat energy must be supplied to promote the chemical reaction. In other words, these mixtures of fuel gas and air will not burn, but must be heated to produce the reaction desired.

"At any air-gas ratio indicated on the horizontal scale, the approximate amounts of hydrogen, carbon monoxide, carbon dioxide, nitrogen and water vapor may be read on the vertical scales. Of course, these values are true only for controlled atmospheres produced from the generating equipment described and do not hold for other equipment.

"With a 2¼ to 1 ratio, that is just a little over two parts air to one of gas, the controlled atmosphere will consist of 21.7 per cent carbon monoxide, 43 per cent hydrogen, 0.8 per cent CH_4, 18.4 per cent nitrogen, no carbon dioxide, no oxygen and no water vapor. Dew point is equal to minus 20 degrees Fahr. This is a good atmosphere to use for bright annealing, clean hardening, and carburizing; although to carburize, it is necessary to introduce a small quantity of a hydrogen such as propane into the line leading to the furnace. This atmosphere can also be used for annealing stainless steel, the slight resulting discoloration being easily removed by an acid dip."

Prime Movers Facilitate

Power shovel and crane-operated magnet operate as a unit in the reclamation of metallics

A FLEET of five diesel crawler tractors, two power shovels, and four crane-mounted magnets operated by small power units—all supplied by the International Harvester Co., Chicago—handle the salvaging job at the refuse dump of the Carnegie-Illinois Steel Corp. at Gascola near Pittsburgh. This dump, where salvage operations started in 1908, is over a mile long and 150 feet high.

Steel mill refuse hauled to the dump in railroad cars comes from slag ladle bottoms and often must be broken. This is accomplished in a pit with a 5-ton steel ball. The latter is raised by a stiff-leg crane operated by a diesel power unit of 100 horsepower at 1400 revolutions per minute.

Much of the metal-containing slag from the ladle bottoms crumbles in small pieces and during the years has been mixed with refuse, sand, broken bricks and other refuse. To salvage this material, the power shovels and crane-opated magnets work in pairs as shown in the accompanying illustration. The shovel is dumped with a swinging motion to spread the material and then the magnet is swung above the refuse. The recovered scrap is dumped into a special pile, and later taken by motor trucks to a railroad siding.

After the refuse material has been worked over by the magnet, it is pushed over the edge of the dump by tractors with bulldozers. These also are used to move the material in piles to facilitate work with shovels and magnets.

The heaviest pieces of metal-carrying slag have a tendency to roll down the refuse pile as they are dumped from railroad cars. A crane with a 40-foot boom operated by a diesel power unit picks up these pieces, assembles them at the bottom and then loads them into trucks.

Three of the magnets used for recovering the metal from the refuse pile receive their current from 15-kilowatt ready power generators. These are operated by a power unit which develops 31½ horsepower at 1800 revolutions per minute. There is also available a power unit which develops 22 horsepower at 1800 revolutions per minute and which is employed for operating a 10-kilowatt generator.

Operation of this dump since 1941 has been under the direct supervision of R. M. Chambers, salvage contractor, Turtle Creek, Pa.

Cleaning Forgings for Magnaflux Inspection

By E. H. JOHNSTON
Chief Metallurgist
Standard Forgings Corp.,
Chicago

DUE to rigid Magnaflux specifications on seams, nonmetallic inclusions, and other defects on certain small aircraft and engine forgings made at Standard Forgings Corp., it was found necessary to develop a cleaning method which would provide not only a surface free of scale, but one which would have a clear, bright surface upon which the red or black Magnaflux powders would stand clearly in relief.

This is especially necessary when a defect of very minute or shallow nature is present. The surface obtained from the routine sulphuric acid pickle has a tendency to be dull and sometimes reddish in color, especially if the pieces are allowed to stand an appreciable length of time before inspection.

Since the tonnage involved in these forgings did not warrant the addition of a more expensive cleaning process to remove the scale and produce a bright surface, it was decided to experiment with a process which could be applied to the forgings after they had been through the routine sulphuric acid pickle.

After various acid mixtures were tried without the desired results, it was decided to try oxidizing the surface metal and smut with a strong solution of sodium hydroxide containing nitrate. It was known that this mixture, when applied to a piece of steel not too highly alloyed, will give a very black surface. It was found by experiment that this black oxidized surface can be removed instantly by dipping the piece into a 1 to 1 solution of hydrochloric acid. Any of the common mineral acids will remove the black coating, but hydrochloric was decided upon because it is somewhat less dangerous to operators and gives off less fumes.

After the black surface oxide has been removed, the forgings are washed in hot water and allowed to dry. The resulting finish is clean and almost as white as a piece of paper. This provides a surface ideal for a red or black Magnaflux powder. Many small defects which previously were unseen become apparent to the unaided eye.

The four solution tanks used in the process are made of ⅛-inch steel plates, welded together, and can be of any size sufficient to produce the required number of pieces per hour. Solutions were used in the following order:

Tank No. 1—Black bath. This solution is made up and used according to data received from E. F. Houghton & Co. The prescribed temperature of 290-295 degrees Fahr. is maintained at all times, with steam coils in the solution tank. Water or additional salt is added from time to time in order to maintain the boiling point as recommended. As stated by Houghton company, the actual boiling point obtained in the tank at any time is the best indication of the condition of the solution. The color obtained on the work is also a good indication. The pieces should always come out a jet black color. (Note accompanying illustration and disk third from top).

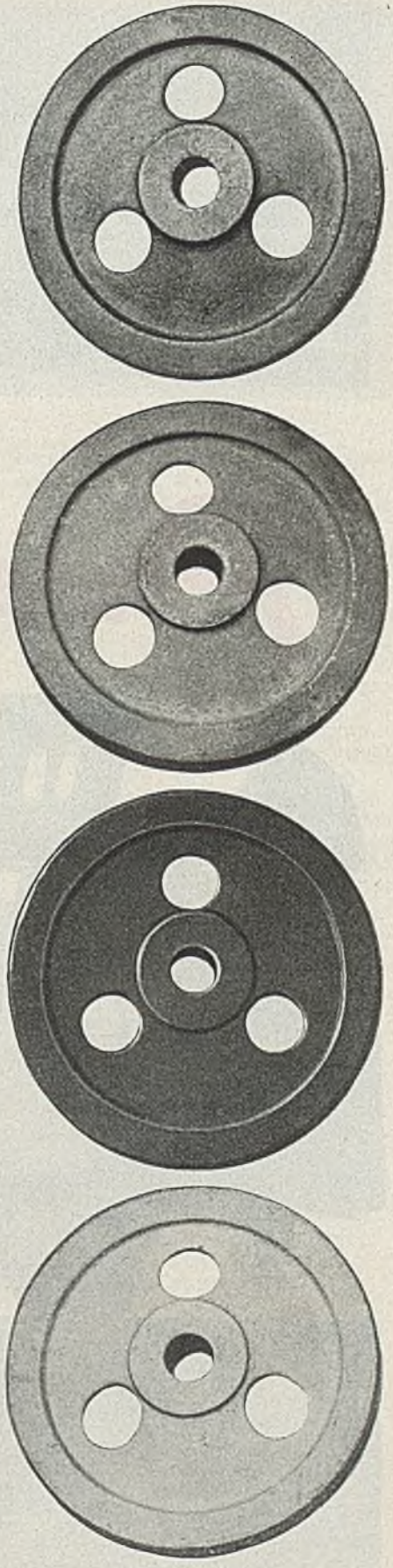
Tank No. 2—Hot water containing a small percentage of the special blackener.

Tank No. 3—Hydrochloric acid (1 to 1). This solution gradually heats up somewhat from the hot work being placed into it.

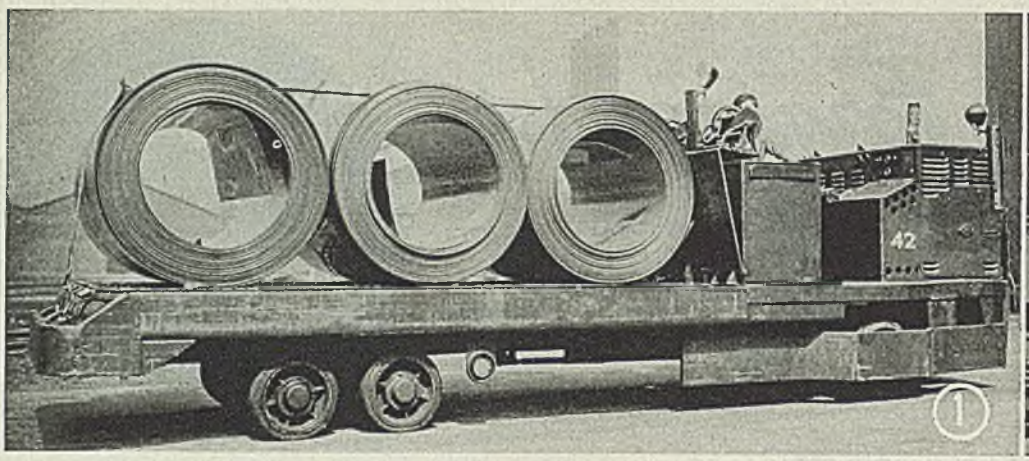
Tank No. 4—Hot water. Same as tank No. 2. This tank can be eliminated and tank No. 2 can be used twice.

Process consists of immersing the work in the hot water tank for 5 minutes so that the temperature lost in the blackening tank will be small. After 5 minutes in the hot water, the work is placed in the blackening solution for 15 minutes. At the end of this time the work is removed, dipped in hot water tank No. 2 to remove excess caustic, then into acid tank No. 3, and then into hot water tank No. 4. The pieces are allowed to remain in the hot water tank for about 1 minute so they will be hot enough to dry quickly in the air. If not white enough to suit, the process can be repeated.

Since the installation of this process, visual and Magnaflux inspection on the small parts mentioned has been stepped up 100 per cent. Not only does the process work very well for small forgings, but it can be applied to forgings or castings of any size. It has been found the surface condition obtained persists for several months if the pieces are kept in a dry, warm place.



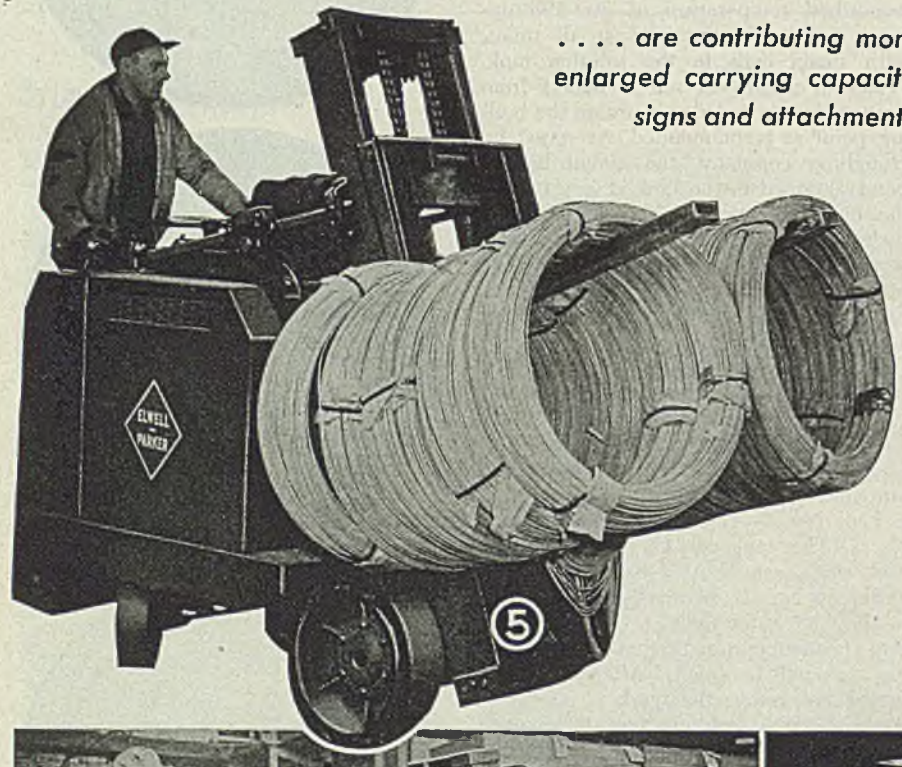
Disks above demonstrate progressive steps in cleaning process. Reading from top to bottom: Disk as forged; after pickling; as blackened in bath; disk with silvery color resulting from stripping blackened work in HCl solution



By E. C. COOK
Vice President
Elwell-Parker Electric Co.
Cleveland

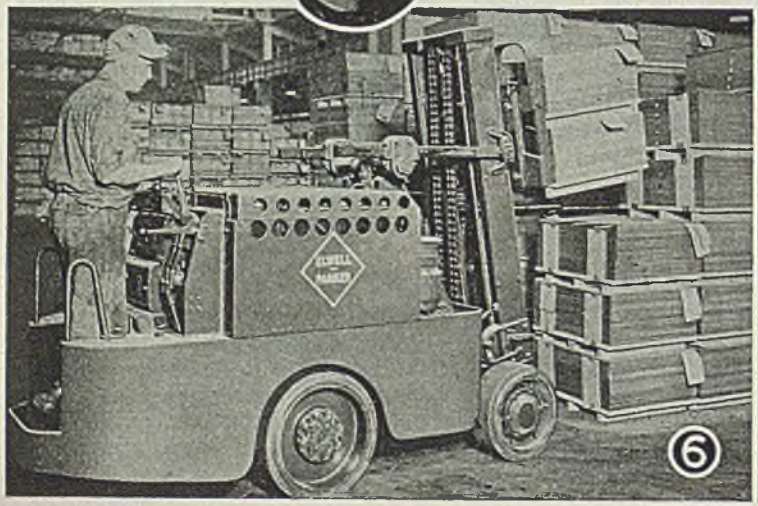
Power Trucks

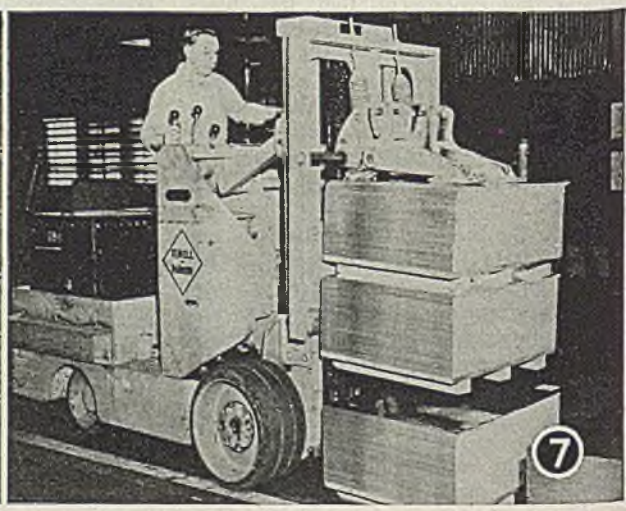
. . . . are contributing more to plant outputs by virtue of their enlarged carrying capacity and greater power. Special designs and attachments also increase their usefulness

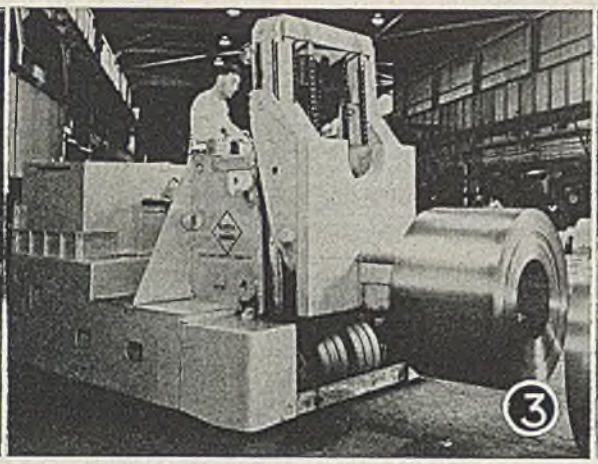


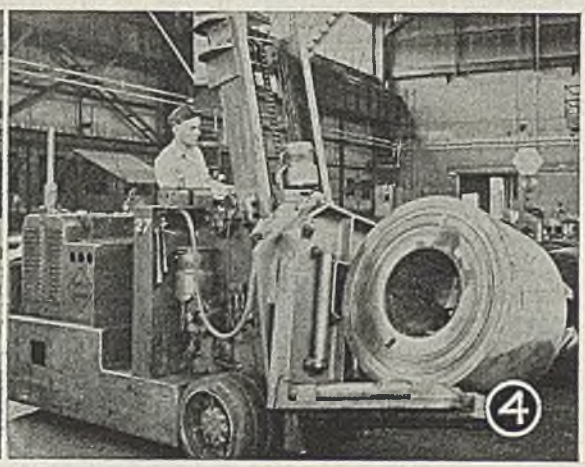
SECOND only to the railroads, steel mills in the United States use more power industrial trucks than any other group. High in the list also are the metalworking and metal-consuming industries such as those devoted to machining, stamping, forging; foundries, aircraft, motors, trucks; paper, chemicals, food packing and rubber. All have made vital contributions to the war effort, and all depend on power trucks and other modern equipment for conveying and handling raw material and finished products.

Power trucks have won widespread recognition as important factors in fast, economical and safe production. One of the reasons for this is that they conserve manpower; and what is more important in many industries, they accomplish work









that is considered hazardous and repellent when done manually.

The greatest advance in development of power trucks occurred in the years between the outbreak of World War I and the beginning of the present struggle. They were well established as indispensable equipment in many industries, ready to assist in accelerating mass production of goods at the outbreak of this war.

Improvements have been made in recent years, mainly in enlarging power plant and capacity, and to an important extent in design of attachments to adapt them to more uses. But basically they are the same machines which were at work in many industries in 1940, and which were ordered in large numbers for new plants devoted to production of armament.

Demand for them expanded much faster than they could be built. Like machine tools and other essentials, they were controlled by double-barreled priorities; steel for their construction could be obtained only on government order; and their distribution was limited to those companies working on essential requirements.

The subject of materials handling has been studied intensively, and if recent experience is any indicator, the use of power trucks will be universally accepted practice in postwar manufacturing.

It is not difficult to discern the reason why the steel industry is one of the largest users of such trucks. The industry is a vast mechanism for handling materials —in mining, transportation, processing, and shipping—employing more equipment of a diverse character in these operations than any other group.

The steel industry's evolution in machines and method has abolished back-breaking, dangerous manual labor. As every one knows, it has contributed in large measure to establishing this nation's high standard of living. But not so generally understood is the fact that if it had not achieved these results before this war, the fate of the world might have been different, for it not only supplied this country's requirements of all-important war metal, but also most of those of our allies.

Some idea of steel as a materials-handling industry may be gained from figures issued recently by the American Iron and Steel Institute, which show that 5 tons of raw materials are consumed

Fig. 1—Huge "power wagons" of this type are one of latest innovations in steel mills where their 156-inch platform is equipped with six sets of endless conveyor chains that can be driven in either direction to load, straighten or discharge three or four large coils, depending upon diameter. Rated capacity is 50,000 pounds. Machine proved less costly to operate than road truck or industrial railway

Fig. 2—Closing doors of dump or hopper type ore cars in Lake Superior district is tough job in cold weather when ice freezes mechanisms. But now the special power truck shown equipped with a mechanical connection to the car mechanism winds up bottom gates on 515 cars in one day as it moves down the line

Fig. 3—Extra heavy duty ram truck carries 25,000-pound coil. Four wheels arranged in pairs across the front, each pair pivoted to conform to floor irregularities and distribute load evenly. All four wheels have brakes. One wheel in each pair is driven through roller chain from motor-driven differential bearing axle

Fig. 4—This truck has cradle with rollers on back and bottom extension permitting unit to upend coils. Extension on other side is in form of two forks. Unit can pick up coils from either horizontal or vertical position, rotate them 90 degrees and deposit them in reverse position or discharge them at the side. Cradle is tilted backward when traveling to prevent coil from rolling off

Fig. 5—The two tines of this fork truck are being used to handle ten coils of wire at a time, greatly reducing time and cost of unloading

Fig. 6—Black sheets and tin plate strapped to skids are handled and tiered easily, effectively reducing shipping and storage costs at both mill and fabricating plant

Fig. 7—Safety clamping attachment is built into frame to hold loose material during handling operations

Fig. 8—One of first power trucks was a unit of this type employed in charging annealing furnace with malleable iron castings in pots. Rubber tires withstand temperatures up to 700 degrees Fahr., permit loading and unloading furnace while hot

for every ton of steel produced. The number of freight cars that would be needed to hold all its incoming materials and outgoing products as in 1944 would reach 2½ times around the earth at the equator. In every 24 hours the industry as an average receives:

317,000 net tons of iron ore
249,000 net tons of coal
128,000 net tons of scrap
80,200 net tons of limestone
25,000 net tons of miscellaneous materials
5,779,000 gallons of fuel oil
621,300 gallons of tar and pitch

These materials are enough to load 16,000 freight cars, a train 133 miles long.

In every 24 hours, the industry ships steel in the following tonnages to these consumers:

Consumer	Net tons
For direct war purposes	58,548
To the railroads	15,954
Construction	12,258
Containers	10,925
Machinery and tools	6,645
Pressing, stamping and forming	7,930
Agriculture	3,044
Oil, gas and mining	4,426
Converting, export and processing	44,962
Jobbers and distributors	21,410
Miscellaneous consumers	12,180
Total	198,282

This tonnage would load 4406 freight cars, a train 36 miles long. More than 41 per cent of the industry's output of finished steel in recent years has been in the flat-rolled classification, as for example in 1944:

Product	Net tons
Tin and terne plate	2,605,285
Strip	2,894,513
Sheets	9,822,898
Black plate	609,917
Sheared and universal plate	12,866,213
Total	28,798,826

In mills such as those devoted to production of heavy, compact tonnages, and in their warehouses and shipping departments especially, power trucks have demonstrated their power and stamina.

Virtually all types are in service, including those with low-lift and high-lift platforms; cranes; combination platforms and cranes; fork trucks with various attachments for handling varied classes of material; the simple load carrier, with larger platform area; the tractor for hauling trains of hand or power-loaded trucks. In recent years, some unusually large trucks have been built, with special mechanisms for multiple loads of strip steel in coils.

Capacities of the machines range from 1000 to 60,000 pounds, but the average of those in the mills is 6000 to 12,000 pounds. Low-lift platform trucks lift their loads 3 to 6 inches, while high-lift platform and fork type trucks elevate loads to height of 117 inches. Crane trucks have telescoping booms extending 12 to 19 feet.

Except for the batteries in the all-electric trucks, and the controls and rubber tires, the trucks are practically all steel; the bodies being built of heavy

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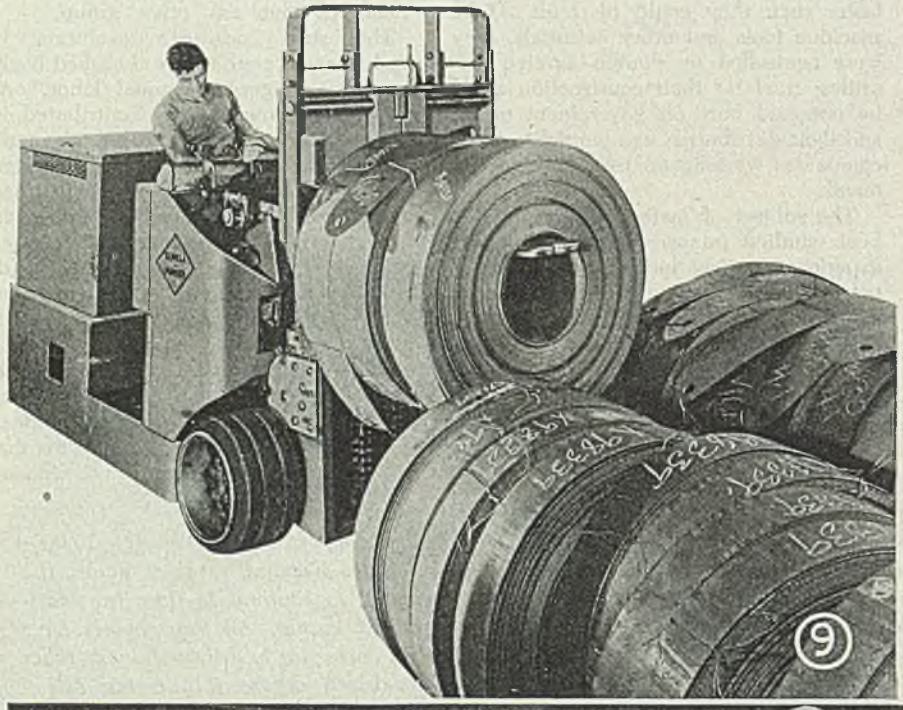


Fig. 9—*Battery behind operator counterbalances heavy loads on this ram truck*

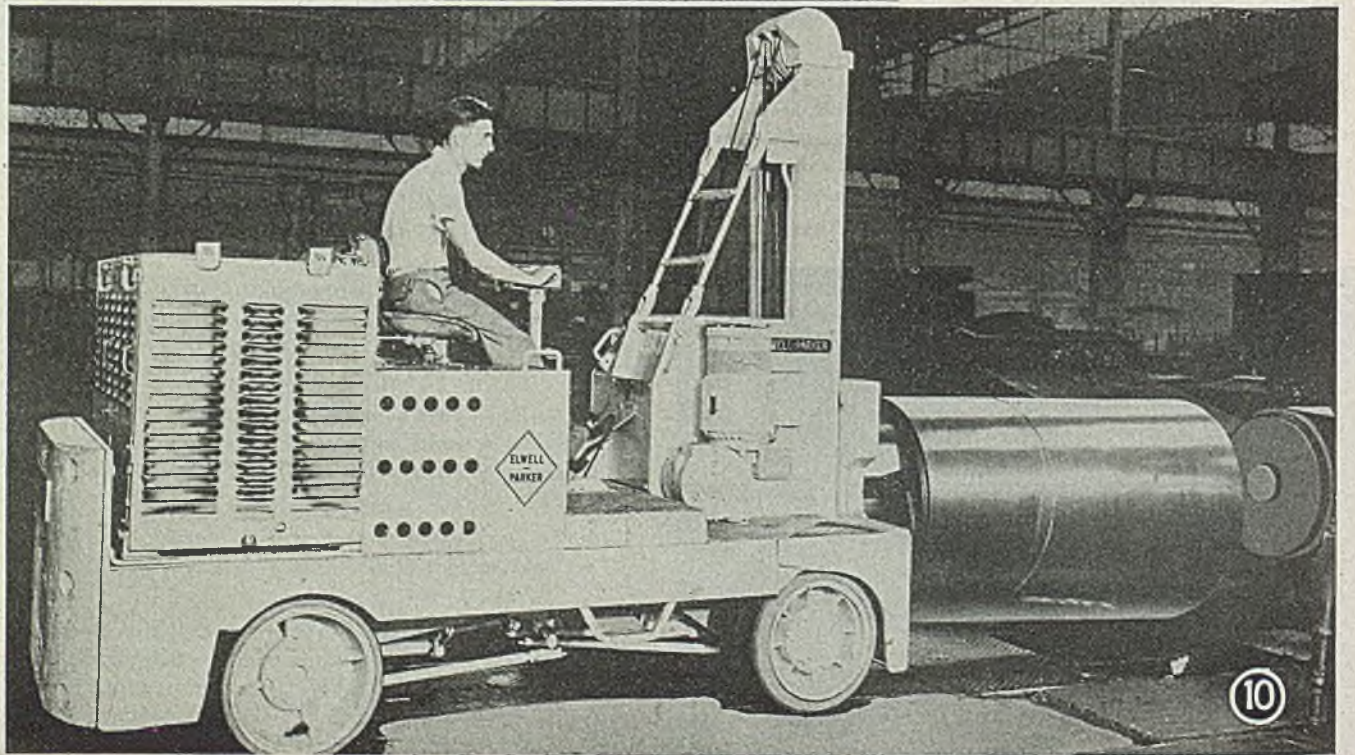
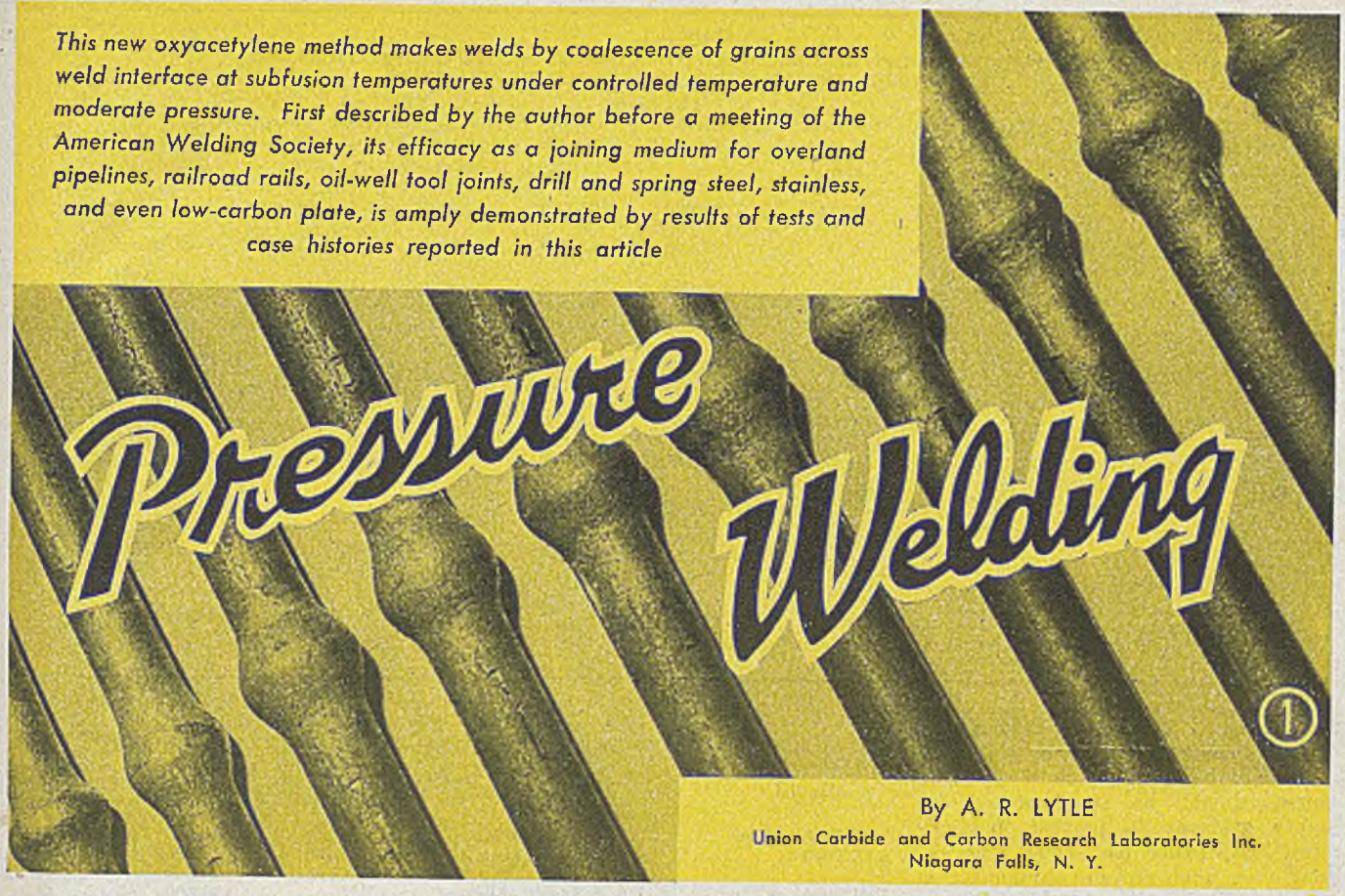


Fig. 10—*Ram truck is driven and steered by both the front and rear wheels*

This new oxyacetylene method makes welds by coalescence of grains across weld interface at subfusion temperatures under controlled temperature and moderate pressure. First described by the author before a meeting of the American Welding Society, its efficacy as a joining medium for overland pipelines, railroad rails, oil-well tool joints, drill and spring steel, stainless, and even low-carbon plate, is amply demonstrated by results of tests and case histories reported in this article

Pressure Welding



By A. R. LYTLE

Union Carbide and Carbon Research Laboratories Inc.
Niagara Falls, N. Y.

OXYACETYLENE pressure welding may be fully or partially mechanized. Specimens are butted under nominal pressure, heated by means of multiple small oxyacetylene flames to a temperature of about 1200 degrees Cent. and upset to a controlled degree. The process possesses many special advantages, among which are adaptability to high-carbon and alloy steels, which are welded with difficulty by fusion welding methods; smoothness and uniformity of the completed weld; short welding time; and relatively low unit cost. Physical properties of these pressure welds are excellent.

Oxyacetylene pressure welding differs from practically every other current welding process in that the weld is made not in the liquid phase but by coalescence of grains across the weld interface at subfusion temperatures under the influence of controlled temperature and pressure. The weld is accomplished by abutting the clean square faces of the two sections to be welded under moderate pressure, and heating the weld zone by one or more oxyacetylene flames to a uniform temperature of about 1200 to 1250 degrees Cent. (2192 to 2282 degrees Fahr.) until upsetting at the joint occurs. The completed joint has a definite bulge or upset at the weld, varying in height with the thickness of the metal welded. The bulge is characterized by smooth, well-rounded fillets. The process is ideally adapted to semiautomatic or fully automatic operation and thus is capable of a high degree of uniformity. Fig. 1 illustrates a group of pressure welds in 1 and 1¼-inch diameter bar stock showing the general appearance of welds made by this method.

Apparatus for pressure welding comprises equipment for applying end pressure, suitable welding heads designed to provide uniform and controlled heating, and necessary indicating and measuring devices for regulating the process throughout its cycle of operation.

Pressure Equipment: The type of pressure equipment depends almost entirely on the shape of the specimen and the location of the weld. Some operations require rather complex equipment, whereas for others a simple press is entirely suitable. For joining long members such as railroad rails and overland pipe, presses equipped with side clamping jaws are necessary, and several different types of these clamps have

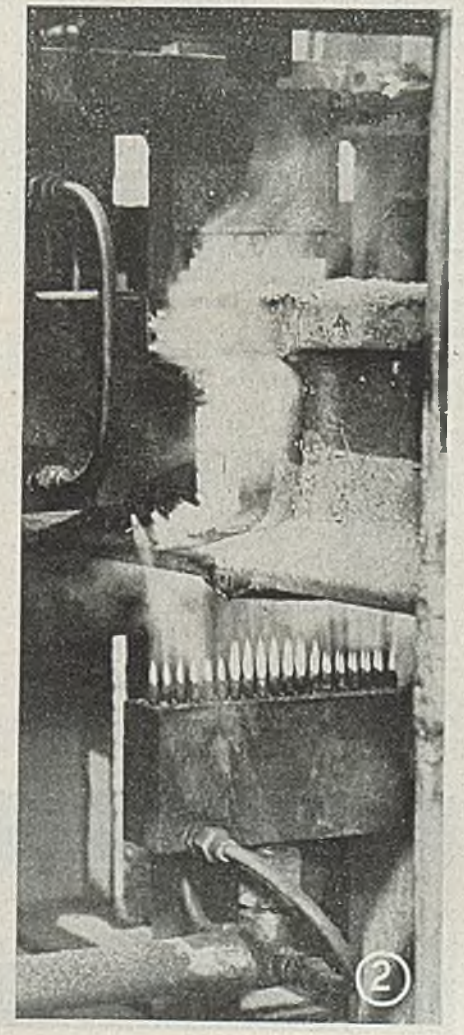


Fig. 1—Oxyacetylene welds in group of 1 and 1¼-inch diameter bars. Note general condition of upset zone and clean smooth condition after welding

Fig. 2—Multiple flame heads for pressure welding of railroad rails. Flames directed downward on top surface of rail are of uniform size, whereas flames directed against side, web and base of rail are proportioned to thickness of section against which they impinge

TABLE I

TENSILE PROPERTIES OF PRESSURE WELDS IN TYPICAL ALLOYS AND APPLICATIONS
(REINFORCEMENT REMOVED FROM WELD IN ALL CASES)

Material	Approx. Dimensions of Weld	Heat Treatment	Lbs. Per Sq. In. Yield Point	Lbs. Per Sq. In. Tensile Strength	Per Cent Elong. in 2 in.	Per Cent Reduction of Area	Bend Elong. ½ in.	Tensile Fractur
Wrought Iron Links	¾ in. diam.	A.W.*		Total load, 43,000†				Shear Break
Overland Pipe	6 in. diam. x ⅛-in. wall	A.W.	35,000	62,300	....	....	Flat	Base Metal
0.10% C Deep-Drawn Steel Shells	15 in. diam. x ⅛-in. wall	A.W.	27,200	48,300	23.8	....	Flat	Base Metal
Reinforcing Bars								
SAE 1030	2 in. square	A.W.	36,000	72,400	....	....	....	Base Metal
SAE 1045	1¼ in. diam.	A.W.	65,000	104,000	....	....	....	Base Metal
	1¼ in. diam.	T.N.*	64,000	98,000	....	....	....	Base Metal
0.80 C Rail Steel	112 lb. rail	T.N.	61,450	130,250	14.8	20.1	....	Base Metal
0.90 C Steel Spring Leaves	3 in. x ⅜ in.	Orig.	126,000	186,600	3.0	4.7	....	Base Metal
		P.W. & H.T.	125,000	190,800	11.3	19.1	....	Base Metal
Tool Joints	5 in. diam. x ⅝-in. wall	T.N.	69,400	105,900	....	....	33%	Drill Pipe
Stainless Steel to Nickel Alloy	Bars	A.W.	37,800	95,700	26.3	35.9	20%	Stainless Steel
NE 8630	¼-in. plate	A.W.	70,900	103,600	....	....	....	Base Metal
Shear Blades 12% Cr Steel to Low-Carbon Steel	½-in. x 6 in.	A.W.	32,200	58,900	....	....	....	In Low-Carbon S
18 Cr-8 Ni Cb	1¼-in. bars	A.W.	31,700	84,700	39.8	53.8	....	Weld
SAE 4340	¼-in. plate	H.T.*	186,500	200,100	....	....	8%	Base Metal

*A.W. = As-welded—reinforcement removed.
T.N. = Torch-normalized.
H.T. = Furnace heat-treated.
†Hand-welded links average 33,000 lbs. total load with shear fracture.

been designed and are in current use. However, in many operations plain end pressure is permissible. Both types, of course, should be supplemented by proper guidance to prevent misalignment. Experience has shown that hydraulic or fluid pressure equipment is almost ideal for this purpose, as it is readily variable, is subject to mechanical as well as manual control, and will maintain pressure regardless of expansion or contraction of the specimens being welded.

Capacity of the pressure equipment, of course, would depend upon the size of the work. Most pressure welding now being done is carried out at pressures of from 2500 to 4000 psi of abutting surface. Welds can be made with the pressure as low as 1500 psi, but upsetting at this pressure is rather slow. For welding steels that have high strength at high temperatures, such as the chromium and chromium-nickel steels, the unit pressures may be as high as 4500 psi. This would be expected from the physical properties of these alloys.

Blowpipe Equipment: As indicated, uniform and controlled local heating is one of the essential requirements for successful pressure welding. It is necessary that the heat supply be proportioned to the dimensions of the specimen being welded so that the rate of temperature rise is uniform throughout the section, as it is necessary to bring the interior of the specimen to the welding temperature without overheating the external surface. For practical purposes, requirements of uniform and controlled heating are best secured by multiple small oxyacetylene flames such as are widely used for flame-hardening operations. This type of heating permits a wide latitude in the balancing of local heat input with the heat requirements

TABLE II

RESULTS OF KROUSE FATIGUE TESTS—10,000,000 CYCLES OF STRESS

Material	Approx. Dimensions of Weld	Heat Treatment	Endurance Limit, PSI	Per E. T.
Low-Carbon Plate	½ in. x 6 in.	A.W.	32,000	
SAE 1045	1¼ in. diam.	T.N.	48,000	
		W.Q. & D.	58,000	
Rail Steel	112-lb. rails	T.N.	56,500	
Tool Joints Low-Alloy Steel	5 in. diam. x ⅝-in. wall	T.N.	50,500	
Stainless Alloy to Nickel Alloy	Bars	A.W.	50,500	
NE 8630	¼-in. plate	A.W.	56,000	
		H.T.	72,000	
SAE 4340	¼-in. plate	H.T.	55,000	

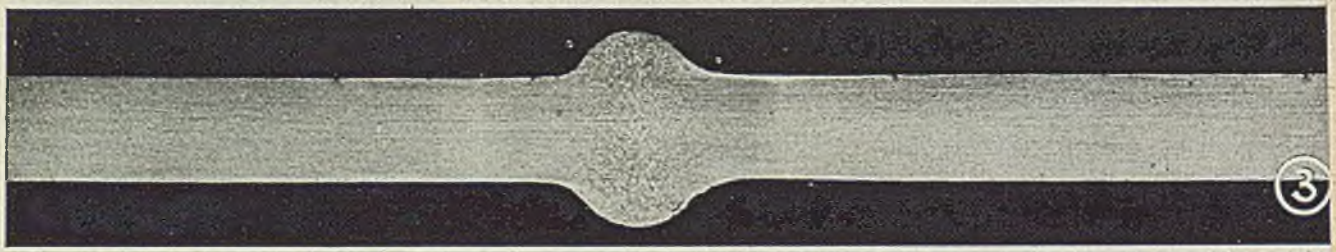
TABLE III

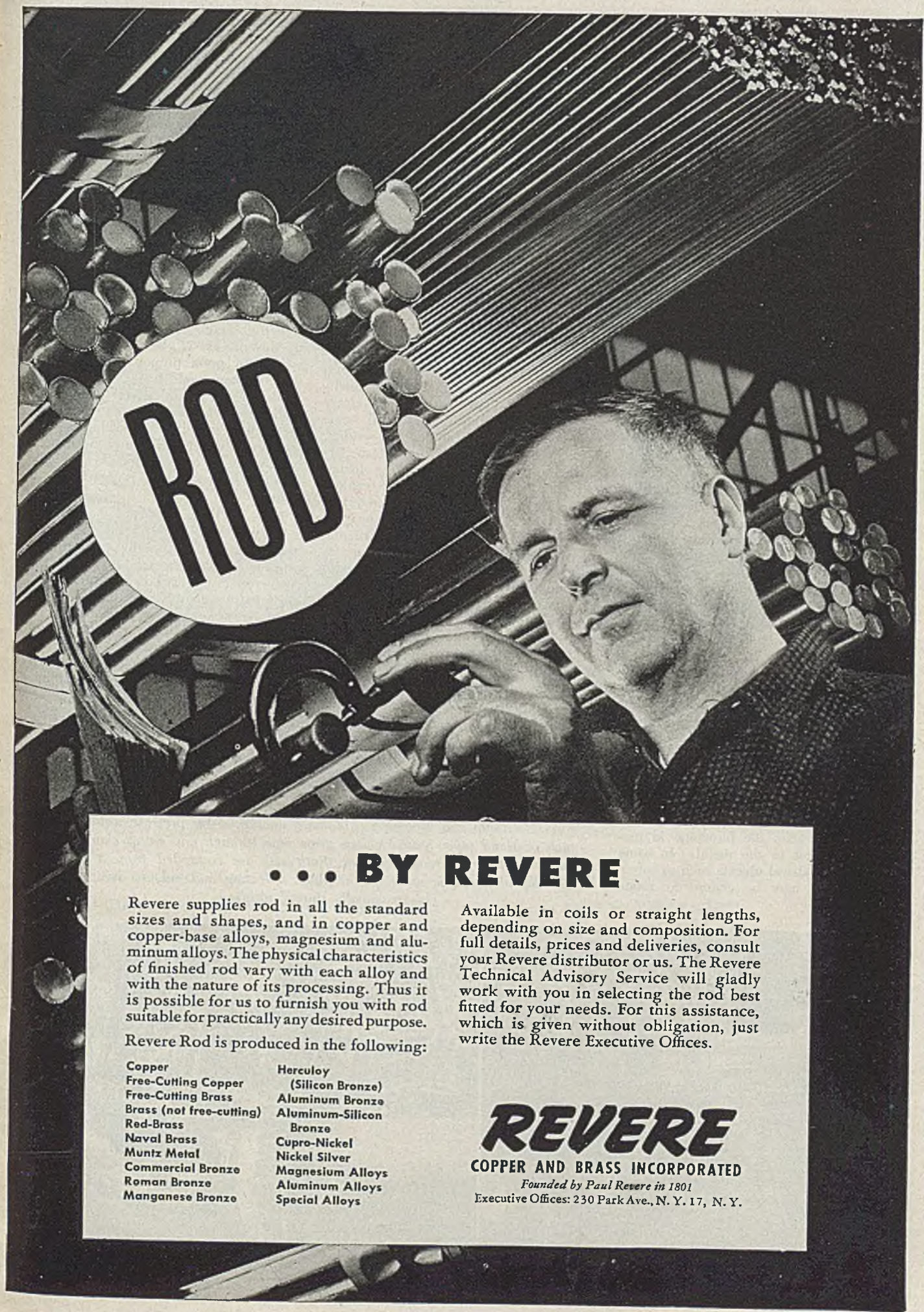
RESULTS OF NOTCHED CHARPY IMPACT TESTS

Material	Approx. Dimensions at Weld	Heat Treatment	Cha Val
0.10% Carbon	15 in. x ⅛ in.	Original	21.
		A.W.	21.
SAE 1045	1¼ in. diam.	A.W.	4.
		As received	17.
		T.N.	28.
		W.Q. & D.	31.
Low-Alloy Tool Joints	5 in. O.D. x ⅝ in. wall	T.N.	24.
Rail Steel	112 lb. rail	Original	3.
		T.N.	3.
Spring Steel	Locomotive leaves	Original	4.
		P.W. & H.T.	4.

*Special notched specimens.

Fig. 3—Pressure weld in 1/2-inch thick boiler plate. Appearance is typical of good quality pressure weld, with uniform grain structure through weld zone and smooth contour of upset metal





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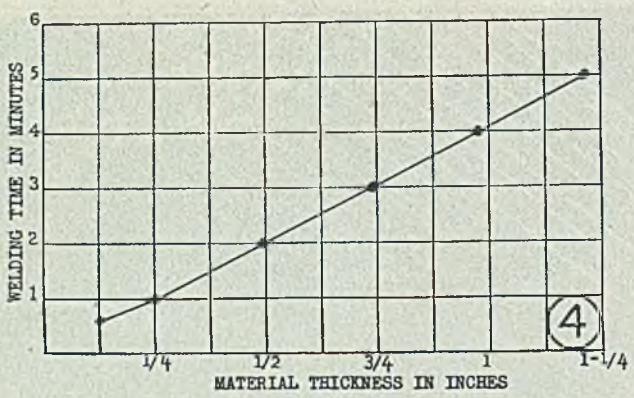


Fig. 4 — Time required for pressure welding in respect to thickness. . Relationship is practically linear and holds generally for most conditions of welding and most alloys

at that particular point. In practically every application, heating flames are directed against one side only, the exception being some cases of very heavy-walled tubing for which economy has favored application of heat to both sides.

Fig. 2 shows a combination of multiple-tip blowpipes that has been developed for pressure welding of standard railroad rail. This is an excellent example of the adaptability of such multiple-tip blowpipes to sections of various thicknesses and irregular contour. The head of a rail is about 2¾ inches wide and 1½ inches deep, the web about ⅝-inch thick, and the base tapers from a maximum of 1 inch to ½-inch in thickness. However, by the proper choice, size and position of insert tips directed toward the various parts of the rail, the rate of heat input has been proportioned so that all points of the rail section reach the welding temperature at practically the same time and at no point is there any under or overheating. In cases of uniform sections, such as pipe or bar stock, the welding head would contain a series of tips with the same drill size or would have a series of orifices drilled in the face of a ring or other suitably shaped heating head.

In most instances it has been found advisable to keep the blowpipe in motion in respect to the metal. In some cases of cylindrical objects such as tubes, the material may be caused to rotate with the blowpipe stationary, or the welding head may be given a slight circumferential oscillation. By moving the head back and forth across the interface, it is possible to heat the desired width of zone with a blowpipe of smaller dimensions than would be necessary if the entire width of heated zone were covered with stationary welding flames. Moving the blowpipes also permits the use of larger heating flames with consequent economy in welding cost, due to reduction in time required for welding and reduced loss of heat by conduction. One instance in particular in which movement of the flames is especially advantageous is in the welding of rail steel. This high-carbon material is very susceptible to burning, and the area immediately under a burned spot would be unsuited for use in service. In this particular operation the blowpipes are moved to and fro just enough to prevent the formation of a spot or zone of melted metal under the heating flames.

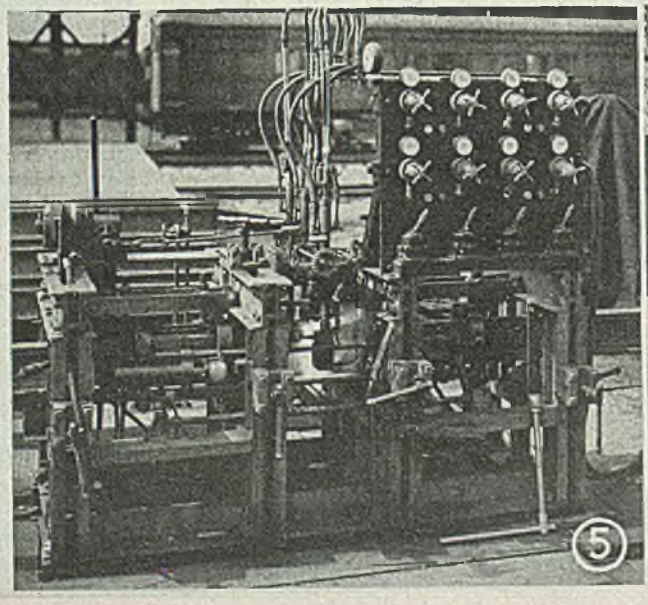
Types of Joints: The pressure-welding method is ideally adapted to butt welding in which the opposing faces are practically the same in size and shape. In pressure welding members of different thicknesses, recourse usually is had to tapering the larger section to the same dimension as the smaller to provide equal thickness at the joint. In the present state of this art, the most important point to consider in regard to the shape being welded is whether it can be heated adequately by a series of oxyacetylene flames without interfering with the application of pressure.

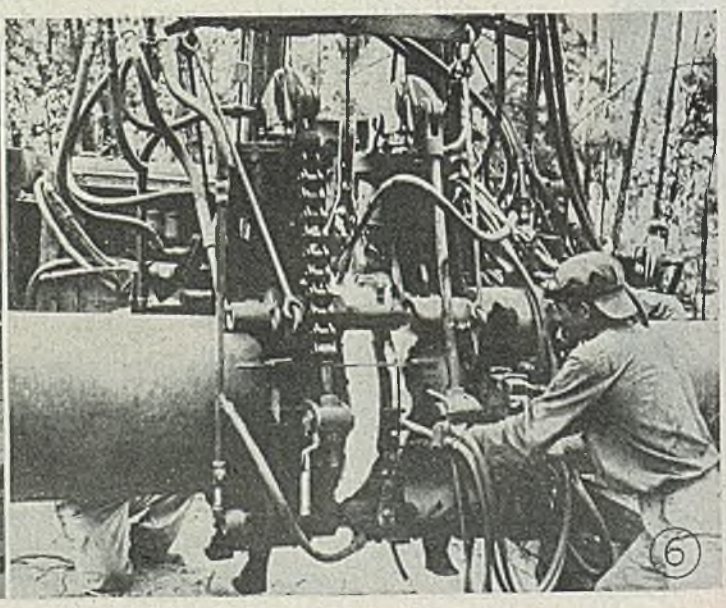
Control: The method used to control the quality of the weld obtained by this process is obviously of great interest, for upon proper control depend the consistency and quality of the welds produced. To understand the control methods, it is necessary to understand the entire welding procedure. Two techniques which differ only mechanically have been evolved for this welding. In one the procedure is practically as follows:

Ends to be welded are machined to a fairly smooth, clean finish. End preparation depends primarily on the composition of base metals being welded. For average low-carbon steels, the principal requirement is cleanliness, as very satisfactory welds have been made on a production basis with a rather poorly mating joint, but for the higher carbon and more particularly the alloy steels, close mating as well as cleanliness

Fig. 5—Pressure welding machine for welding rails. Specimens are clamped from side with end welding pressure applied through clamps. Welding pressure is applied through a manually operated pump. In other larger models both gripping and welding pressure are applied by a motorized pump. Standard 112-pound RE rails are being welded here

Fig. 6—Clamp and blowpipe equipment developed for pressure welding 24-inch overland pipe. Master clamp grips pipe through one set of clamps and applies pressure through another. Both sets are controlled from a tractor. Annular blowpipe is mounted on frame of clamp and may be reciprocated manually during welding





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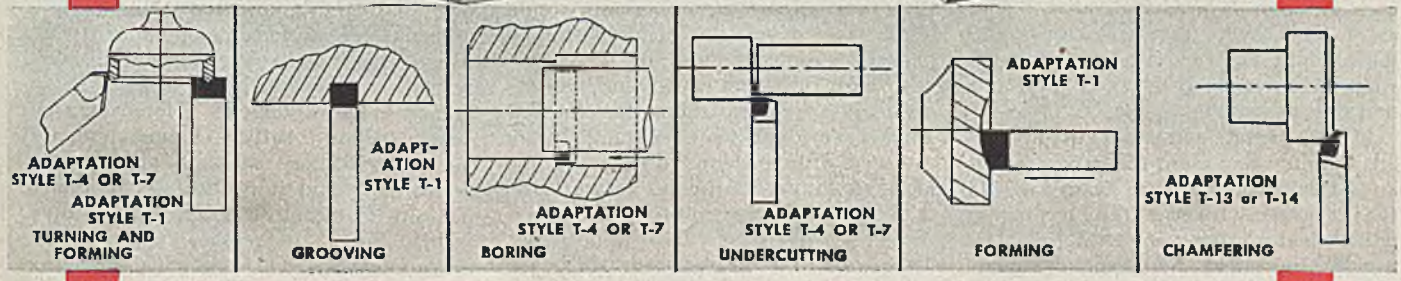

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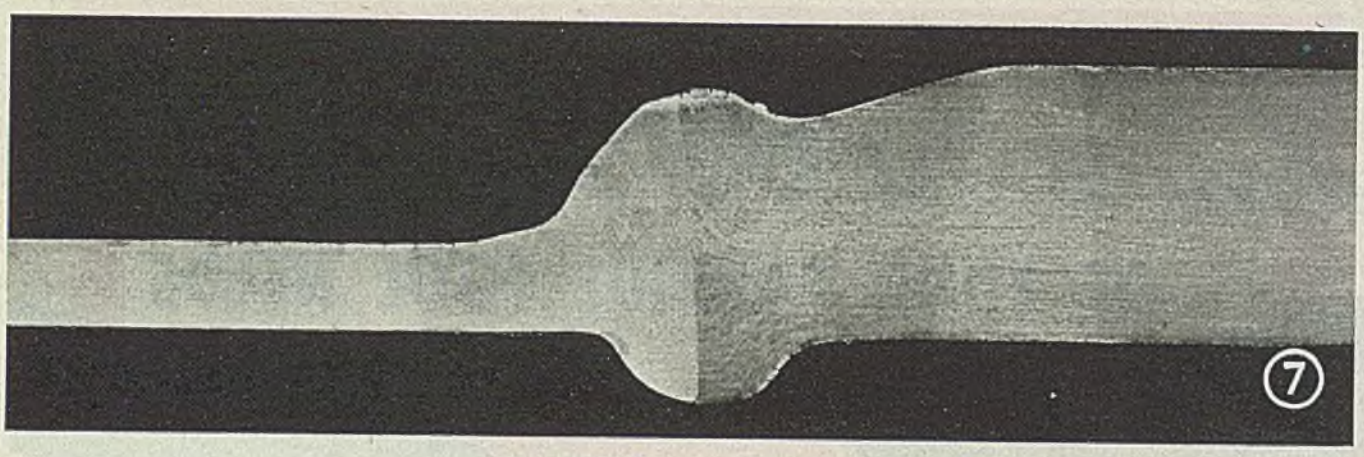

Fig. 7—Photomacrograph through pressure weld in oil weld tool joints after torch normalizing but before machining to final dimensions. Weld was made partly up taper which joins thin-walled drill pipe on top to heavy-wall tool joint. On completion of welding, reinforcement is removed from inside of joint and from taper on outside

is required. These faces are usually cleaned with acetone or other grease solvent and butted together under a normal pressure of about 500 psi. Opposing pieces are lined up carefully, after which the full pressure of about 2500 psi is applied. Blowpipes are lighted and adjusted to previously determined gas pressures and are started reciprocating across the joint. A relief valve in the pressure line usually is installed to compensate for thermal expansion and to hold the pressure constant as the temperature at the joint rises. After a temperature of about 900 degrees Cent. is reached, the metal starts to upset gradually. Process continues with the specimen temperature increasing gradually to a maximum of about 1250 degrees Cent., during which time a predetermined degree of upset is produced, after flames are extinguished. Pressure may be retained until the weld has cooled somewhat in order to avoid possible distortion due to handling.

In the alternate and widely used method, the only important difference is that an intermediate pressure is applied to the specimens during the heating-up period, and upsetting is accomplished by rapidly increasing the hydraulic pressure after a certain time interval, or when a certain predetermined temperature of the work has been attained.

In studying an idealized cycle of this welding process, it will be seen that the instantaneous temperature of the specimen, the rate of temperature rise, time, total gas flow, and degree of upset—with its attendant shortening of the specimens—are variables. By the same token, they provide values that may be measured and may be used as means for indicating the progress of the weld. However, from a practical standpoint there are other factors which would lessen the degree of reliance to be placed on some of these possible methods. For instance, with work in the open or in a drafty shop, the effect of wind or a draft may substantially increase the time required to raise the metal to a predetermined temperature, or the original temperature of the specimens may vary over a fairly wide range. There are also instances in which the flow of gas may be irregular. These variations exclude the use of total gas consumption or total time as determining factors for completion of the weld.

Although quality of pressure welds has been found to be most closely associated with maximum temperature, measurement of surface temperature of a specimen under the influence of multiple flames is somewhat uncertain due to the presence of scale on the surface and because of the large temperature differential that exists in the specimens during the heating cycle. Although these difficulties might be overcome, the measurements of surface temperature still would be unreliable unless multiple points were observed and a wide general average obtained. Moreover, in heavy sections, surface temperature is not a satisfactory measure of internal temperature and it is the internal temperature that controls the quality of the weld. For these reasons, temperature measurement is not used as a measure of the progress of welding.

As an integration of the elements of time, pressure and average specimen temperature—all closely related under conditions of constant heat— the amount of upset or shortening of the specimens is an entirely satisfactory measure of the progress of the weld. This holds true when the width of zone being heated is constant from one weld to another. Degree of upsetting is rather difficult to measure, as the upsetting oc-

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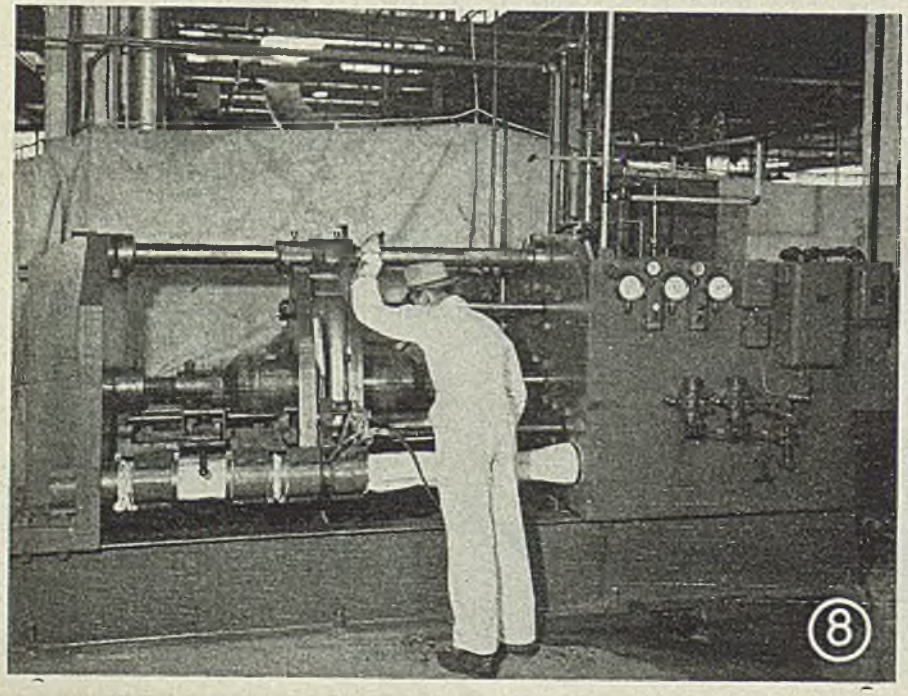
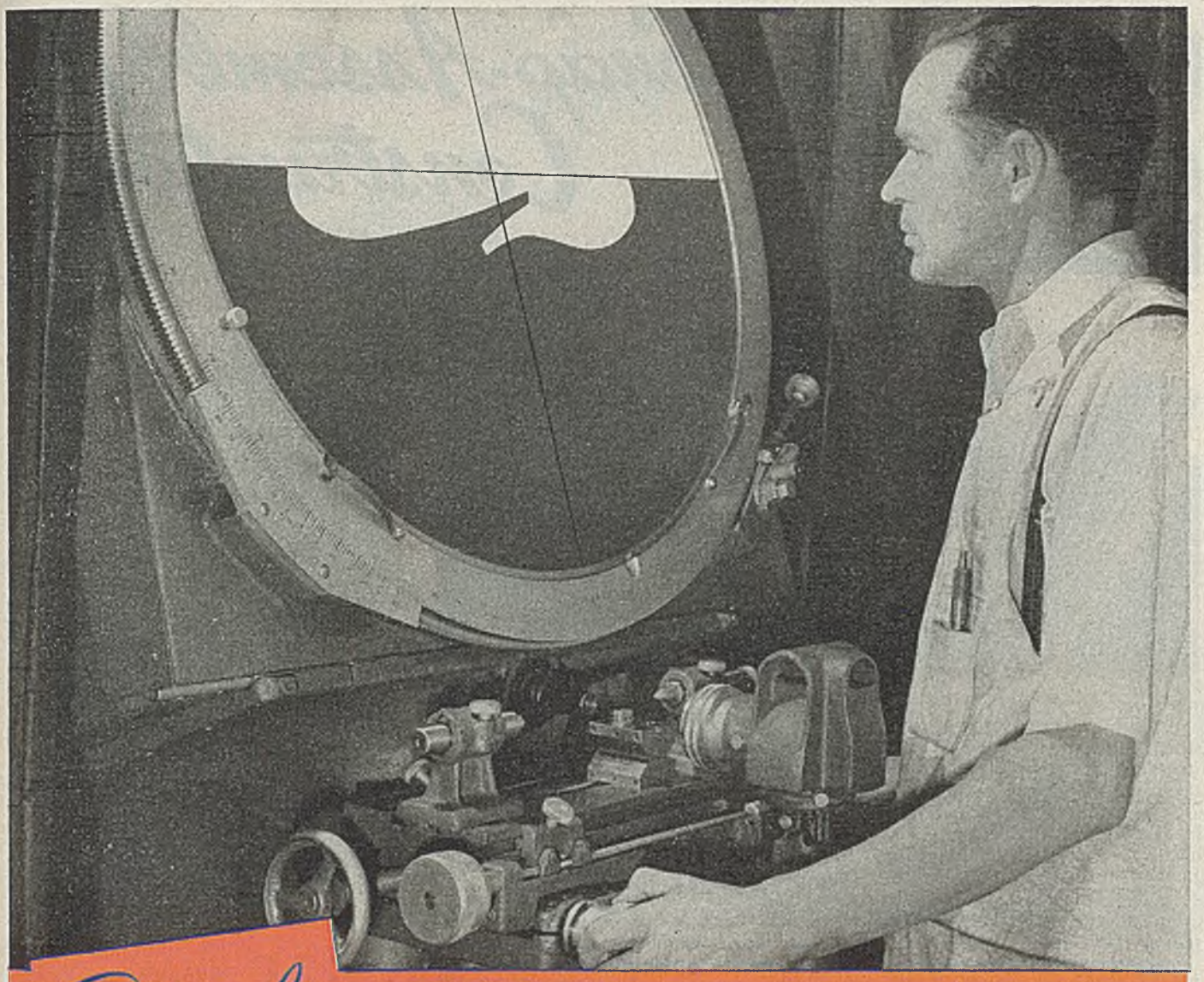


Fig. 8 — Machine for pressure welding short thin-walled cylinders joining two deep-drawn shells about 12 inches in diameter with 1/8-inch wall. Panel at right contains hydraulic and gas-pressure indicating gages and other controls. Operator manually oscillates welding head through a short amplitude during welding. Time required for this operation is about 22 seconds



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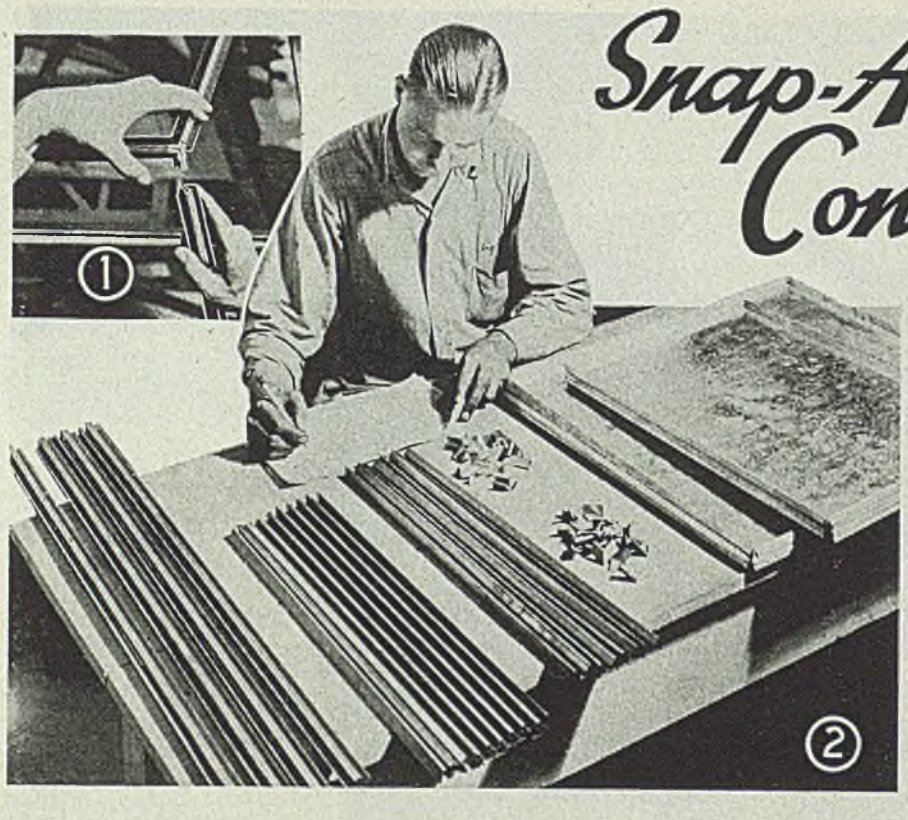
Snap-Assembly Construction



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A NEW prefabricated light metal construction based on a patented method of snap-assembly may extend the advantages of prefabricated metal assembly to a broader field. The method, developed by Lindsay & Lindsay, Chicago, complements the company's other product, the Lindsay Structure, for construction applications where lighter weights are requisite and strength requirements are correspondingly lower.

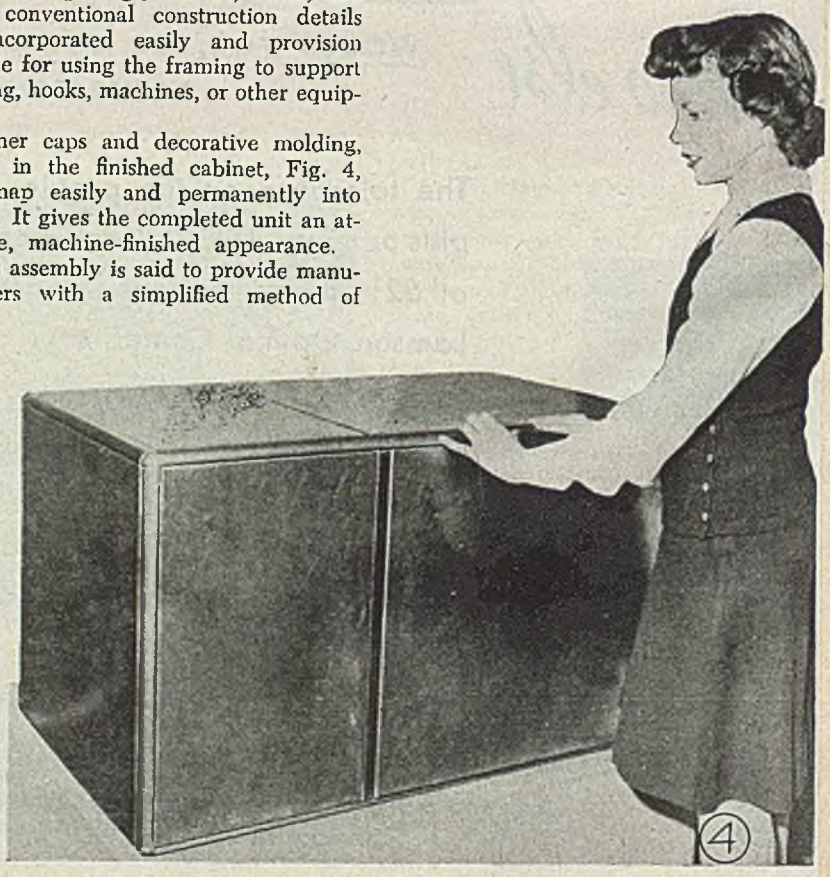
Snap-assembly construction, or Struc-Lok, consists of only three basic parts: Framing, sheets, and fittings, as shown in Fig. 2. All parts are die-formed accurately by mass production methods in a wide variety of sizes. Materials can be handled easily by men or women without special training, as all of the parts snap together by hand and hold position without benefit of fasteners.

Basic principle of this assembly is as follows: Special fittings connect the framing and hold it together while the flanged edges of the sheets are snapped into die-rolled frame channels, as shown in Fig. 1. As the edges of the sheets snap into place, they lock framing and sheets permanently into position, as shown in Fig. 3. This provides an unusually strong light-weight unit without sacrificing space for reinforcing braces.

Snap assemblies now are available with sheets in 26 and 24-gage mild steel. Perforated or expanded metal sheets also may be used. Openings, louvers, doors, and other conventional construction details are incorporated easily and provision is made for using the framing to support shelving, hooks, machines, or other equipment.

Corner caps and decorative molding, shown in the finished cabinet, Fig. 4, also snap easily and permanently into place. It gives the completed unit an attractive, machine-finished appearance.

This assembly is said to provide manufacturers with a simplified method of making an almost unlimited variety of light metal units and to lend itself particularly well to line production. A few of its uses are: Light machinery housings, cabinets for electrical and electronic equipment, refrigerators, walk-in coolers, freezing units, furnace casings, kitchen cabinets, air conditioning units, shipping containers, storage bins, shelving and radiator covers. It also is suitable for interior lining and exterior sheathing and roofing.



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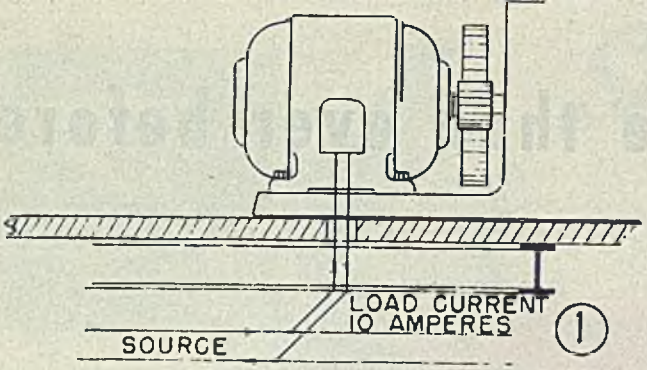


Fig. 1—Normal simple electric current system

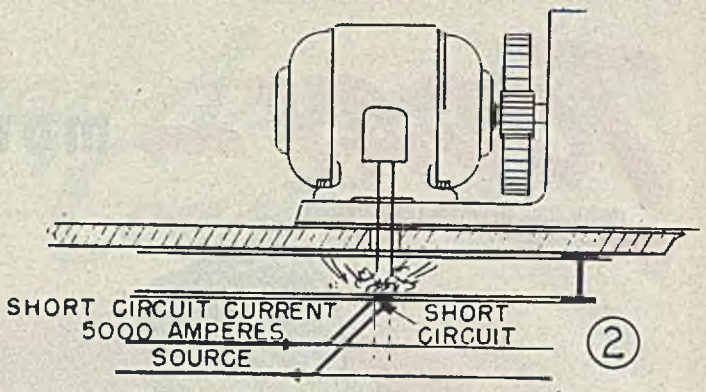


Fig. 2—Effect of high short-circuit current

Short-Circuit Currents

IN INDUSTRIAL PLANTS

For adequate protection of plant and personnel, short-circuit currents in electrical systems should be determined accurately. Power sources of higher capacity and alterations incident to expansion, when served by inadequate fuses and circuit breakers, spell trouble in the making

By D. L. BEEMAN
Industrial Engineering Division
General Electric Co.
Schenectady, N. Y.

TO INSURE adequate short-circuit protection in a plant distribution system, the short-circuit currents available must be determined accurately. Available short-circuit current now can be accurately calculated at any point in power system. The calculating procedures have been verified by many tests on actual systems and in short-circuit laboratories. Some former fallacious ideas, which lead to many installations of inadequate fuses and circuit breakers, have been dispelled. For example, the idea that only 20,000 amperes fault current could be obtained at 480 volts has been dispelled by actual measurements of currents of the order of 100,000 amperes at 480 volts.

If the plant operator cannot calculate these short-circuit currents, then his consulting engineer, or the utility company's engineer, or the application engineers of electrical manufacturers can calculate them for him. Several instructive articles which might be helpful have been published on short-circuit calculations. The method is not too complicated. Until the magnitude of short-circuit currents is known, it is not possible to be sure that the short-circuit protection is adequate.

A simple electric circuit consists of a source of electricity and a means of using it, connected by two conductors for outgoing and for return of load current, as shown in Fig. 1. The amount of current which normally flows through the conductors is that required to operate the motor, light, heater, or other loads.

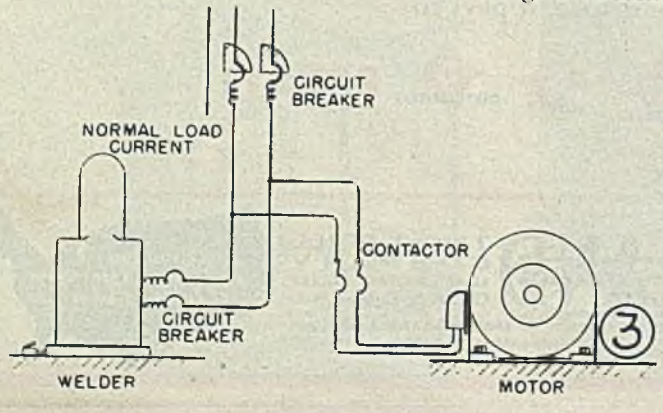
Conductors of an electric system are separated by nonconducting material which sometimes breaks down and allows the conductors to touch, or permits an arc to form across the break. When this happens, the flow of current is no longer related to the load requirement, but is limited only by capacity of the supply source. Hence, a very high short-circuit current flows—a current which may vary from a few to several hundred times the magnitude of the normal load current, illustrated in Fig. 2.

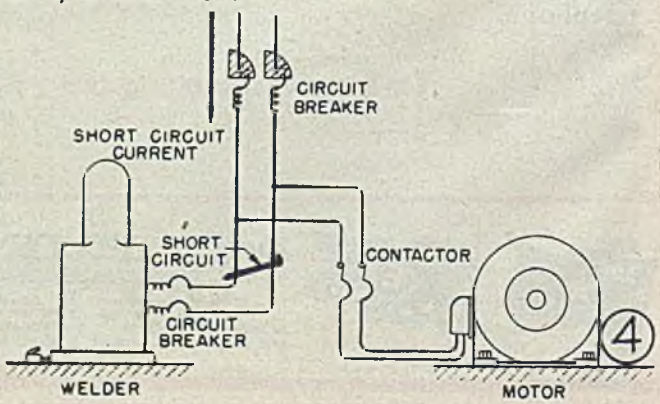
Magnitude of load current is determined by amount of work being done, and bears little relation to size of system supplying the load. However, magnitude of the short-circuit current is practically independent of load. It is directly related to size or capacity of power source. The larger the apparatus which supplies power to the circuit, the greater the short-circuit current will be.

These two currents are analogous to the flow of water in a hydroelectric plant. Amount of water that flows under normal conditions is determined by load on turbines. Within limits, it makes no difference whether the reser-

Fig. 3—System employing circuit breakers for switching or stopping flow of the current

Fig. 4—Development of a short circuit





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One of the best methods of combining high production and precision involves the use of double-end machines with indexing fixtures. Frequently a piece can be completed from the rough in the overall time required by the longest operation. Every production job warrants an analysis of the cost advantages of this method.

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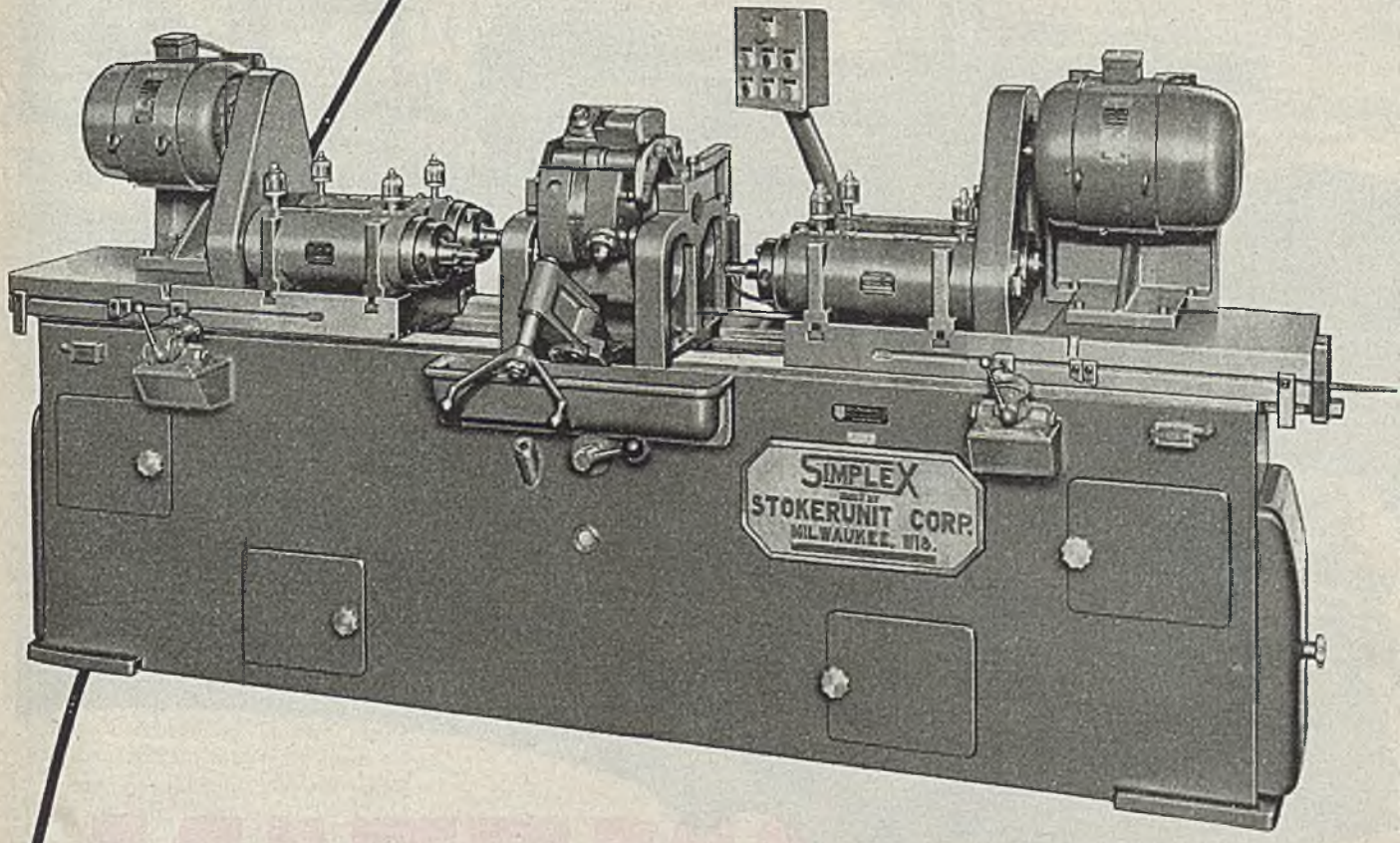

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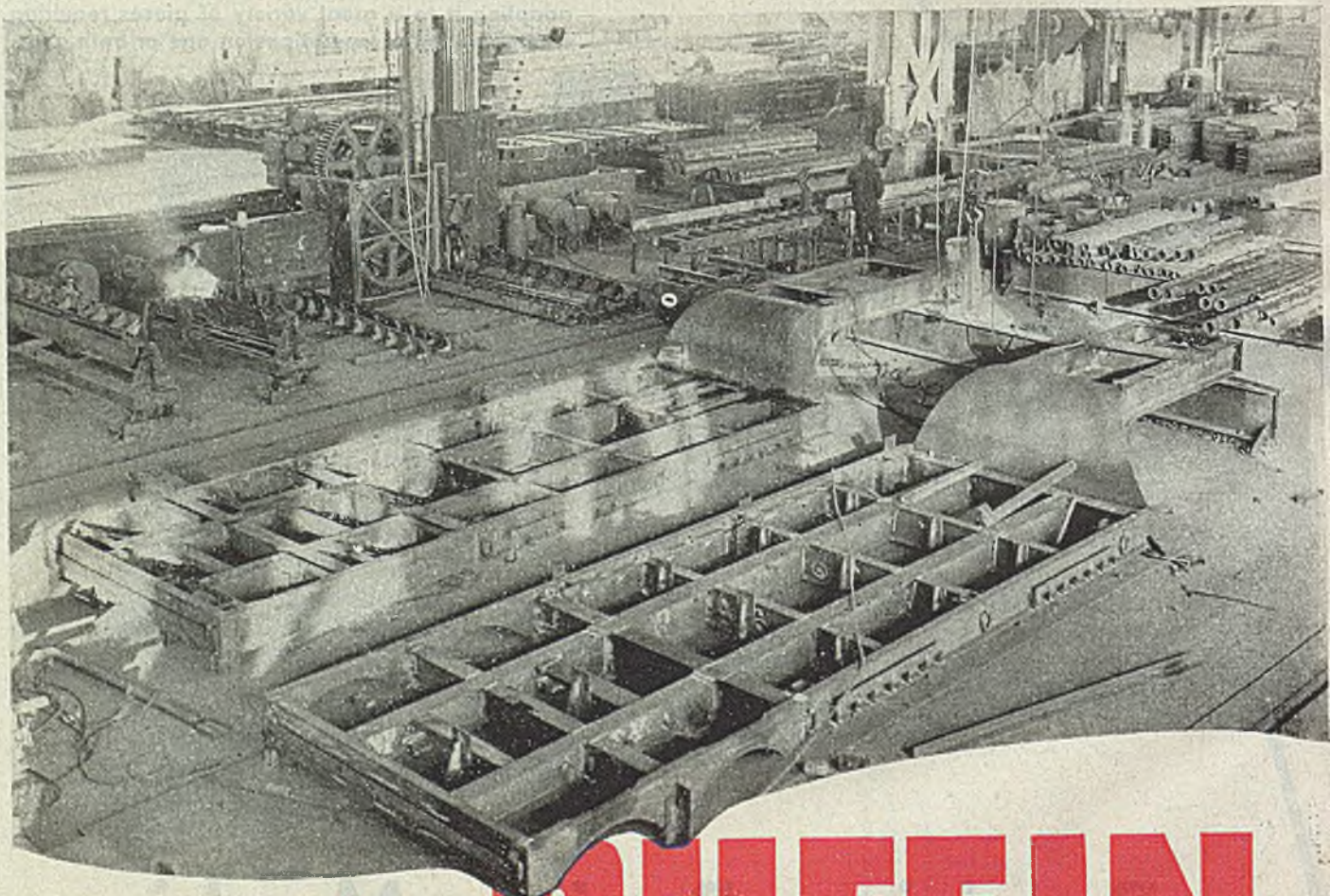

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voir behind the dam is large or small. This flow of water is comparable to the load current flow in factory system.

If the dam breaks, the amount of water that will flow will depend upon the capacity of the reservoir, and will bear no relation to the load on the turbines. Whether the reservoir is large or small will make a real difference in this case. Flow of water is comparable to flow of current through a short in the distribution system. Load currents do useful work, like water that flows down the penstock through the turbine water wheel. Short-circuit currents produce unwanted effects, like the torrent that rushes downstream when a dam breaks.

Flow of short-circuit current must be stopped in the shortest practical time, lest it damage considerable equipment, cause fires, or even cause injury to nearby personnel. Normally, circuit breakers, and sometimes fuses, are used to open the faulty circuit to stop the flow of short-circuit current.

These circuit breakers have two functions and two current ratings. The first function is to carry normal load currents and, when necessary, to switch them, as indicated in Fig. 3. This function requires a continuous current capacity designated by the ampere rating on the breaker nameplate.

Second function of these breakers is to open the circuit to stop the flow of short-circuit into a fault; in other words, interrupt the short circuit, as shown in Fig. 4. Ability of the breaker to open short-circuit current is given in amperes or kilovolt-amperes and is known as the interrupting capacity rating.

Circuit breakers or fuses have a definite limit in their ability to interrupt short-circuit current, just as they have a definite limit in their ability to carry load current. The purpose of giving the circuit breakers an interrupting capacity rating is to tell the user how much short-circuit current the device can be depended upon to open safely, just as the ampere rating tells how much load current the breakers will carry safely.

Not all devices have the same interrupting capacity for dealing with short-circuit currents, just as all devices do not have the same ampere capacity for carrying load current. Hence, the circuit breaker or fuse must be so selected that its interrupting capacity rating is not less than the short-circuit current which the system will deliver, just as it must have a continuous ampere rating not less than current drawn by load.

It is not possible to prevent short circuiting entirely. However, by using breakers or fuses of adequate interrupting capacity rating, it is possible to minimize their effects on the system.

When the short-circuit current delivered by the system is in excess of the interrupting capacity rating of the short-circuit protective device, i.e., the breaker or fuse, this protective device may not successfully open the circuit.

Inadequate short-circuit protective equipment is not only dangerous but uneconomical. When the short-circuit device fails, a condition equivalent to a short circuit occurs within the device itself. This condition releases a tremendous amount of uncontrolled energy within the housing, and may cause intense heat or a violent explosion. This explosion may cause parts to be hurled about with high velocity, and may cause much hot gas to be emitted and spread over an area of several feet or more. In many old low-voltage systems (600 volts and below), inadequate oil-filled breakers are used. These breakers usually have a very low interrupting capacity rating, and when they attempt to open short-circuit currents beyond their rating, burning oil may be thrown over a considerable area, and a major fire may shut down the entire plant, destroy other equipment, and injure personnel.

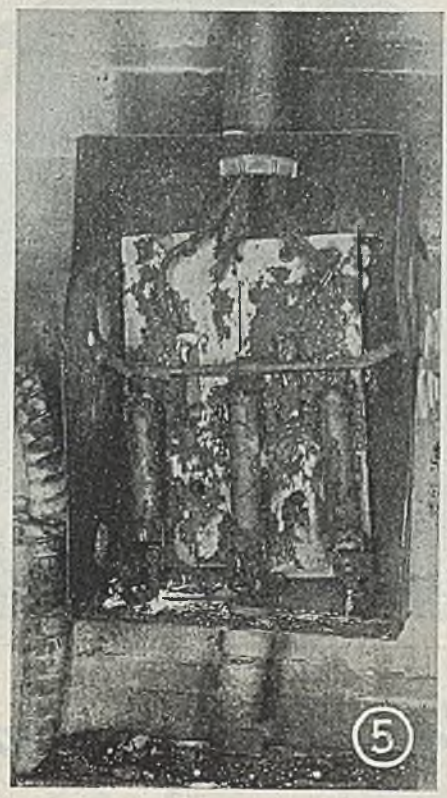


Fig. 5—Result of failure in switch that was opened under load

Whether short-circuit protective devices are oil-filled or air-type breakers, or fused disconnecting switches, the fact they do not provide adequate protection means danger for anyone who happens to be near when they fail. The result of such a failure is shown in Fig. 5.

When the device fails, the condition is equivalent to a bus fault and hence causes much more load to be shut down, with consequent loss of production. For instance, if circuit breakers or fuses of adequate interrupting capacity had been used in the feeder to Department 6 in Fig. 6, the device would have opened the first short circuit on cable to Department C, and other departments would not have been affected.

Salient features of a properly balanced system and factors which are potential causes of trouble are as follows:

Install only circuit breakers or fuses of known adequate interrupting capacity rating. Devices of adequate rating to meet all requirements are available.

If a system is installed with circuit breakers that are only large enough for present requirements, circuit breakers will become too small, from an interrupting standpoint, when capacity is added. The system should be designed and the circuit breakers selected on a basis that will provide for expansion, without exceeding interrupting-capacity ratings.

Main and auxiliary switchboards in hundreds of plants in operation today were installed years ago when the plants were small. The power demand then was limited; therefore, small transformers were all that were required to supply the plant. Switchboards too probably were adequate. But as plants grew, more power was needed. New feeders were added to carry the new load, and new transformers were added to the bus to supply the added load. In most cases, no thought was given to the breakers, because they carried their load currents satisfactorily. However, when new transformers were added, the capacity of the power supply increased, and hence the available short-circuit current also increased. This higher short-circuit current would impose added interrupting duty on the old breakers, if they were required to clear a faulty feeder cable.

Often this added short circuit current was sufficient to bring the total short-circuit beyond the ability of those existing breakers. But, through oversight, nothing was done about it, leaving the plant vulnerable to a major shutdown if a fault occurred and one of those old breakers failed to clear it.

Failure to consider the effect of increased short-circuit currents has probably been the most common single cause of many of these older installations becoming unsafe from a short-circuit protection standpoint. Many systems which have been operating for years have never had a major short-circuit. Operators of these systems have come to believe that short-circuits never occur. This belief is comparable to an assumption that fire insurance is unnecessary because a factory has never burned down.

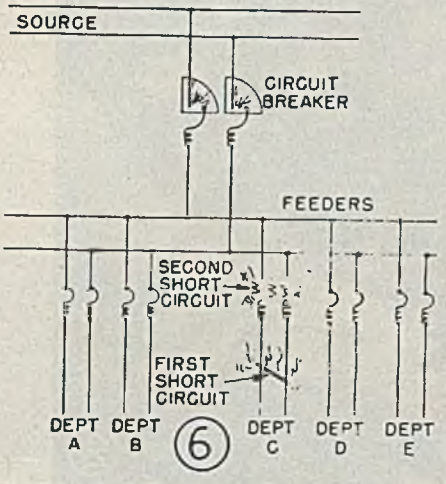
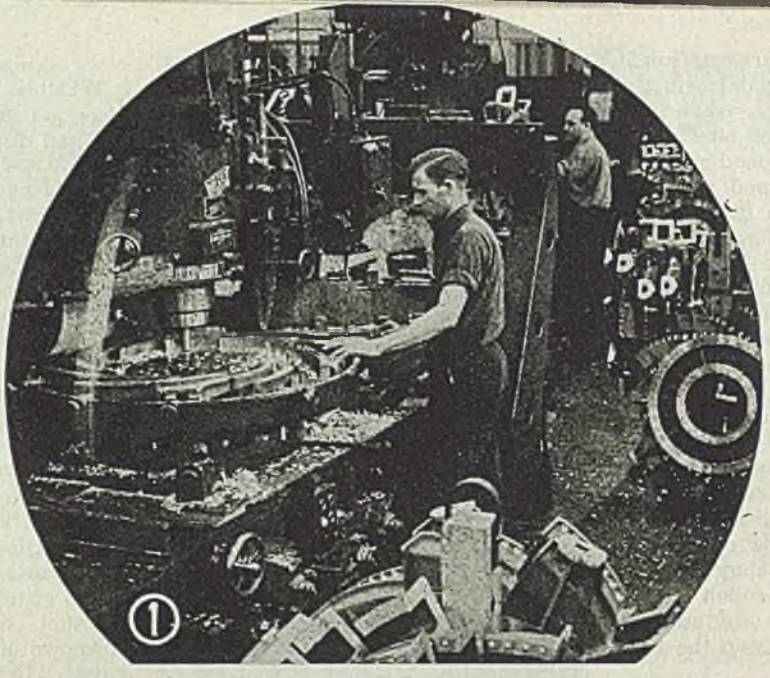


Fig. 6—Effect of inadequate interrupting devices



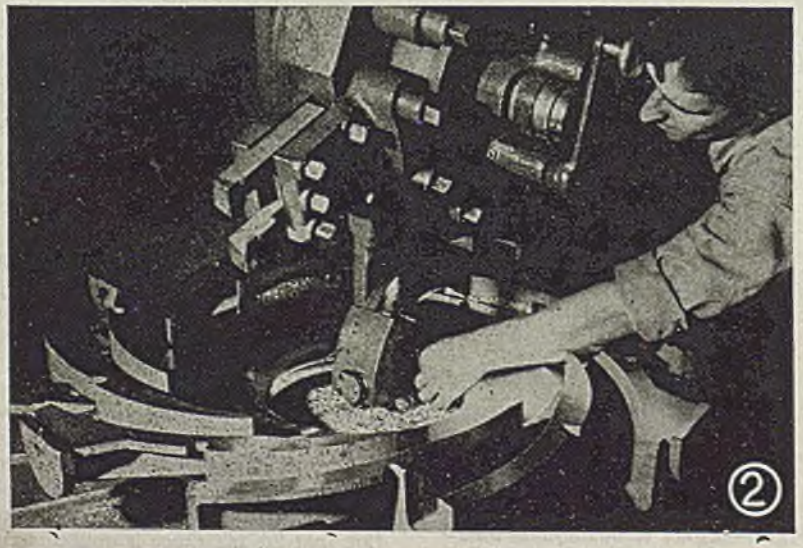
Unusual Machining Operations

. . . required to produce parts for jet propulsion engines

PRODUCTION of parts for the jet propulsion engine being manufactured at General Electric's Lynn, Mass., River Works, calls for unusual machining operations. The part shown in Fig. 1 requires several sections to be symmetrically machined to contours consisting of several radii and angles blending together to make an irregular shaped passage. This machining was greatly simplified by the use of a hydraulically controlled vertical milling machine provided with automatic depth control and 360-degree horizontal profile circuit of the selective type.

A specially designed milling fixture supports the casting and provides for accurate indexing of the passages. An end mill designed with three staggered Carboloy inserts breaks up the chip. The stock removed varies in depth up to 1/4-inch. The machine makes it extremely convenient for the operator to vary the feed rate in weak sections of the contour.

Two master blocks which have the correct contour machined into them are mounted on the right hand side of the machine. One block controls the horizontal travel of the end mill and the other block controls the vertical travel of the end mill. They act simultaneously. When the circuit of the cutter has been completed, the cutter travels off the edge of the casting to permit indexing to the next passage and the cycle is repeated for each vane.



Sensitivity of vertical miller makes it adapted for this particular application. To machine other contours, all that is required is to change master blocks.

In machining the part shown in Fig. 2, the inner section of the casting is machined to a 15-degree downward slope which blends into a radius. A 54-inch vertical boring mill, with specially designed tools, is used. The 15-degree angle is machined by a spring load turning tool following a template. The radius tool shown here consists of a cast quadrant mounted on a fabricated supporting member. A sliding block, into which a Carboloy tool bit is fastened, travels on the quadrant. A reference button on the sliding block enables the operator to measure across the button to the point of the tool bit to establish the radius dimension being machined.

The radius machining operation is started at the point closest to the machine table and the upward feed travel of the block is accomplished by a cable attached to the block. The other end of the cable is fastened to the side head of the machine. The power feed of the machine tool is used to make the cutting tool follow the path of the quadrant. This tool has worked out very well and is extremely simple in its construction. The single pointed tool generating the curve produces a fine finish and eliminates chatter. It is a decided improvement over the old method of using a form tool in a plunge cut.

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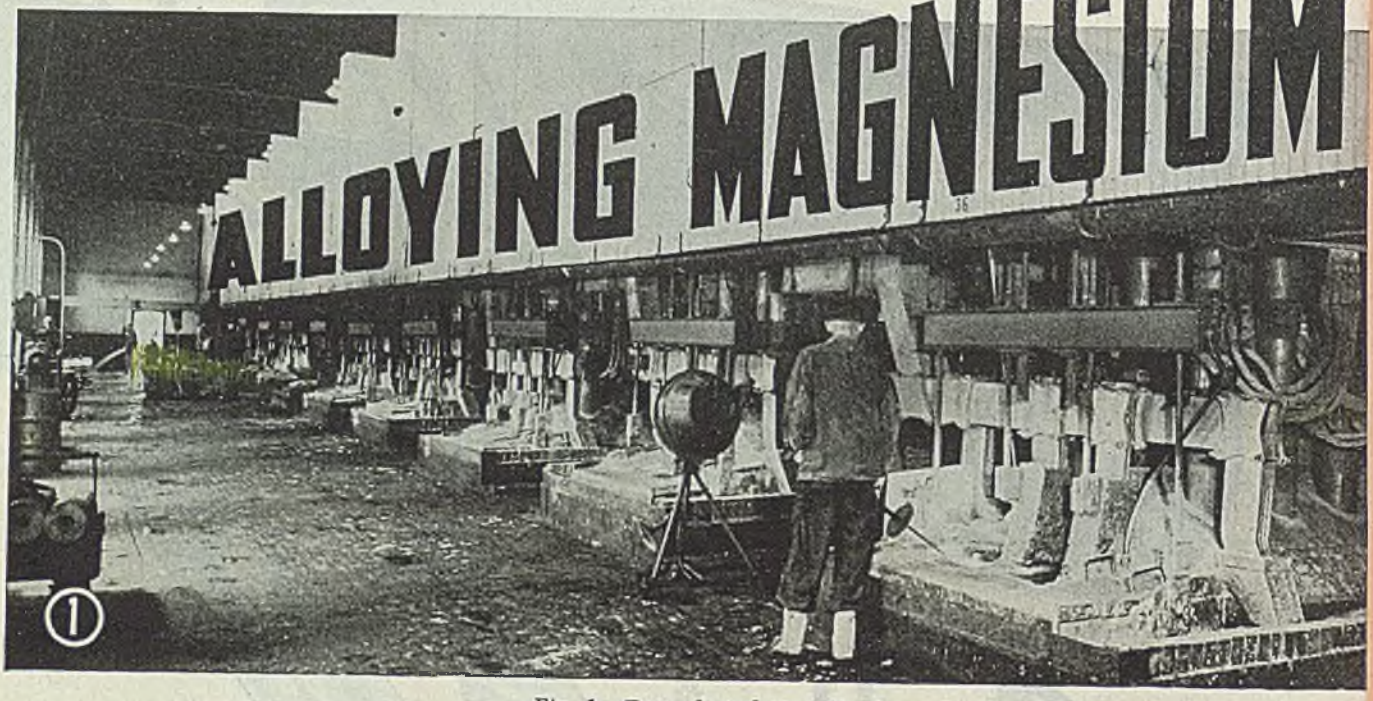
ALLOYING MAGNESIUM



By G. ELDRIDGE STEDMAN

Fig. 1—Dow electrolytic cells shown here produce 99.9 per cent pure magnesium. The 18-pound ingots made are transferred to alloy plant

MAGNESIUM is the lightest of structural metals. Because of their use of it in aircraft, the Germans nearly won the Battle of Britain. Today, allied war planes are flying progressively farther and faster with heavier loads as consumption has increased from 80 pounds per plane in 1940 to over 1000 pounds in certain planes at present.

The Dow Chemical Co. has been responsible in large measure for the fact that the United States has a magnesium industry by making freely available its technical knowledge and skill.

Magnesium is present almost everywhere on earth, and in all sea water, but always as a compound. Its extraction as a pure metal demands precise technique. When molten, it has the quality of igniting and burning easily unless protected by a proper flux or atmosphere, as is the case with a number of other metals. Alloyed with zinc, aluminum, manganese and other elements, it has great strength, durability and ductility. It is less subject to corrosion than many metals. Alloying and fabrication require special techniques adapted to the characteristics of the metal.

The faith, courage and skill of Dr. Herbert H. Dow and of his son, Dr. Willard H. Dow, and the intrepid staff of technicians known as the "Dow group" finally gave the United States its own independent magnesium industry—just when most critically needed.

From 1918 to 1939, Dow made and sold magnesium at a loss in all but four years. The company poured millions of dollars into exhaustive research concerning the extraction, alloying, fabrication. It confounded German efforts to control U. S. production. It caused reduction of price per pound from $1.83 in 1918 to 20.5 cents, present delivered

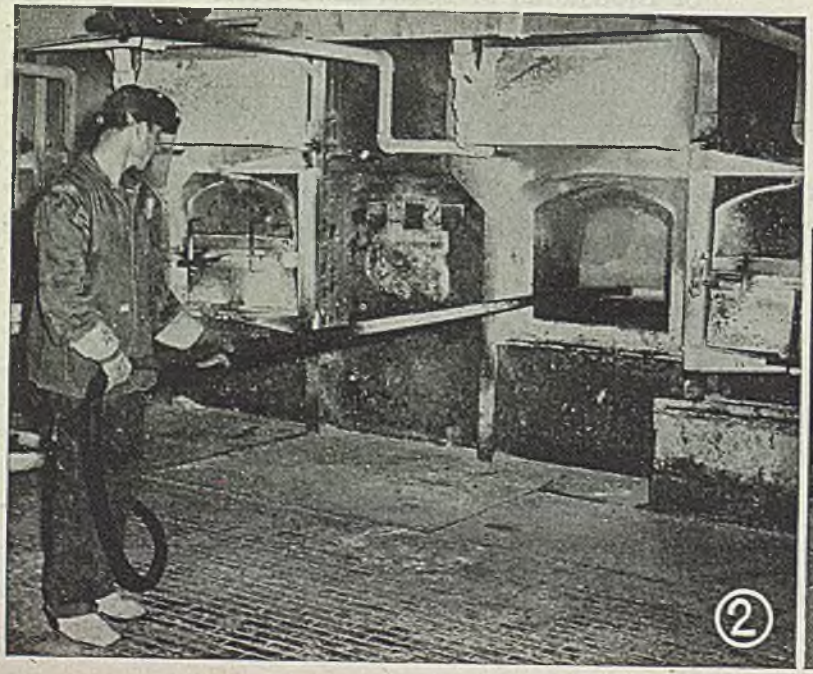
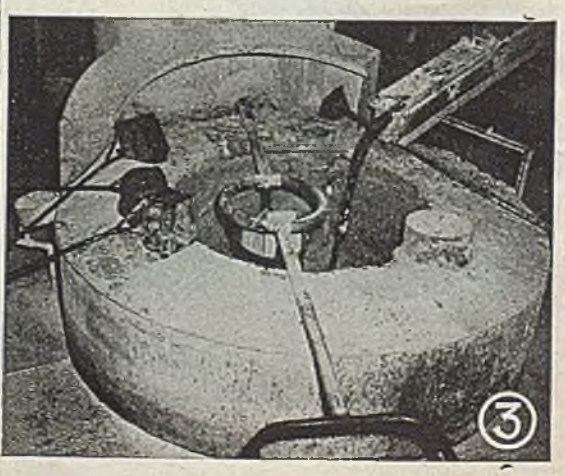


Fig. 2—Molten magnesium in melting furnace is prevented from burning by flux blown on surface of metal

Fig. 3—Perforated basket containing alloying elements is suspended in alloy pot. Molten magnesium is pumped into pot from the melting furnace



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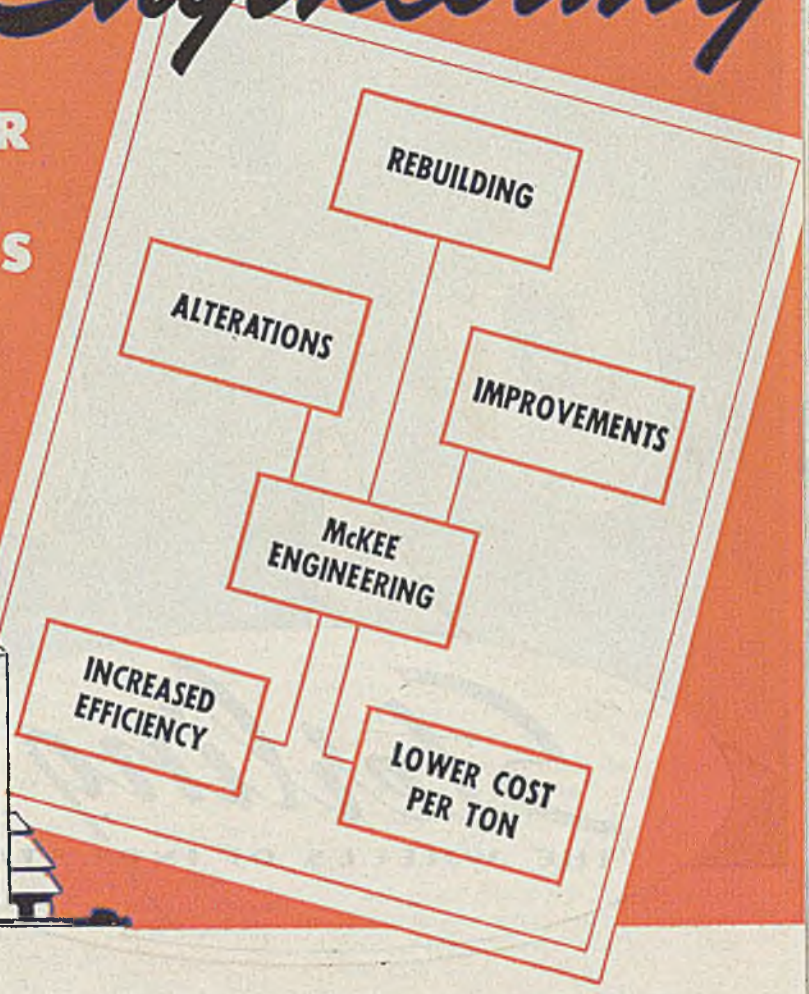

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By scheduling alteration or rebuilding work on your furnace to coincide with anticipated relining jobs, McKee can take full advantage of the shut-down to make alterations with minimum loss of production time.

Such a program necessarily requires advance planning so that all engineering is completed and all essential material is on the job before the furnace is blown out.

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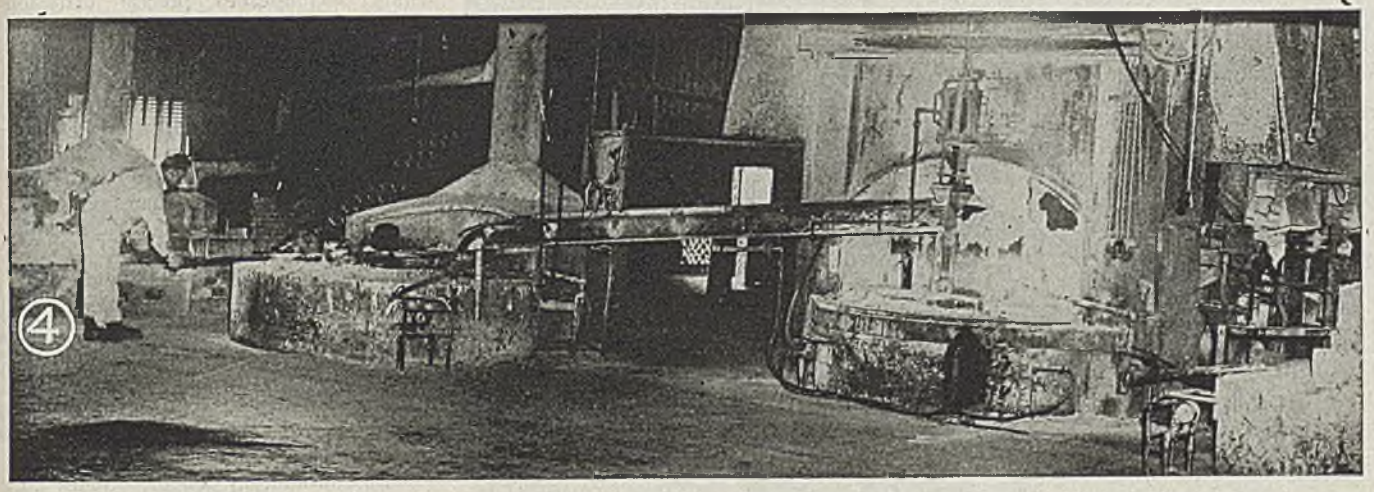


Fig. 4—Molten metal pump is suspended centrally to serve two alloy pots

price. And production was upped from 20,017 pounds in 1920 to 63,430,040 pounds in 1943.

Flashback: In 1940, Dow had at Midland, Mich. capacity for production of 18,000,000 pounds per year. It established a plant at Freeport, Tex., capable of another 18,000,000 pounds—of which overall the British government had financed 6,000,000 pounds. In early 1941, Dow's Freeport capacity was upped another 18,000,000 pounds, the U. S. government providing capital for the first time. In June, 1941, the Defense Plant Corp. arranged for another 144,000,000 pounds to be produced under the direction of a subsidiary known as the Dow Magnesium Corp.—half at Velasco, Tex., a D.P.C. plant (about 7 miles from Freeport), half at Marysville and Ludington, Mich.

This gives Dow itself a present production capacity of 198,000,000 pounds, in addition to that of Diamond Magnesium Co. and International Minerals & Chemical Corp., to which it has extended technical knowledge and engineering advice. Outside the Ludington-Marysville setup, which did not begin production until midyear, Dow operated at 107 per cent capacity in 1943.

In past years, the Dow process had not contented itself alone with extraction of magnesium from brine but had been on the alert for new sources. This led to establishment of a pilot plant at Kure Beach, N. C., to extract bromine from sea water and later to construction of the huge Ethyl-Dow bromine extraction plant at Wilmington, Del. Since sea water is even richer in magnesium than it is in bromine, Dow concluded that mining magnesium from the sea should be even a simpler task than extracting bromine. After exhaustive search, Dow settled on Freeport, Tex. as a magnesium extraction site because of cheap power, abundant raw materials and excellent transportation.

At Midland, magnesium exists as a chloride in brine. In sea water, both magnesium chloride and magnesium sulphate are present, calling for a different extraction process. About 300,000,000 gallons of sub-surface sea water can be pumped each day at Freeport. After screening it and diverting some to the bromine plant, the rest enters a sea water flume, is met with milk of lime from oyster shells, flocculated under a controlled pH to gain magnesium hydrate. This is filtered off and treated with hydrochloric acid to become magnesium chloride which is dried to an 85 per cent anhydrous condition and used as "cell feed" for electrolytic cells which extract pure magnesium in ingot form.

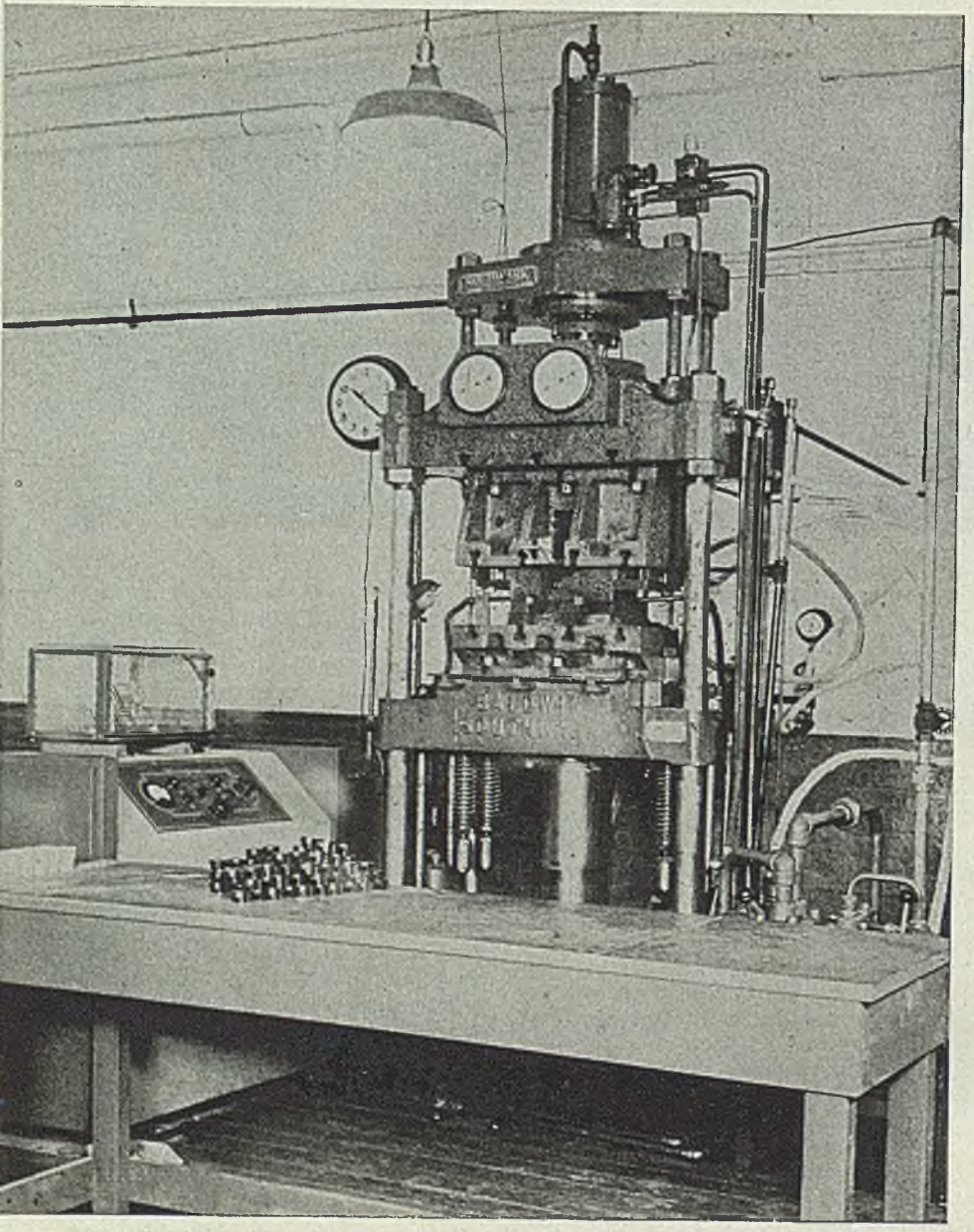
Early Difficulties Solved: The affinity of magnesium for oxygen and early difficulties with corrosion for a long time discouraged the use of the metal for structural purposes. Patiently, the Dow group worked out their own excellent alloys known as "Dowmetal" and went deeply into their fabrication. Magnesium castings were hard to make. Unless the molds were properly prepared, the molten magnesium would unite with oxygen in the water and quickly oxidize. There is always 3 to 4 per cent moisture in mold sands. There was the danger of metal burning, necessitating use of agents to prevent this hazard. The percentage of waste in casting was high.

However, these early difficulties were entirely solved. Today, because of the

(*Please turn to Page* 164)

Fig. 5—Pinch of flux being added to ladle of molten alloyed metal to prevent oxidation. Continuous belt casting machine at right

Fig. 6—Casting belt delivering alloy ingots weighing 25 pounds each



Electronic Heating Employed for Products Molded in

HYDRAULIC PRESS

A VERTICAL hydraulic "hyspeed" press that molds plastic items and utilizes electronic heating of the plastic material effects unusual economies in production time. Experiments have been conducted for months on resins, ureas, and melamines, vital to the process, in Bryant Electric Co. Hemco plant in Bridgeport, Conn. Also working with Baldwin Locomotive Works, Southwark Division, to create the method were the Electronic Division of Westinghouse Electric Corp. and the Monsanto Chemical Co., Springfield, Mass.

The first electronic heating unit and forming press, set up to operate manually, have proved entirely successful in high frequency heating of parts. The plant has been able to reduce the curing time on a particular product from minutes to seconds. By reducing this time, it is claimed that workmen have been able to turn out 20 per cent more pieces from an experimental 6-cavity mold as were previously turned out from a standard 24-cavity compression mold. The mold savings in this one experiment between the 6-cavity and the 24-cavity molds are estimated to amount to $6000, in addition to a 12 1/2 per cent saving in plastic materials afforded by the press, which accomplishes precise extrusion work.

The method of squeezing preheated plastic into the mold and changes in mold design are said to make high-speed thermo-setting molding practical. Therefore, the production from a small press with a small number of cavities is just as great as, or greater than, that of a large compression press with a large number of cavities.

With such a unit, the following savings are effected: A small press is required, reducing the initial investment; a smaller mold will be required, reducing the initial investment, as well as reducing maintenance cost to a marked degree; due to the reduction of pressure on the material molded, the mold life will be considerably longer, besides materials that can be hobbed more readily can be used for mold construction; molded pieces can be made faster; there is a decided saving in "flash," of waste material and rejects; savings will be shown in cost of raw materials due to the possibility of using substitutes or cheaper materials; and there is a considerable saving in finishing, since there is practically no "flash" on cutting edge or in holes.

Plastic Exposed To Short Waves

In the first experiments at Bridgeport, attended by engineers and other interested persons, one workman operated both the 2-kilowatt heating unit and the molding press. The plastic, in form of thick wafers, was placed in the heating device where it was exposed to shortwaves for a few seconds. Then the workman lifted out the hot wafer, transferred it to the press and a plunger forced it down against the mold. Under pressure of 6 tons per square inch, it remained only a few seconds, then was released. When removed, the particular product in this case turned out to be a series of clean and shiny plastic electric outlet plugs.

As a result of these tests, there is believed to be a possibility that many common mold products such as electric insulating parts, novelties, etc., which are injection molded from acetates, may be made from phenol or urea materials. Meanwhile, studies have been made on the use of different plastics in creating other postwar products of larger size and many different shapes.

A 75-ton molding press may be used for both compression and transfer molding. It has a hydraulic plunger on top which is used for pressing the preheated material into the mold. In straight compression molding this cylinder is not used, and the unit is operated with a self-contained oil pump that is located on the side.

Units will be available in capacities of from 50 to 300 tons and can be operated either directly from an accumulation system or by means of separate self-contained motor-driven pump units. They will have incorporated all the modifications found desirable in initial experiments.

Too little ...too late

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The public is itching to spend its saved up billions —for scores of products it has long been denied. V-Day should open the floodgates of a buying boom unlike anything we've ever seen.

Will *your* products be in the running for postwar market prizes? The public can't buy goods that aren't finished. Some people will wait for their pre-war favorites—but it isn't good business to put their patience to too great a test. There will be new brands, new aggressive organizations to challenge the laggard in the race for postwar markets.

One way to insure getting your postwar products to market faster is to turn over your parts-production problem to others. You've met your war production schedules by this procedure; it should be just as practical—and time-saving—in your peacetime production.

Joyce has had long experience in the production of machined metal parts and machined assemblies. Joyce workmanship is synonymous with precision workmanship. Our unique facilities, modern equipment, specialization and reputation for craftsmanlike workmanship offer you many advantages in getting your postwar products to market faster, better and at lower cost. Not to be overlooked, too, are the plus factors of lower capital investment and lessened labor problems by this parts-production procedure.

A discussion of your postwar products will not obligate you in any way. With proper preplanning, we'll be ready to go as soon as the starting gun sounds. Why not write, telephone or wire us—now?

WE'VE FOUND JOYCE A SOUND CHOICE

THE PERFECT POSTWAR PLAN . . . BUY BONDS

JOYCE
Machine Company
FRANKFORD • PHILADELPHIA
MANUFACTURERS OF PRECISION PARTS AND SPECIAL MACHINES FOR ALL KEY INDUSTRIES

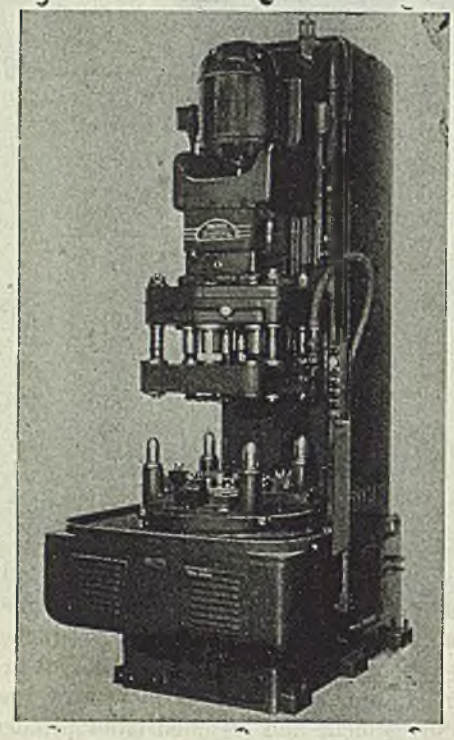
NOW IS THE TIME TO PLAN PARTS-PRODUCTION FOR POSTWAR PRODUCTS

INDUSTRIAL EQUIPMENT

Drilling Machine

Designated as Standard 10 V 18, a new drilling machine is offered by Snyder Tool & Engineering Co., 3400 East Lafayette, Detroit 7. It is equipped with a five spindle head and uses four indexes to complete its hollow milling job on 20 bosses. The index table housing serves as a chip trough and coolant retainer. The standard index mechanism provides the smooth acceleration and deceleration of the Geneva wheel, hydraulically powered from the hydraulic system of the machine itself.

Basically this machine is a general

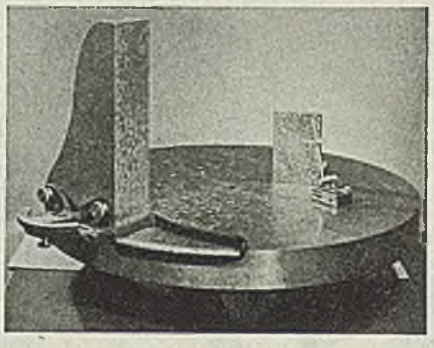


utility machine, yet it can be adapted to do many jobs with efficiency and speed through the use of special fixtures, heads and tools. It is available with or without special tooling and speed change transmission for single or multiple spindle adaptations. Only the equipment is special, and it can be retooled for entirely different production by changing the special equipment.

Radial Layout Plates

Engineered to make available a flat working surface in any of three dimensions, a new radial layout plate for the transfer of information from blueprint or loft to master model, pattern, jig or fixture, is announced by Contour Co., 43 East Green street, Pasadena 1, Calif. These surfaces intersect each other at 90 degrees. Through the use of specially designed protractors, a flat vertical surface is automatically held on the radius line throughout the entire 360 degrees.

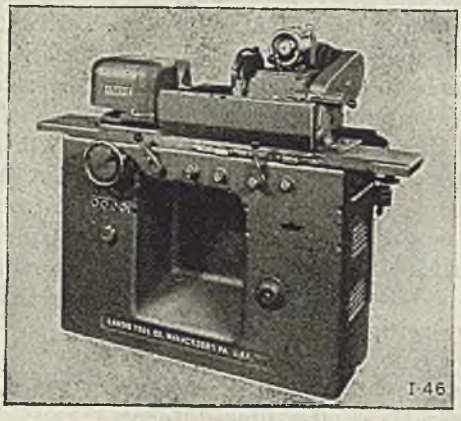
The MLM radial layout plates are furnished in two regular sizes—24 and 96 inches; other sizes are custom built. All plates are normalized and the 24-inch plate is hand scraped, the 96-inch one



can be furnished hand scraped. In addition to the top surface, outer edge and supporting points, the lower edge is also machined for clamping purposes on this plate.

Hydraulic Universal Grinder

Exact and sensitive controls of type H hydraulic universal grinder enable it to produce continuously within very close tolerances. The unit, manufactured by Landis Tool Co., Waynesboro, Pa., features universal wheel head and universal headstock. The bed is of box type design with integrally cast compartments for the coolant reservoir, control, hydraulic and electrical equipment. Bed design prevents headstock or footstock overhang at any portion of the carriage. The V and flat guides are



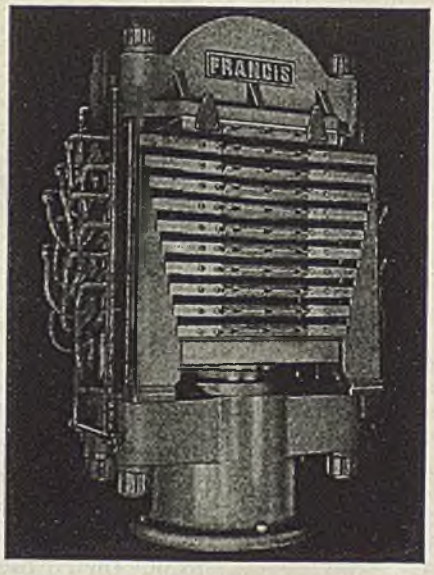
constantly lubricated by a metered amount of filtered oil.

Headstock is driven by a constant torque type variable voltage motor. This self-excited motor has a work speed range of 90 to 600 rpm and drives headstock spindle through V-belts to eliminate vibration. Starting and stopping are controlled by the work start and stop lever. Headstock spindle and work drive pulley are mounted on preloaded superprecision ball bearings. Face plate overhang is at a minimum and rigid support is given the work. Change from live to dead spindle is made quick and easy by a plunger.

Grinding wheel head is mounted on a subslide and swivel base. It may be swiveled 90 degrees either side of zero and may be moved 4 inches forward or back to obtain additional work clearance. All V and flat guides and swiveling surfaces are lubricated by a "one shot" system. A 1 hp constant speed dynamically balanced motor drives the chrome vanadium grinding wheel spindle through V-belts. Hydraulic system consists of a traverse cylinder, a direct connected motor driven vane type oil pump and control valves. Uniform carriage traverse speed of 3 to 120 ipm is possible with a reversal accuracy of within 0.001-inch. The oil reservoir is in the machine bed.

Hydraulic Press

Designed to handle laminated plastic for war items as well as a variety of other plastic work, a new steam plate press is announced by Chas. E. Francis



Co., Huntington, Ind. The one shown here is a 30 x 30 x 2-inch, 153-ton capacity hydraulic general purpose press with motor driven pump unit, automatic pressure and temperature controls and is equipped with 11 steam plates. It can be provided with 14 or 16-inch diameter cylinders, with or without pumping unit. The strain rod nuts have a special locking device to prevent unscrewing.

Power Booster

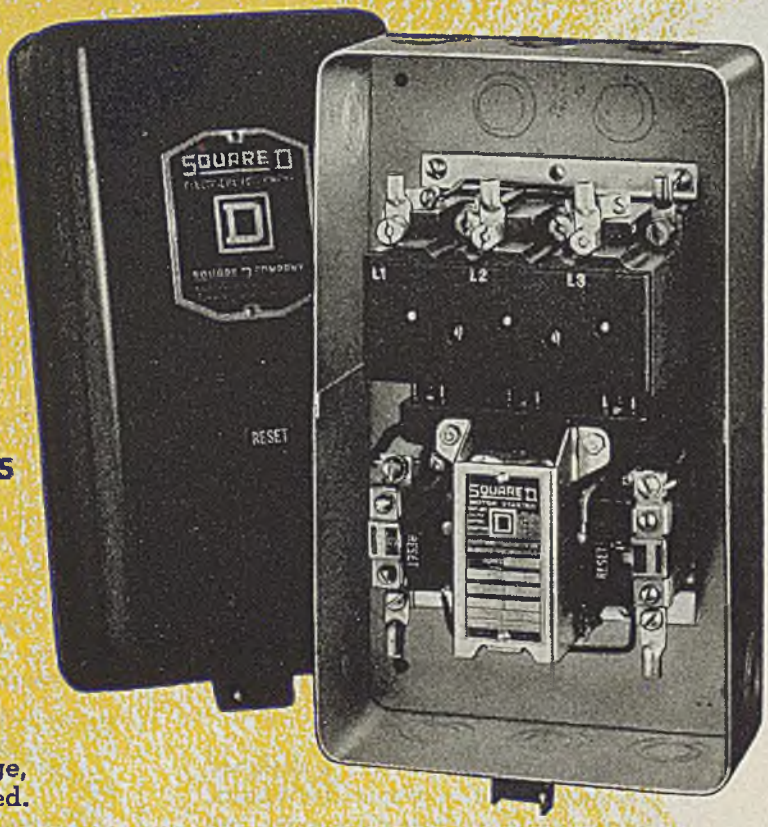
The new HP-16 power booster developed by Talk-A-Phone Electronic Laboratories, Talk-A-Phone Mfg. Co., 1512 South Pulaski road, Chicago 23, enables an executive to communicate with both his office and factory without using the central switchboard.

The unit is capable of delivering a minimum of 15 watts "voice range" pow-

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

THE RIGHT START TO EFFICIENT MOTOR CONTROL IS—

the Right Starter



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- **COMPLETENESS OF LINE**

Square D's complete range of types, sizes and enclosures enables you to select exactly the right starter for each job. Manual, Automatic, Line-voltage, Reduced-voltage, Reversing, Multi-speed.

- **SIMPLICITY OF DESIGN**

Square D starters are simply designed and ruggedly built to give long life under severe operating conditions. Although compact, the ample wiring space and accessible terminals reduce installation time.

- **EASY, FAST MAINTENANCE**

Accessibility simplifies inspection and saves valuable production time should replacements be necessary. Contacts can be quickly changed without disturbing external connections.

Water-tight enclosure

Dust-tight enclosure

Class II, Group G enclosure

Class I, Group D enclosure

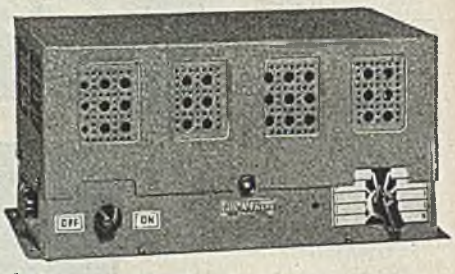
• When you select Square D starters, you can be confident that they'll back up your judgment in terms of consistent, efficient service. That they are designed and built to "take it" is being doubly proved by their around-the-clock wartime performance in thousands of America's leading industrial plants.

• See your nearby Square D Field Engineer for details or write for Bulletin 8536 which describes line-voltage starters shown above. Square D Company, Industrial Controller Division, 4041 North Richards Street, Milwaukee 12, Wisconsin.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

er. More than one booster can be used in a system where greater power levels are necessary. In addition, special type speakers are available for use with boosters when necessary. The power booster will work with most intercommunication systems. However, certain of the company's models have been designed so that when the HP-16 is used it becomes an integral part of the system. For example, when model C-410 is used, the pressing of a button marked "power" will immediately throw the booster into action and the voice goes out into the

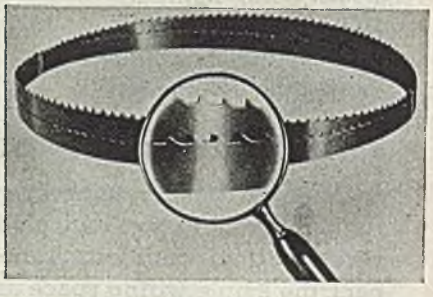


factory, penetrating the high noise levels. The unit is designed so that when the answer is received from the outlying station, the voice comes through at regular reduced office volume.

The unit illustrated here measures 12 x 6¼ inches. It is equipped with "on-off" switch, pilot light indicator and variable volume control. It may be placed anywhere near the master station and is connected to it by four wires. Operation is on 110 volts, alternating current, 60 cycles.

Band Saw

W. O. Barnes Co. Inc., 1297 Terminal avenue, Detroit 14, announces a new skip tooth band saw. The saw is designed for faster, easier cutting of magnesium, aluminum, soft brass and



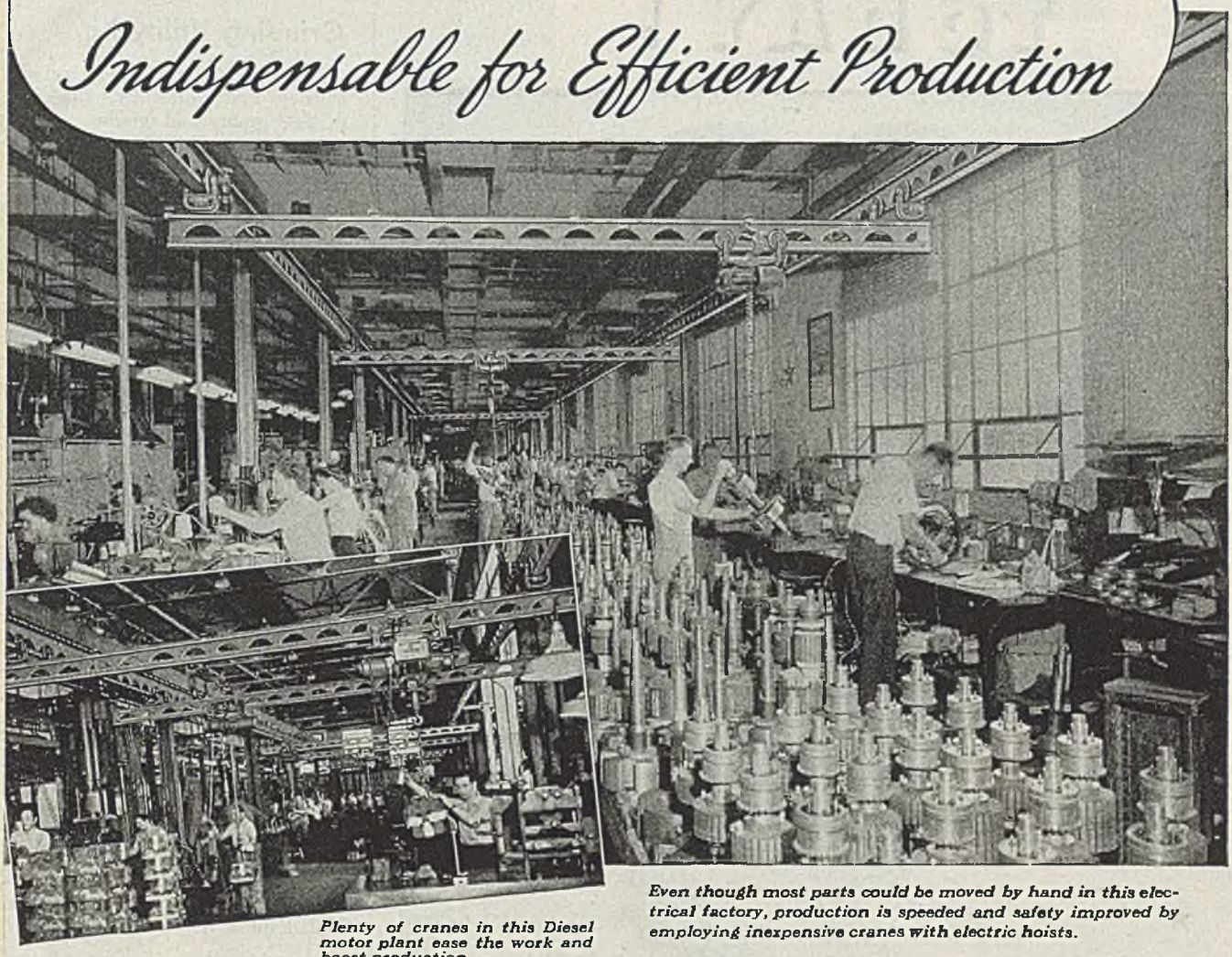
other nonferrous metals and for the cutting of plastic, composition, fibre, wood, etc. It is of hard edge, flexible back construction and fits any standard band saw machine. It can be used until completely worn out and requires no resharpening.

Auto Charger

A new charger for recharging rechargeable flashlight storage batteries from an automobile battery is announced by Ideal Commutator Dresser Co., 1921 Park avenue, Sycamore, Ill. It connects directly to the "live" side of the ignition system and does not interfere in any way with the operation of the vehicle. It may be mounted either

TRAMRAIL CRANES

Indispensable for Efficient Production



Plenty of cranes in this Diesel motor plant ease the work and boost production.

Even though most parts could be moved by hand in this electrical factory, production is speeded and safety improved by employing inexpensive cranes with electric hoists.

Three things which are held extremely important to modern industrial plants are achieved by the use of simple Cleveland Tramrail overhead cranes:

(1) Production is speeded
(2) Costs are cut
(3) Safety is improved

Cranes save many costly man-hours of skilled mechanics by enabling one man, in most cases, to pick up and move heavy or awkward parts that ordinarily require hard and dangerous work by several men when lifting and tugging by hand.

Even where light loads are lifted only a few times a week, it has come to be realized that the cost of Cleveland Tramrail cranes is well justified because they are a tremendous factor in the elimination of hernias, smashed hands and feet, wrenched backs and other unnecessary injuries.

Progressive plants regard overhead materials handling equipment as indispensable.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

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

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

on the dashboard or on the side plates just inside the door. A small pilot lamp on the charger indicates when the flashlight battery is charging. It may be charged even though the motor is not running.

Grinding Utility Kit

For all-round usefulness, grinding efficiency and versatility, the 21 sizes, shapes, grains and grades combined in utility kit No. MP21 are ideal for mechanical craftsmen. They have been selected to meet the widest range of every-

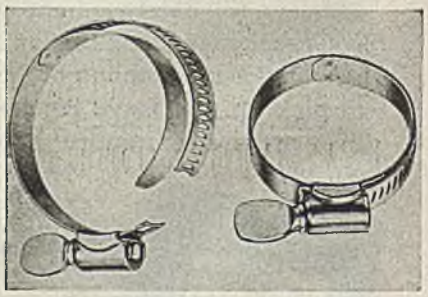
day requirements possible on portable grinders.

The 20 points in the assortment are mounted on stainless steel mandrels 1½ inches long and 1/8-inch in diameter and may be used on high-speed grinders, whether air, electric or flexible shaft. The Electrolon (silicon carbide) dressing stick is included for use in dressing and altering wheel shapes for special applications.

This utility kit is available from Abrasive Co., Division of Simonds Saw & Steel Co., Tacony and Fraley streets, Philadelphia 37.

Worm Drive Hose Clamp

Made of stainless steel, the improved worm drive (Wittek Type WWD) hose clamp is made to specification AN-FF-C-406A and features an inner band of stainless steel which protects the hose from the serrations in the outer band and



distributes the load uniformly to provide greater strength and sealing characteristics.

The device has compact streamlined housing and hardened 1-piece thumbscrew. It is made by Witteck Mfg. Co., Chicago 23, and is available in eight adjustable sizes to cover the entire range of application.

Industrial Brushes

(*Concluded from Page* 108)

arbors for attachment to cores later, brass is also utilized. Winding machines are located just beyond discharge station of roll-forming machines on tracks and a winder can be moved to service any of the six rolling machines operated at the Fuller plant. A seventh roll-forming machine is being installed.

The forming and winding machines are synchronized, starting and stopping together, thus eliminating slack or sudden tension. From strips are also fabricated brushes without cores for the metalworking industries, usually for lighter work and of shorter length. Strip is attached to cast iron and flanges of various diameters from 2 inches and greater by special head screws or wedges; flanges are also frequently cadmium coated.

Pre-spiraled brushes may be thus assembled. Filler may also be mounted or inserted to permit removal for refills. On arbors brushes have been wound of lighter metal backing and center wire to as small as ½-inch diameter and up to 15 inches on arbors and cores.

Spiral brush assemblies are used for sheet scrubbing in steel mills, mostly on steel cores; in the aircraft industry sheet deburring brushes are mounted on special flanges with clamp and set screws. For tin plate polishing a rotary brush 70½ inches long on a tube 2⅜ by 71½ inches, tampico filled, is standard with some tin mills.

Strip is right hand spiral-wound, ⅜-inch lead with a flat wire spacer between coils. Approximately 186 strip coils from backing strip slightly over 125 feet in length are made, also 187 wire coils, 119 feet, 5 inches in length. Outside diameter of the brush is 5¾ inches. This type of assembly, with shaft and collar, may be rewound repeatedly as worn down, with spares available. Wire spacer in this unit is $\frac{1}{16}$ x $\frac{1}{16}$ flat.

A close wound brush used in hot strip finishing has 228 coils or 349 feet of backing strip, brush length being 6 feet, 3½ inches on a 5½-inch OD steel core, first two coils at the ends being welded 180 degrees apart, strip section being 0.230-inch at the top and 0.320 at the base. A cylinder brush pickling machine in the brass industry has a Monel metal holding strip, seven-eighths by 0.040 or 0.050-inch, approximately 95 close wound spiral coils on a 31-inch brush.

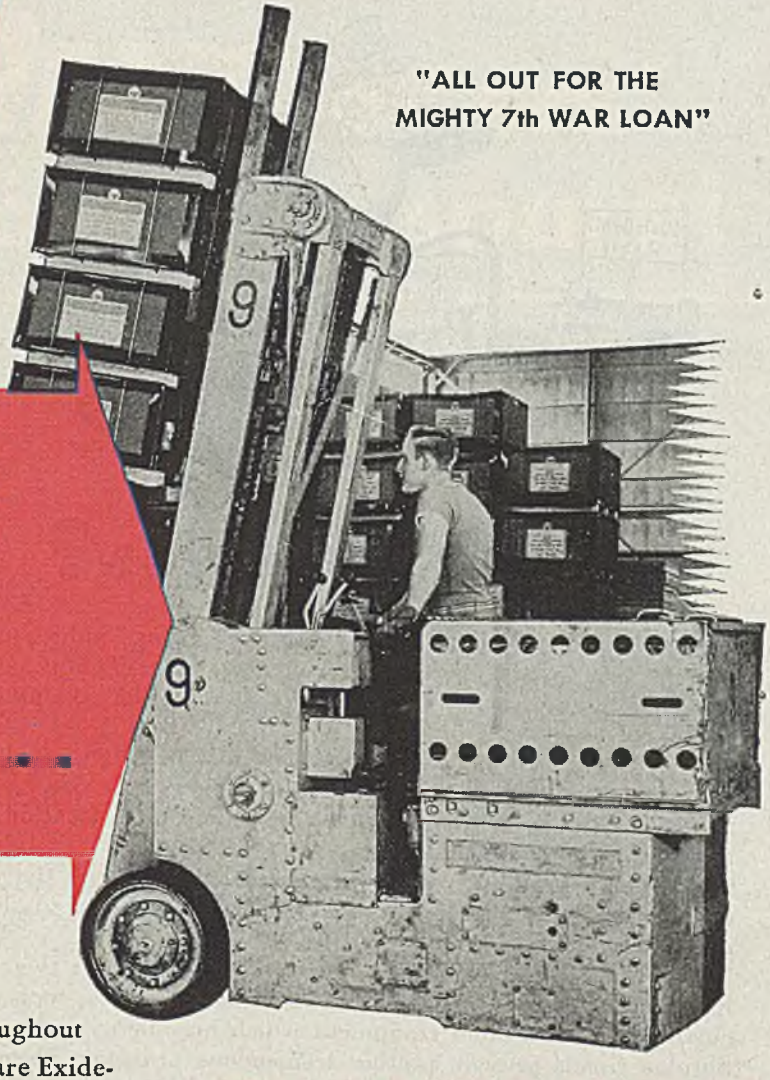
Welding Electrode Chart

A wall chart on welding electrodes, 24 x 37 inches and printed in four colors, is available from Metal and Thermit Corp., New York 5. Electrodes are divided into four groups for quick reference: Mild steel, special steels, stainless steels, and hard surfacing steels. Each electrode is described according to AWS-ASTM class, and color identification, recommended current strengths, polarity and physical properties are given. There also are brief descriptions of electrodes' general characteristics and applications.

EXIDE POWER

"ALL OUT FOR THE MIGHTY 7th WAR LOAN"

KEEPS TRUCKS HUSTLING IN TOP FORM ALL DAY LONG . . . . .

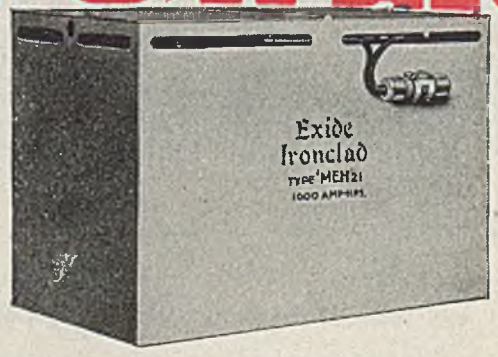


Sustained speeds are kept up throughout the day when electric industrial trucks are Exide-powered. They wind in and out along the warehouse highways—lifting, hauling and stacking unit loads—at savings of time and manpower, at lowered costs, and with improved efficiency.

More Exide Batteries are used to power these modern electric trucks than all other makes of batteries combined. Their abundant power enables them to handle today's greatly increased load. Extra rugged construction keeps them steadily on the job. And their ample reserves can stand the drain of continuous, day-long service. You can always count on Exides for dependability, long-life and ease of maintenance.

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



ARMY E NAVY

Exide BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

Power Trucks

(*Continued from Page* 114)

reinforced formed plates, electrically welded in rigid boxlike structure.

For work such as encountered in steel mills and most of the metal-fabricating shops, weight of the machines frequently is an advantage as a counterbalance for the loads they carry and also to withstand hard usage. Excessive weight, however, imposes an unnecessary burden on motors and handling mechanism. Knowledge of the purposes to which the machines are to be applied and experience of the builders generally result in the installation of equipment entirely suited to the job.

Actual capacity exceeds by liberal margin the rated capacity, and being practically foolproof from the standpoint of operating controls and safety devices, they survive through years of abuse. Literally hundreds of such trucks have been in operation in steel mills and metalworking industries for more than 25 years. Their longevity might be considered a disadvantage from the strictly commercial viewpoint; but beyond question the trucks built today are superior in every respect to their early predecessors. Like many machine tools in the metals industries, these older units have been kept in service—necessarily so, in this war period. While they do a job well, they are obsolete when compared with modern equipment.

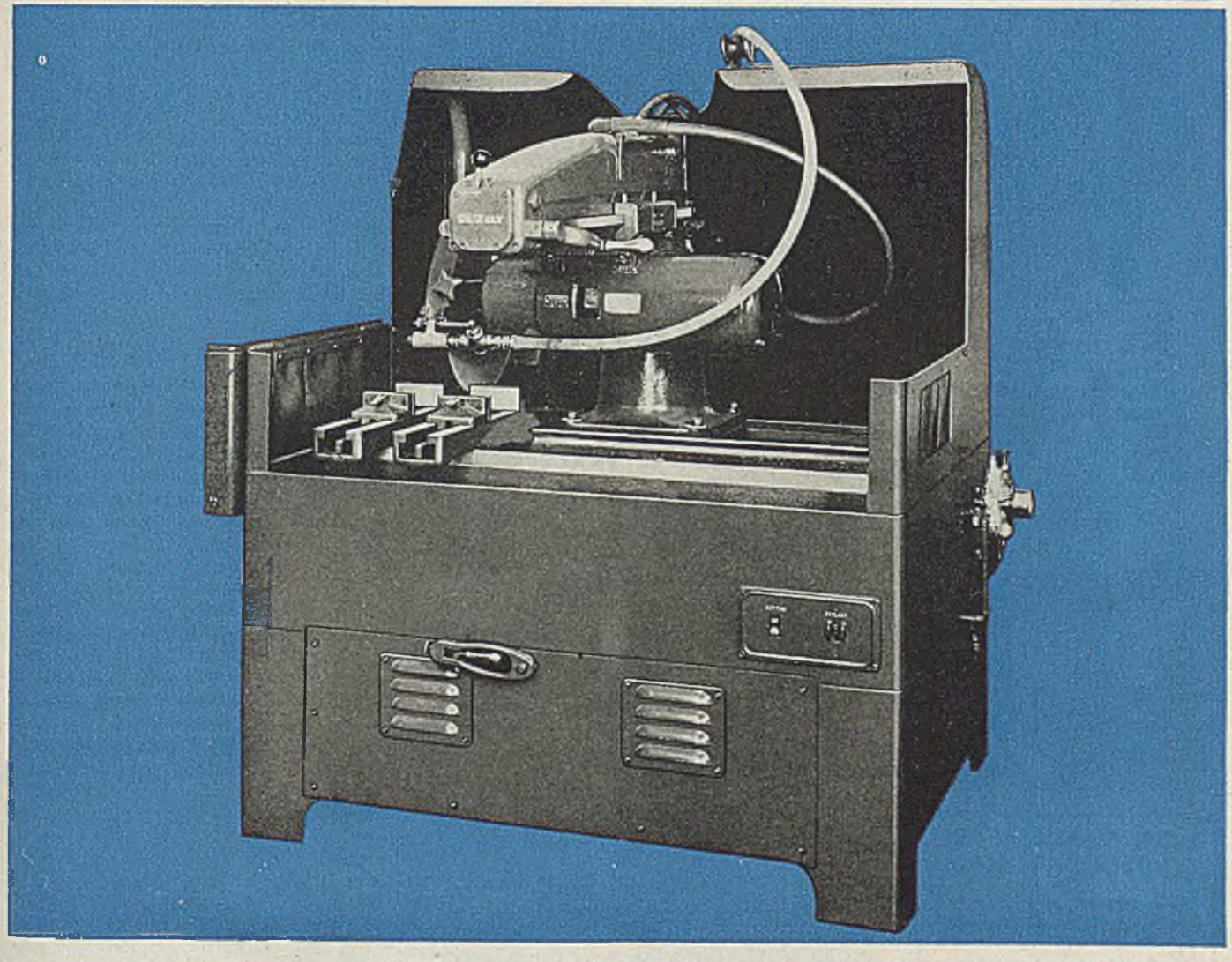
Uses in Steel Industry

It would be difficult to name all the uses to which the trucks are applied in the steel industry. That is because they supply a large amount of power in extremely compact, easily transmitted form. For example, on iron ore loading docks in the Lake Superior district, trucks equipped with power wrenches, Fig. 2, move along the line of cars, "trapping" or closing the hoppers after the cars have dumped their ore into shipping pockets below. Trucks have been used at times as auxiliaries in ore, coal and scrap handling at lower lake ports and terminals. Nearly all heavy equipment in steel plant and rolling mills requires constant maintenance work. Scores of platform trucks and cranes are used to lift out and convey mill parts to machine shops and back again to replacement.

Standard types and sizes accomplish the majority of tasks in rolling mills and related processing departments, such as continuous transporting of coils of hot strip from one operation to another; for carrying black plate from shears to picklers; for conveying stacks of tin plate from mills to inspection rooms, thence to final operations in packaging and shipping.

Peak production of steel led to construction of some unusually large and novel types of trucks. The unit shown in Fig. 1 weighs 25,750 pounds (12.8 net tons); has a rated capacity of 50,000 pounds (25 net tons); and frequently carries a load of strip steel weighing up to 30 tons. It is one of the largest power

DE WALT offers cut-off power to spare!



The new DeWalt "Wet-Cut" Metal Cutting Machine:

- cuts wet with coolant or dry if desired
- cuts off wide stock and odd shapes
- also cuts metals on an angle

Power is the keynote of the new DeWalt "Wet-Cut" Heavy-Duty Metal Cutting Machine. Its 15 H. P. DeWalt-built motor, driving an 18" diameter abrasive wheel or steel saw blade, makes it possible to "walk" through the toughest kind of metal. It is this same power that keeps abrasive wheels operating at a constant speed, thus increasing wheel life and accuracy of cut. It is power like this that saves time and lowers cutting cost.

If you have a heavy-duty metal cutting job to do, investigate this DeWalt. Write for full information.

DEWALT PRODUCTS CORPORATION

225 Fountain Avenue — Lancaster, Penna.

industrial trucks ever built for interplant service.

The motor-operated conveyor platform is 6 feet 10 inches wide, 13 feet long, and consists of six endless duplex roller chains, enclosed with heavy steel casing except on top side. The chain can be driven in either direction for loading, straightening or discharging the coils. The casing, besides protecting load and chain, prevents mud, water or snow from being splashed onto the rolls of steel. Top of this platform is 33 inches above floor level. Two heavy canvas belts are drawn over the rolls and fastened in front to hold them in place while being moved.

This truck, Fig. 1, travels 3 to 3½ miles an hour with a capacity load; light, 4½ to 5 miles per hour. This truck takes its load of hot-rolled strip steel in huge coils from a roller conveyor leading directly from the mill. It loads them on its platform by means of its own chain conveyor, and after a half-mile haul, unloads the coils in another processing department. This, too, is a continuously operating system, as developed by the steel company's engineers.

Truck Handles Strip Steel

Another interesting type of truck brought out in the war effort is that shown in Fig. 3. This also was built for handling single or multiple loads of strip steel—but on a ram, instead of platform. In this model the ram functions much like a fork, lifting its load almost vertically (with slight backward slope). This truck, weighing approximately 35,000 pounds, has capacity for handling 25,000 pounds of strip steel in coils and conveying such a load 375 feet per minute.

It has four 22 3/4 x 14-inch front drive wheels; four 20 x 8-inch rear wheels, articulated drive wheels being adjacent to the load end for maximum traction on oily floors when truck is loaded or empty.

Still another type of truck with novel handling device is that shown in Fig. 4. This is a coil upender. It receives the load in either a vertical or horizontal position, rotates it 90 degrees and deposits it in reverse position. The extensions on one side of the rotating cradle have rollers, the other side has forks.

Typical trucks for handling tin plate and flat sheets are shown in Figs. 6 and 7. These are the high-lift fork types, adapted to picking up loads on pallets and stacking them in warehouses or freight cars. One of these trucks, Fig. 7, is shown with a clamping device for holding three packs of tin plate or sheets, to facilitate movement over uneven and sometimes slippery floors. This is a center-control unit, of 6000 to 7000-pound load capacity.

Uses for the medium size 6000-pound capacity fork trucks in steel mills, processing plants and metal-working shops are endless. Fig. 5 shows one handling ten coils of wire, five on each fork.

The story of power industrial trucks has been linked from the first with developments in the steel industry. Briefly related, Alexander E. Brown invented a machine for handling iron ore and coal on Great Lakes docks in Cleveland in

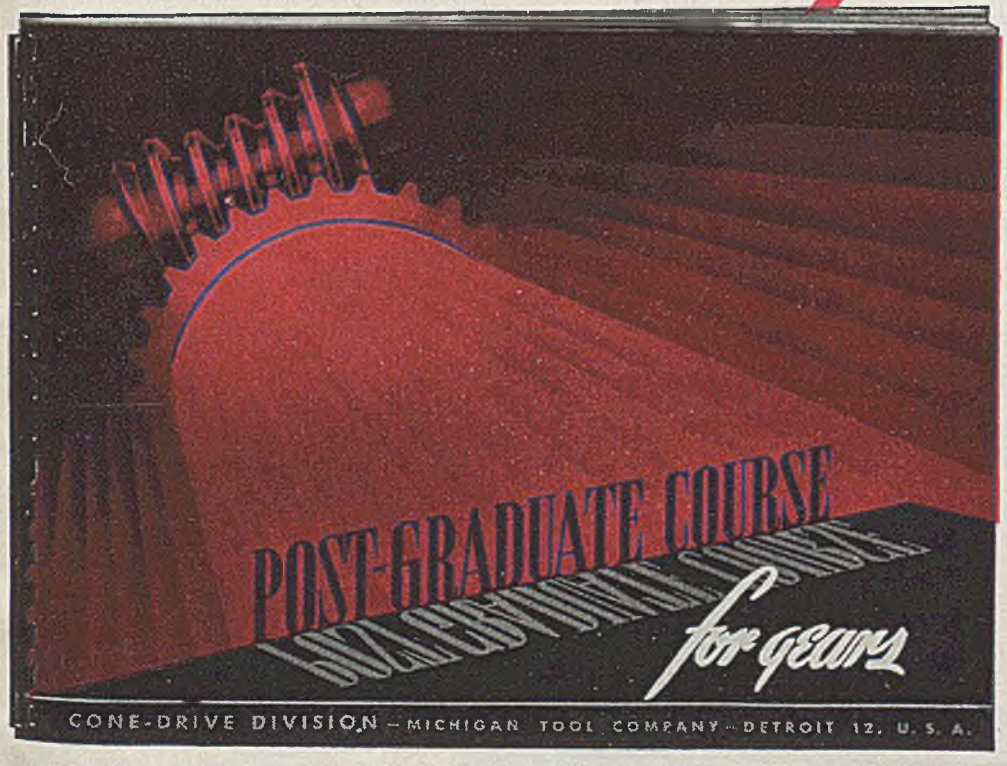
Gears?

READ THIS!

Among the new ideas in design which in the crucible of mechanized War, have achieved records exceeding even the hopes of their most enthusiastic supporters is Cone-Drive gearing.

It has taken a war to prove that Cone-Drive's pre-war promises could be fulfilled and repeated time after time in unequalled records of increased load carrying ability, longer life, decreased wear, vast savings in weight and space, etc., as compared with other forms of gearing.

What some of these records are and what they may mean tomorrow in the design of new products is told in a 20-page booklet now available to those engaged in developing new products for war or peace-time use.



Ask for Booklet 745

Also available: Manuals
CW-41B (For executives)
CW-41A (For design engineers)

CONE-DRIVE DIVISION **MICHIGAN TOOL COMPANY**
7171 E. McNichols Road, Detroit 12, U. S. A.

1879. He and his father, Fayette Brown, organized the Brown Hoisting & Conveying Machinery Co. They needed motors and other electrical devices for their machinery, and to build them according to designs originated by the British firm of Elwell-Parker, they founded Elwell-Parker of America in 1893.

Besides equipping ore and coal handling machinery, this company supplied motors for electrically driven passenger cars and trucks. When these cars were at the peak of their popularity, Detroit interests purchased the majority shares in Elwell-Parker from the Browns. When the electric passenger car and street truck business gave way to gasoline cars, there was a regrouping of interests, and the Elwell-Parker Electric Co. of Cleveland was formed.

This company saw its opportunities in the industrial field, and designed and continues to build equipment exclusively for such purposes. Equipment and construction service had been supplied to the Pennsylvania Railroad in 1906, in building the first motorized railroad baggage trucks. In 1913 it built a power tractor for the Hydraulic Pressed Steel Co., Cleveland, to push or pull four-wheeled hand-trucks that were loaded with steel products.

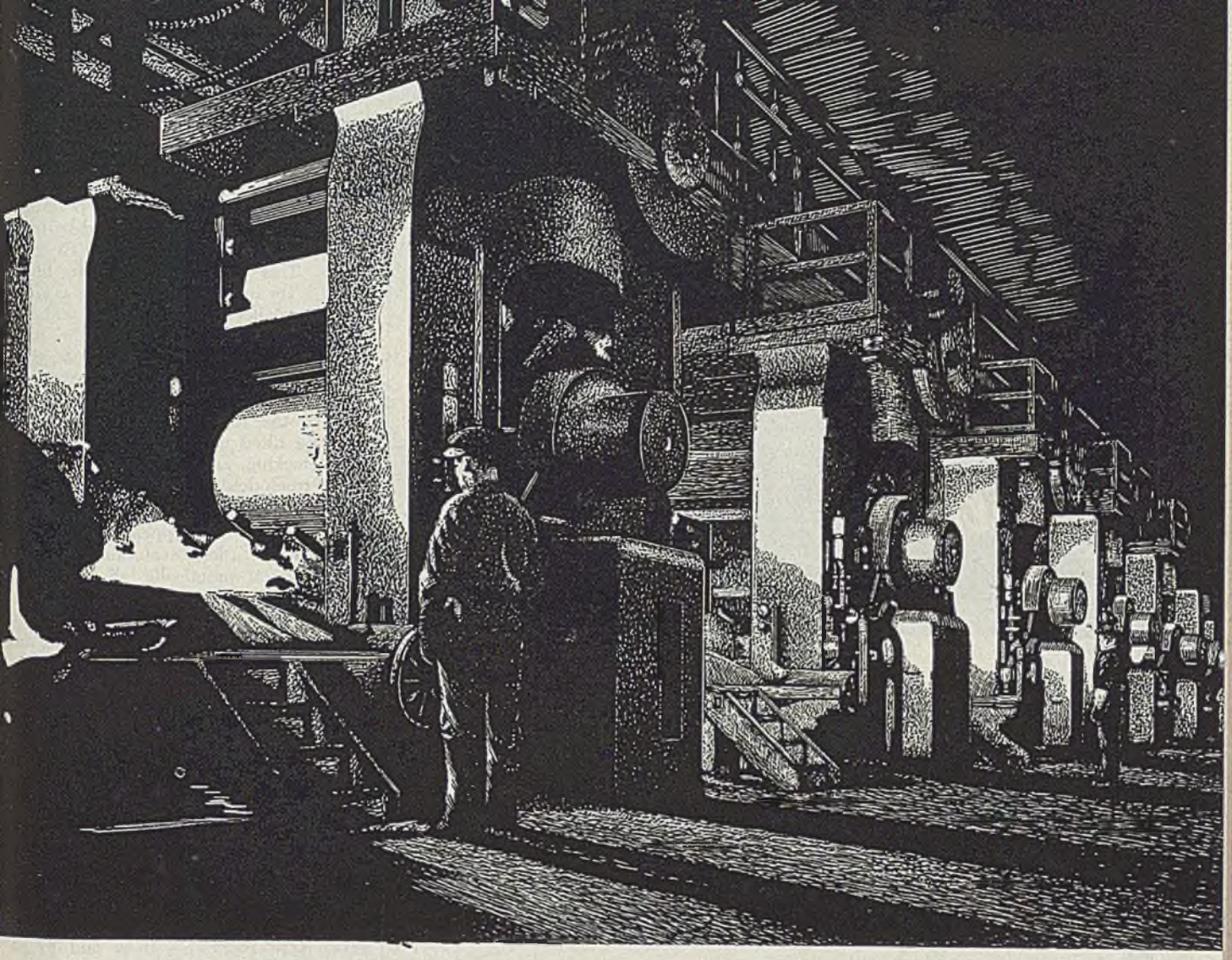
First Units Made In 1914

The great advance to the compact self-contained power unit for mechanically lifting, handling and conveying was made in 1914, with the company's low-lift platform truck. In the original, the lifting device was operated by hand-crank, but this soon was replaced with separate motor. One of the first of these trucks was shipped to Schneider et Cie., Paris, and was used in handling 75-mm shells.

In 1915 the company built trucks fitted with revolving cranes actuated by separate motors to handle 1000-pound steel dies, and also some that were fitted with both platform and crane.

The foundry industry furnished the inspiration for the first fork truck. Early in the present century, malleable iron foundries used hand-operated rigs whereby they could lift, vertically, annealing pots stacked on low iron stools and move them into annealing ovens. In this position the machine formed a steel framework around three sides of the stack. Two steel "toes" were turned by hand-levers, inward to slip under the stool, outward to release it. Such a machine required several men to operate.

Elwell-Parker experimented with the machines and equipped them with power in the period 1910-1915. Finally in 1916, it redesigned the entire mechanism, embodying the principle of the tilt-lift fork. This was done for the Eberhard Mfg. Co., Cleveland, which is a division of Eastern Malleable Iron Co. A pivoted fork was set far out in front of the body of the machine in order that the annealing pots could be set deep inside or lifted out of hot ovens as shown in Fig. 8. Capacities of this and similar units at that time were 4000 to 6000 pounds. The tilt-lift principle was applied in several other succeeding inventions, notably



HOW TO KEEP THEM *Rolling*

Thermit welding provides steel mills and other plants with a complete repair service capable of restoring broken rolls, pinions, machine frames and many other heavy-duty parts to active service.

Three major factors account for Thermit welding's growing use. First, the low cost of Thermit repairs in contrast with the cost of new parts for replacement. Second, the speed with which Thermit repairs can be made compared with the length of time required to obtain and install new parts. And third, the strength and permanence of Thermit welds.

Thermit welded repairs are as strong as a forging of the same cross-section. No machining is required, unless the weld collar interferes with operation of the part, and stress-relieving is unnecessary. Both castings and forgings may be repaired with Thermit welding—and there is no limit to the size of a Thermit weld. Send for new booklet, "Thermit Welding" which explains the applications of the process for both repair and fabrication. Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y., Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

Thermit Welding

one for handling large shells in World War I.

The company's first vertically-lifted fork truck was built in 1919 for Frigidaire. Up to this point in their development, power industrial trucks could lift their loads only high enough to move them horizontally. Now came the portable freight stacking elevator, invented by two Seattle engineers and assigned to Elwell-Parker. This truck was designed for high tiering. Its fork was run under a load laid on a pallet or across cleats, and by means of a winding mechanism the load could be lifted to a considerable height, depending on the length of its vertical frame. This frame was pivoted near its base, so the forward part of the load could be tilted upwards slightly to facilitate stacking, and the load rotated for side-of-truck delivery.

Simple and complete as the modern industrial truck now appears to be, it is the product of a long evolutionary period during which practically all American industries contributed some ideas toward its development. Fortunately, this combined experience resulted in a type of machine that has proved of inestimable value to those same industries now engaged in the war effort.

Switch Copper Facilitates Electrical Unit Assembly

A switch copper that eliminates hand-finishing of metal before assembly and effects a reduction in rejections of the finished product has been developed by Revere Copper and Brass Inc., 230 Park, New York 17. It is said to be useful and economical for manufacturers of switches and similar products requiring flat copper conductors with minimum contact losses. Copper has a fine polish which means lower losses at contact points of switches, knife blade fuses and exposed bus bars.

In the past these parts have been made of commercial bar and, in order to obtain surfaces giving full contact and conductivity, it was necessary to utilize operations such as hand selection, sand blasting and wire brushing. The company claims that use of switch copper eliminates these.

The new metal is cut to length, drilled and assembled by the equipment manufacturer. It has close tolerances that include no convexity when flatness is measured across the width of the bar; concavity 0.001-inch maximum per side up to 2 inches; 0.002-inch per side, 2 inches and over; camber, or depth of lengthwise arc, ⅛-inch maximum in 8 feet. It comes in square or rounded edges.

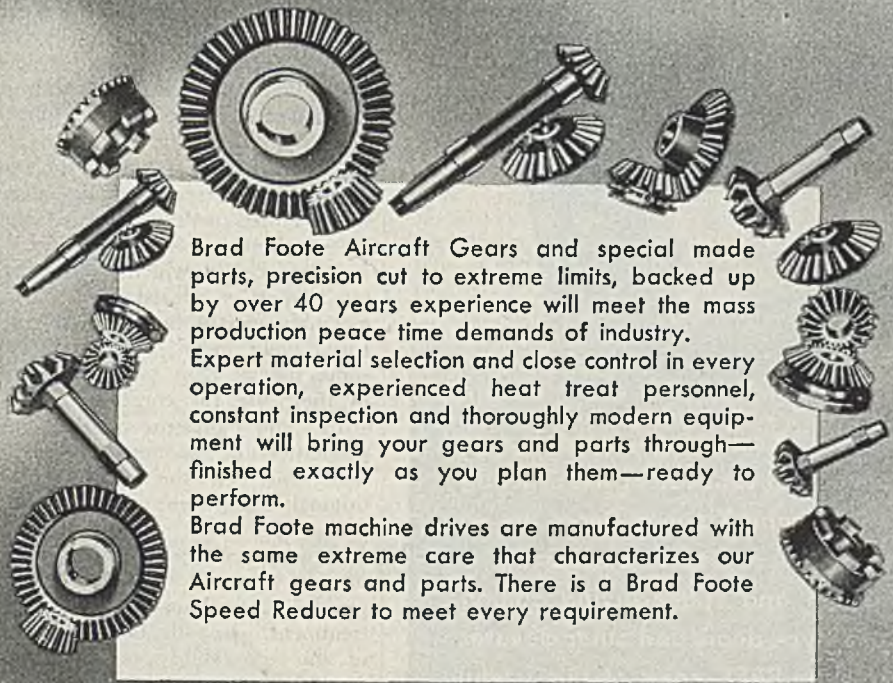
—o—

A 40-page catalog, No. 784, covering a line of crushing equipment for mines and industries using coal, is available from Crusher Division, Jeffrey Mfg. Co., Columbus 16. It shows types, sizes, capacities, space required, and the complete range of product sizes.

Brad Foote Gears

FOR

Aircraft



Brad Foote Aircraft Gears and special made parts, precision cut to extreme limits, backed up by over 40 years experience will meet the mass production peace time demands of industry.

Expert material selection and close control in every operation, experienced heat treat personnel, constant inspection and thoroughly modern equipment will bring your gears and parts through—finished exactly as you plan them—ready to perform.

Brad Foote machine drives are manufactured with the same extreme care that characterizes our Aircraft gears and parts. There is a Brad Foote Speed Reducer to meet every requirement.

ARMY E NAVY

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Pressure Welding

(*Continued from Page* 120)

curs immediately under the flames. For this reason, amount of shortening of the specimen has been used in all the unit operations developed to date. This method of determining the completion of the weld has a further advantage in that, if desired, an electrical or mechanical means can be set up to shut off the gases and the pressure, and thus contribute to the mechanization of the process.

Metal Compositions Amenable to Pressure Welding: This new pressure-welding method is free from two elements that limit the applicability of fusion-welding methods to some metals; namely, the element of fusion and the presence of added weld metal. It undoubtedly is true that the molten condition would seem to be the ideal state in which to unite two metal parts at their junction. However, the act of fusion frequently offsets this apparent advantage by seriously impairing quality of the base metal through overheating, burning, grain growth or other high-temperature reactions. Medium and high-carbon and alloy steels are especially sensitive to these high-temperature effects. Most of these reactions, such as burning of high-carbon steel, occur only at temperatures close to the solidus and, therefore, are difficult to avoid in fusion welds. However, in pressure welding, the temperature within the cross section being welded rarely exceeds 1250 degrees Cent. and therefore the base metal is not subject to the detrimental effects of extremely high temperature. For this reason, even high-carbon and alloy steels can be pressure welded and the welds will have physical properties equivalent to those of the original base metals.

Fusion welds, except the nuggets formed during spot welding, always include added weld metal and therefore have a heterogeneous structure. There are instances in which weld metal having properties desired in the completed assembly cannot be obtained readily in fused weld metal, and for this reason some special base metals are restricted in their use for construction purposes.

In the pressure-welding process, properties of the weld are dependent only on the properties of the original component metals. In some cases the heat of welding modifies by annealing or similar action the original physical properties, but these can be restored readily by suitable heat treatment. Investigation has been made of the adaptability of this process to steels of various compositions, and it can be stated confidently that the entire range of carbon and both low and high-alloy steels can be pressure welded. Excellent results have been obtained commercially in low-carbon pipe and boiler plate, medium-carbon bar stock and high-carbon rail, drill and spring steel. Equally satisfactory results are being obtained regularly on medium-carbon, low-alloy steels, alloy steels of

Grinding Questions Answered

Continued

By Allen Steele, Manager, Dayton Grinding Wheel Division
SIMONDS WORDEN WHITE COMPANY

This series of questions and answers is presented as a practical aid in the solution of many of the more common grinding problems. Readers are invited to send in their own grinding questions, without obligation of any sort. All questions will be answered by mail or in this column. No identities will be revealed if published.

1 Q. *"We are doing a cylindrical grinding job and think the wheels we are using are a little on the 'soft side' for this work. Is there any way to make these wheels act harder?"*

A. Try decreasing the work speed (not wheel speed). This usually makes a wheel act somewhat harder and may enable you to use up your present wheel stocks.

2 Q. *"Is there any certain point where a wheel should be tapped to tell whether or not it is cracked?"*

A. Yes. With the wooden handle of a screw driver tap the wheel lightly at a spot about 45 degrees on either side of the vertical diameter.

3 Q. *"Is there any difference in the cutting action of a wheel as it wears smaller?"*

A. As a grinding wheel wears smaller its cutting action tends to act softer. It also requires more frequent truing.

4 Q. *"Please recommend a good 'general purpose' wheel for a Model B, Thompson surface grinder. We want a wheel that can be used for grinding both mild and hardened steel and that will give a fairly good finish."*

A. For the kind of machine you mention, one of the best "general purpose" wheels we know of is our 8A-46 K-15-V-25 Dayton (old marking 846 K-1-V). Processed of size 46 Dayton Refined Aluminous Oxide grain, with a vitrified bond and of very open structure, this wheel does a very good grinding job on a wide range of materials. It cuts fast and cool; gives an excellent finish; requires a minimum of dressing; wears at just about the right rate for efficient cutting action.

5 Q. *"We have a new grinding job that requires a high finish, but all too frequently scratches appear on the finished part. Could this be the fault of the wheels we are using?"*

A. We doubt very much whether such scratching is the fault of the wheels as all wheel manufacturers take the utmost precautions to prevent the inclusion of any foreign materials or larger grain sizes than those specified from getting into the wheel. In all probability the scratching is due to small particles getting into the coolant. We suggest you take steps to see that the coolant is properly filtered and also that the tank is frequently cleaned.

6 Q. *"Which is the most important —the pressure of a coolant at the point of contact between the wheel and the work, or the volume of coolant?"*

A. Since the chief function of a coolant is to dissipate heat, it naturally follows that the more coolant you use the more heat it will dissipate and carry away. Hence, the volume of coolant used is more important than the pressure employed.

7 Q. *"Does the shape of the material to be ground have any bearing on the work-speed?"*

A. The shape of the piece to be ground has a lot to do with the work-speed. If the pieces are irregularly shaped, such as camshafts, the work-speed must necessarily be slow in order to follow the track. For rough grinding, an F.P.M. somewhere between 15 to 30 is usually the most efficient work-speed, whereas for finish grinding the work-speed is reduced to 10 to 15 F.P.M.

8 Q. *"Is there any rule to determine the number of steady-rests to use in cylindrical grinding?"*

A. A very practical rule in this regard is to use from six to ten diameters of the work as the spacing between rests. This is an especially good rule when grinding long and thin work. But no matter how thick and short the work may be, it does no harm to use at least one rest as it will prevent vibration when heavy cuts and rapid table feeds are used.

9 Q. *"We are grinding hardened steel parts for use on a gun mount. The wheel we have been using is a soft, vitrified wheel, 46 grit. It has done a good job. But recently, there are chatter marks on the work. What could be the cause of this?"*

A. Since the chatter marks are a recent development, we think the wheel you are using can be eliminated as a possible source of the trouble. Suggest you check the machine itself and the headstock for vibration. Usually, if the chatter marks are fine, it will be found that the entire machine is vibrating excessively. If the chatter marks are somewhat coarse, are spaced evenly, and run longitudinally, the vibration can be traced to the headstock.

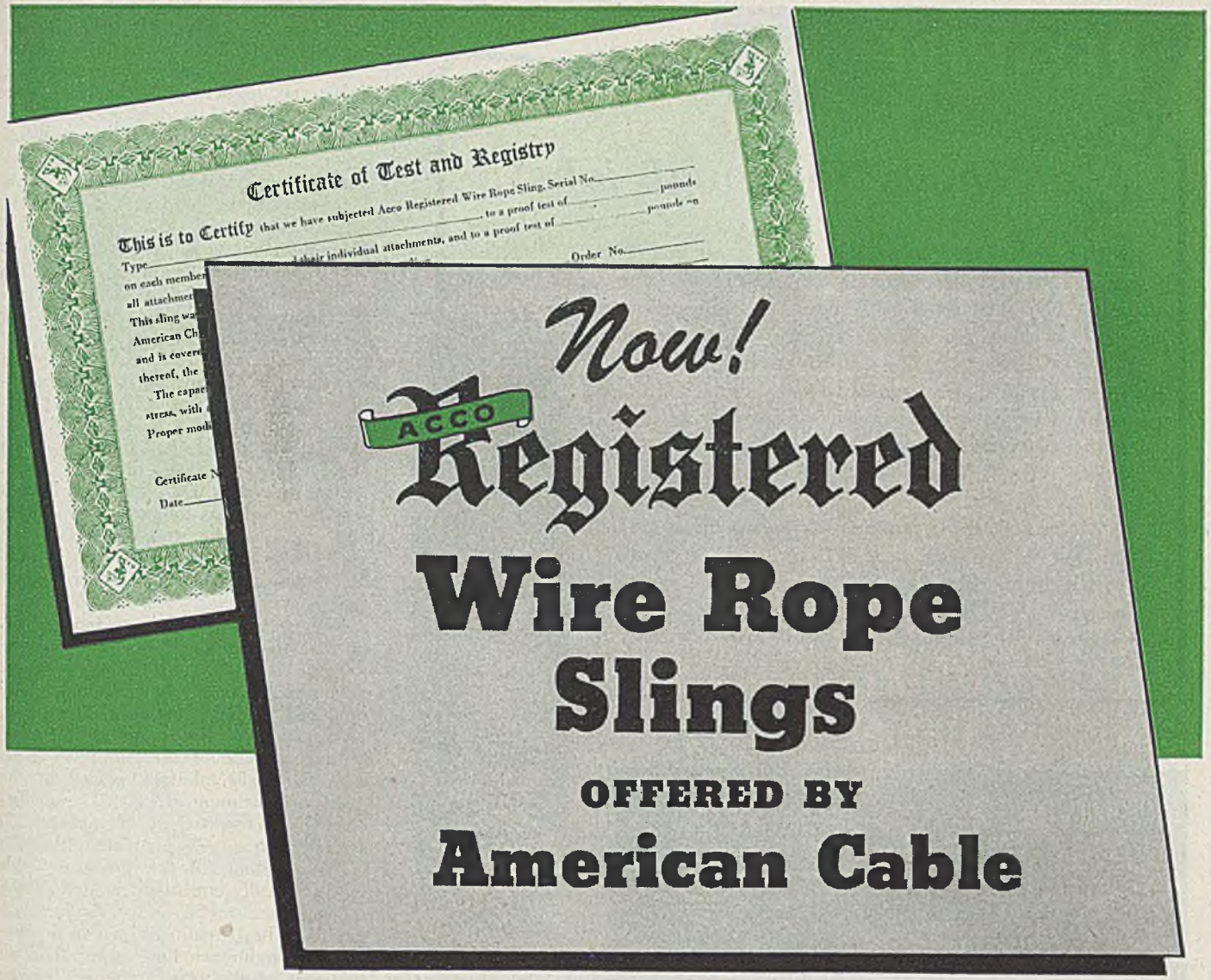
the stainless type and in one large operation in particular, on joining stainless-type steel to a high-nickel-base alloy. Excellent results also have been obtained in the use of this process for welding high-speed tools and Stellite to low-carbon steel shanks. Some experimental work has indicated fair success with aluminum in bar form and there is one pressure-welding installation under final test for joining brass.

Welds in the low-carbon steels and probably in some of the low-alloy steels, have very good physical properties in the as-welded condition. However, some of the higher carbon steels and the medium-alloy steels require normalizing to refine the grain structure produced during the pressure welding and to restore a better balance between tensile strength and ductility. In practically every case thus far investigated, it has been found that torch normalizing serves as an effective means of producing the desired improvement in physical properties. This torch normalizing can be done with the same set of blowpipes with which the welding was accomplished, the gas pressures and time being adjusted to produce the correct normalizing temperature throughout the section without local overheating.

Physical Properties: Numerous pressure welds have been subjected to extensive series of regular physical tests both during laboratory development and in testing prior to adoption by industry, and the welds have satisfactorily passed all the specified requirements. As a result of these tests, considerable data are available on the physical property characteristics of pressure welds. Most of the data presented here were obtained from tests of commercially produced welded assemblies, and therefore represent the physical properties that confidently can be expected from regular production. There are, however, a few data based on laboratory work only, but these physical properties should be readily reproducible in commercial installations as the welds were made with the possibility of commercial use in mind.

Table I is a compilation of tensile and bend test data obtained in tests of a number of typical pressure welds. The data are grouped in relation to the carbon and alloy content of the steel, and reference is made in each case to the general type of structure welded. It will be noted from this table that excellent results were obtained with steels within the complete range of commercial carbon contents, and also with typical low-alloy as well as high-alloy steels. In every case, the physical properties of the heat-treated or as-welded welds were equivalent to the physical properties of the base metal under the same conditions of heat treatment. Bend test results confirm the good ductility that is obtainable with this method of welding.

As rate of cooling following either pressure welding or torch normalizing is very low, practically no hardening oc-



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curs in the base metal and as a consequence, the hardness traverses are relatively flat. Even in pressure-welded rails and in low-alloy steels of the SAE 4340 type, hardening in the weld zone is of a relatively low degree and does not indicate the need for any preheating or slow cooling. Torch normalizing, if properly controlled, is suitable for restoring the hardness of the weld zone to the desired value.

Uniform physical properties are obtained along the length of a pressure weld and across the weld. One tensile specimen was obtained lengthwise of the weld in a thin-walled cylinder, the weld being located lengthwise through the center of the specimen. This specimen was 1⅜ inches wide and therefore included all the heat-affected metal. It was noted that the weld zone stretched equally with the base metal. Average physical test data for two such specimens were as follows: Yield point, 33,100 psi; tensile strength, 54,300 psi; per cent of elongation in 8 inches, 24.5. No indication of failure occurred until final fracture.

Fatigue tests demonstrate more clearly than any other test the excellence of pressure welds. Table II gives results of fatigue tests made in commercially produced welded structures. These tests were run in a Krouse rotating fatigue testing machine of the cantilever type, with the weld interface placed at the point of maximum stress. The endurance limit reported is for 10,000,000 cycles of stress. The data show that the endurance limit of the pressure welds was practically equivalent to that of the original base metal under similar conditions of heat treatment, and in no case was this endurance limit lower than 43 per cent of the tensile strength of the base metal.

Microstructure: General metallography of the pressure-welded joint appears to be relatively simple. Except for metallographic changes caused by the heating through critical temperatures, there is very little indication of the presence of a weld, especially if the two base metals are of the same composition.

Macrostructure, as revealed in Fig. 3, shows only the extent of the areas in which the structure was altered on each side of the weld, as would be expected. There is no sharply defined heat-affected zone at the weld, as the type of heating employed produces a mild temperature gradient. When the joint is examined under higher magnification, very little indication is found as to the location of the original joint. In a properly welded specimen the grains on the opposing sides of the interface have coalesced and merged across the boundary, forming a continuous crystallographic structure. In instances in which alloys of two different compositions are pressure welded together, the joint between the two alloys is, of course, distinguishable.

Economy of Process: It is rather difficult to discuss costs in other than a

general way, as almost every application presents a different balance among a number of factors and must be considered on its own merits. Items chargeable directly to the process are apparatus, gas consumption and time. Apparatus, which includes the pressure and lining-up equipment as well as the welding heads and supplementary controls, will vary in cost with the size and complexity of the parts to be welded, but in general it will be simpler and cost less than generally has been found necessary for other mechanized welding methods. In all cases, cost of implementation of the process has been well in line with size and importance of the product. It is, however, the economical use of the expendible items, time and gas, that contributes most to the relatively low unit cost of the process. As shown in Fig. 4, time for welding varies almost directly with the thickness of the material, being on the order of 1 minute per ¼-inch thickness. As the entire length of the joint is welded simultaneously, the time given in this chart represents the total welding time for the job regardless of length of weld. The volume production of the apparatus, therefore, may be very high. This short welding time also results in low total gas consumption even though the rate of gas flow during welding may be relatively high. Generally speaking, total gas consumption during pressure welding is considerably less than that required for fusion welding. This combination of moderate apparatus cost, low gas consumption and high rate of production results in a unit cost which has been found to be economically very satisfactory in practically every installation of pressure welding.

Commercial Applications: Versatility and dependability of this process are attested by its many successful commercial applications. Two of the most extensive applications are notable in that the welding is done out-of-doors away from the protection and facilities available in shops. These two applications are the welding of railroad rails and of overland pipe.

As the joining of rails was the first commercial use of the process, pressure welds in rails were subjected to an especially thorough investigation. The tests were conducted at the University of Illinois on full-sized rail welds made under regular operating conditions. During this work, rails were subjected to bend and rolling load tests, and the joint was examined thoroughly for tensile strength, ductility, hardness and microstructure. Rails were found to withstand the rolling load tests very satisfactorily, and no failure occurred during the bend tests. Fig. 5 shows one of the machines developed for this welding.

Up to the present time, many thousands of rail joints have been made by the pressure-welding process in various grades and sizes of standard railroad rail. In some installations the rails have been double and triple-lengthened, and in other installations continuous lengths up to 4000 feet have been welded. The general results from both cost and per

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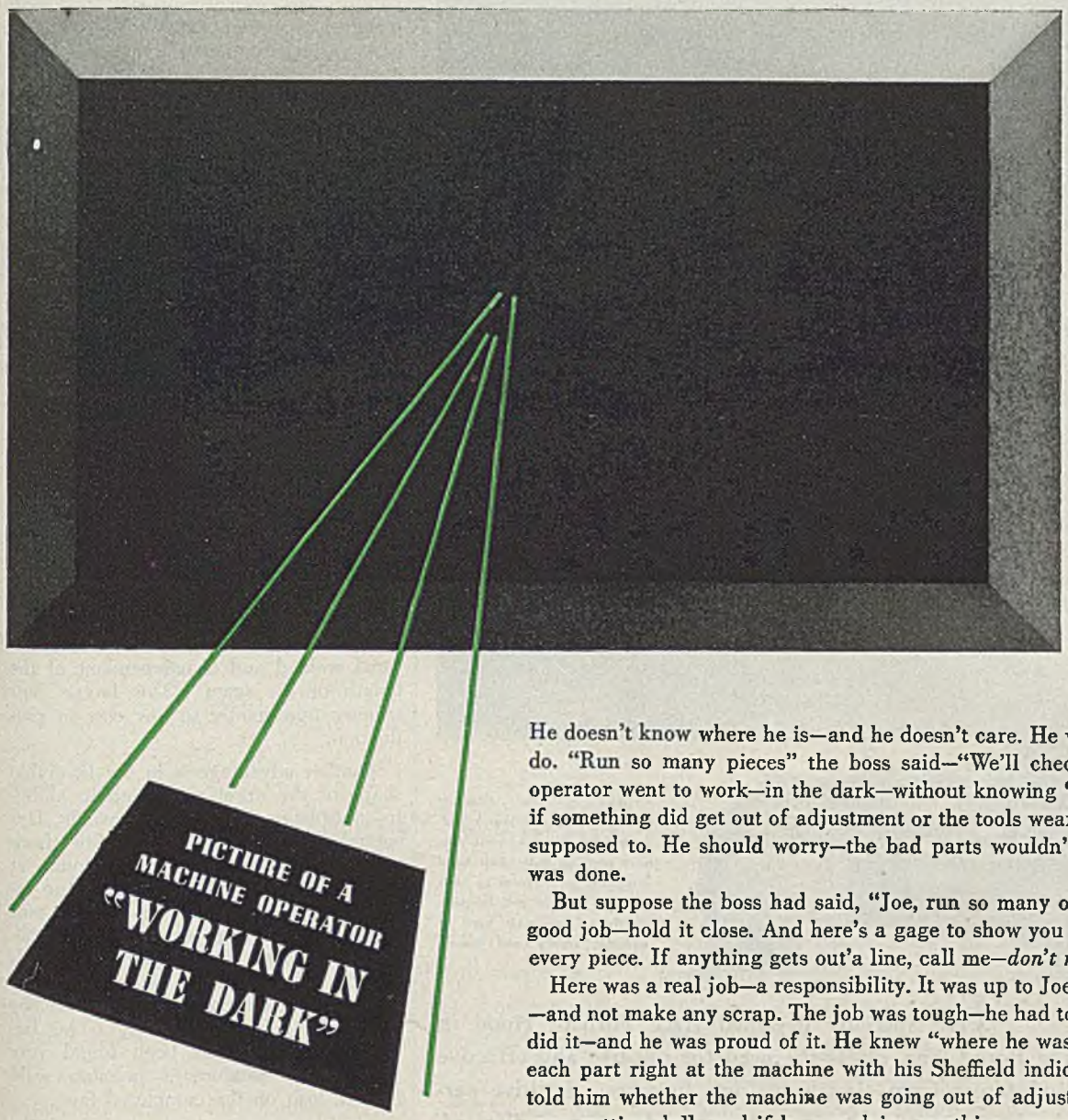
formance standpoints have been very satisfactory.

The second notable application of pressure welding as done in the open is the joining of overland pipeline, as presented in Fig. 6. Special welding clamps have been constructed for welding pipe from 2 to 24 inches in diameter, and several of these are in relatively continuous operation in this work. It is understood that over 650 miles of pipe have been laid by this process during the past 2 years. Pressure welding provides a number of advantages when used for this type of operation, an important one being that it permits the stovepipe type of construction with a minimum amount of labor and time per weld. Currently, average welding time is 1 to 1½ minutes per weld, with a joint-to-joint time of about 3 to 4 minutes, whether the pipe is 2 or 24 inches in diameter, and an average crew of eight or nine men is sufficient for maintaining this rate of production. For equivalent production per day by hand welding, a crew of up to 28 men probably would be required. The process also has the advantage that the entire weld is made simultaneously, thus eliminating residual stresses due to nonuniform cooling around the circumference. Also because of the smooth, uniform, but slight upsetting on the inside, no obstruction or restriction to flow occurs at the weld.

Another highly successful application of pressure welding is the fabrication of oil-well tool joints. In this welding a short thick-walled stub known as a half-tool joint is butt welded to each upset end of a 40-foot-long drill pipe. The half-tool joint stub end is threaded and serves to join the successive lengths of drill pipe during oil well drilling. The drill pipe is essentially a medium-carbon low-alloy steel, and the half-tool joint material is a heat-treatable low-alloy steel. As in one type of drill pipe, the half-tool joint has a 1¼-inch wall thickness and the upset end of the drill pipe is only ⅝-inch thick on the average, the half-tool joint is tapered to ⅝-inch at the end at which it is joined to the drill pipe. After welding and machining, the weld lies in the taper joining the two thicknesses. As would be expected from an understanding of the use to which drill pipes are put, these welds are subjected to extremely severe service in respect to impact, both torsional and longitudinal. Thousands of welds have been made in these drill pipes, and very satisfactory service has been obtained with these welded assemblies. Fig. 7 shows an etched section through one of these pressure welds after torch heat treatment, but before machining.

Process also is being used on a large scale for joining two stainless alloys in rather heavy sections. The application is in direct war production and so cannot be described in greater detail except to state that, by means of this process, a welded product is being made that could not be made nearly as satisfactorily by other welding methods, and service results have been excellent. The process also is in use currently for the welding

HE *Doesn't know* WHERE HE IS!



He doesn't know where he is—and he doesn't care. He was given just a job to do. "Run so many pieces" the boss said—"We'll check 'em later!" So the operator went to work—in the dark—without knowing "where he was." What if something did get out of adjustment or the tools wear faster than they were supposed to. He should worry—the bad parts wouldn't show up till the job was done.

But suppose the boss had said, "Joe, run so many of this. It's got to be a good job—hold it close. And here's a gage to show you where you are. Check every piece. If anything gets out'a line, call me—*don't run scrap!*"

Here was a real job—a responsibility. It was up to Joe to make GOOD parts—and not make any scrap. The job was tough—he had to hold it close. But Joe did it—and he was proud of it. He knew "where he was" because he checked each part right at the machine with his Sheffield indicating gage. The gage told him whether the machine was going out of adjustment—when the tools were getting dull—and if he was doing anything wrong.

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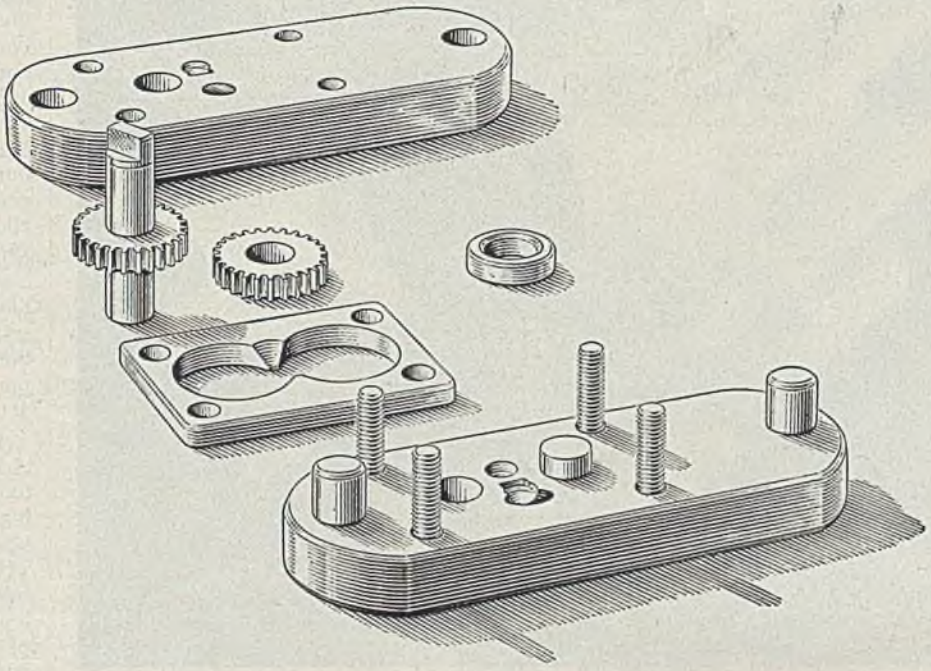
of cylinders in which liquefied gases are shipped. An almost fully mechanized machine for this welding is shown in Fig. 8. A completely automatic machine for the welding of boiler tubes by this method also has been constructed, and the welds have passed all test requirements. Portable pressure-welding apparatus has been constructed for shop welding pipe and other structural sections varying from 2 to 6 inches in diameter. The process has the approval of the ASME Boiler Code Committee under Case 973, and of the U. S. Coast Guard and American Bureau of Shipping for Class I piping on merchant vessels. The process also has been demonstrated to be satisfactory for the welding of wrought iron chain links in which much higher test loads were secured than are obtainable on hand-forged links. Another notable application that has received official approval of the WPB is the butt welding of high-speed tool tips to low-carbon steel shanks.

Special Merits: As a mechanized welding process, oxyacetylene pressure welding provides a combination of a number of distinctive advantages, in addition to the freedom from the element of fusion which has already been mentioned. This permits welding of alloys which are difficult to weld by any other method. In applications such as the overland pipelines, time required for welding is dependent only on the thickness of the material welded and is independent of the length of the seam. This factor contributes importantly to low cost in production.

Another advantage is in the favorable shape of the upset metal and in ability to control the contour of the weld. Upset metal tapers by a smooth fillet from the original thickness to a maximum at the center of the weld and leaves no reentrant angles, pockets or sharply projecting metal which would be objectionable in service. This feature is especially important in welds that are left in the as-welded condition. Moreover, by proper beveling of opposing edges before welding, it has been found very practical to produce a pressure weld that is flush on the completed face.

A very important advantage in a number of applications is the control over the location of the weld and the final dimensions of the welded assembly. This derives from the method used to indicate the end point of the welding operation. It has been found that if original specimens are of uniform dimension and welds are made according to predetermined conditions, location of the weld in respect to the original interface will be remarkably consistent. In one welding application in which the location of the weld is important, it has been determined in many hundred welds that the weld interface does not vary more than 0.02-inch from a mean. This characteristic is of considerable advantage when dimensions of the finished weld are close, and adjustment in dimension cannot be made at a later stage in manufacture.

Accurate



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Accustomed to thinking of tolerances in "tenths"?

Then you can readily appreciate the problems overcome in mass-producing this gear-driven metering pump, where vital dimensions must be held, not just to ten-thousandths of an inch, but to "quarter tenths"!

Consider these "musts": undeviating accuracy of the gear teeth...precise thickness and concentricity of the gears themselves...uniform gear-chamber clearances...four holes in the side plates located, ground and exactly spaced on a perfectly straight center line...lapping to ±.000025". Add to this, *strict interchangeability of parts.*

Do you wonder that leading engineers frowned on its practicability in mass-production...had discarded the principle of the geared pump with an "it can't be done"?

But W. H. Nichols and Sons is doing it. Engineering its production so that strict interchangeability is possible *without pre-selection of any of its parts,* Nichols has produced over 400,000 of these pumps and is still at it. Called "the most accurate assembly of commercial parts ever produced," this pump is essential equipment today in 95% of our rayon plants.

You may never need a rayon pump. *What you may need is the ability that made it.* The same Nichols engineering skill, mass-precision methods and production facilities that went into the successful development of the Rayon Pump can be your answer to an equally difficult manufacturing problem.

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PRECISION ENGINEERING AND MANUFACTURING FACILITIES FOR MASS PRODUCTION

Alloying Magnesium

(*Continued from Page* 133)

precision in modern alloying and casting practice, the knowledge of how to best work and use this fascinating metal is thoroughly established.

Twelve Alloys: Of the 12 standard Dow alloys, four can be produced in the alloying plant at Velasco, of which one is primarily for war use. The four magnesium alloys are "C", "H", "I-B" (incendiary bomb), and "M". Some 9 per cent of aluminum, 0.2 manganese, and 2 zinc are involved in "C". This is a good sand casting alloy where a tight, hard casting is desired. Alloy "H", containing approximately 6 per cent aluminum, 0.2 manganese and 3 zinc, is for general sand casting. The ignition bomb alloy contains 4 per cent aluminum, 0.4 zinc and 0.2 manganese.

As alloying agents, aluminum imparts tensile strength, manganese provides corrosion resistance, and zinc contributes both tensile strength and ductility. Aluminum and zinc in solid solution both act in the same way.

Both "C" and "H" alloys as cast, have characteristics of moderate strength and toughness, can be heat treated to gain high strength and toughness, and when both heat treated and aged (HTA) have high yield strength and hardness. To cite a typical example: Alloy "C" as cast, has typical tensile strength of 24,000 psi with specified minimum of 20,000; typical yield strength of 14,000 psi and minimum of 10,000; typical elongation of 2 per cent in 2 inches and minimum of 1; compressive strength 51,000 psi; hardness, 68 rockwell "E"; impact Izod 1 foot-pound; fatigue endurance limit 11,000 psi. When in HTA condition, alloy "C's" mechanical properties change to average tensile strength of 39,000 pounds and a minimum of 32,000; yield strength 21,000 psi, minimum 18,000; elongation in per cent in 2 inches, typical 3, minimum 1; compression strength 58,000 psi; hardness, 85 rockwell; impact, 1 foot-pound Izod; fatigue endurance and a limit of 11,000 psi.

Protective Fluxing: Dow Magnesium Corp. technicians describe the alloying practice as "melt it down, mix it up, pour it out". But the technique is not as simple as that. Chief consideration, of course, is to protect it from oxygen at all times while in the molten state by use of protective fluxing. Vigilance must never be relaxed in the smallest detail of handling.

The 380 x 100-foot Velasco alloy plant is of concrete arch construction with no columns obstructing the working area. It is set high to eliminate any hazard from flood conditions, being at an elevation 13 feet 9 inches above the ground, which is at 7 feet above sea level. All electrical equipment is especially protected against shorts, for the $MgCl_2$ used in fluxes is a conductor and takes up water from the air. It gets into everything, such as sockets and connec-

IT'S UP TO YOU TO HELP MAKE 2=3 WITH...

A job for seasoned executives—this 7th War Loan! Especially when we've got to make 2 war loans total just about as much as all 3 in 1944! Putting this over demands the combined and *continued* efforts of the "No. 1" men of American industry.

This means marshaling your plant drive to make every payday—from now 'til June 30th—do its share toward the success of the 7th. Directing the drive is not enough. It's equally important to check to see that your directions are being carried out—intelligently!

For example, has every employee had:

1. an opportunity to see the new Treasury film, "Mr. and Mrs. America"?
2. a copy of "How To Get There," the new Finance Division booklet?
3. a new bond-holding envelope with explanation of its convenience?
4. 7th War Loan posters prominently displayed in his or her department?
5. information on the department quota—and an urgent personal solicitation to do his or her share?

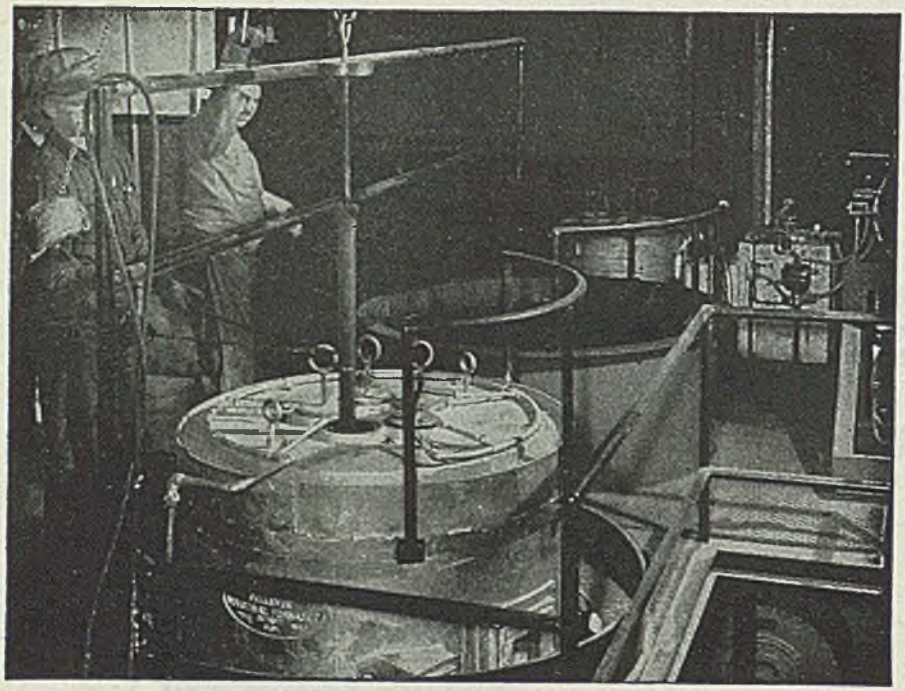
Remember, meeting—and beating—your highest-yet 7th War Loan quota is a task calling for "No. 1" executive ability. Your full cooperation is needed to make a fine showing in the 7th! Do not hesitate to ask your local War Finance Chairman for any desired aid. It will be gladly and promptly given.

If you haven't a copy of this important booklet, "7th War Loan Company Quotas," get in touch immediately with your local War Finance Chairman.

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★



tions, unless these are specially protected.

From the warehouse, the 18-pound pure magnesium ingots produced from Dow electrolytic cells are loaded on skids, handled by hydraulic lift trucks and moved to the preheat charging ends of the reverberatory magnesium melting furnaces.

This type of melting furnace is fired by natural gas (1000 Btu) through six automatic burners and makes use of the reflected heat of the reverberatory arch design. Magnesium ingots are fed in through a short preheat zone that brings them up to about two-thirds of melting temperature in their travel. Dow No. 260 flux is introduced by means of air jet and hopper. This provides a protective surface skin over the molten magnesium, shielding out oxygen and thus preventing burning. This coating is maintained through three fluxing doors on one side and two on the opposite side of the furnace, so spaced as to be able to reach all locations in the unusually large hearth. One reverberatory furnace services two alloy pots, there being three furnaces and six alloy pots in the plant.

Metal Is Pumped: Another Dow development is the centrifugal pump which pumps the molten magnesium from the furnace into the alloy pots. The high pouring temperature of 1350 degrees Fahr. and the peculiarities of the metal subject this pump to much distortion and rapid wear. Caution is taken not to bump the pump in any manner, for that would cause excessive wear of bushings. It pours directly into the cast steel pots 4 feet 6 inches in diameter and with 4000-pounds capacity.

The alloying agents are aluminum, zinc and manganese. From the scales, aluminum and zinc are conveyed together in a perforated alloy basket to the pots. Prime western zinc in 60-pound slabs is broken into small chunks and placed in the basket and pig aluminum added. The density of these metals is so much higher that if they were placed directly in the pot with magnesium, a good mix could not be produced. These perforated alloy baskets therefore are hung in the pot first and preheated before the magnesium is pumped in.

All pots are radiographed before use. Each has thermocouples connected with controls. Pots are heated from the bottom by natural gas, inspirator type burners, one to the pot, firing tangentially.

The metal pumped into the pot contains virgin magnesium, some secondary magnesium alloy recovered from the sludge refinement mentioned later, and small quantities of flux. The alloy basket hangs suspended across the pot until the alloy metal is melted. This requires from 5 to 10 minutes at a temperature of 700 degrees Cent.

The manganese addition agent (Dow Flux No. 250) is melted in a separate pot and ladled into the alloy pot by hand. This produces a better effect than if added as a solid powder. As the manganese agent is added the entire alloy

BURNING TIME LESS THAN 20 SECONDS— FOR THE TOUGHEST FIRES

• Yes, Kidde built-in systems choke off flammable liquid fires (Class B) —or electrical equipment fires (Class C)—in *less than twenty seconds.* When *automatic* systems are used, fires are often suffocated before nearby workers realize a blaze has even *started!*

Ordinary water-type extinguishers cannot stop these tough fires. But they can be quickly smothered under clouds of swift carbon dioxide gas—dry, inert, odorless and non-toxic. And that's the Kidde method! It leaves no after-fire mess, no contamination of mixes or fluids, no damage to electrical equipment. That's why the Kidde system is recognized as one of the speediest, cleanest, safest means of fire extinguishing in use today.

Check the accompanying list of typical industrial fire hazard areas—for safety's sake. If there is one of these danger spots in your plant, call in a Kidde representative — he'll be glad to discuss your fire protection problems.

Kidde Kills Tough Fires

PROCESS ROOMS
OVENS
SPREADERS
MOTORS
STORAGE ROOMS
MIXERS
COATERS
TRANSFORMERS
DIP TANKS
AGITATORS
WASHING TRAYS
CONTROL PANELS

K Kidde

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Walter Kidde & Company, Inc. · 140 Cedar Street · New York 6, N. Y.

pot mix is stirred by hand ladle, with the effect of a gentle rolling action. After this stirring, Dow No. 230 flux is added to protect the metal surfaces and wash out the oxide and chloride inclusions.

The alloy pot then stands at ease. Impurities settle to the bottom. These include burned metal, magnesium oxide, some metallic manganese and a bit of iron. The alloy pot is then ready to pour.

The metal "dipper" breaks the surface of the flux on the alloy pot with a ladle, dips a ladle full and then throws additional flux on to heal the broken-through surface of the pot. He then adds Dow No. 181 flux to the pouring ladle to shield the metal in the ladle from oxygen while pouring into the ingot mold. Two men alternate left and right at the pouring station.

Ingots Weigh 25 Pounds: A four notch ingot, as poured, weighs 25 pounds. Sulphur is sprinkled on ingot mold edge to protect it from burning. Ladle pours from a spout designed to take molten metal from the bottom. It is equipped with a skimmer which is used for brushing back the flux of the alloy pot before taking the dip. The attempt always is made to pour as close to the melting point as possible to prevent wasteful burning.

The molds travel on an enclosed conveyor, cooled by air flowing around the molds. The entire conveyor travel is protected by a sulphur-dioxide atmosphere over the metal surface, accomplished by hanging a pan above the mold and permitting sulphur to burn, the suction drawing the atmosphere through the conveyor.

In pouring ingots, a "skin" or fragile film is formed. The remainder of the pour is through this skin. The pour is with a minimum head from the ladle to avoid turbulence. The original film is maintained at all costs. Any turbulence that breaks this fragile film will cause a scaly ingot surface.

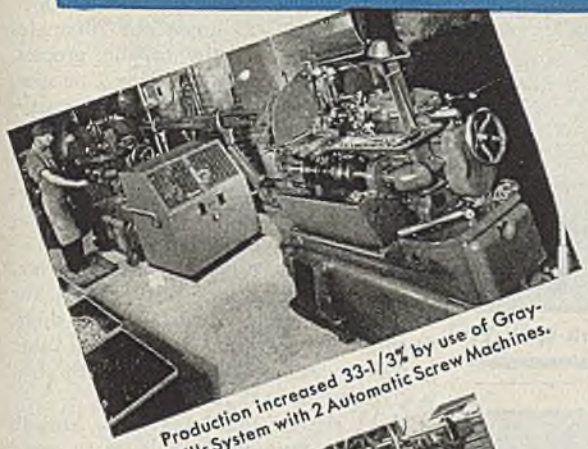
Coming out of the enclosed conveyor, the ingots drop from the molds and are picked up by an endless inclined conveyor which delivers them to skids for transport by hydraulic lift truck to the magnesium alloy warehouse for shipment as required in railway cars.

The sludge from the alloy pots is removed by long handled shovels to sludge pans and carried to the recovery process. Crystallizing faster than the sludge, much of the magnesium alloy can be forked out easily.

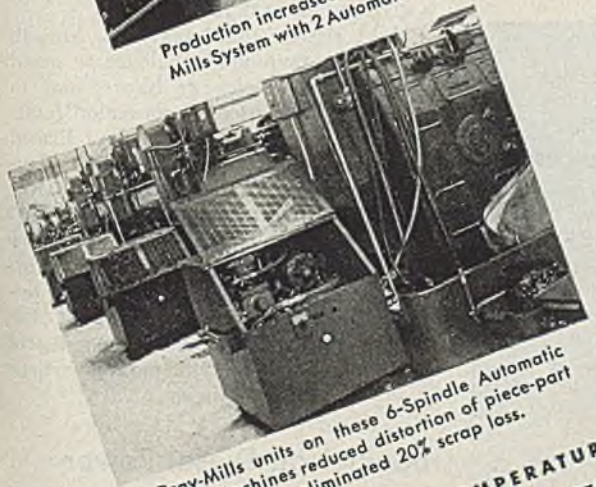
In the recovery process, the sludge is submitted to the grinding action of a ball mill where the fines are segregated and removed as waste. The sludge metal is remelted in a recovery pot and the reclaimed ingots are re-introduced into the furnace load to become part of the regular charge. Remaining sludge is removed to waste.

Casting Samples: A sample from each alloy pot batch is poured into a special split steel mold designed to provide a quick chill, thus avoiding segregation. This is very important to good specto-

Is Your Coolant Really a Coolant or *Just* **Hot** *Oil?*



Production increased 33-1/3% by use of Gray-Mills System with 2 Automatic Screw Machines.



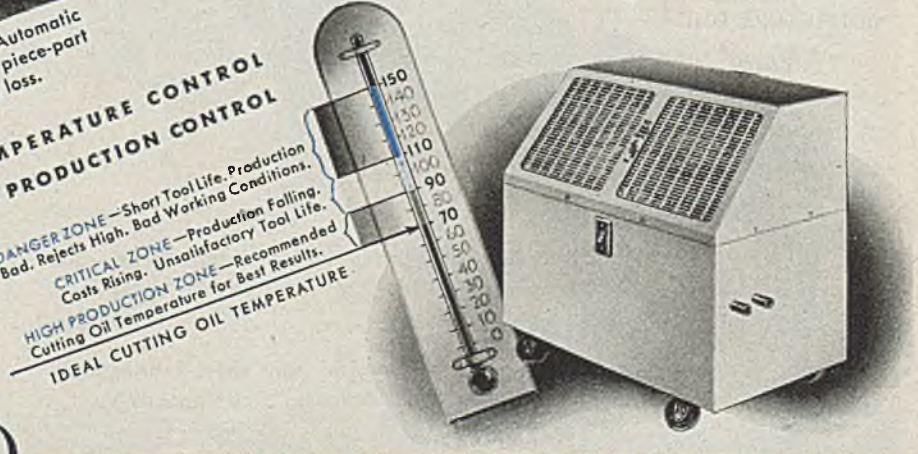
Gray-Mills units on these 6-Spindle Automatic Screw Machines reduced distortion of piece-part to zero, eliminated 20% scrap loss.

Make this simple one-minute test and find out today

• When cutting oil gets hot—its function as a coolant diminishes. Hot oil kills tools, slows machining operations, causes costly tolerance trouble, makes it hard for machine operators to work properly.

Today, after an 8-hour run, check the temperature of the cutting oil in the reservoir of your machines. Then compare your findings with the thermometer chart below. If your cutting oil runs hot, it will pay you to investigate Gray-Mills Industrial Fluid Refrigerating Systems. These efficient units will help you step up production and cut production costs by keeping your coolants cool. The standard self-contained units are fully portable and require no water—can be used with all heat generating machine tools. Larger central systems are engineered to individual requirements. Gray-Mills Fluid Refrigerating Systems have produced outstanding results: In one plant —production was increased 40%, and in another plant tool life was increased 100%. Write for complete information.

Send for Case Histories—
These case histories describe actual, on-the-job results. Along with them you will receive complete information on Gray-Mills Industrial Fluid Refrigerating Systems.



GRAY-MILLS 400
INDUSTRIAL FLUID REFRIGERATING SYSTEMS

For Cooling Cutting Oils • Quenching Oils • Hydraulic Oils and Other Industrial Fluids

GRAY-MILLS CO. • 1937 RIDGE AVENUE • EVANSTON, ILLINOIS

graphy. This mold pours two 1/4-inch round pins for spectography analysis, the pour being through an angled gate whose port can itself be used for analysis. Alloys whose aluminum content substantially exceeds 6 per cent are analyzed chemically for aluminum. The thick part is used for this purpose.

The entire alloying technique is characterized by methods of closest precision. The metal surface is continuously shielded from oxygen during the time the magnesium is in molten condition. Machinery and equipment was all developed by Dow. Hand stirring and ladling in a prescribed delicate technique is artfully employed by skilled molders. The result is a flow of perfectly alloyed ingots. Scrap is low.

In casting magnesium, the sand should be as open as possible, consistent with surface smoothness required to permit these light alloys to flow into the mold with minimum back pressure. Open sand generates less steam and dissipates it more quickly in the casting process, decreasing the reaction tendency because of molten magnesium's affinity for oxygen, particularly in the presence of moisture.

Must Watch Details: Special gates and risers are used, along with oxidation inhibiting agents, to offset the special considerations arising from high shrinkage, light weight and fast cool of the molten magnesium. Misruns, cold shuts, casting defects are not greater than other forms of casting if meticulous attention is given to these details.

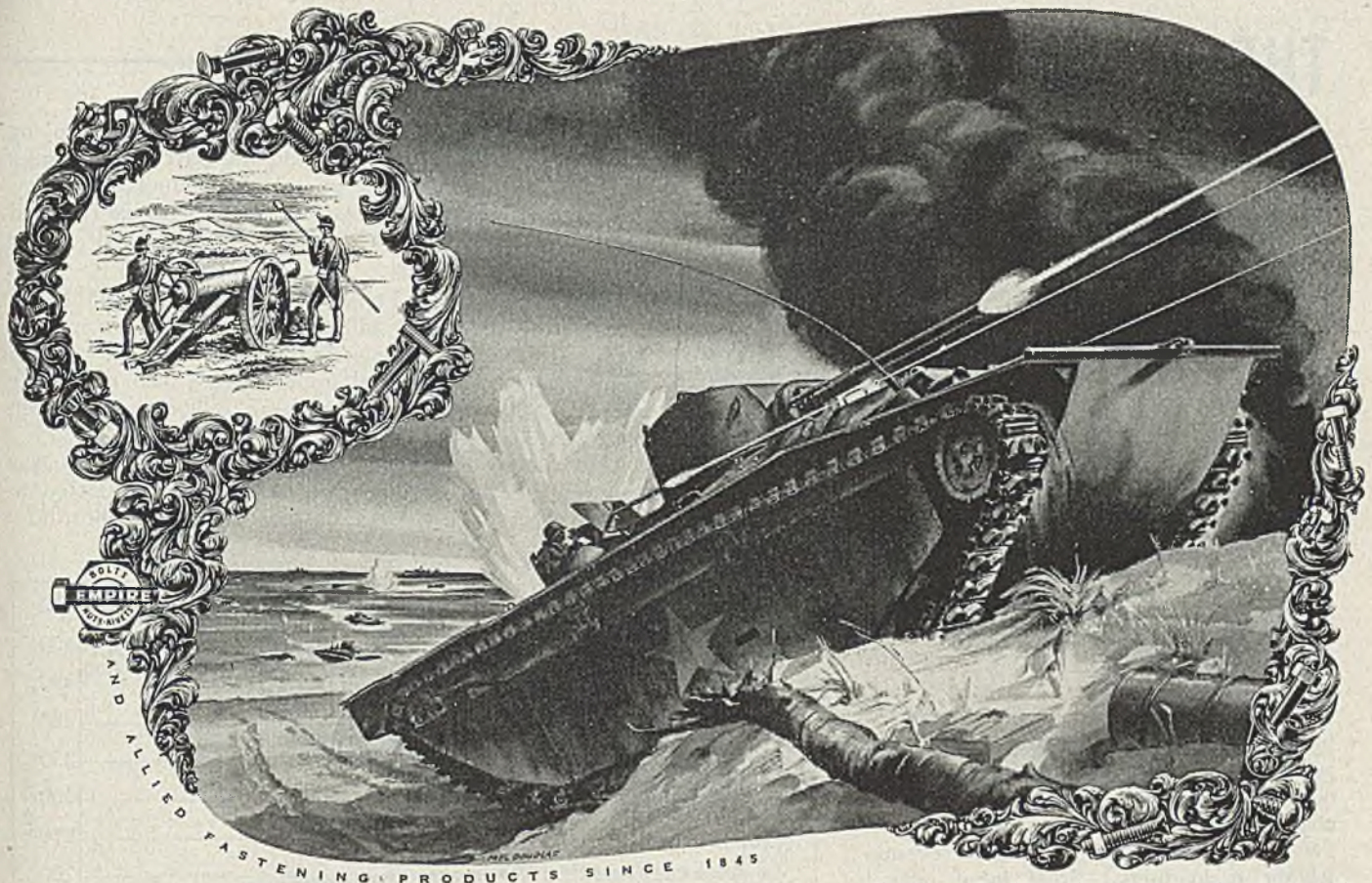
Mold design must permit a smooth pour with minimum turbulence to avoid entrapped gas holes or blows, and to prevent the inclusion of concealed faults caused by imbedded oxide skins. Placed in the bottom of sprues, filters can effectively be used to exclude oxide skin formations as well as to smooth out the flow. A large number of gates are used and of a design that prevent pouring swirl. The pouring basin of the mold is designed sufficiently large to quiet the metal before entering the sprue. Risers are also larger and more numerous than in other forms of casting.

Booklet on Diesel Power

A booklet, Form 8815, entitled "Over 50 Years of Leadership," describes contributions of Caterpillar Tractor Co., Peoria, Ill., to the solution of power problems. List includes the first successful track-type tractor, the first diesel tractor, and the first motor graders with rear mounted engines and power controls. Records of diesel performance and profit are given for a wide range of jobs, and dealer service facilities available are included.

—o—

A large card, giving detailed information regarding care and maintenance of boiler tubes, is available from Steel and Tubes Division, Republic Steel Corp., 224 East 131st, Cleveland 8.



These are the things that make America strong...the industries that RB&W has served during its 100 years of developing better fasteners for better products.

NO. 6 *General Manufacturing*

Boom... BOOM...
TO ALL-HELL-LET-LOOSE

What Eli Whitney started over a century ago has reached its peak during these war years. Mass production . . . American Industry's not-so-secret weapon that even the prescient Hitler under-estimated . . . began with Whitney's ten muskets produced from interchangeable parts . . . Yet full advantage of close-tolerance machining could never have been realized without fasteners of utter uniformity . . . Such fasteners . . . bolts, nuts, and other types . . . *were* introduced . . . a century ago . . . by RB&W. As the years went on, operations became automatic (RB&W developed automatic cold-heading), accuracy improved, and any RB&W fastener of given specifications could be depended upon to fit —assembling quickly, holding true and tight.

Today, millions of RB&W bolts and nuts fasten the fighting equipment that American Industry has put onto the field of battle in such astronomical numbers. Thanks to RB&W's traditional policy of continually investing in research, development work and modern machinery, we were ready when the call came . . . Now, RB&W begins its second "100 years" with continued great faith in America and its industries, to whom we pledge unceasing efforts to keep RB&W EMPIRE a name that stands for fasteners of maximum dependability.

100 Years.. MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

RB&W

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Factories at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill. *Sales offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle. *Distributors* from coast to coast. The industry's most complete, easiest-to-use catalog.

THE BUSINESS TREND

Cut in War Production Reflects Revised Needs

INDUSTRY is entering a period requiring greater flexibility than at any time since the start of the war program. Overall production of war materiel is on the downtrend as the armed forces adjust their requirements program to a one-front war. The situation today is in sharp contrast with the exceptional production stability experienced during the past nine months.

Munitions output will be sustained at relatively high levels over coming months, but the expected tapering in war requirements should permit spotty transition to civilian goods production. A number of manufacturing plants are already reverting to the one-shift basis and 40-hour week, and much discussed VE-Day plans are being set in motion.

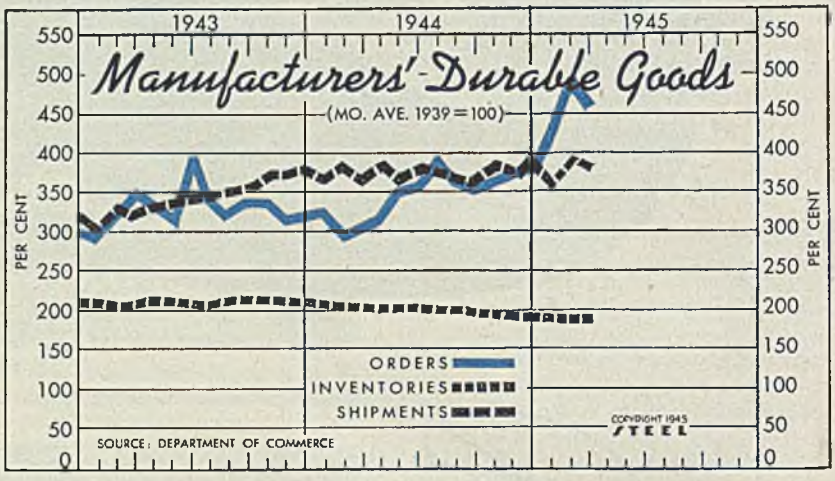
A downward tendency was recorded by most industrial indicators during the latest period with declines registered in electric power consumption, bituminous coal output, engineering construction awards, truck assemblies and revenue freight carloadings. Steel ingot output has held steady at near the 95 per cent of capacity level the past few weeks, and there are strong indications that the current steel production pace will be maintained through the remainder of this quarter at least, despite a recent drop in order backlogs resulting from reduction in war steel requirements.

INVENTORIES—The downward trend in manufacturers' durable goods inventories, in effect since April, 1943, continued at a somewhat slower rate throughout the first quarter. On March 31, last, the Department of Commerce's index on durable goods stocks stood at 188.9 per cent of the average monthly total for 1939. This represents the lowest level registered since April, 1942. Materials are expected to be released fairly rapidly from the declining war programs. However, the War Production Board will not permit hoarding, or buying ahead of needs of production, on the part of companies returning to production of peacetime products.

Shipments of durable goods by manufacturers declined slightly during March to a level of 384 per cent of the 1939 monthly average.

FOREIGN TRADE—Dollar valuation of United States exports rose to $1,016 million during March, compared with $873 million during February and $1,187 million in March, 1944. General imports were also up during March to $365 million, against $357 million in like month last year.

The volume of United States exports has risen to new record levels during this war period and is expected to remain exceptionally large despite the end of hostilities in Europe.



Index of Manufacturers' Durable Goods

(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1945	1944	1945	1944	1945	1944
January	427	332	354	364	190	212
February	481	294	394	384	189	209
March	453	310	384	377	189	207
April	...	325	...	389	...	205
May	...	352	...	371	...	204
June	...	359	...	383	...	204
July	...	393	...	373	...	202
August	...	367	...	366	...	201
September	...	350	...	372	...	199
October	...	367	...	380	...	197
November	...	372	...	374	...	195
December	...	378	...	390	...	192
Average	...	350	...	377	...	202

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output, (per cent of capacity)	95.0	95.0	94.5	99.0
Electric Power Distributed (million kilowatt hours)	4,302	4,397	4,332	4,238
Bituminous Coal Production (daily av.—1000 tons)	1,765	1,875	1,292	1,976
Petroleum Production (daily av.—1000 bbls.)	4,860	4,839	4,811	4,502
Construction Volume (ENR—unit $1,000,000)	$38.9	$40.6	$52.2	$42.2
Automobile and Truck Output (Ward's—number units)	16,885	20,470	20,470	17,080

*Dates on request.

TRADE				
Freight Carloadings (unit—1000 cars)	850†	863	846	868
Business Failures (Dun & Bradstreet, number)	16	23	17	32
Money in Circulation (in millions of dollars)‡	$26,312	$26,204	$25,939	$21,725
Department Store Sales (change from like week a year ago)	+10%	+18%	+8%	+18%

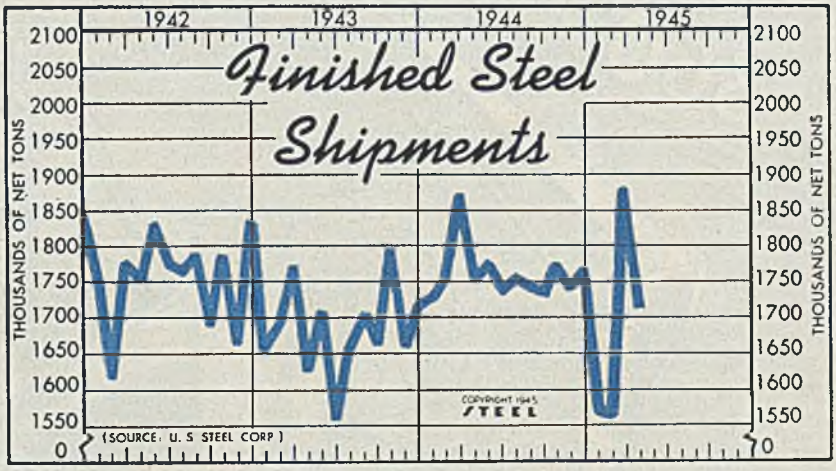
†Preliminary. ‡Federal Reserve Board.

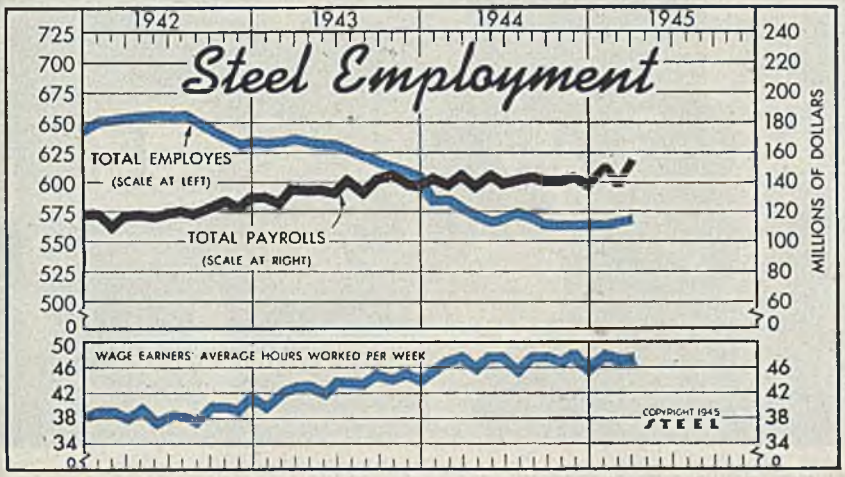
U. S. Steel Corp.'s Finished Steel Shipments

(Net Tons)

	1945	1944	1943	1942
Jan.	1,569,115	1,730,787	1,658,992	1,738,893
Feb.	1,562,488	1,755,772	1,691,592	1,616,587
Mar.	1,869,642	1,874,795	1,772,397	1,780,938
Apr.	1,722,845	1,756,797	1,630,828	1,758,894
May	.....	1,776,934	1,706,543	1,834,127
June	.....	1,737,769	1,552,662	1,774,068
July	.....	1,754,525	1,660,762	1,765,749
Aug.	.....	1,743,485	1,704,289	1,788,650
Sept.	.....	1,733,602	1,664,577	1,703,570
Oct.	.....	1,774,969	1,794,968	1,787,501
Nov.	.....	1,743,753	1,660,594	1,665,545
Dec.	.....	1,767,600	1,719,624	1,849,635
Total	.....	21,150,788	20,244,830	21,064,157
Adjustment	.....	.....	*97,214	*449,020
Total	.....	.....	20,147,616	20,615,137

*Decrease.





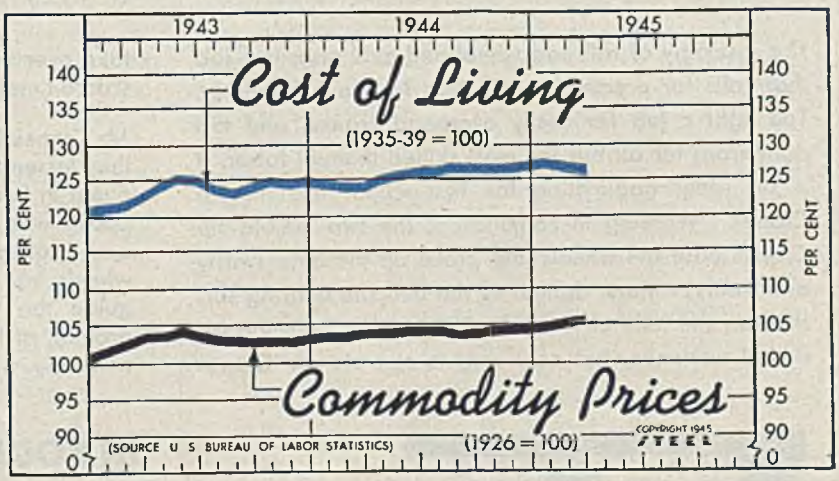
Steel Employment

	Employes (000 omitted)			Total Payrolls (Unit—$1,000,000)		
	1945	1944†	1943	1945	1944	1943
Jan.	564	583	637	$150.3	$141.8	$129.7
Feb.	566	583	635	138.4	137.6	122.8
March	570	578	637	155.0	145.3	136.8
April	...	573	634	.....	138.9	133.3
May	...	569	632	.....	145.4	137.4
June	...	570	631	.....	140.5	136.2
July	...	571	627	.....	141.7	142.8
Aug.	...	569	625	.....	143.9	139.9
Sept.	...	565	620	.....	142.2	143.8
Oct.	...	564	615	.....	147.7	144.9
Nov.	...	564	611	.....	143.1	141.5
Dec.	...	564	605	.....	139.9	140.2

†Monthly average; previous reports showed total number regardless of whether they worked one day or full month.

Wholesale Commodity Price—Cost of Living Indexes

	—Commodities— (1926=100)			—Living Costs— (1935-39=100)		
	1945	1944	1943	1945	1944	1943
Jan.	104.9	103.3	101.9	127.1	124.2	120.6
Feb.	105.2	103.6	102.5	126.9	123.8	120.9
Mar.	105.3	103.8	103.4	126.8	123.8	122.8
Apr.	....	103.9	103.7	....	124.6	124.1
May	....	104.0	104.1	....	125.1	125.1
June	....	104.3	103.8	....	125.4	124.8
July	....	104.1	103.2	....	126.1	123.8
Aug.	....	103.9	103.1	....	126.4	123.2
Sept.	....	104.0	103.1	....	126.5	123.9
Oct.	....	104.1	103.0	....	126.5	124.4
Nov.	....	104.4	102.9	....	126.6	124.1
Dec.	....	104.7	103.2	....	127.0	124.4
Ave.	....	104.0	103.2	....	125.5	123.5



FINANCE

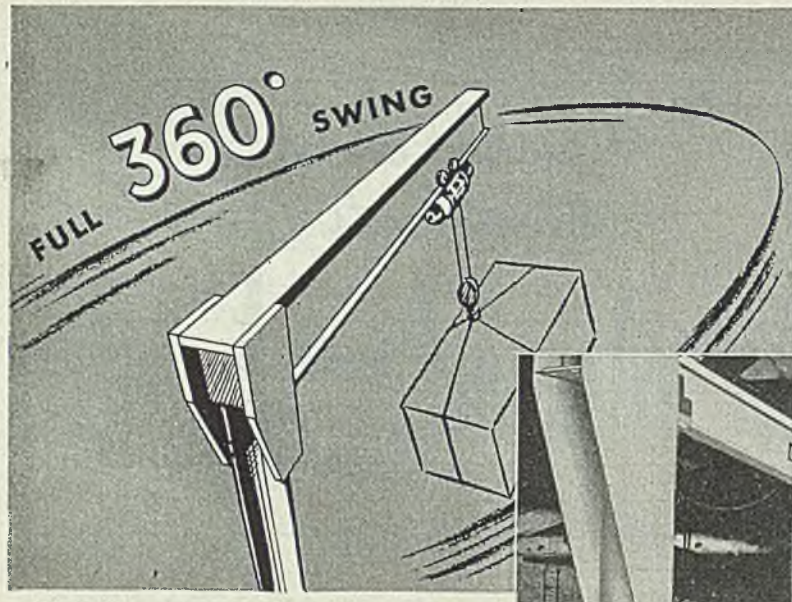
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,576	$11,039	$10,245	$8,569
Federal Gross Debt (billions)	$236.6	$235.1	$235.2	$187.4
Bond Volume, NYSE (millions)	$69.9	$83.8	$39.8	$39.1
Stocks Sales, NYSE (thousands)	8,159	7,853	5,241	3,438
Loans and Investments (billions)†	$57.2	$57.1	$57.3	$50.7
United States Gov't. Obligations Held (millions)†	$42,844	$42,854	$43,286	$37,603

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$57.55	$57.55	$57.55	$56.73
All Commodities†	105.7	105.7	105.1	103.7
Industrial Raw Materials†	117.8	118.2	116.1	113.3
Manufactured Products†	102.0	101.9	101.9	101.0

†Bureau of Labor's Index, 1926 = 100.



CHICAGO TRAMRAIL

JIB CRANES

SPEED

POINT-OF-OPERATION JOBS

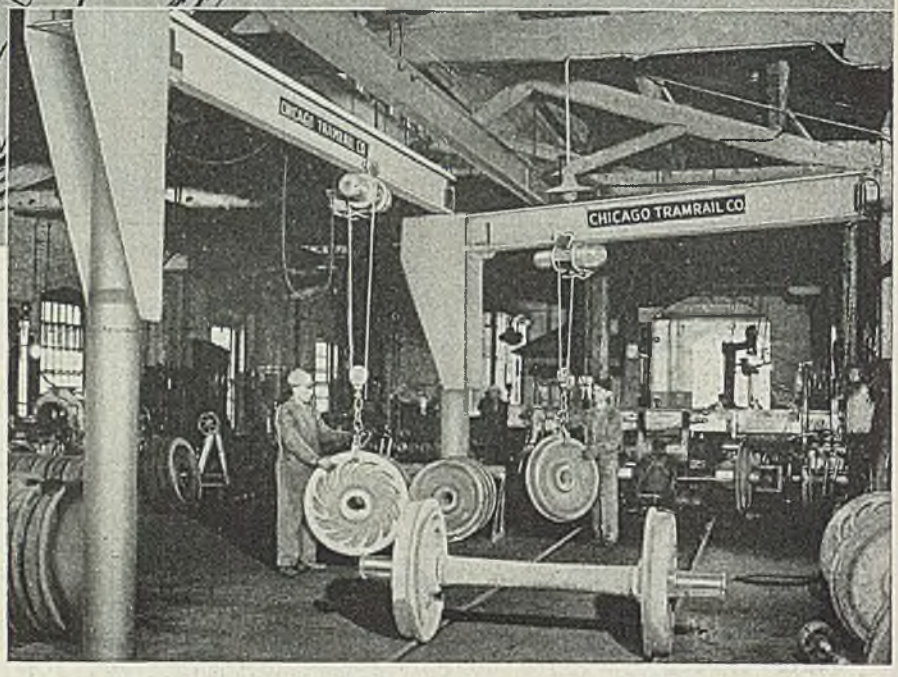


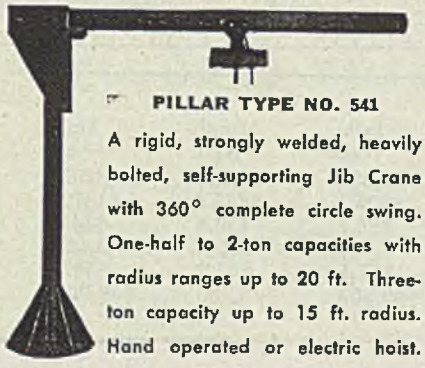
PHOTO COURTESY UNION PACIFIC RAILROAD

YOU SAVE...

1. MANPOWER
2. INSTALLATION COSTS
3. COMPENSATION COSTS
4. PRODUCTION COSTS
5. MAN-HOURS

The assembly of railroad wheel-and-axle units is a job that calls for precise coordination in heavy handling. Too light a job for costly overhead cranes, and too dangerous for all but the most skilled manual labor, it is an ideal application for fast-action, flexible Jib Cranes. Working in conjunction, the two nimble Jib Cranes ease the wheels into place on the axle swiftly and surely, without danger to the delicate bearing surfaces of the axle or journal. This used to be a job for skilled workmen, but now easy-to-operate Jib Cranes take over the difficult task—a real help in these labor-scarce times.

Jib Cranes help to reduce compensation costs because they lessen the probability of accidents that are so frequent in heavy handling. For example; the operation above was formerly a dangerous one. Many strains and broken bones resulted from rolling the heavy wheels into position, but now the men have only to guide the free-swinging Jib Cranes as they swing around, pick up the wheel and carry it to the point of assembly.



PILLAR TYPE NO. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

IN *YOUR* PLANT . . . .

It's easy to see how swiftly, economically and safely Jib Cranes perform the operation illustrated. You can effect these same savings in your plant through the use of Jib Cranes. Look around your plant—you're sure to see many places where the use of these sturdy "mechanical muscles" will save you time and money as well as speed up production. Write for full particulars today. We will be glad to send you an illustrated circular showing the various types of Chicago Tramrail Jib Cranes together with many suggested applications for their use.

WRITE TODAY!

CHICAGO TRAMRAIL COMPANY

2912 CARROLL AVE. PHONE KED 7475 CHICAGO 12, ILL.

High Steel Output Seen For Months into Future

War needs still large and civilian demand presses. . . . Some orders accepted for scheduling after July 1 . . . April ingot output shows decline

STEEL production promises to remain at a high rate for some time, in spite of the fact full effect of cutbacks and cancellations cannot yet be fully appraised, as it appears that essential civilian needs will go far in taking up the slack in war requirements following end of the European phase of the war.

Claimant agencies in Washington estimate third quarter requirements at about 16,000,000 tons of finished steel, practically the same as for second quarter. Steel cancellations so far have been lighter than expected and where nearby schedules have been affected the gaps have been filled promptly. Where they have affected future positions, however, they have left their mark as there has not been sufficient forward buying to sustain schedules. Even in sheets and special quality carbon bars, where deliveries still are far extended, there is easing, which should become more pronounced, particularly in large hot-top quality rounds, because of cutbacks now effective or likely to become effective soon in the large shell program.

Meanwhile, open-ending of CMP, under which producers are allowed to accept orders at once for scheduling after July 1, provided the scheduling does not interfere with CMP requirements, has proved a disappointment to many consumers. Recent announcement of this step caused a flurry of inquiry, as it appeared that numerous buyers with unrated tonnage had anticipated relatively early scheduling of their orders in third quarter, which in various important products is out of the question.

In some products, notably plates, unrated orders probably will find substantial openings in third quarter and this also may be the case in shapes and some sizes of bars. But if claimant agencies now estimate their needs at 16,000,000 tons of finished steel in third quarter it is obvious no considerable capacity will be available for unrated orders unless essential needs prove much lighter than now indicated.

Some producers with ingot capacity in excess of finishing capacity are said to have orders for automobile sheets which can not be scheduled now, but are producing semifinished steel in preparation for conversion as soon as the orders can be put on schedule.

Among buyers entering the market recently are organizations and individuals with unrated structural building projects. However, definite schedules for receipt of materials is of prime importance to contractors and on shapes such schedules cannot be counted on at present unless the project has a rating. As a result contractors are not interested. Even where there is an opening unrated work may be scheduled only to have to give way later to rated work, leading to much uncertainty.

Steelmaking operations last week declined 1½ points to 93½ per cent of capacity, mainly because of a strike at Buffalo which cut production there to a low point for half the week. Other changes were minor. Cincinnati gained 5 points to 92 per cent and Wheeling ½-point to 92. Chicago declined ½-point to 97½, Youngstown 2 points to 90, Cleveland 1 point to 92½ and Buffalo 30½ points to 60 per cent. Rates were unchanged as follows: Pittsburgh, 92; eastern Pennsylvania, 93; St. Louis, 80; New England 90; Birmingham, 95; Detroit, 88.

A shorter month and some interruptions in fuel supply caused steel ingot production in April to fall 400,000 tons short of March output, April totaling 7,308,579 net tons against 7,707,965 tons in March. In April, 1944, production was 7,593,688 net tons.

Scrap is irregular, some weakness developing in eastern Pennsylvania, at the same time Pittsburgh strength causes stiffening in the New York market. Supply is sufficient but preparation is slow because of labor shortage in dealers' yards.

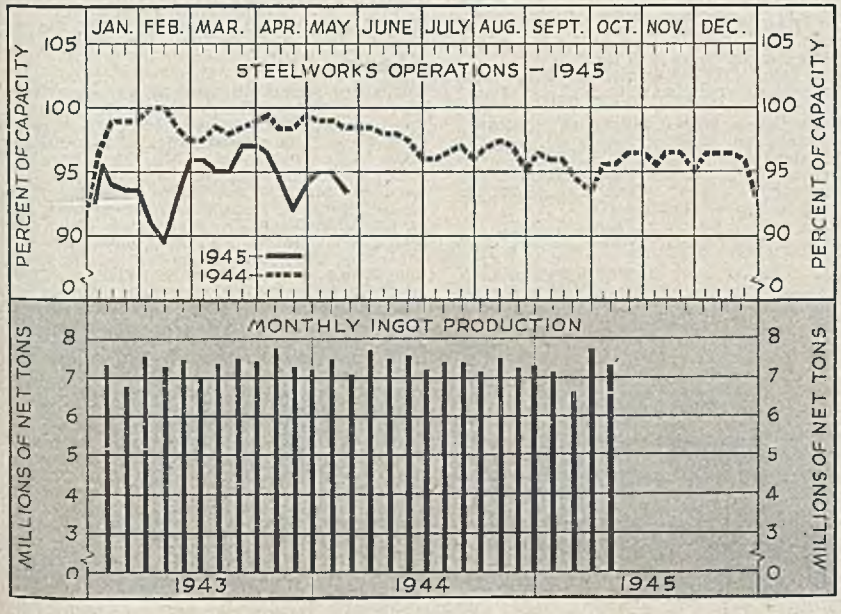
Average composite prices of steel and iron products are unchanged at prevailing levels, finished steel at $57.55, semifinished steel at $36, steelmaking pig iron $24.05 and steelmaking scrap $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended May 19	Change	Same Week 1944	Same Week 1943
Pittsburgh	92	None	94	99
Chicago	97.5	—0.5	102	96.5
Eastern Pa.	93	None	94	95
Youngstown	90	—2	96	97
Wheeling	92	+0.5	102	93
Cleveland	92.5	—1	77.5	96
Buffalo	60	—30.5	90.5	90.5
Birmingham	95	None	95	100
New England	90	None	92	95
Cincinnati	92	+5	82	94
St. Louis	80	None	77	90
Detroit	88	None	86	94
Estimated national rate	93.5	—1.5	°98.5	°99

°Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	May 19	May 12	May 5	One Month Ago April, 1945	Three Months Ago Feb., 1945	One Year Ago May, 1944	Five Years Ago May, 1940
Finished Steel	$57.55	$57.55	$57.55	$57.55	$57.55	$56.73	$56.08
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.55	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	17.30

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. 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. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	May 19, 1945	April, 1945	Feb., 1945	May, 1944
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
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	2.20	2.20	2.20	2.10
Plates, Philadelphia	2.25	2.25	2.25	2.15
Plates, Chicago	2.20	2.20	2.20	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	3.65	3.65	3.65	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	3.65	3.65	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.80	2.80	2.80	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts	2.00	2.00	2.00	2.00

Finished Material	May 19, 1945	April, 1945	Feb., 1945	May, 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$25.69	$25.19
Basic, Valley	24.50	24.50	24.00	23.50
Basic, eastern del. Philadelphia	26.34	26.34	25.84	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.19	24.69
No. 2 foundry, Chicago	25.00	25.00	24.50	24.00
Southern No. 2, Birmingham	21.38	21.38	20.88	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	24.80	24.30
No. 2 fdry., del. Phila.	26.34	26.34	26.34	25.84
Malleable, Valley	25.00	25.00	24.50	24.00
Malleable, Chicago	25.00	25.00	24.50	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	24.69	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.00	$7.00	$7.00	$7.00
Connellsville, foundry ovens	7.75	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

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 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual 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, $34; Detroit, del. $36; Duluth (bil) $36; Pac. Ports, (bil) $46. (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, $40. Detroit, del. $42; Duluth, billets, $42; forg. bil. f.o.b. Pac. ports, $52.

(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, $34. (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, No. 5—$\frac{3}{8}$ in. inclusive, per 100 lbs., $2. Do., over $\frac{3}{8}$—.47-in., incl., $2.15; 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, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c. (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, 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., 2.65c; Detroit 2.70c; Toledo 2.80c. (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 freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.65c; Granite City, base 3.75c; New York del. 3.89c; Phila. del. 3.82c; Pacific ports 4.20c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.75c; Granite City, base 2.85c; Detroit, del. 2.85c; eastern, Mich. 2.90c; Pacific ports 3.40c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.35c; Detroit del. 3.45c; eastern Mich. 3.50c; Pacific ports 4.00c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

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. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

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.

Commodity 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 3.35c.

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, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin 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 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 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, 2.20c; New York, del. 2.39c; Phila., del. 2.25c; St. Louis, 2.44c; Boston, del. 2.52-77c; Pacific ports, 2.75c; Gulf ports, 2.55c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.60c

Spring wire 3.20c

(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.80; galvanized, $2.55; Pac. ports ..... $3.30 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.05c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.40c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

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

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¼	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron 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
9-19	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
2¼"	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, $43.00.

*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, $43 net ton, base, Standard spikes, 3.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, 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.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
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.

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.

Extras 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.

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., ⅝ and ⅝ x 6-in. and shorter	63¼ 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

Piling

Pittsburgh, Chicago, Buffalo 2.40c

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

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.00
Connellsville, foundry	7.50- 8.00
Connellsville, prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75

By-Product Foundry

Wise county, furnace	6.75- 7.25
Kearney, N. J., ovens	12.65
Chicago, outside delivered	12.60
Chicago, delivered	13.35
Terre Haute, delivered	13.10
Milwaukee, ovens	13.35
New England, delivered	14.25
St. Louis, delivered	†13.35
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.85
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.35
Philadelphia, delivered	12.88

*Operators of hand-drawn ovens using trucked coal may charge $7.75, effective Nov. 29, 1943. †13.85 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 9400 series
Boston	4.044[1]	3.912[1]	4.012[1]	5.727[1]	3.874[1]	4.106[1]	5.106[1]	5.374[14]	4.744[16]	4.144[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[12]	4.613[16]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[13]	4.613[16]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.705[1]	5.272[1]	3.618[1]	3.922[1]	4.272[1]	5.168[15]	4.872[15]	4.072[21]	4.772	5.816[23]	5.860[23]
Baltimore	3.802[1]	3.759[1]	3.694[1]	5.252[1]	3.494[1]	3.902[1]	4.252[1]	5.044[1]	4.852[15]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.896[1]	5.341[1]	3.696[1]	4.041[1]	4.391[1]	5.346[17]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	4.071[1]	5.465[1]	3.871[1]	4.165[1]	4.515[1]	5.521[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.73[1]	5.26[1]	3.45[1]	3.819[1]	3.819[1]	4.90[15]	4.40[16]	3.75[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.81[1]	3.50[1]	4.80[15]	4.30[16]	3.65[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.50[1]	5.00[1]	3.45[1]	3.60[1]	3.60[1]	4.90[12]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.50[1]	3.50[1]	4.80[12]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.50[1]	5.188[1]	3.45[1]	3.60[1]	3.60[1]	5.027[12]	4.40[14]	3.75[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.40[1]	.....	3.35[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.709[1]	5.281[1]	3.550[1]	3.700[1]	3.700[1]	5.15[13]	4.500[24]	3.800[11]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.265[1]	5.765[1]	3.965[1]	4.215[1]	4.215[1]	5.758[12]	5.443[24]	4.443[12]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.165[1]	5.665[1]	3.865[1]	4.115[1]	4.115[1]	5.658[12]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.761[1]	5.291[1]	3.525[1]	3.675[1]	3.675[1]	4.975[12]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.55[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	.....	.....	.....	4.80[15]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.65[1]	5.15[1]	3.35[1]	3.50[1]	3.50[1]	5.381[15]	4.20[14]	3.75[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.787[1]	5.287[1]	3.487[1]	3.737[1]	3.737[1]	5.422[15]	4.337[24]	3.887[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.73[1]	5.23[1]	3.618[1]	3.768[1]	3.768[1]	5.068[15]	4.568[24]	3.98[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[3]	3.81[3]	3.91[3]	5.41[3]	3.61[3]	3.86[3]	3.86[3]	5.407[15]	4.46[24]	4.361[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.797[1]	5.297[1]	3.497[1]	3.747[1]	3.747[1]	5.322[15]	4.347[24]	4.031[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.165[5]	5.78[5]	4.065[5]	4.215[5]	4.215[5]	5.415[15]	4.78[24]	4.33[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.65[1]	5.903[1]	3.55[1]	3.70[1]	3.70[1]	4.90[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	4.00[4]	5.85[4]	4.158[4]	4.20[4]	4.20[4]	5.40[26]	5.079[10]	4.66[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[5]	4.35[5]	5.50[3]	3.863[3]	4.313[3]	4.313[3]	5.463[15]	4.10[10]	3.65[22]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	5.05[4]	7.20[4]	5.10[4]	4.95[4]	6.75[4]	6.15[12]	7.20[6]	5.583[20]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.75[7]	6.35[7]	4.65[7]	4.50[7]	5.75[7]	6.50[15]	7.30[15]	5.333[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.85[27]	6.50[27]	4.75[27]	4.75[27]	6.30[27]	5.90[15]	6.60[15]	5.583[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[15]	7.05[15]	5.783[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[15]	7.60[15]	5.783[21]	.....	.....	8.00[23]

*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 18 to Revised Price Schedule No. 49. Deliveries outside 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 bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [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 discharging; 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, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10 .15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70 .90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	†21.38	†20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

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, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 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)	$30.50		
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. 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, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (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.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

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 Quality

Pa., Mo., Ky. $66.55

First Quality

Pa., Ill., Md., Mo., Ky. 52.85
Alabama, Georgia 52.85
New Jersey 57.70
Ohio 46.35

Second Quality

Pa., Ill., Md., Mo., Ky. 47.90
Alabama, Georgia 39.15
New Jersey 50.50
Ohio 37.30

Malleable Bung Brick

All bases 61.60

Silica Brick

Pennsylvania 52.65
Joliet, E. Chicago 60.65
Birmingham, Ala. 52.85

Ladle Brick

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

Dry press 31.90
Wire cut 29.90

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 ton, 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.)

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, eastern, central and western zones, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton; f.o.b. cars, Eastern seaboard and Gulf ports, $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 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, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less 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. 80c; central, 81c and 82.50c; western 82.25c 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 .65c 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 ton 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, 10.75, 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 5cto 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. ¼ 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 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

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 Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 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. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.25-18.75
No. 2 Heavy Melt. Steel	18.25-18.75
No. 2 Bundles	15.75-16.25
No. 3 Bundles	13.75-14.25
Mixed Borings, Turnings	9.50
Machine Shop Turnings	9.50
No. 2 Busheling	12.50
Billet, Forge Crops	20.75-21.25
Bar Crops, Plate Scrap	20.75-21.25
Cast Steel	20.75-21.25
Punchings	20.75-21.25
Elec. Furnace Bundles	18.75
Heavy Turnings	17.75

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	$14.33-15.33
No. 2 Heavy Melt. Steel	14.33-15.33
No. 2 Hyd. Bundles	12.83-15.33
No. 3 Hyd. Bundles	10.83
Chemical Borings	14.33
Machine Turning	6.50
Mixed Borings, Turnings	6.50
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	9.00-10.00
Short Shovel Turnings	13.50-14.00
Mixed Borings, Turnings	11.50-12.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	12.50-13.00
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	13.06-14.06*
No. 1 Busheling	13.06-14.06*
Machine Shop Turnings	6.50
Mixed Borings, Turnings	6.50
Short Shovel, Turnings	9.00
Chemical Borings	13.06*
Low Phos. Clippings	16.56*
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

*Inland base ceiling; Boston switching district price 99 cents 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	16.00
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
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	21.00

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	15.00-15.50
Cast Iron Borings	14.00-14.50
Machine Shop Turnings	11.50-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-11.50

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.	16.25-16.75
No. 3 Galv. Bundles	14.25-14.75
Machine Turnings	10.50-11.00
Mix. Borings, Sht. Turn.	12.00-12.50
Short Shovel Turnings	12.00-12.50
Cast Iron Borings	12.00-12.50
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	13.00
Short Shovel, Turnings	15.00
Mixed Borings, Turn.	13.00
Cast Iron Borings	14.00
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	7.00- 7.50
Short Shovel. Turnings	10.50-11.00
Cast Iron Borings	9.50-10.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

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	6.50- 7.00
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25

(Cast grades f.o.b. shipping point)

Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.90
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

NONFERROUS METAL PRICES

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. Casting, 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 Island.

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 1c 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, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices 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: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

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" 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. 44.75c 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% 20.40c, 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 bbls. 34.00c f.o.b. Niagara Falls.

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 ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. 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	7.875
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	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c 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: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

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, old zinc 7.25c 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 176

In spite of some gaps in sheet mill schedules as a result of cancellations other pressing tonnage has been substituted immediately and in general the delivery situation is not improved. Bookings extend to the end of the year and into next. Hot-rolled pickled and cold-rolled are generally in the latter position. Some silicon sheets can be booked for delivery within 30 days, while on other grades March or April is quoted by some producers.

New York — While there have been some spot openings, as a result of cancellations and cutbacks, they have been quickly filled in and the overall picture in sheets appears about as extended as ever.

Announcement of the open ending of CMP July 1, under which producers may accept orders at once for scheduling after that time, so long as they do not interfere with CMP commitments, has resulted in a flurry of inquiries. However, these inquiries lead to disappointments, because producers so far at least have had little to promise for anything like nearby positions.

Apart from spot openings, which are somewhat more prevalent, producers are still well booked into late this year and the early part of next. In general, hot-rolled pickled and cold-rolled deliveries actually fall in January and February but are no more extended than they were. On the other hand, they are not appreciably easier even in these more extended positions.

The situation in galvanized continues mixed, with deliveries on more popular sizes ranging from late October into March of next year, depending largely upon the relative positions of the individual sellers. Also there is a somewhat mixed situation in electrical sheets, depending somewhat upon grades. For instance, one producer may be able to quote high silicon sheets for November, while sold up solidly into March or April on certain lighter silicons.

On the other hand, some producers can quote a wide range of silicon grades for delivery within 30 days. One large producer has a variety of grades for January delivery. Demands for radar and Signal Corps equipment fall heaviest on higher silicon grades while those for fractional horsepower motors and similar units are consuming major quantities of lower silicon sheets.

Stainless steel sheets are available in August, with deliveries firmed up somewhat following recent cutbacks in the aircraft program.

Boston — While there are scattered cancellations and cutbacks in narrow cold-rolled strip, including carbine magazine material, aggregate volume is not large and not sufficient to affect nearby rolling schedules notably. Revocation of numerous production limitation orders, including typewriters, is developing some inquiries for steel for delivery after July 1. Most of this prospective unrated volume, however, stands slight chance until firm orders now on mill schedules are liquidated either by cancellation or cutbacks. Rerollers are frequently in October on high-carbon and practically filled for the year on alloys.

St. Louis — Sheets are under heavy pressure, despite a 10 per cent cutback, which leaves backlogs 50 per cent greater than on Jan. 1. Shortage of shearing and loading labor is greatest since the beginning of the war. All orders still are under directives. Mills expect the Controlled Materials Plan to be eliminated, but not before Oct. 1. Sheet deliveries are extended into January.

Cincinnati — Nothing has developed since V-E Day to ease sheet supply and cutbacks so far have not been reflected in early mill schedules. A moderate upturn in cancellations recently affected chiefly distant deliveries. Considerable tonnage has been booked for reconversion industries on an if-and-when basis. Currently, however, books are filled on most grades into first quarter and in near months schedules are overloaded.

Cleveland—Pressure for prompt delivery on sheets and strip has changed little, despite cancellations. Sellers note a slight tapering in overall backlogs, but in most instances they are still behind schedule on deliveries and booked into November on hot and cold rolled items. Galvanized sheets are extended into February and March, while February is earliest available on hot-rolled pickled sheets in some instances. A marked increase in civilian orders has already developed. Sheet and strip output has been substantially increased the past month, with the decline in plate output opening up rolling facilities on converted strip mills.

Pittsburgh — Tightness which has been evident in sheets for some time is the obstacle to production of civilian goods. It was indicated by WPB Chairman Krug in press conferences last week that flat-rolled products probably would not be available for civilian goods in third quarter and only in limited quantities during fourth quarter. This, of course, delays any programs of major volume in large household equipment or automobiles. On the other hand, a spotty and scattered tonnage of surplus sheets and strip is available, which may be turned into civilian goods in third quarter in combination with a fair tonnage of other products.

Chicago — War cutbacks so far involve little sheet tonnage, so that the situation remains as tight as in recent weeks. Guess is that sheets, except for landing mat and ammunition containers, will not participate in reduced war production to the same extent as other products. Ammunition containers are being reduced in keeping with the scaling down of heavy ammunition. As far as known, landing mat has not been curtailed, but feeling is general that it will be, and this will reach mill level almost immediately thereafter. Production of pontoons is being increased, and the requirements will call for heavy gage sheets.

Steel Bars . . .

Bar Prices, Page 176

Though cancellations have been made as the ammunition program has been contracted somewhat deliveries have not receded sufficiently to be felt materially. Occasionally it is possible to find a gap early in third quarter, but this is the exception. Cold-drawn bars are especially tight and on sizes 2½ inches or larger mills are filled into next year. Carbon bars show more effect from cutbacks than do alloy bars. Directives continue to be used to obtain prompt shipment for war purposes.

New York — Despite reports of cutbacks and cancellations in some lines, cold-drawn bar schedules continue tight and extended. On 2½-inch cold-drawn carbon bars and up, deliveries generally fall into early next year. This tightness is ascribed in particular to further expansion in the rocket program and in certain types of bombs. There recently has been a rocket cancellation in this district, the work being shifted elsewhere to allow enlargement of another program at the plant affected by the cancellation, and does not reflect any easing in rocket requirements.

On sizes of cold-drawn carbon bars ranging from ¾-inch in diameter to 2½ inches, December appears to be the usual delivery promise. These sizes are being required in particular for truck parts and fuse components, trench knives, etc. On still smaller sizes, ¾-inch and under, deliveries are being generally quoted for October and November. These smaller sizes go into bolts and nuts, studs and other miscellaneous uses.

Cold-drawn alloy shipments are a shade easier, falling principally in September and October. Much of this tonnage is going into bomb components and trucks and to some extent into aircraft, although the latter program is tapering.

Deliveries on hot carbon bars have not yet eased to any material extent; however, with substantial cancellations now going on in certain heavier types of shells, it would not prove surprising if schedules on larger rounds, especially hot-top quality steel, would ease soon. At present, some leading producers are booked solidly into March and April of next year on special quality bars in the larger dimensions.

Shipments on small and medium sized bars have eased slightly, but with delivery promises still mainly in fourth quarter. Readjustments in the tank program and in caterpillar tractor production may have a more pronounced bearing soon, even though total bar output may continue high for some time.

Boston — Cutbacks affecting nearby bar schedule deliveries are in slightly heavier volume. Openings permit scattered tonnage for early next quarter, and in at least one case June, to be moved up. Thus far carbon bars have been more affected than alloys, although there are adjustments in requirements for the latter. Reductions include rifle blanks for Garands at the Springfield armory, where production by Aug. 1 will be down to 22 per cent of April. Two Connecticut shops, fabricating heavy artillery shells for some time, are revising downward releases on quality rounds. Forge shop needs hold heavy, but new buying in general has slackened. Some producers have improved delivery position on electric furnace hot-rolled bars by as much as a month. Easing in cold-finished is less apparent. Some sizes in hot-rolled alloys can be obtained for August delivery and cold-finished for October.

St. Louis — Barmakers welcome moderate cutbacks as a means of rearranging order books but schedules still are extended to September and October. Pressure continues heavy with no relief expected until V-J Day.

Cleveland — Openings on bar mill schedules, resulting from cutback in ammunition, tank and aircraft engine programs, largely involve third quarter scheduling. Pressure for early delivery on current rollings remains as acute as ever, although some easing in production is expected during June. Sellers are still booked well into fourth quarter on hot-

dip quality bars. Commercial bar delivery promises generally fall into November while electric furnace alloys are scheduled for October shipment and open-hearth alloys into November.

Chicago — Cutbacks in heavy ammunition afford little current relief to bars, for the reductions have to do principally with schedules not yet attained. Despite the fact that cancellation of some airplane programs has caused suspension of engine production, the alloy steel thus released is being absorbed in growing requirements for jet propulsion planes and for rockets. Farm implement makers are optimistic that the bar situation will ease soon to permit increased production of implements.

Pittsburgh — More extensive cancellations on shell contracts and cutbacks of other ordnance items seem to indicate a much better situation in all bar mill products for third quarter. There is little doubt that June schedules will continue virtually unchanged on bar mills. June directives, which are now in the making, will be little changed from the overall picture in May.

Philadelphia — Except for small plain carbon rounds little bar tonnage is available before fourth quarter and on hot-top quality little is being offered before next year. This is also true of cold-drawn carbon bars, 2½ inches and larger. Electric furnace alloys are available in October and open-hearth alloys in November and December. In general these schedules represent a slight improvement.

Steel Plates . . .

Plate Prices, Page 177

Principally the result of shipbuilding reduction plates are the easiest steel product and deliveries are much less deferred than for bars and sheets. Railroad and agricultural implement needs are waiting permission to buy for immediate production of cars and farm machinery. Navy pontoons and towboats and barges for river transport also are taking some tonnage.

Pittsburgh — One of the most readily available steel products, plates will provide a substantial proportion of the expected 500,000 tons of steel for non-rated orders in third quarter. Just how much of this available plate tonnage will actually go into consumption is a question since production of civilian goods requires a relatively small percentage of steel plates. Plans to produce a limited number of passenger coaches for domestic railroads, beginning almost immediately, will call for a fair volume of plates as it is anticipated that these cars will be built much along the lines of prewar cars and will not be the super-streamlined jobs which have been promised for postwar use. There is also a fair amount of plate demand for towboat and barge orders on inland waterways now being placed by shipbuilders on the rivers.

Chicago — Plates continue easiest of all steel products, but this pattern had developed through ship cancellations before V-E Day. No new cancellations of significance have been received by platemakers since and production schedules remain unaffected. Only new requirements in sight at present are those involved in an enlarged program for pontoons for the Navy and the size of this is not known.

Boston — Plate buying still slackens. New orders for miscellaneous fabrication are only a fraction of shipyard tonnage lost and to complete several contracts yards are drawing on surplus. While new procurement for the Navy is reduced, most plates required for shipbuilding in this area from now on will be for naval vessels. Some warehouse orders with mills have been revised downward. Deliveries on new business can be made in June. Range of sizes for flame-cutting is now ample, and, while down from peak, demand for that purpose holds relatively well. Liquidation of miscellaneous corrosion-resisting material by the Navy at Quincy, Mass., includes moderate quantities of plates and sheets.

St. Louis — More than 50 per cent of plate rolling capacity in this area has been shifted to sheets. The shipbuilding program has been completed and plate orders have been reduced to cover only repairs. Labor is critically tight despite layoffs in some metalworking plants. Plate production has been cut to less than sufficient for normal needs and deliveries are advanced to July.

Philadelphia—Plate demand continues to decline, with some moderate cancellations recently from the Navy. Some tonnage can still be picked up in June, although most delivery promises now fall in July and August.

Tubular Goods . . .

Tubular Goods Prices, Page 177

New York — The major effect of present cancellations and cutbacks on pipe is to check the steady extension of deliveries. In only relatively few cases

have deliveries substantially improved. One such case is cold-drawn carbon tubes, up to 2 inches inside diameter, 10 BWG average and lighter, with one producer now quoting November shipment, compared with December only a few days ago. This reflects particularly cutbacks in the aircraft program.

Most deliveries on tubes remain far extended. On hot-finished tubing, 2¾ inches and heavier, delivery schedules of one producer fall in January, and on cold-drawn tubing, over 1½-inch outside diameter and heavier, and 10 BWG, shipments fall principally in May of next year, due primarily to rocket and miscellaneous Navy requirements. Hot-finished tubing to around 2⅜ and 2¾ inches, but not heavier than .203-inch average is available in September, however, although reflecting no particular easiness.

Butt-weld pipe is being quoted generally for August, with the situation rather static. Lap-weld pipe can be had in July and August. Small sizes of seamless pipe, ¾-inch and under, are being quoted for October and November, with larger sizes freely available in September. Cutbacks in the shell program have not materially affected seamless pipe schedules, other than to keep delivery from expanding further. However, substantial gaps may develop soon in some nearby schedules.

Boiler tubing backlogs are being bolstered by additional specifications for locomotive building and repair. New shipbuilding work is light.

Wire . . .

Wire Prices, Page 177

New York — Although expected in somewhat greater volume, cancellations and revisions in wire mill backlogs are thus far negligible, affecting production and delivery schedules only slightly for the near future. Probably the most important cutback has been in keystone-shaped wire, low carbon, required as outside casing for fragmentation bombs. With some mills this is opening limited capacity for coarser sizes. Production goals for bead and rope wire, both under maintained production directives, have not been lowered, although some sizes of rope wire are less tight in the range around 0.065. Backlogs are heavy but slackening marine requirements, at least to the extent of decline in shipbuilding, may be felt soon. Overall shipments with most eastern mills are slightly in excess of new booking, about five per cent, indicating the meager effect of slightly slower buying and few cancellations. Pressure for nails, notably cement coated, is heavy, with jobber orders covering the remainder of the year.

Boston—Openings in the wire mill schedules resulting from cancellations and cutbacks are minor and few. There are some for aircraft and more are expected in other directions but revisions have been less than expected. There also are scattered voluntary deferments by a few engaged in war contract and in such cases most producers are urging outright cancellation to clear backlogs of doubtful tonnage where possible. Consumers frequently are slow to cancel, awaiting developments in their own contracts. In aircraft, material destined for B-29 use is under delivery pressure.

Rails, Cars . . .

Track Material Prices, Page 177

New York — Carbon steel allocations 170,000 tons for domestic cars in the current quarter are expected to be increased to about 220,000 tons for third quater, an increase of 50,000 tons. This is not as much as had been hoped for by car builders but will prove sufficient to lend some impetus to box car construction, which is badly needed in handling the wheat movement this fall.

With the average box car requiring about 20 tons of steel, including wheels and axles, the increase proposed for next quarter would provide around 2500 box cars. However, there is also considerable pressure for passenger cars, with a possibility that some of this may be cut in for a portion of the increase.

Meanwhile, some export business is active, including 6750 twenty-ton box cars and 1500 gondolas for the French government, for delivery in last quarter. Inquiries are expected to be issued soon through the Army for account of the Foreign Economic Administration. It is also likely that inquiries for 30,000 additional cars for the French will be brought out soon for delivery early in 1946. The latter cars will be of French design, while the former will be of American Army design. These two lots will represent a total of 38,250 out of approximately 74,500 originally contemplated and still under tentative consideration.

Latest buying includes 1340 cars for the United States Army engineers for export. These comprise 790 thirty-ton box cars, placed with the Pullman-Standard Car Mfg. Co., Chicago; 310 flat cars,

Greenville Steel Car Co., Greenville, Pa.; and 240 gondolas, American Car & Foundry Co., New York.

Domestic freight car awards in April involved 1120 cars, making a total of 12,570 for the first four months of this year. Comparisons follow:

	1945	1944	1943	1942
Jan.	7,200	1,020	8,365	4,253
Feb.	1,750	13,240	350	11,725
March	2,500	6,510	1,935	4,080
April	1,120	4,519	1,000	2,125
May	.....	1,952	870	822
June	.....	1,150	50	0
July	.....	795	4,190	1,025
Aug.	.....	3,900	8,747	0
Sept.	.....	400	6,820	1,863
Oct.	.....	2,425	5,258	0
Nov.	.....	1,065	870	0
Dec.	.....	16,245	2,919	135
Total	.....	53,221	41,355	26,028

Domestic freight cars on order as of May 1 total approximately 37,640, with foreign orders amounting to a little more than half that number. At present rate of production it is estimated that scarcely more than 35,000 or 40,000 of these cars would be completed by the end of this year. However, some easing in raw materials is in sight and, of equal, if not greater importance, an easing in manpower; hence this present schedule may be stepped up materially and still allow for some additional orders for equipment badly needed before the end of this year, such as the 8200 cars or so needed by the French for fourth quarter.

Actually the car building capacity of the country is sufficient to provide for the construction of many thousand more, this capacity amounting to 175,000 cars annually on a single shift basis. But materials and manpower, with certain ordnance contracts, will stand in the way of any such heavy increases in car construction as might be possible under full capacity operations.

Tin Plate . . .

Tin Plate Prices, Page 177

New York — Appeals of canmakers for more tin plate have resulted in increased allotments to mills. Various producers for more tin plate have been asked by Washington how much more tin plate they can turn out. Their responses have varied depending not only upon their position with respect to steel but ability to obtain adequate labor. At least several mills were told to go ahead and produce tin plate on the basis of the increases estimated. Precisely what the overall increase will amount to has not been announced. It is believed no important cuts in export allotments will be made to help meet demands of domestic canmakers. It is pointed out that export allocations for next quarter were small at best, as was also true for the current quarter.

Chicago — Tin plate output in this district is up to directive, and box car supply is adequate. However, fear already is being expressed that shipping difficulties will recur this summer, apparently based on the heavy burden on freight equipment as railroads undertake heavy westward traffic in moving military supplies and materiel to the Pacific. Hope of increased tin plate for containers in the near future has been dispelled by WPB. At present, tin plate makers would be unable to step up operations because of inadequate manpower.

Pittsburgh — Despite the fact that the third quarter quota was to have been cleared up by this time, there has been no definite word on what tin plate producers are to expect during that period. Definite plans had been made in some quarters and are still being carried forward to increase output of tin mill products. The chief trouble has been in splitting the available quantities of cold-reduced strip between tin mill and sheet mill demands. In all probability there will be little change in the overall tin mill schedule from second to third quarter. This would leave the projected output for third quarter at about 825,000 net tons. On the consumption side release of WMC controls on workers in certain districts will prove of some benefit to canneries. On the other hand, many canneries are located in areas which still come under the War Manpower Commission. Manpower will continue a limiting factor on the quantity of tin plate which can be consumed. Outlook for the fruit pack in northern and eastern states is poor because of late frosts in most areas.

Structural Shapes . . .

Structural Shape Prices, Page 177

Boston — Jobbers participate in most small structural volume active; inquiries in excess of 100 tons are rare. August is the nearest delivery with most structural mills, although cutbacks in shell steel opened up some space for June

with one mill. This was quickly filled. Except for Navy needs shipyard buying has all but ceased and most fabricating shops are in need of work, operating on reduced schedules. Drying up of subcontracts is a factor with new structural work lacking. Some tonnage for July delivery for tankers has been distributed but the total was less than first estimated due to drawing on surplus from other yards.

Philadelphia — Shell cancellations have had some effect on shapes, with one producer recently having an opening for some June tonnage and still having a little capacity left for July. A relatively short time ago this interest was booked into late August and early September. At the same time, some producers have remained in September.

Pig Iron . . .

Pig Iron Prices, Page 179

With transportation difficulties removed, the situation in pig iron is easier though demand continues high and absorbs all that is produced. Foundry demand is as high as labor supply allows, as castings contracts are offered beyond ability of shops to accept. Need for gray iron castings will continue until end of the Japanese war, Washington indicates. Civilian needs are expected to take up all slack in war demand.

New York — Pressure for foundry iron appears slightly easier, as shipments have been accelerated and consumers are no longer being forced to anticipate difficulties in transportation and in possible furnace suspensions due to fuel shortages, at least not to the extent that was necessary recently. However, the foundry melt in this district in general continues as high as labor supply will permit. Foundries still claim that manpower is their principal bottleneck.

Meanwhile, word from Washington is that peak gray casting production will be necessary for a considerable period in meeting expanding demands for the war against Japan, plus essential civilian requirements. The trade also sees a promising future in malleable, although possibly an easing in steel casting requirements.

Sweden is inquiring for iron, mentioning some rather large figures. However, with the situation in this country still tight, the Swedes are not receiving much encouragement. Moreover there are complications at present with respect to ocean shipping space. There are various inquiries from other parts of the world, the Near East and South America in particular. However, relatively little business is developing in these directions and for the same reasons.

Boston — First barge shipment of the season, basic from the Buffalo district, has arrived in Connecticut, bolstering a steel works inventory which was under 30 days. All new basic releases are from outside furnaces; reserves of that grade at the Everett furnace are depleted, the last going to Rhode Island. Cutbacks are not seriously affecting melt, confined temporarily for the most part to jobbing foundries. Loss of war contracts in some cases will contribute to an increase in pig iron demand, provided regulations limiting production of normal products are lifted promptly without red tape and labor supply continues to improve. No tenders were received on a small inquiry from the Navy, including 100 tons for Boston delivery.

St. Louis — Pig iron continues in heavy demand and dealers expect no easing until six months after it is felt in the East. Backed up industrial needs in this area are expected to keep supply under pressure for some months after the war. Consumers are operating on a day-to-day basis, with no prospect of accumulating inventory.

Buffalo — Pig iron output in this district dropped 29 points to 53 per cent of capacity as five blast furnaces were banked at the Lackawanna plant of Bethlehem Steel Co. because of a strike. Output of these furnaces was almost entirely for steelmaking. Merchant iron demand has increased and absorbs entire output. Numerous foundries are refusing business because of labor shortage, this being the choke point. Makers of railroad castings are especially busy. There is little civilian foundry work in this district.

Cincinnati — Demand for pig iron is sustained and foundries are confident of a high rate of melt despite cutbacks in military needs. Some furnace interests are inquiring about third quarter needs and replies are expected to show requirements at least as heavy as for first and second quarters. Any easing in the labor situation probably would result in an expansion in melt. Deliveries often lag to a point where production is threatened, stocks of foundries being low.

Cleveland—Pig iron sellers note little change in volume or changes in specifications. Foundry activity is limited only by manpower and there is little likelihood of any easing in demand for some

months for war requirements continue to exceed production. Even should cutbacks in war programs substantially reduce foundry order backlogs adequate civilian orders are expected to offset tapering in military requirements. However new truck equipment and spare parts programs are taking an increasing tonnage of castings and schedules call for still greater output during 1946. Supply of pig iron is adequate in this district, although blast furnace interests have not been able to build up stocks. Foundries are well within the WPB's 30-day inventory limitation.

Philadelphia — No. 2 stack at Swedeland, Pa., has resumed operation with production temporarily devoted to foundry iron, and is expected to change basic later in the month. Demand and supply are in fair balance on both foundry and basic grades.

Scrap . . .

Scrap Prices, Page 180

Scrap supply is fairly easy and prices for most part are holding, except in turnings, which are a drug on the market. Some easing is evident but most steelmaking grades show no change. Supply is limited by lack of labor for preparation, and melters are wary of buying too freely, holding purchases as close as possible to consumption.

Chicago — Prices for scrap are unchanged and buying continues substantial, although consumers are being more cautious in making commitments. War cutbacks have not reached steel mills in any considerable total and until they do there is no basis for expecting lower operating rates any time soon. The caution being exercised is that mills are checking with brokers on the status of shipments against old orders before placing new orders, keeping intake in close balance with consumption. Since better grades of heavy melting steel are not plentiful, limited quantities are coming into this territory by allocation from the Southwest.

Pittsburgh — Situation continues unchanged with some weakness recurring in the less desirable turnings grades but full strength evident in prices of standard and premium grades. Demand is heavy with all producers and springboards are still being paid in some cases. Interest, however, is rising, and all factors involved are watching carefully for indications which might point to a change in buying policy on the part of consumers.

Buffalo — With steel production halted by a strike, Bethlehem Steel Co. is holding up shipments of all grades of scrap, because of lack of labor to unload. Dealers are holding cars temporarily, pending outcome of the strike, and are diverting some material to other users. A leading consumer is bidding $3 below ceiling on bundles but dealers refuse the offer and no sales are reported below ceilings, except on borings and turnings. No shipments by water have been received recently but both lake and canal arrivals are expected this week.

Cincinnati—Selling prices on steel and iron scrap, except borings and turnings, appear firm although caution rules. Dealers with substantial yard stocks tend to keep away from offerings, especially grades requiring preparation, unless price would cushion any sudden weakening. Activity is less. Some spots find easing in labor while others experience no relief from shortage.

Los Angeles — General scrap supply is not excessive. Continued reduction in scrap from shipyards is expected to advance prices soon, though little variation from ceilings has been noted yet. Collections are quiet. Mill supplies in this area are said by WPB agents to be at or above the 45-day stockpiles recommended.

St. Louis — Scrap supply continues tight but pressure is easing somewhat. A few large consumers have allowed orders to run out in view of contract cancellations. Shipments are light, due to continuing labor shortage. Remote shipments have been cleared up here and are shifting to the Chicago area. Foundry grades are easier and machine turnings are plentiful with no demand. Largest scrap consumer in this district has been out of the market for a month, because of cutbacks.

Cleveland — In absence of consumer buying for the past two weeks, or longer in some instances, dealers and brokers are shipping entirely on old contracts. These orders are expected to be cleared up by the end of the month, when it is considered likely mills will re-enter the market at somewhat lower prices. Consumers and dealers alike appear to be waiting developments. Although weakness in heavy melting steel is reported in other centers there have been no sales here recently to establish a market. Ma-

chine shop turnings have declined in volume slightly recently, due to cutbacks in some war programs. However, supply of turnings is considerably more than current requirements, which has tended to weaken prices still further to between $9 and $10 in this district.

Boston—Lighter grades of steelmaking scrap are easy and good selected heavy melting firm. District consumers are buying bundles from nearby local sources and paying ceilings, but some pressure on prices is apparent from outside. Buying is not brisk but as regards district consumer demand this is due largely to limited volume of wanted grades, including cast. Turnings are soft and not wanted, at lower prices. While this grade is accumulating, further reduction in production is probable. Chemical borings are firm and readily absorbed. Steelworks inventories are not heavy, with at least two below 45 days and one about three weeks. Dealer bids for unprepared scrap fluctuate from near ceiling to $1 below, with the trend toward lower quotations.

New York—Strength of the scrap market at Pittsburgh is reflected in brokers' buying prices here in No. 1 and No. 2 heavy melting steel and hydraulic bundles. Dealers are covering on shipments to that point at $15.33 as their buying price on all three grades. Meanwhile, they are paying $14.33 on heavy melting steel and $12.83 on No. 2 bundles for eastern Pennsylvania. Labor difficulties at Buffalo have resulted in suspension of some orders temporarily but with Pittsburgh consumers active dealers have little difficulty in moving steelmaking grades. Considerable unprepared scrap is developing, more than yards can handle with available labor.

Philadelphia — Little activity is noted in scrap, with prices easing on No. 1 and No. 2 heavy melting steel to $18.25, delivered. No. 2 bundles are down to a spread of $15.25 to $16.25 and No. 3 bundles to $13.75 to $14.25. Machine shop turnings and mixed borings and turnings are at a flat level of $9.50. Other grades are unchanged, with cast scrap holding strongly at ceiling as supply is far short of demand.

Warehouse . . .

Warehouse Prices, Page 178

Boston — Holding of warehouse purchases to 100 per cent of 1944 levels on hot-rolled sheets and strip and 120 per cent on cold-rolled, starting third quarter, is interpreted as aimed at better balance and reported speculative buying in some areas. Anticipating heavy demand for reconversion, including automobiles, some heavy buying of both commodities bordering on the speculative is rumored. Meanwhile demand for warehouse steel is heavy, notably alloys, with but slight declines. Fill-in buying by shipyards has slackened. Not for some weeks are distributors expected to share substantially in spot or reconversion order relaxations.

New York — Demand on warehouses for steel has slackened only slightly and cancellations are few. Replacement situation has not improved materially except for plates. Light gage carbon sheets are especially tight, with inventories out of balance. Buying of alloys continues brisk, most distributors experiencing no decline. Carbon bars in smaller sizes are slightly less active. Some have revised mill orders for small bars downward as in the case of plates.

Los Angeles—War contract cutbacks, principally in aircraft and shipbuilding, have had little effect on warehouse sales. Some lag is expected later as fabricating plants return to civilian production after clearance on contract terminations and OPA price fixing on peacetime products. Galvanized sheets are slightly easier but shortage of plates continues.

Cleveland—A slight decline in shipments from distributors' stocks is reported, compared with the like period during April. For the month as a whole the drop in shipments will likely be 5 to 10 per cent. Cold-finished bars and to a less extent sheets remain difficult to obtain from mills. Mill deliveries on bars, plates and shapes have been ample for immediate needs. Although alloy steel supply is tight, the situation is expected to ease during June. WPB has restricted tonnage of sheets and strip that warehouses may order for third quarter to 25 and 30 per cent, respectively, of their purchases during all 1944. This is to provide equitable distribution of these products among all steel warehouses and at the same time satisfy the heavy post V-E Day war demands.

Philadelphia — Warehouse demand is easing, one leading jobber reporting a decline of 5 per cent compared with the corresponding period last month. Meanwhile shipments from mills are about even with outgo, for the first time this year.

Some cancellations in sheets and strip

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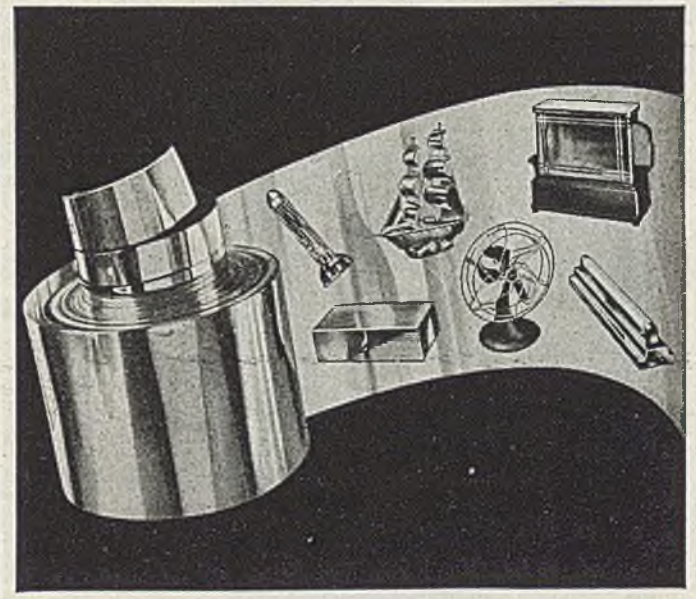

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as a result of Direction 1 to M-21, with various distributors, basing replacements of rated tonnage from stocks accumulated from excess and idle inventories as well as mill shipments, having ordered more from producers for shipment beyond June 30 than the new regulation permits. In an effort to provide a more equitable distribution of these products among all warehouses and also better to satisfy anticipated demand, the new ruling sets up quotas for purchases from mills on the basis of purchases from scheduled mill rollings in 1944. Except for hot-rolled pickled these quotas equal or better the rate of purchases from mills last year. Certain alternatives are permissible and where orders are in excess of the new limitations they may be deferred to a later quarter if not cancelled for the period in which they fall.

Ferroalloys . . .

Ferroalloy Prices, Page 179

New York — Ferroalloy sellers report only a slight drop in specifications this month and anticipate no particularly pronounced decline in June. In fact, they look for steelmaking operations to be fairly well sustained for some weeks to come notwithstanding the fact that Germany is now out of the war and such being the prospect they expect ferroalloys likewise to be sustained.

Cutbacks in the aircraft program, resulting in a drop in stainless steel requirements, have been reflected to some extent in alloys, but this situation has become at least temporarily stabilized, with requirements for the jet propulsion program actually increased.

Nonferrous Metals . . .

Nonferrous Prices, Page 181

New York — Although there will be delay during the transitory period, once details are further clarified, increased civilian brass mill requirements will contribute largely toward balancing military cutbacks and cancellations now in progress. Revised military schedules indicate 28,000 tons a month, including 10,500 tons strip, 7000 tons rods, 5000 tons tubing and 5500 tons copper products, will be made available for civilian production.

During the July-September quarter military requirements are estimated: 144,000 tons of strip a month, compared with 167,125 tons in March, the latter month reaching peak for copper deliveries; rod needs will be about 44,500 tons a month, tapering to 42,000 tons, compared with a March total of 55,000 tons. Some feel that these estimates are high as to strip.

Since March demand for copper has declined, 161,111 tons in April compared with 218,488 tons, previous month. May is expected to be under last month and buying for June delivery light thus far, indicates a continuance in the trend, or until the way is cleared for increased civilian consumption. Ordnance plants will buy less metal for next month; cutbacks, sizable inventories and allocation of fired ammunition to government-owned brass mills as scrap are factors. Heavy drain on reserves which lowered inventory by nearly 100,000 tons during the first quarter has eased and, while all domestic production, around 75,000 tons, will be taken in June, an increased ratio of foreign arrivals will go into stockpile. Unless government buying

policy is revised, the reserve is likely to increase steadily during the months ahead.

Zinc deliveries this month will fall below April, reflecting again early revisions for war needs. Current buying by larger users engaged in war production is influenced by desire to lower inventories. More zinc would be bought by galvanizers except for the tightness in steel. Lead for war during the balance of the year will be lower, but civilian demand is expected to balance any military decline.

Increase Chromium Output

War Production Board has decided to use an idle Defense Plant Corp. magnesium plant at Lake Charles, La., for production of 10 million pounds of sodium bichromate per quarter. Chrome chemicals are used in production of pigments for camouflage, priming pigments for aircraft and ships, tanning of leather, plating and anodizing processes in aircraft production and manufacture of pure metallic chromium for special alloys and other important war applications.

Steel in Europe . . .

London — (*By Cable*) — Heavy call for bullet core material is being experienced by producers in Great Britain. Sheet bar and wire rod bookings are light. Sheets are sold to the end of the year. Rail mills are active and brisk demand is entertained for colliery steel.

Canada . . .

Toronto, Ont. — While there has been some reduction in buying of steel on war account and some cutbacks due to prospective early curtailment in war production, overall demand for steel continues with little change. Civilian interest is developing on a broadening scale and with prospects for larger tonnages for nonwar purposes industrial leaders now have started to place orders for raw materials for peacetime operations. Already a number of restrictions have been lifted with regard to civilian manufacture and others will follow soon, according to word from Ottawa. However, while there is a possibility that Canada's war program will be reduced eventually by 35 per cent, manufacture of war materials for the Pacific will continue.

While there was some slowing in sales of merchant pig iron immediately following the surrender of Germany, business has returned to a more normal basis and sales volume for the past week rose to approximately 10,000 tons, against the previous week's level of less than 5000 tons. Most melters are interested in spot needs only, with the result that there is a constant flow of orders ranging from 50 to 200 tons. Only a few of the larger melters have placed contracts through second quarter.

Improvement was shown in Canadian iron and steel production for March and for the first three months of this year, according to the Dominion Bureau of Statistics. Output of steel ingots and castings was at a new all-time high in March, while pig iron reached the highest monthly total since July of last year. For March steel production was maintained at an average level of 91.88 per cent of rated capacity, while pig iron

held at 71.68 per cent. Nine blast furnaces continued production throughout the month, with five stacks idle. Production of ferroalloys also increased during the month under review. Comparative figures on Canadian steel and iron production in net tons follow:

	Steel Ingots, castings	Pig Iron	Ferro-alloys
Mar. 1945	277,461	165,517	16,434
Feb. 1945	250,464	149,487	13,402
Mar. 1944	275,539	168,047	13,427
3 Mos. 1945 ..	796,647	471,273	41,966
3 Mos. 1944 ..	747,577	442,053	44,642
3 Mos. 1943 ..	723,558	414,668	56,973

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2991 tons, including 2165 tons bearing piling and 826 tons beams, for Bahrein Petroleum Co., Arabia, to Carnegie-Illinois Steel Corp., Pittsburgh.

1175 tons, fixed railroad bridges, for U. S. Engineers, Columbus, O., to Bethlehem Steel Co., Bethlehem, Pa.

1100 tons, stripper building, Rouge plant, Ford Motor Co., Dearborn, Mich., to American Bridge Co., Pittsburgh; bids April 14.

1000 tons, kingposts for merchant ships, through Sun Shipbuilding & Dry Dock Co., Chester, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, racks, Firestone Tire & Rubber Co., Pottstown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

180 tons, Navy work, Dresden, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., in addition to 195 tons recently placed with same producer.

150 tons, Federal Telegraph & Radio Corp., Nutley, N. J., to Bethlehem Fabricators, Bethlehem, Pa.

105 tons, pile driver leads, Hueneme, Calif., for Bureau of Yards and Docks, U. S. Navy, Chicago, to New City Iron Works, Chicago; bids May 4.

STRUCTURAL STEEL PENDING

8000 tons, sheet piling, for Suez canal, inquiry from Norton-Lilly Co.

2000 tons, new cold reduced sheet mill buildings, Granite City Steel Co., Granite City, Ill.

500 tons, coach repair shops, Chicago, for Chicago, Rock Island & Pacific railroad; bids May 10.

400 tons, body plant, Studebaker Corp., South Bend, Ind.; bids May 17.

320 tons, hangars, Chicago, for Pennsylvania Central Airlines; bids May 14.

300 tons, Pennsylvania railroad stockyards terminal at Jersey City, N. J.

300 tons, airport development, Lansing, Mich.

200 tons, factory building, American Phenolic Corp., Chicago.

REINFORCING BARS . . .

REINFORCING BARS PLACED

930 tons, addition to building 22, Delco Products division, General Motors Corp., Dayton, O., to Truscon Steel Co., Youngstown, O.; James I. Barnes, Dayton, contractor.

240 tons, building 16, Buick Motor Division, General Motors Corp., Flint, Mich., to Joseph T. Ryerson & Son Inc., Chicago; Thorgerson & Ericksen Co., Chicago, contractor; bids May 7.

160 tons, buildings 70 and 71, U. S. Veterans hospital, Bedford, Mass., to Northern Steel Co., Boston, through Jefferson Construction Co., Chelsea, Mass.

REINFORCING BARS PENDING

2500 tons, Boulder dam, bureau of reclamation, Boulder City, Nev.

1000 tons, body plant, Studebaker Corp., South Bend, Ind.; bids May 17.

250 tons, buildings 21 and 21A, Chrysler Corp., Detroit.

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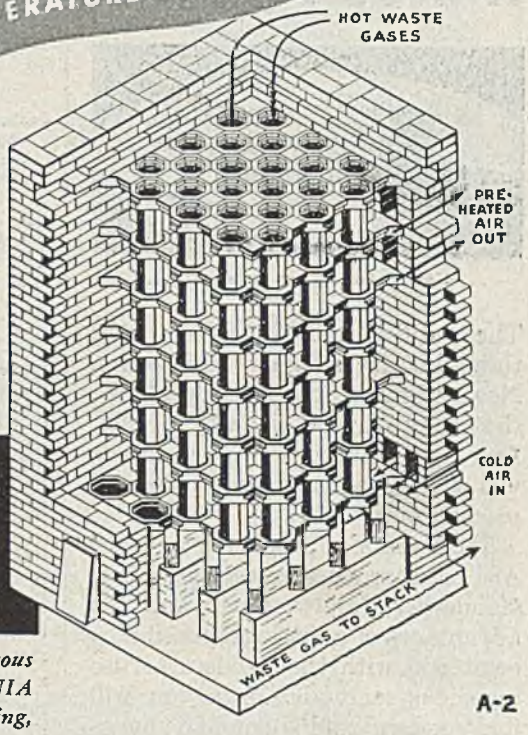

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RAILS, CARS . . .

RAILROAD CARS PLACED

U. S. Army, 1340 freight cars, for export, as follows: 790 thirty-ton box cars to Pullman-Standard Car Mfg. Co., Chicago; 310 thirty-ton flat cars, Greenville Steel Car Co., Greenville, Pa.; and 240 gondolas, American Car & Foundry Co., New York.

LOCOMOTIVES PLACED

Seaboard Air Line, 14 diesel-electric passenger engines, to Electro Motive Division of General Motors Corp., La Grange, Ill.

Pricing Policies Designed To Encourage Production

(*Concluded from Page* 81)

price, when raised by the use of the 'increase factor,' is higher than the existing price, the manufacturer can take the former as his legal ceiling. Otherwise, his existing ceiling will continue to apply.

"This formula is designed for initial industry-wide review of ceiling prices of reconversion products in cases where the industry requests such review. It is not an alteration of our basic pricing standards. It is devised merely to meet a situation in which these standards cannot be applied because actual cost data are lacking.

"If the manufacturer in an industry for which an 'increase factor' is announced is coming out with new models, he will first use the method just described to adjust his ceiling prices for the model he last sold. He will then use the adjusted old-model prices as a basis for arriving at ceiling prices for the new models in the way mentioned earlier in this statement.

"Generally, OPA will obtain from the particular industry the data required for working out the 'increase factors' for the products of that industry. Where necessary, however, OPA is prepared to announce 'increase factors' on the basis of data already collected by government agencies. We will consult with industry representatives on the question as to whether to do this or to make a quick survey to secure more detailed and up-to-date information."

Such industry-wide price adjustments may work hardships on individual companies, Mr. Bowles pointed out. In these cases, OPA will be prepared to offer relief on an individual basis, generally through OPA's field offices.

In the case of manufacturers who did less than $100,000 annual business in 1941 and anticipate less than that in the first year after reconversion, a simple streamlined procedure for individual pricing will be used. Such firms may calculate new ceilings on a form to be supplied by OPA without waiting for the announcement of industry-wide increase factors. Where these new ceilings exceed their previous ceilings they will file the form with the nearest field office.

and these will become their legal ceilings subject, of course, to later revision by OPA if they are not properly calculated. The firm will compute its new ceiling price or prices by adjusting its 1941 costs for lawful increases in its own basic wage-rate schedules of factory workers and in prices of materials and parts and adding whichever is higher of the following two margins: (1) A margin equal to its own 1936-39 profit margin on sales or (2) one-half the industry average profit margin in 1936-39 as announced by OPA). Of course, small firms may use their industry-wide "increase factors" if they wish.

CONSTRUCTION AND ENTERPRISE

MICHIGAN

DETROIT—Standard Tube Co., 14600 Woodward avenue, has let contract to R. H. Hidey Inc., 260 Manchester avenue, for plant additions.

DETROIT—VanDresser Specialty Corp., 5533 Woodward avenue, has awarded contract for a new plant to Couse & Westphal, contractors.

DETROIT—Carboloy Co. Inc., 11177 East Eight Mile road, has let contract to O. W. Burke Co., 1101 Fisher building, for a plant addition.

DETROIT—M.C.W. Mfg. Corp., 5812 Cass avenue, has been incorporated with $5000 capital to manufacture roller skates, by Herbert F. Carey, 14299 Chelsea avenue.

DETROIT—National Plating & Processing Co. Inc., 1117 Penobscot building, has been incorporated with $50,000 capital to operate a metal plating business, by Sidney R. Solomon, 20490 Picadilly avenue.

DETROIT—Swiss Precision Automatic Screw Machine Products Co., 4423 Field avenue, has been incorporated with 1000 shares no par value to operate a machine shop, by Richard H. Asam, 4423 Field avenue.

HAZEL PARK, MICH.—Circular Chaser Corp., P.O. Box P, Hazel Park, has been incorporated with $25,000 capital to manufacture tools, dies, chasers and machinery, by Merle K. Chambers, 1227 East Sixth street, Royal Oak, Mich.

MORENCI, MICH.—Morenci Rubber Products Inc., 555 West Main street, has been incorporated with 500 shares no par value to manufacture natural and synthetic rubber products, by Milton A. Wadler, 1233 Greenleaf avenue, Chicago.

YPSILANTI, MICH.—Central Specialty Co. has let contract to W. E. Wood Co., 4649 Humboldt street, Detroit, for a core room and equipment.

CONNECTICUT

BRIDGEPORT, CONN.—Standard Column Co., 1575 Railroad avenue, has plans by H. E. Koerner, 83 Fairfield avenue, for one and two-story 50 x 150-foot and one-story 78 x 90-foot plant buildings costing about $55,000.

HAMDEN, CONN.—Connecticut Metal & Finishing Co., Haig street, has let contract to Mott-Mohr Construction Co. Inc., 440 Elm street, New Haven, Conn., for a one-story 100 x 150-foot plant estimated to cost about $75,000.

NORTH HAVEN, CONN.—American Crucible Co., Shelton, Conn., will build a brick and steel factory on Washington avenue, costing over $40,000.

NORTH HAVEN, CONN.—American Crucible Co. has let contract for design and construction of a plant on Washington avenue to Austin Co., 19 Rector street, New York, estimated to cost over $40,000.

RHODE ISLAND

BRISTOL, R. I.—Bristol Mfg. Corp., Buttonwood avenue, has plans by Linwood & Gardiner, 49 Hanover street, Providence, R. I., for a two-story 40 x 100-foot plant addition, to cost about $40,000.

VERMONT

WALLINGFORD, VT.—American Fork & Hoe Co. has let contract to C. G. Noyes, 21 Center street, Rutland, Vt., for a one-story 110 x 115-foot plant addition. C. B. Rowley, Keith building, Cleveland, is architect.

NEW YORK

BROOKLYN, N. Y.—Brooklyn Union Gas Co., 176 Remsen street, will take bids soon on alterations to gas generator house, 287 Maspeth avenue, to cost about $260,000. United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, is architect.

NEW JERSEY

NEW BRUNSWICK, N. J.—Delco-Remy Division of General Motors Corp. has bought 27 acres here for modern storage battery plant when regulations permit erection. O. V. Badgley, Anderson, Ind., is general manager of the division.

PENNSYLVANIA

BRUCETON, PA.—Bureau of Mines, Pittsburgh station, has received WPB authorization for construction of a building 11 x 160 feet with 20 bays and installation of electric constant temperature ovens here, at cost of about $11,100.

CONSHOHOCKEN, PA.—Alan Wood Steel Co. has let contract to Amsler-Morton Division, Union Industries Inc., Fulton building, Pittsburgh, for steel soaking pits at Ivy Rock, Pa., to cost about $200,000.

JOHNSTOWN, PA.—Johnstown Traction Co. has received WPB authorization for construction of a powerhouse extension 18½ x 22½ feet, to house rectifiers, to cost about $60,248.

MORTON, PA.—Lansdowne Steel & Iron Co., has let contract to Work & Co., 1700 Sansom street, Philadelphia, for an extension to its shell shop, to cost about $165,000, including equipment.

PHILADELPHIA—Midvale Co., 4320 Wissahickon avenue, has let contract to Murphy-Quigley & Co., 1518 Sansom street, for an X-ray laboratory costing about $40,000.

PHILADELPHIA—Pennsylvania Range Boiler Co., C. Kaufman, vice president, Twenty-fourth street and Washington avenue, is rebuilding its manufacturing plant at cost of over $200,000.

OHIO

CLEVELAND—Erie Railroad, Midland building, has received WPB authorization for construction of coaling station at Marion, O., including bins, hoppers, loaders, etc., and a two-track crane-type skip hoist and cinder pit, to cost about $99,650.

CLEVELAND—Assembly Products Inc. has been incorporated with $500 capital and 250 shares of $50 par value to manufacture electrical and mechanical devices, by Maurice G. Dratler, 517 Schofield building, and associates. Malvery E. Schultz, 1237 Schofield building, is agent.

CLEVELAND—Mi-Radio Corp. has been incorporated to manufacture a new type of radio by Alex Kerby, president, 10121 Detroit avenue. Plant is established at 2612

Lorain avenue and company is in the market for machinery, equipment and materials.

CUYAHOGA FALLS, O.—Connelly Metal Treating Co., 1850 Front street, will buy and erect three used buildings at this address, at cost of about $18,000.

MARION, O.—Huber Mfg. Co., 202 North Greenwood street, has let contract to G. P. Dysart, 249 Overlook Drive, Columbus, O., for a one-story 130 x 400-foot plant addition, to cost about $100,000.

WARREN, O.—General Motors Corp., Packard Electric division, Dana avenue, will erect a water tank and tower costing about $18,000.

ILLINOIS

CHICAGO—Cornell Forge Co., 1659 West Seventy-fourth street, is building modern forge plant at 6666 West Sixty-sixth street, one story, 36,000 square feet on site of 88,000 square feet. Additional 37,400 square feet adjacent is under option for expansion.

INDIANA

FORT WAYNE, IND.—Bowser & Co., East Wayne street, plans a plant addition to cost $50,000 or more, including equipment.

INDIANAPOLIS—Automatic Valve Co., 1255 Roosevelt avenue, has been incorporated with 2400 shares $10 par value to manufacture valves, machinery and other equipment, by Edward J. Bennett, Perry E. O'Neal and Russell Ryan Jr.

TENNESSEE

NASHVILLE, TENN.—Allen Mfg. Co., 300 Tenth avenue North, has let contract to V. L. Nicholson Co. for addition to stove foundry 45 x 160 feet, between two present buildings, to cost about $20,000.

WEST VIRGINIA

SOUTH CHARLESTON, W. VA.—Carnegie-Illinois Steel Corp., Pittsburgh, has WPB authorization for installation of equipment, quenching tanks, conveyor, crane, coolers, grinders, lathes, etc. for production of rocket noses, to cost about $3,150,000.

MISSOURI

ST. LOUIS—Cupples Mix Co., J. K. Wallace, president and general manager, 401 South Seventh street, plans rubber tire manufacturing plant on eight acres at Vandeventer and McRee avenue, to cost about $100,000, including equipment.

ST. LOUIS—Ernest George Lay Inc., 5471 North Kingshighway, has contract for machine shop addition at 2915 North Market street for Gruendler Crusher Co., one story 70 x 103 feet, to cost about $15,000. C. A. Koerner, Syndicate Trust building, is engineer.

ST. LOUIS—Hussmann-Ligonier Co., W. B. McMillan, president, 2401 Leffingwell avenue, has bought site at Glasgow avenue and Benton street for one-story plant costing about $500,000, with equipment, for manufacture of refrigerators and mechanical refrigeration.

ST. LOUIS—John Ramming Machine Co., 4591 McRee avenue, has bought four acres adjacent to its plant for expansion.

ST. LOUIS—George C. Dischert, 4050 Shreve avenue, has bought a site at 4417 Clayton avenue for erection of a plant to cost $250,000, consisting of one-story plant and warehouse.

WISCONSIN

MILWAUKEE—Badger Die Casting Co., 1570 South First street, has let contract to Meredith Bros. Inc., 121 East Washington street, for a one-story plant addition 100 x 120 feet, to cost about $55,000.

MILWAUKEE—Milcor Steel Co., South Forty-first and Burnham streets, will build a one-story 17 x 800-foot addition. Lawrence E. Peterson & Associates, 312 East Wisconsin street, Milwaukee 2, are engineers.

MILWAUKEE—Gibbs Steel Co., 338 South Seventeenth street, has plans by F. Scott, 724 East Mason street, for a one-story 84 x 132-foot plant addition.

MINNESOTA

MINNEAPOLIS—Cornelius Co., 1621 Hennepin avenue, has let contract to Pearson Bros., 2202 Bryant avenue South, for a one and two-story 200 x 240-foot steam heating plant. Lang & Raugland, 502 Wesley Temple building, are architects.

TEXAS

DALLAS, TEX.—Dallas County Water Control & Improvement District No. 3, care Al Templeton, county judge, plans disposal plant and sewerage system, bond issue of $210,000 to be voted on June 12.

HOUSTON, TEX.—Texas Bolt & Supply Co. Ltd., 2301 Congress street, W. L. Robertson, manager, plans one-story plant and warehouse at Commerce and Emmanuel streets, Sam H. Dixon, 6902 South Main street, Houston, is architect.

IDAHO

KELLOGG, IDAHO—Bunker Hill & Sullivan Mining & Concentration Co., W. C. Simmons, secretary, plans construction of a 250-ton ore mill to cost about $200,000.

CALIFORNIA

SAN PEDRO, CALIF.—Todd Shipyards Corp. is having plans drawn for alterations to compressor house and foundations for boilers at cost of about $45,000.

VAN NUYS, CALIF.—Timm Aircraft Corp. is altering and enlarging its plant at 7731 Havenhurst avenue, at cost of about $8000.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Self Winding Clock Co. Inc., New York, $35,000 to provide equipment at a plant in Brooklyn, N. Y., for manufacture of aircraft instruments.

New England Alcohol Co., Everett, Mass., $55,000 to provide equipment at a plant in Everett.

Gibson Refrigerator Co., Greenville, Mich., $35,000 increase in contract to provide additional equipment at a plant in Greenville, making overall commitment $130,000.

McDonnell Aircraft Corp., St. Louis, $150,000 increase in contract to provide additional equipment at a plant at Municipal Airport, St. Louis, making overall commitment $950,000.

Farm Crops Processing Corp., Omaha, $65,000 increase in contract to provide additional equipment at a plant in Omaha, making overall commitment $6,500,000 to increase production of commercial alcohol.

General Motors Corp., Detroit, $275,000 to provide equipment at a plant at Dayton, O., for production of special equipment machine tools.

National Smelting Co., Cleveland, $50,000 increase in contract to provide additional equipment at a plant in Cleveland, making overall commitment $900,000.

Detroit Aluminum & Brass Corp., $300,000 to provide equipment at a plant in Detroit.

United Aircraft Corp., East Hartford, Conn., $800,000 increase in contract to provide additional equipment at a plant at Stratford, Conn., making overall commitment $6 million.

Boeing Aircraft Co., Seattle, $800,000 increase in contract to provide additional plant facilities at Renton, Wash., making overall commitment $22,500,000.

EQUIPMENT . . . MATERIALS

EQUIPMENT...MATERIALS

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A new but proven manufacturer of bolts, nuts, screws and special headed and threaded parts located in the Chicago area invites inquiries from manufacturers' agents located in the following areas: Milwaukee, Davenport, St. Louis, Peoria. Should have contacts with large users and should be selling production items. Give some details in first letter.

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MANUFACTURER'S AGENT EXPERIENCED IN TOOL STEEL SALES FOR PITTSBURGH AND SURROUNDING TERRITORY. OLD WELL KNOWN COMPANY. COMPLETE LINE HIGH QUALITY TOOL STEELS. ADDRESS BOX 924, STEEL, PENTON BLDG., CLEVELAND 13, O.

Positions Wanted

PLANT MANAGER—AVAILABLE. GRADUATE Engineer. 26 years experience as Factory Manager and Executive Engineer in Wire Drawing, Galvanizing, Screen Cloth Weaving, Metal Stampings, Forgings, Heat Treating, Outdoor Electrical equipment, and Textile Weaving, Knitting and Sewing operations. Good background of Production Engineering, Methods Improvement, Wage and Salary Incentives, Layout, Long Range Planning and Design of Plant and Machinery. Age 46. Prefer plant employing 1000 or less. Address Box 913, STEEL, Penton Bldg., Cleveland 13, O.

MANAGER; WORKS OR GENERAL OPERATING and administrative experience in precision parts, machine tools, farm equipment, metal specialties, foundry. College in administration, engineering, metallurgy. Six years, consultant, ten years, executive in charge of operations, previous; up through the ranks, machine hand, tool room, methods, process, design, coordination, etc. Age; forty-nine, Protestant. Present location Chicago. Principals only. Address Box 892, STEEL, Penton Bldg., Cleveland 13, O.

GENERAL MANAGER AND TREASURER experienced in manufacturing, industrial relations, production planning, production control, purchasing, development, cost analysis, budgets, cost and general accounting, consolidations and taxes. Familiar with steel, automotive, steamship, industrial machinery, stoker, coal, and iron foundry business. Age 37. University graduate. Location desired Southwest. Address Box 916, STEEL, Penton Bldg., Cleveland 13, O.

FACTORY MANAGER—AVAILABLE. EXPERIENCED in manufacture of radios, refrigerators, sheet metal products, stampings, tools, dies, etc. Efficient, aggressive organizer with sound business judgment. 26 years of broad technical, executive and administrative experience in all elements of factory operations. American, age 50. Address Box 890, STEEL, Penton Bldg., Cleveland 13, O.

INDUSTRIAL RELATIONS DIRECTOR—Now employed. Experienced all phases labor relations, personnel management, job evaluation, W.L.B., union negotiations, wage stabilization, etc., extensive machine shop, foundry and pattern shop experience. Age 32, B.A. and L.L.B. degrees. References. Address Box 884, STEEL, Penton Bldg., Cleveland 13, O.

DROP FORGE MANAGER — MECH. ENGR. experienced in all kinds of forging equipment, die designing, heat treating and maintenance. Understand drop forge accounting and planning. Desire earning an interest in reputable company as part of salary. Address Box 874, STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEER. 7 YEARS EXPERIENCE sales steel products, 2 years production. Graduate engineer. Age 30. Ambitious, capable supervising sales staff steel producer or distributor. Available near future. Address Box 914, STEEL, Penton Bldg., Cleveland 13, O.

ACCOUNTANT. MACHINIST - TOOLMAKER with 27 years broad business and practical experience, seeks a position with a progressive company as Administrative Assistant. Address Box 918, STEEL, Penton Bldg., Cleveland 13, O.

Opportunities

AN OLD ESTABLISHED BUSINESS strategically located in the deep South, entered the field of metal stamping and forming for war contracts. They equipped their plant in an excellent manner, which can be used advantageously in postwar work. This company would be interested in carrying on this department under the management and possible financing of other competent parties, or making some mutually satisfactory arrangement. Correspondence leading to an interview is invited. Address Box 917, STEEL, Penton Bldg., Cleveland 13, O.

Accounts Wanted

SAINT LOUIS REPRESENTATIVE IS IN position to handle an additional line for established manufacturer, on an exclusive basis in this area. This is an opportunity to obtain top-flight representation by aggressive, well-known salesman with extensive acquaintance and successful background. Home-office and field experience with products such as lighting equipment, appliances, ornamental and architectural metalwork, display fixtures, tubular metal products, and similar manufactured lines. Address Box 921, STEEL, Penton Bldg., Cleveland 13, O.

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WANTED—COLD FINISHED STEEL PRODUCTION SUPERINTENDENT

Must be capable of installing and handling complete production of new cold finished steel mill being erected by large established manufacturer. Please state experience in detail, and in brief, personal history and availability. All inquiries to be held strictly confidential.

Address Box 920,
STEEL, Penton Bldg., Cleveland 13, O.

ELECTRICAL ENGINEER—A WESTERN NEW York manufacturer of heavy machine tools desires the services of an electrical engineer or experienced draftsman willing to break in on electrical designing. The work will consist of designing control panels, switchboards and electrical systems of large machine tools. This opening is permanent to the right man and offers excellent post-war prospects with well established, nationally recognized machine tool manufacturer. Apply by letter, stating age, experience, education and other pertinent data. W.M.C. rules apply. Address Box 922, STEEL, Penton Bldg., Cleveland 13, O.

SHOP SUPERINTENDENT
Florida steel fabricating plant has opening for experienced shop superintendent with executive ability and sufficient engineering knowledge to organize and maintain an economical operation which involves the fabrication of structural steel, miscellaneous iron, and plate work. Give complete information in first letter including age, education, experience, and salary expected. Address Box 915, STEEL, Penton Bldg., Cleveland 13, O.

DRAFTSMEN WANTED — EXPERIENCE IN heavy machine tool work desirable, aircraft experience acceptable. Outstanding post-war picture for right men. Location, upstate New York. W.M.C. rules observed. Give full particulars in letter addressed to Box 923, STEEL, Penton Bldg., Cleveland 13, O.

DESIGNER, DRAFTSMAN & ESTIMATOR Wanted. Must have full knowledge of A.S.M.E. construction on all types of pressure vessels and other complicated steel plate construction of refining equipment, etc. Plant located in Texas. Statement of Availability required. Address Box 828, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: A TOP GRADE ADVERTISING Writer with mechanical training and experience capable of handling a steel account. Good salary —good connections with possibility of unlimited growth. Permanent position in Detroit. Write Zimmer-Keller, Inc., Stroh Bldg., Detroit, Mich.

Help Wanted

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ELECTRIC FURNACE OPERATORS
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WANTED—CARBIDE TECHNICIAN. WELL-known eastern company with established sales outlet has excellent opportunity for Chief Technician to develop carbide line, especially for wear resistant applications. Fundamental processing equipment installed. Company also interested in cast tool developments, precision and centrifugal castings, with particular reference to special heat resisting applications, such as gas turbines. State age, education, experience, salary desired and draft status. Address Box 903, STEEL, Penton Bldg., Cleveland 13, O.

WANTED PATTERN FOREMAN
Malleable Foundry in Texas has an excellent opening for a man capable of taking charge of wood and metal pattern shop employing twelve to fifteen pattern makers and apprentices, make own layouts and estimate pattern costs. Applicant should state age, family status, salary expected, past and present employers. Address Box 910, STEEL, Penton Bldg., Cleveland 13, O.

WANTED: PROJECT ENGINEERS WITH experience in blast furnace, open hearth, blooming mill, hot and cold strip equipment. Permanent employment to those who can qualify. Salary. Statement of Availability required. Address Engineering Dept., Jones & Laughlin Steel Corp., Cleveland, Ohio.

ESTABLISHED MANUFACTURER AND DISTributor of foundry equipment and supplies requires first class sales engineer to cover Michigan. Advise age and previous experience. Address Box 893, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

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SALES ENGINEERS

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