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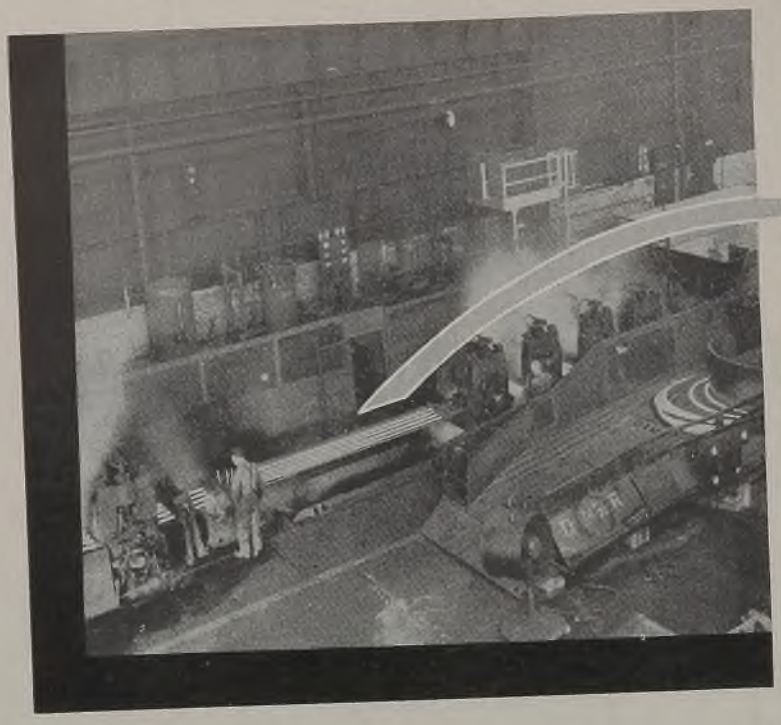
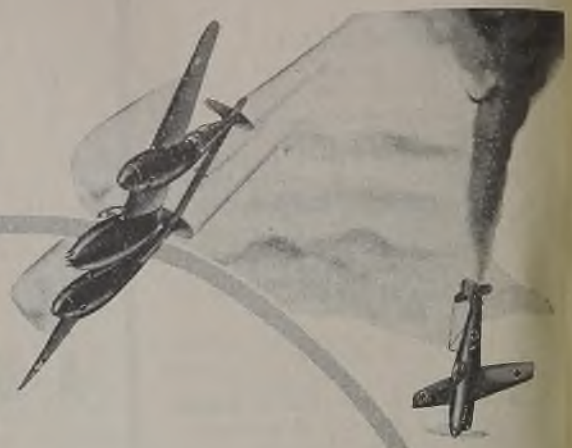
NEWS

TECHNICAL

FEATURES

MARKETS





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STEEL
August 21, 1944

"Weakens National Character"

Debate in the Senate over the Murray-Kilgore and George bills and the subsequent adoption of the latter by a resounding vote of 55 to 19 reflect differences of opinion that will be manifested in the discussion of many major issues which will arise in the next few years.

It is unwise to ascribe this feud solely to a flare-up of the old states rights versus federal control issue or to a straight out-and-out cleavage between conservatives and liberals. Its roots go far deeper.

In the first place the two bills have a similar objective. Each is intended to facilitate reconversion of the national economy from a state of war to a state of peace. The chief difference lies in the degree to which the bills would lodge authority in the federal government and in the amount of aid extended to persons suffering from the adjustment from war to peace.

A second pertinent factor lies in the sponsorship of the bills. Behind the Murray-Kilgore bill is the powerful CIO and the radical element of the new deal bureaucracy. Backing the George bill are Senators representing both major parties who, feeling a responsibility to fight against what they believe is a dangerous trend toward state socialism, are supported in this particular instance by the majority of taxpayers.

So the issue boils down to one wherein one side, having gone a long way toward centralizing government authority and abusing that authority to the benefit of favored pressure groups, now wishes to carry the centralization and the attending additional opportunities for abuse a few steps farther—in fact to a fantastic extreme. The other side, seeing the danger, is trying to avert it by sponsoring enabling legislation which will deal with reconversion effectively without subjecting the nation to the hazards inherent in the Murray-Kilgore proposal.

On Feb. 16, 1887, Grover Cleveland, a great Democratic President, wrote a letter to members of the House of Representatives in which he emphasized the following two points:

". . . The lesson should be constantly enforced that though the people support the government, the government should not support the people."

"Federal aid . . . . encourages the expectation of paternal care on the part of the government and weakens the sturdiness of our national character."

These are good points for the congressmen of 1944 to consider carefully when they take up the George bill this week.

NO SUDDEN EXODUS: A comparison of the effects of World Wars Nos. 1 and 2 upon industry shows numerous parallels and some important divergencies. For almost every major point at issue during the present conflict one can find a corresponding controversy in the earlier war. The chief points of difference arise from the great discrepancy in the magnitudes of the two events. World War I was a small-scale operation in comparison with World War II.

When we are able to look back upon our present war experience in retrospect, we may find that the sharpest contrasts were not in the war effort itself but in the readjustments after the fighting ceased. The armistice of World War I occurred at 11 a.m. Somebody—oversimplifying the rapid removal of wartime restrictions—remarked that all the dollar-a-year men fled Washington on the 11 p.m. train the same day.

Nothing like that will happen this time. Much

(OVER)

as most persons will welcome the abandonment of excessive government controls, they recognize the necessity of proceeding cautiously during the period of adjustment. This time our release from wartime restraints will be more orderly. —p. 70

* * *

OUR SECRET WEAPON: Battlefields are great testing grounds for automotive vehicles. Some of the Allied nations have been so impressed by the stamina of American automotive military equipment that they are investigating design and production procedure in the United States.

British investigators are finding sharp differences in costs. They have discovered that a steering wheel in a British vehicle costs 81 per cent more than that in an American car of comparable design. A British starter costs 79 per cent more, a distributor 59 per cent more, a crankshaft 127 per cent more and malleable iron castings 100 per cent more than their American counterparts, respectively.

These comparisons are particularly significant when viewed in the light of British and American wage rates. Generally, the worker in a manufacturing establishment in the United States receives an hourly wage which is about double that received by his British contemporary.

Obviously there is something in the American system of manufacturing which makes for greater efficiency. It may be ability to organize effectively, higher productivity of labor, superior "know how" or special refinements in mass production technique. Whatever it is, it is a national asset which will be invaluable in the postwar competition for world markets. —p. 85

* * *

ADJUSTMENT AHEAD! As the net draws tighter around the enemy in Europe, representatives of government and industry study more intently the events which would follow a sudden victory. Industrialists are thinking of inventories, prices, etc. in relation to their reconversion problems. The government men are scanning the same factors, but from the angle of their overall effects.

Of all of the public statements on this subject, the most specific is Donald Nelson's estimate that a German collapse will mean a 40 per cent cut in munitions orders after which "industry will be able to produce as much for civilians as it did in 1939, at the same time carrying on all the military production necessary for the war against Japan."

This is a rather reassuring prospect, but it involves a terrific amount of difficult adjustment. —p. 67, 72, 73

SELLING U. S. PLANTS: Disposition of government-owned plants is one of the most important problems of the reconversion period. Most of the bills before Congress on the disposal of wartime surpluses deal with the subject but thus far debate has not brought forth any definite policy from legislative sources.

Meanwhile the Surplus War Property Administration and the Defense Plant Corp., proceeding under authority acquired by executive order, have been formulating policies governing the sale of plants. While these policies are far from being fixed or definite, they do indicate that a pattern is being developed which may encourage seller and buyer to get together.

Prospective buyers are warned not to expect "bargains." At the same time it is apparent that replacement cost at the time of sale will weigh heavily in determining the price asked.

The quicker the government can come to a "talk turkey" position on this difficult problem, the sooner industry will be able to key these government facilities into its postwar plans. —p. 69

* * *

WARTIME PROGRESS: Metallurgists have learned much about the heat treatment of steel during the war period. According to Harry W. McQuaid, assistant chief metallurgist of Republic Steel Corp., this accelerated progress is reflected in two ways: The use of multiple lower alloy steels to replace simpler steels of higher alloy content and water quenching of alloy steel armament are full-fledged developments largely attributable to the war. Induction and flame heating, isothermal heat treating, improved quenching, shot blasting and controlled atmospheres are developments which were under way in prewar days and have advanced to various stages of commercial application under the pressure of war.

Much remains to be learned about these developments and considerable additional refinement in the technique of applying them can be expected. Nevertheless, the accelerated progress induced by the war now provides designers of structures, machines and parts with some important materials and methods which under the normal rate of peacetime development probably would not have been available for a decade or more. —p. 123

E. L. Shaner

EDITOR-IN-CHIEF

Projections of the spectrum of a steel sample being studied by the spectroscopist.

The Case Against "Tramp" Elements

Ten minutes after a sample of steel is delivered to the Inland laboratory its chemical content is clearly and permanently recorded on spectrographic film. This film is greatly enlarged by projection, and is studied by the spectroscopist. There is not a chance for any "tramp" element to pass undetected.

The apparatus by which these checks are made is known as a spectrograph. A small specially prepared sample of steel is placed in the apparatus, where it is quickly vaporized by an electric arc, and the spectrum recorded on photographic film.

Inland uses the spectrographic laboratory for frequent and rapid tests while heats are being made. But this is only one of the many methods used by Inland to control the quality of steel—steel that is uniform from order to order—steel that is easily fabricated with minimum wastage.

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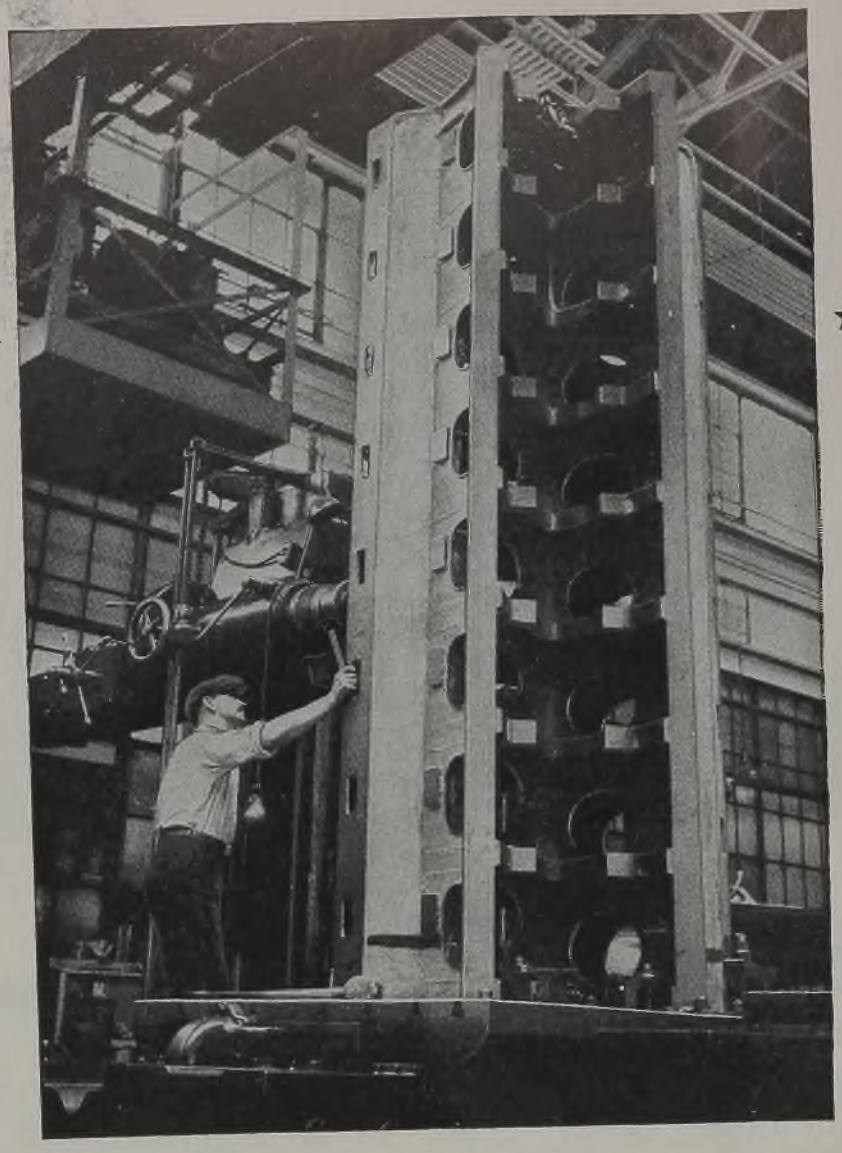

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8-Cylinder Frame-Up

MASS producing the millions of parts that go into the combat equipment of the United Nations requires metal working machines ranging in size from a few pounds to thousands of tons.

This record mass production would not have been possible but for the introduction of vastly improved machining methods, and of equal importance, the cutting and soluble oils developed by Texaco.

Texaco Cutting Oils permit higher spindle speeds, increased feeds, greater output. They lubricate the tools, and by carrying away the heat, prevent chip welding, improve the finish, increase tool life.

For example, finish reaming Army tank tread pin couplings, *Texaco ALMAG Cutting Oil* increased reamer life 5 times.

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Effective Price Control Promised During Transition

OPA administrator holds hard and fast rules for reconversion pricing not feasible. Outlines general policies to be followed during changeover from war to civilian production

CHESTER W. BOWLES . . . . . OPA Director

CITING the War Production Board's ction in permitting, subject to availbility of labor, materials and facilities, esumption of the manufacture of many ivilian items which had not been made since early 1942, Chester Bowles, OPA Administrator, told his press conference last Thursday that effective price control will be provided during the reconversion period.

He said: "It is obviously impossible for the OPA at this time to lay down any hard and fast rules for reconversion pricing. Conditions will vary sharply from industry to industry and even between competing firms in the same industry. Some manufacturers' unit production costs re up substantially while others have isen very little, if at all. Some firms nay be able to reconvert wholly to peaceime items following the end of the war Europe, while others will reconvert ly part of their facilities with a large ortion of their output still going to the ar Eastern battlefronts. Today, we are ill faced with shortages of manpower, any materials in general are still tight, d inflationary pressures are close to an l-time peak."

Mr. Bowles said: First, the cost of liv- g index must continue to be held in eck. Second, we will continue to price oducts which have been available to nsumers throughout the war period ac- rding to present standards. He pointed t these standards had given us effective ce control while not interfering with payment of wages and the realiza- n of profits substantially higher than ore the war. Third, on items coming o production "we will take prompt ion either company by company or on industry-wide basis, depending upon circumstances. In deciding the amount increase, if any, above the old ceiling es which is needed by a manufac- r who is reconverting, we will take into account increased wage rates and increased prices of material. In the case of companies which continue to have war business or other civilian business we will also consider the general financial position of the firm. We will decentralize the adjustment of these prices to our district and regional offices as far as possible. In adjusting these prices we must also take into consideration the decrease in unit costs resulting from technological advances and a high level of output. The production 'know-how' we acquired during the war is going to stand us in very good stead.

"This means that while some commodities are going to come back into production at higher prices than when they went out, not all of them will be higher. In every case, the OPA will be particularly concerned not to set prices which force deflation of the general wage level. When the work-week drops from 48 hours to 40, overtime payments of some $12,000,000,000 will drop out. To that extent there may be a drying up of potential sales for our business men and merchants.

"During the reconversion period there is bound to be some unemployment. Even with adequate unemployment insurance this will mean a further reduction in the purchasing power of many of our workers. If the prices on reconversion items are set too low they may further add to this dangerous drop in national purchasing power and hence help pave the way for another depression.

"If on the other hand, prices are set too high, our savings and current dollar income will be dissipated to pay unnecessarily high prices and we will soon find ourselves repeating the deadly cycle of 1919 with booming inflationary prices followed by an inevitable collapse and economic disaster."

Mr. Bowles said: "We will modify and change our pricing methods to fit changing conditions and in line with our experience. Pricing (or prices) will be rechecked at regular intervals and all new prices will be subject to prompt recalculation if they are out of line."

Mr. Bowles said: "We can sum it up this way. Our pricing policy should encourage the fullest possible production of goods and services at the lowest possible prices to the consumer. Unless American industry produces to the limit of its powers, there will be an increased danger of depression and eventual collapse."

Wage Case Stymies Steel Price Increase

Upward adjustment of steel prices, acknowledged to be necessary if the industry is to break even or earn a profit when the demand for premium-priced war steel slackens, is being stymied by the steel wage case now in the hands of the War Labor Board.

The industry has presented figures to the Office of Price Administration showing that many products are being sold below cost. OPA is biding its time, awaiting a decision of the WLB on the United Steelworkers' demand for a wage increase. Any increase in wages, of course, would necessitate a corresponding increase in prices.

Many steel executives believe the WLB will grant the union some increase in wages, although there is no expectation that the full demands of the

Troopships assembled for the invasion of southern France move in on a broad front. Widening of the Allied front and indications of weakness in German resistance place increased emphasis on reconversion problems, including pricing policies to be applied during the transition period. NEA photo

steelworkers for a 17-cent hourly increase, guaranteed annual wage and other benefits will be allowed. Generally it is expected that an advance of perhaps 5 cents an hour will be granted. Such an increase, retroactive to last December, would make an impressive pay check just before the national elections and would wipe out the profits of most producers.

Opinion on how large an increase is necessary varies. Generally the figure, based on present wage levels, is around 10 per cent on an overall basis, although it generally is conceded that this will vary according to product. Any increase in wage rates would have to be superimposed upon the higher prices.

WLB will start consideration of the CIO unions' demands that the Little Steel wage formula be breached on Sept. 5.

The problem also is made more difficult by the necessity for safeguarding war production while at the same time encouraging greater output of civilian goods.

The manufacturers' attitude is fairly summarized by the statement to STEEL of S. Duncan Black, president, Black & Decker Co., Towson, Md.: "All manufacturing industries that have no reconversion problem or who have completed reconversion should have price controls removed now or very soon. Those with reconversion problems should have liberal ceilings on peacetime products during the transition period to cover advance in all costs over the prewar period and to cover compliance with government regulations of all kinds, such as overtime in critical manpower areas, costs of reconversion, etc. Competition and the desire to cultivate and maintain public acceptance and trade good will will be the best insurance against gouging the public."

Steel Stocked and in Fabrication Not Thought Excessively Large

PITTSBURGH

GUESSES are being made in all quarters of the steel industry as to the effect of surplus stocks in the reconversion period. Guesses as to the tonnage involved have been large and small, but the most common at the moment seems to be that there are some 15 million tons of steel in mill and warehouse stocks, consumer and government inventories, and in process of fabrication.

How potent a force to be reckoned with is such a tonnage?

Much Material Will Be Used

In the first place, it can be assumed that the 15 million tons of steel will be only partially available for use. Materials in process will be greatly discounted, almost 100 per cent expected to be returned via the scrap route after termination of contracts. As a matter of fact, much of the material now in process will be used. Shipyards, for example, will have plenty of warning on their contract cancellation, and if they have been playing the game according to the rules, they will have on hand little more than enough steel to complete ships on the ways.

The tonnages involved in inventories on other programs are relatively small, and for the most part usable in civilian goods production. A short period of civilian goods production will eat heavily into available usable inventories.

Taking a look down the list of major steel products, it becomes evident that the chief trouble will be in one or two items. Railroad steel poses no problem; there is even now a shortage of rails, track accessories, wheels, axles and other carbuilding items, as well as boiler tubes for the locomotive.

Bars present a little difficulty. There is a substantial tonnage of bar items in hands of consumers, both primary and secondary. Cold drawing plants are relatively well stocked and might conceivably be in trouble if they could not immediately match their stocks with civilian demand. However, one answer to that problem is a shift of specifications to those sizes which are availabe in stock. This could be done with relatively low loss on the part of the producer.

Much of the secondary bar consumer stocks are in the automotive industry, where they can be used immediately. Truck production has been pushed over the past few months, and the remaining truck program for the military is large enough to provide a market for all available stocks and a considerable tonnage besides.

The plate situation is tied up closely with the ship program.

Concrete reinforcing bars are almost nonexistent as a stock item, there is no tonnage problem involved whatsoever.

Semifinished delivery picture is so tight that the problem here is one of inadequacy rather than surplus inventories, whether the product involved is sheet bar, billet, skelp, slab, ingot or tube round.

Sheet deliveries on existing needs are thousands of tons behind schedules now with little hope for a change in the near future. There are virtually no sheet stocks and the same is true of strip and other flat rolled items including tin mill products. Black plate and terne plate are

(*Please turn to Page* 188)

Plant Disposal Pattern Shaping

Policy being developed with reference to sale of government-owned iron and steel properties. Prospective buyers should not expect bargains

STUDIES by the Surplus War Property Administration and the Defense Plant Corp. with reference to the sale of government-owned iron and steel plants have progressed to the point where a prospective buyer should have little difficulty in having a reasonable offer accepted promptly.

For some time, Defense Plant Corp. engineers, as stated by Jesse H. Jones, Reconstruction Finance Corp. head, have been preparing detailed reports on government-owned plants, covering details of cost, plant layout, data on taxes, utilities, transportation, raw materials, convertibility to peacetime operations and other factors. In addition, they have been analyzing operating costs with a view to fitting these plants into the postwar civilian economy.

"Prospective purchasers of plants should not expect bargains, but will be assured of fair prices," says Mr. Jones, adding that "bargains would prove unfair to the purchasers' competitors and to the taxpayers of the country. While no set formula can be applied as to the sale price of the plants, the salient factors entering in such determination are present reproduction cost, cost of adaptation to civilian production, and the cost of special wartime installations having no peacetime value."

RFC Ready To Finance

Mr. Jones adds that where private financing is not available, "the Reconstruction Finance Corp. stands ready to supply all necessary and proper financing in the sale of these plants, and in appropriate cases a temporary continuation of a leasing program such as the Defense Plant Corp. has used during the war may be useful in putting plants into early production."

Although no formula for the sale of iron and steel plants has been prepared, a number of conclusions can be taken for granted.

One is that the Defense Plant Corp. is ready to negotiate terms considerably easier than those included in the contracts by which the steel companies operating these plants may obtain title to them on one of two bases—original dollar cost less annual depreciation of 5 per cent on the buildings, 12 per cent on machinery and equipment, and 25 per cent on portable durable tools, or original dollar cost less rentals, whichever brings the highest price to the government. Mr. Jones and several other officials in the RFC family have gone so far as to advise a number of congressional committees in recent months that the terms of these options would not be permitted to stand in the way of selling these properties and putting them to use.

Another conclusion that can be counted on is that prospective buyers of government-owned iron and steel plants will not be asked to pay any abnormal wartime costs that were incurred in building these plants and the equipment in them. DPC appraisals will be aimed at determining the replacement value of these plants on the basis of costs prevailing at the time of sale; they will not include costs resulting from overtime wages and premium costs for materials.

DPC engineers also are expected to allow proper deductions for depreciation, also for costs required in converting some of these plants for peacetime operation. In addition, DPC engineers are prepared to consider any factors or conditions that are special to a particular plant. Some of the iron and steel plants built to supply war demand, for example, are not located as favorably as others with respect to proximity to consuming territories, or to competitive plants.

While Defense Plant Corp. engineers have not attempted to set up any final sales formulas with respect to disposing of iron and steel plants, this is largely due to lack of interest among prospective buyers up to this time. They are now ready to "talk turkey" with interested parties.

Present, Past and Pending

■ STEEL PLATE SHIPMENTS LOWER IN JULY

WASHINGTON—Shipments of steel plates in July totaled 1,069,771 tons, slightly lower than June shipments of 1,111,561 tons. For the first seven months shipments amounted to 7,973,479 tons.

■ WYCKOFF ACQUIRES EMPIRE FINISHED STEEL

PITTSBURGH—Wyckoff Steel Co. on Sept. 1 will acquire the properties of the Empire Finished Steel Corp., Newark, N. J. and Putnam, Conn. The Newark property will be operated as the Empire Works and the Putnam plant as the New England Works augmented by the company's works at Ambridge, Pa. and Chicago.

■ U. S. STEEL TAKES OVER BENNETT MFG. CO.

CHICAGO—United States Steel Products Co., U. S. Steel subsidiary, has acquired the manufacturing assets of the Bennett Mfg. Co., maker of steel drums, with plants at Chicago and New Orleans. The plants will be operated as the Bennett Mfg. division. Stevens A. Bennett has been named vice president of United States Steel Products Co. in charge of the Bennett division.

■ ALLOY RODS CO. TO CONSTRUCT NEW PLANT

YORK, PA.—Alloy Rods Co. has received authorization from WPB to construct a new plant. Complete laboratory facilities for chemical and metallurgical control and research will be included. The company is the world's largest producer of stainless steel electrodes, according to E. J. Brady, president.

■ VIRGINIA BRIDGE BUILDING BAILEY UNITS

ROANOKE, VA.—For more than a year and a half the Roanoke plant of the Virginia Bridge Co., U. S. Steel subsidiary, has been engaged in secret production of prefabricated units of the famous British-designed Bailey bridge.

■ SNYDER HEADS CRUCIBLE; HUFNAGEL RESIGNS

PITTSBURGH—W. P. Snyder Jr. has been elected chairman of the Crucible Steel Co. of America succeeding F. B. Hufnagel who has resigned as chairman and president but who continues as director and will serve in an executive advisory capacity.

■ BLAST FURNACE OPERATION RECORD SET

CHICAGO—New record in continuous group operation of blast furnaces has been established at the Indiana Harbor plant of Inland Steel Co. where five furnaces have maintained uninterrupted production for more than four years. All five stacks have been operated at maximum capacity since Aug. 6, 1940, each producing about 1000 tons of iron daily.

■ STEELWORKER DRAFT EXEMPTION REPORT COMPLETED

WASHINGTON—WPB Steel Division has completed its report on the designation of some 500 steelworkers under 26 years of age for which exemption from military draft is sought. The report has been sent to various WMC regional offices for actual designation.

Many Parallels Are Noted in Tw

Divergencies also exist. First conflict and accompanying conditions were miniature of present war. Earlier and more comprehensive planning may ease transition to civilian production and provide more adequate job opportunities in 1944

By G. H. MANLOVE
Associate Editor, STEEL

IS THE history of World War I, as it affects steel and the metalworking industries, repeating itself in the present conflict?

With current reports of disintegration of German morale, continued defeat of the German armies and expectation of an early Nazi collapse, many aspects of the situation are startlingly similar to those of August, 1918. It appears, however, that more preparations are being made today to cushion the shock of peace and to ease the transition into civilian production.

This is as it should be, for the 1918 war and the conditions surrounding it appear to be only a miniature of today's situation. Production then was only a fraction of 1944's, operations were lower, and prices were much higher, though under control to some extent.

In drawing a parallel it must be noted that the United States had been in the war only a little more than a full year in August, 1918, compared with almost three years of participation in the present European war. Some of the measures now long in force were being put into effect in August, 1918.

General Pershing's American army was pushing ahead in France in August, 1918 and the victorious advance of the Allies heartened the people at home and indicated a turn in the tide. Production of munitions and armament was reaching a peak and more was demanded, as is the case today. Selective service was depleting working forces and labor was cutting into production by unwise leadership. Costs of many materials were increasing and relief was being sought by steelmakers, ore sellers and pig iron producers.

While civilian goods had been produced without severe curtailment the beginnings of drastic control of materials started in August, 1918, manufacturers of automobiles being denied steel except where it had been given priority or covered by permit from the steel director. Ship design was being simplified to reduce sizes and forms of steel ship sections to concentrate mill production and increase output. Demand for shells was at its height, mainly for cast semisteel shells. At the beginning of September needs of the Allies for these shells was estimated at 12 million 3-inch and five million 6-inch, wanted as quickly as possible.

Files of *Iron Trade Review*, predecessor of STEEL, reveal that at the beginning of July, 1918, a priority system was being put into effect to assure steel supply for war purposes, but its provisions were not clear cut and much confusion resulted. War Industries Board, corresponding to the War Production Board, was charged with administration of the priority plan. However, allocation of steel was undertaken by the director of steel supply only with reference to direct government orders. This contrasts sharply with powers of the War Production Board. Much freedom of action was allowed, the steel director giving mills blanket authority to ship small lots to consumers in nonwar lines.

Civilian Steel Use Curtailed

By the end of July, 1918, restrictions on use of steel for other than war purposes were tightened. At that late date manufacturers of passenger automobiles were requested to curtail output to 25 per cent of their 1917 output. This was followed almost immediately by an order of the War Industries Board to builders of pleasure automobiles to change over operations to a war basis by Jan. 1, 1919.

During August the conclusion was reached that the end of the war could be foreseen by the close of June, 1919. That the end of the war was several months nearer had not yet become apparent.

Rapidly advancing needs for the Army in France in its steady progress brought seemingly impossible demands on the steel industry in October and only scanty amounts of steel were available for nonwar uses. Early in that month peace talk appeared but had practically no effect on the steel industry. The President's demand in October for unconditional surrender stimulated output of all war supplies and shipments were rushed to France in increasing volume. About the end of October consideration began to be given to contract termination at the end of the war.

So little credence was given to peace talk that late in October an order for 40,000 freight cars for General Pershing's forces was closed and 150,000 tons of barbed wire were being distributed. Then, almost without warning, the armistice was signed and pressure for war materials stopped abruptly.

This brief survey of the final months

When news of the 1918 *armistice was announced, workers threw down their tools, staged mammoth parades. Shown here are shipyard workers celebrating in a Broadway parade in New York. Manufacturers, with a sense of imminence of victory, now are anticipating a recurrence of the* 1918 *celebration when Germany falls.*
NEA Photo

d in World Wars

accompanying
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o civilian prod
rities in 1944

f World War I indicates points of simi-
arity and of divergence from the situa-
ion at the present time. As previously
mentioned the present war is much older
ow than the prior struggle was in the
corresponding months of 1918 and much
of the current regulation was developed
many months ago. Doubtless the plans
or price control and priorities applied
early in the present war stemmed from
experience in 1918 and by grasping the
situation early government control saved
much of the difficulty experienced then.
Price control was instituted in 1941,
freezing prices at a level of a few months
before the announcement and for the
most part no increases have been made
since. In World War I the President an-
nounced maximum prices in September,
1917, on iron ore, coke, pig iron, steel
bars, shapes and plates, applying until
Jan. 1, 1918. The prices had been de-
termined by agreement between the War
Industries Board and steel producers and
were subject to revision Jan. 1.

Before this date the market had been free and had advanced sharply. Foundry pig iron, Valley, was reduced from $52 per ton to $33; basic, Valley, from $48 to $33. Steel bars, Pittsburgh, were cut from 4.00c to 2.90c; structural shapes, Pittsburgh, from 5.00c to 3.00c and tank plates from 8.00c, Pittsburgh, to 3.25c. All these prices remained unchanged to the end of the war. These compare with present prices of $24 for foundry pig iron, basic iron $23.50, steel bars, 2.15c, structural shapes, 2.10c, plates, 2.10c. Heavy melting steel maximum was set Nov. 5, 1917, at $30, delivered, later reduced to $29. This contrasts with a Pittsburgh base of $20 during this war.

Effective control of steel by priorities dated from March 4, 1918, when administration was placed in the hands of the Priorities Division of the War Industries Board.

One of the factors in the tremendous production of war material in the present war was the early application of restrictions on civilian production, best illustrated in the case of the automobile industry, when complete cessation of production was ordered after a brief period for using up inventory. In the former war automobile builders continued production at about 50 per cent of capacity by voluntary restriction, later reduced to 25 per cent and in August, 1918, it was determined no more pleasure cars were to be manufactured, only passenger cars needed for the war.

Less Subcontracting in World War I

War production in the first war was not spread so widely by subcontracting, which is such an important factor in the present instance. In fact, the first war was not as highly mechanized as the present struggle. Emphasis then was more heavily laid on ships, shells, artillery, railroad rails, cars and locomotives for the Army to use in its advance in France.

While labor shortage existed to some degree it was not as marked as at present, probably another result of the short time the war had been in progress and the fact that the draft did not cut as deeply.

While it is difficult to make exact comparisons, the labor situation in 1918 was about the same as now, numerous strikes causing idleness and cutting down production. It was stated that in seven months of 1918 there were 922 strikes involving 140,042 men, an increase of 12 per cent in number and 18 per cent in men involved, over the preceding year.

It was noted then that strikes were increasing for the purpose of forcing employers to discharge nonunion workers and reinstate union men discharged for cause.

Conditions became so bad by September that the President issued an order to striking machinists at Bridgeport, Conn., that unless they accepted the decision of the War Labor Board and returned to work they would be barred from employment in any industry in control of the government for one year and would be inducted into military service. The men then returned. In the present war seizure of plants by the government has been resorted to in similar cases. In the former year labor leaders lacked control of their men and the latter refused to obey orders, striking without authority and refusing to return to work or to comply with contracts.

Nothing like the present effort to cushion the effect of the war's end was in evidence in 1918 and postwar planning, reconversion, re-employment of veterans and surplus property disposal were not considered as important as at present. Less than a month before the armistice peace talk was deflecting thought into postwar channels and a rather complacent view was taken on war contracts should peace become an actuality within the next few months.

About this time Bernard Baruch prepared an exhaustive report for President Wilson in which he suggested the urgent need of appointing a committee to study the orderly conversion to peace. On advice of Newton D. Baker, Secretary of War, the president held the matter in abeyance; the armistice was signed and returning soldiers found no jobs awaiting them, a condition which present planners hope to avoid. Today as in 1918 the military authorities are reluctant to permit resumption of civilian production on a wide scale so long as the war continues.

In October, 1918, a clause was inserted into new ship steel contracts, providing for cancellation by the Shipping Board whenever it was to the country's interest to do so. Provision was made for termination of Army Ordnance contracts by an adjustment for materials manufactured. Yet some thought was being given and provision was made for expenditure for construction or operation of plants built by steel producers for the government. British purchases of shell steel were to be replaced by an equivalent tonnage of other rolled material for any undelivered shell tonnage.

Ship Contracts Canceled

First actual indication of the approach of peace was met in cancellation of much ship tonnage in the final week of October, 1918. At the same time new contracts for steel products were being distributed.

November 11, 1918, brought the war's end and within a week 50 per cent of the restrictions on supply of steel for civilian use had been lifted. Steel prices were steady, but scrap prices, always sensitive to coming events, had been irregular for several weeks. Scrap at present is also showing signs of slackening demand as melters seek to avoid being caught with too large inventory.

Changeover was swifter than had been expected. Cancellations made steel available for lines of output sorely curtailed under war demands. The French government at once placed an order for 150,000 to 200,000 tons of soft steel bars for rebuilding work and Italy came into the market for 150,000 tons of plates. The Secretary of War announced that projects for his department authorized but not started would be abandoned and work under way would be adjusted at once.

The adjustment at the end of World War I was simpler than it promises to be in the present instance. By the end of November, 1918 the steel market was reassured against drastic upheaval. Steel allocations ended that month and a free market was restored. The War Industries

(*Please turn to page* 188)

WPB Removes Production Ban but Slow Start on Reconversion Seen

Only handful of manufacturers expected to qualify in near future for civilian goods production. Manpower regulations prevent broad resumption. WPB's latest move is last of series of four aimed at easing transition

THE War Production Board last week went through the motions of launching industry on the reconversion trail.

WPB Director Donald Nelson's much disputed order to permit resumption of civilian goods production in plants where materials and manpower are available and where such resumption does not interfere with the war effort went into effect on schedule Aug. 15.

It was doubtful, however, if the formal order means much in present circumstances. Few manufacturers, it is believed, will be able to prove (this is mandatory) they are in position to resume or expand their normal activities, especially in view of the manpower ceiling regulations of the War Manpower Commission issued early this month. In other words, while the formal order permits reconversion, the WMC regulations largely will veto moves in that direction. Consequently, only a comparative handful of manufacturing firms is expected to qualify for civilian goods production over the next few months. Indicative of this also is the fact that few manufacturers have sought to avail themselves of the benefits of previous actions, in the Cleveland area, one of the larger war production centers, not a single request having yet been received by the regional WPB office for permission to go ahead on experimental model production although the order permitting such went into effect July 22.

The Aug. 15 order is the last of a series of four designed to ease industry back into civilian goods production. The first of these orders lifted restrictions on the use of aluminum and magnesium, the second permitted manufacture of experimental models, and the third authorized placement of forward orders for machine tools for use in postwar manufacturing. The last of the four orders, that which went into effect last Tuesday, permits WPB field offices to approve production of civilian goods by manufacturers who show they have plant capacity and labor not needed in the war effort. This order had been strenuously opposed by the armed forces who had succeeded in postponing its effective date a month.

The latest action of WPB cuts across 86 restrictive orders empowering WPB field offices to permit individual plants to make consumer goods hitherto prohibited or limited. It provides priority aid, also, for companies able and willing to manufacture any of several hundred "preferred" items listed by WPB as scarce.

"This is primarily a plan to decentralize some of the operations which will be necessary to 'take up the slack' as men and materials cease to be needed for war purposes," Mr. Nelson said.

"Above everything else it is vital to arrange the machinery, so that in the future when military demands decline or change, the men, the facilities and the materials which are set free can speedily be put to other uses.

"Under the terms of the 'spot' procedure, field offices will be in a position to authorize production of civilian goods now, provided the materials, manpower and facilities not needed for war production are available."

Authorizations to manufacturers to proceed with civilian goods production by WPB field offices are subject to review by the Area Production Urgency Committee and to veto of the local Manpower Commission representative. This is in step with War Mobilization Director James F. Byrnes' recent directive.

It is understood civilian reserves of some metals are being established by WPB from which allotments will be made to manufacturers qualified under the new order. It is said an aluminum reserve definitely will be set up, but it is not certain whether supplies of steel and copper will be so earmarked at present.

To obtain WPB consent for civilian production under the new order a manufacturer must file a request on specified forms with his district WPB office. After screening by WPB and WMC, authorization will be granted fixing the amount of goods which may be made and setting a production schedule.

Civilian Goods Items To Be Given Priority Preference Under WPB's Reconversion Order

CIVILIAN goods items which will be given War Production Board priority preference under its latest reconversion order permitting limited resumption of production where manpower and materials permit without interference with the war effort are as follows:

DOMESTIC MECHANICAL REFRIGERATORS, all items except electric.

DOMESTIC LAUNDRY EQUIPMENT, all items except washing machines.

METAL OFFICE FURNITURE AND FIXTURES, cabinets, bathroom and utility filing cabinets, steel safes and safe deposit boxes, school furniture.

DOMESTIC VACUUM CLEANERS, all items.

DOMESTIC ELECTRIC RANGES, all items.

DOMESTIC COOKING APPLIANCES AND DOMESTIC HEATING STOVES, all items.

GALVANIZED WARE AND NON-METAL COATED METAL ARTICLES, ash cans, coal hods, diaper pails, funnels, garbage cans, garbage can liners, oil cans, pails and buckets, utility and wire picking baskets, step-on pails, wash boilers, wash tubs.

ENAMELED WARE, infants' enameled bathtubs, household coffee makers, not electrical, all types, cooking utensils, all types; dinner pails, dishpans, double boilers, frying pans, covered kettles, percolators, saucepans, surgical and medical (and veterinary) instruments and equipment, and tea kettles.

CAST IRON WARE, cooking utensils.

MISCELLANEOUS COOKING UTENSILS AND OTHER ARTICLES, can openers, cans, step-on, and liners, choppers, hand, food, meat, onion; clothes pins, diaper cans and pails, dish drainers, blued steel drip pans, dustpans, eggbeaters, flour sifters, frying pans, wire garment hangers, insecticide spray guns, juice extractors, commercial and household; kitchen tools, lunch boxes, mop wringers, openers, bottle, can; dustpans; pans, household, baking, drip, pie, cake, roasting; pot scourers, spoons, basting, cooking, mixing, measuring; stirring spoons; strainers, coffee, tea, food, fruit, vegetable, jelly; carpet sweepers, vacuum bottles and wash boards.

INDUSTRIAL AND COMMERCIAL REFRIGERATING AND AIR CONDITIONING MACHINERY AND EQUIPMENT, Blood plasma equipment, coolers, evaporative, walk-in, water, reach-in and refrigerated display cases, frozen food dispensing equipment, home freezers, ice cream cabinets, air condition equipment.

FIRE PROTECTIVE, SIGNAL AND ALARM EQUIPMENT, all items of this type.

BEDS, BED SPRINGS, MATTRESSES AND DUAL SLEEPING EQUIPMENT, bed springs, box, coil and flat and metal crib springs; bedsteads, metal cots, bunks and rollaways; mattresses, innerspring, sofa beds and studio couches.

BICYCLES AND BICYCLE PARTS, all items.

OFFICE MACHINERY, all items.

ELECTRICAL APPLIANCES, dishwashers, domestic; electric appliances, commercial; food preparation; hair clippers; electric hand; heaters, space, electric; heating pads, electric; repair and replacement parts; automotive, refrigeration, domestic and electric appliances.

ELECTRIC FLAT IRONS, all items.

LAWN MOWERS, all items.

CLOSURES AND ASSOCIATED ITEMS, all items.

OFFICE SUPPLIES, pins, common and safety.

OIL BURNERS, all items.

COAL STOKERS, Class A and Class B.

ELEVATORS AND ESCALATORS, all items.

COMMERCIAL LAUNDRY EQUIPMENT, DRY CLEANING EQUIPMENT AND TAILOR'S PRESSING EQUIPMENT, all items.

DOMESTIC SEWING MACHINES, all items.

METAL HAIRPINS AND BOB PINS, all items.

CHURCH GOODS, all items.

CUTLERY, all items.

FLATWARE AND HOLLOWWARE, flatware.

DOMESTIC WATT-HOUR METERS, all items.

AUTOMOTIVE REPLACEMENT PARTS, all functional items.

DOMESTIC AND COMMERCIAL ELECTRIC FANS, all items.

REPLACEMENT STORAGE BATTERIES, all items.

COMMERCIAL COOKING AND FOOD AND PLATE-WARMING EQUIPMENT, all items.

WATER HEATERS, all items.

CAST IRON BOILERS, all items.

SCALES, BALANCES AND WEIGHTS, scales, balances and weights, except coin-operated scales.

PLUMBING AND HEATING TANKS, range boilers, hot water storage tanks and water tanks.

AUTOMOTIVE TIRE CHAINS, TRACTOR TIRE CHAINS AND CHAIN PARTS, all

FLOOR MACHINES, RUB-SCRUBBING MACHINES, INDUSTRIAL VACUUM CLEANERS AND BLOWERS FOR CLEANING PURPOSES, floor finishing and floor maintenance machines, including floor sanding machines, portable rug scrubbing machines, vacuum

cleaners; commercial and industrial, including portable electric hand blowers.

ELECTRICAL CONDUIT, ELECTRIC METALLIC TUBING AND RACEWAYS, electrical conduit and fittings.

PRINTING AND PUBLISHING MACHINERY, PARTS AND SUPPLIES, composing room and type setting equipment, plate-making equipment, photoengraving, lithographic, stereotype, electrotype, and rubber and plastic plate; printing press equipment, bindery and printers' finishing equipment.

COMMERCIAL DISHWASHERS, all items.

FARM MACHINERY EQUIPMENT, all items except tractors.

AUTOMOTIVE MAINTENANCE EQUIPMENT, for shops and garages, passenger car jacks, tire gauges, tire pumps, tire tools.

ALARM CLOCKS, all items.

FOOD PROCESSING MACHINERY, all items.

FOOD DEHYDRATORS, DOMESTIC, all items.

LUBRICATION EQUIPMENT, all items.

MOTION PICTURE 35-MM. PROJECTION EQUIPMENT AND ACCESSORIES, all items.

TELEPHONE EQUIPMENT, all items.

COPPER, animal traps and cages for commercial trapping and pest control, blow torches, gasoline flat irons, laundry tags, liquid fuel lamps and lanterns, marking devices, metal insect screen cloth, padlocks, pin tickets, rivets and burrs, watches, weather stripping, window shade rollers.

ZINC, laundry tags, marking devices, padlocks, pin tickets, rain goods.

LEAD, rain goods.

STEEL, fireplace equipment, furnace scoops, hardware cloth, laundry tags, marking devices, padlocks, partition studs, pin tickets, playground equipment, rain goods, snow shovels, watches, water storage tanks, agricultural use, weather stripping, wheelbarrows, window shade rollers and steel wool.

Nelson Sees Civilian Goods Output At 1939 Level After Nazi Defeat

NONMILITARY goods production in this country will increase 30 per cent after the defeat of Germany, returning the nation's output of civilian goods to the 1939 level, Donald M. Nelson, chairman, War Production Board, estimated at a press conference last week.

The war production chief said the German collapse will mean, roughly, a 40 per cent cutback in munitions orders, upon receipt of which industry will be able to produce as much for civilians as it did in 1939 at the same time carrying on all military production necessary for the war against Japan.

Mr. Nelson expects there will be an "unemployment gap" in many industries during the reconversion period. However, he pointed out that there are numerous manufacturers of war goods that can immediately devote facilities to production of civilian products. He cited the rubber tire industry, agricultural implements, and textiles as examples. All of these industries, he said, have huge backlogs of peacetime orders and will require little, if any, adjustment.

The biggest gap, in his opinion, will be in the automobile industry which was "completely scrambled" in converting to war production. He was not pessimistic over the automotive outlook, however, pointing out that this industry has "some of the best management in the United States," and he thought the auto builders may surprise the nation with the speed they get back into normal production.

Some relaxation of WPB controls will follow the victory over Germany, Mr. Nelson said, adding that at the conclusion of the war with Japan there would be no need for any of his agency's controls at all. However, he thought it may be found necessary to maintain some of the regulations in force that apply on crude rubber, tin, and lumber.

Steel and Iron Produced for Sale During June

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS
Period JUNE - 1944

Steel Products	Number of companies	Items	Maximum Annual 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.	46	1	xxxx	xxxx	xxx	732,000	241,888	xxxx	xxx	4,276,070	1,351,444
Structural shapes (heavy)	10	2	8,977,450	300,839	41.4	297,850	xxxx	2,028,924	46.2	1,979,506	xxxx
Steel piling	4	3		4,073		4,543	xxxx	33,791		33,277	xxxx
Plates (sheared and universal)	23	4	15,990,020	1,092,703	83.3	1,075,178	65,404	6,954,131	87.4	6,760,377	301,123
Skelp	6	5	xxxx	xxxx	xxx	65,676	50,539	xxxx	xxx	426,845	331,858
Rails—Standard (over 60 lbs.)	4	6	3,625,000	171,528	57.7	174,556	xxxx	1,155,559	64.1	1,148,885	xxxx
—All other	6	7	518,600	11,605	27.3	16,957	xxxx	92,003	35.7	97,943	xxxx
Splice bars and tie plates	13	8	1,743,500	67,671	47.3	70,056	xxxx	410,092	47.3	419,246	xxxx
Track spikes	10	9	350,640	12,380	43.0	13,795	xxxx	74,401	42.6	79,575	xxxx
Hot Rolled Bars—Carbon	27	10	xxxx	699,208	xxx	581,315	69,472	4,372,270	xxx	3,664,845	467,197
—Reinforcing—New billet	15	11	xxxx	37,287	xxx	39,659	xxxx	226,652	xxx	240,310	xxxx
—Rerolled	15	12	xxxx	5,994	xxx	4,924	xxxx	43,863	xxx	48,491	xxxx
—Alloy	24	13	xxxx	250,581	xxx	172,188	38,361	1,614,013	xxx	1,166,540	232,872
—Total	46	14	21,177,110	993,070	57.1	798,686	107,833	6,256,798	59.4	5,120,186	700,069
Cold Finished Bars—Carbon	26	15	xxxx	140,066	xxx	141,888	xxxx	905,528	xxx	902,611	xxxx
—Alloy	22	16	xxxx	31,449	xxx	28,665	xxxx	206,721	xxx	182,966	xxxx
—Total	32	17	2,700,650	171,515	77.4	170,553	xxxx	1,112,249	82.8	1,085,577	xxxx
Tool steel bars	19	18	214,970	11,610	65.8	11,751	xxxx	72,744	68.0	69,568	xxxx
Pipe and Tubes—Butt weld	16	19	2,289,130	114,760	61.1	121,026	xxxx	714,170	62.7	707,683	xxxx
—Lap weld	8	20	967,900	44,721	56.3	46,306	xxxx	296,689	61.6	295,579	xxxx
—Electric weld	9	21	1,225,170	84,365	83.9	82,054	xxxx	391,440	64.2	388,030	xxxx
—Seamless	15	22	2,625,250	187,954	87.2	188,784	xxxx	1,176,117	90.0	1,167,027	xxxx
—Conduit	7	23	184,500	5,688	37.6	5,165	xxxx	26,521	28.9	27,304	xxxx
—Mechanical tubing	11	24	1,038,450	64,631	75.8	60,920	xxxx	413,201	80.0	417,148	xxxx
Wire rods	25	25	6,883,170	370,611	65.6	109,821	29,225	2,228,302	65.1	632,429	169,268
Wire—Drawn	40	26	5,558,730	296,042	64.9	173,361	4,149	1,794,962	64.9	1,021,711	25,346
—Nails and staples	18	27	1,240,900	52,898	51.9	53,582	xxxx	346,465	56.1	337,999	xxxx
—Barbed and twisted	15	28	546,230	20,831	46.5	20,878	xxxx	127,595	47.0	126,545	xxxx
—Woven wire fence	15	29	1,110,200	31,880	35.0	32,645	xxxx	192,805	34.9	192,480	xxxx
—Bale ties	12	30	150,660	6,328	51.2	6,434	xxxx	40,285	53.7	38,965	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	40,352	54	xxxx	xxx	233,368	886
—Chemically treated	8	32	464,000	9,290	24.4	9,712	xxxx	80,231	34.8	76,993	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,719,650	176,072	57.7	192,116	xxxx	883,359	47.7	965,911	xxxx
—Electrolytic	10	34	2,155,100	65,475	37.0	63,726	xxxx	333,684	31.1	310,517	xxxx
Sheets—Hot rolled	28	35	20,137,200	1,022,132	61.9	506,666	19,769	6,264,989	62.5	3,170,865	126,157
—Cold rolled	14	36	7,318,780	309,899	51.6	167,234	xxxx	1,819,883	50.0	1,003,169	xxxx
—Galvanized	15	37	2,681,130	114,162	51.9	114,315	xxxx	634,650	47.6	627,891	xxxx
Strip—Hot rolled	22	38	8,549,590	224,857	32.1	139,675	20,654	1,337,245	31.4	854,899	138,582
—Cold rolled	34	39	3,267,470	108,411	40.4	97,417	xxxx	589,204	36.2	550,933	xxxx
Wheels (car, rolled steel)	5	40	348,800	22,744	79.5	20,770	xxxx	146,034	84.2	143,862	xxxx
Axles	6	41	416,170	14,806	43.4	14,566	xxxx	105,661	51.0	101,699	xxxx
All other	5	42	172,290	4,315	30.5	4,188	xxxx	20,958	24.4	21,079	xxxx
TOTAL STEEL PRODUCTS	154	43	xxxx	xxxx	xxx	5,703,314	539,515	xxxx	xxx	34,911,141	3,144,733
Effective steel finishing capacity	154	44	64,722,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Per cent of shipments to effective finishing capacity	154	45	xxxx	xxxx	xxx	97.2%	xxxx	xxxx	xxx	98.7%	xxxx

Companies included represented 98.7 per cent of total 1943 output

Coast's Postwar Prospects Studied By Senate Group

Murray Small Business Committee told West must retain as much of wartime industrial development as possible

SAN FRANCISCO

THE Far West's postwar prospects, with emphasis on California's reconversion problems, were given a thorough overhauling in discussions before the Senate Small Business Committee here recently. Headed by Sen. James E. Murray, (Dem., Mont.) the group held a two-day session during which views were obtained from many westerners.

Woven into most of the testimony was the theme that the West must retain as much as possible of the wartime industrial developments in this area and at the same time exploit its rich natural resources on an expanded basis.

Keynoting this viewpoint, Senator Murray called on "industrial, financial and business leaders to exercise a dominant leadership in the development of economic plans and programs necessary for broad expansion of business and industry in the West. The western part of the United States has resources far greater than those of any other section of the country. Its industry and agricultural development can provide jobs and homes for millions of new residents".

Prominent in discussion before the committee were the problems of postwar operation of new steel producing facilities in the West, at Geneva, Utah, and Fontana, Calif. Eventual policy on disposition of these installations, of course, must come from the federal government, which owns them, and no solution or possible hint of policy came out of the committee hearings here. Attitude of the group was summed up, however, by Senator Murray who said:

"Our conferences on the West Coast have brought out the fact that the full operation of the Geneva and Fontana steel mills is indispensable to any sound plans for full employment in the West. The legislation which Congress enacts on the disposition of government plants must provide for the operation of these plants at full capacity. It must guarantee the people of the West that western steel, properly priced will be available for the industrialization of the western states."

Regarding the Geneva steel plant, Senator Murray said that it should continue in the postwar period "and every effort should be made to find some group who will lease the plant. If necessary the government should give very liberal terms and make every effort to further develop this vital industry so necessary to postwar development of the West".

EXPLAINS GAS TURBINE: J. Kenneth Salisbury, left, a member of General Electric Co.'s turbine engineering division, explains a design feature of a cutaway model 3000-horsepower gas turbine to William H. Guild, executive assistant to the president of the Union Pacific Railroad, and S. E. Gates, manager of General Electric's Los Angeles office, during a recent demonstration of the new power plant in Los Angeles

Asked if this meant the possibility of a government subsidy to continue operation of the steel plants, Senator Murray added: "I think the government should make a loan on favorable terms as part of its major problem of plant disposal. I have no doubt that Congress will take a hand. By this I definitely do not mean government operation. We do, however, have a solemn obligation to employ some 15 million people after the war and every effort should be made to continue Geneva according to sound economic practices and in accordance with conditions favoring the expansion of the West. I think also that the same policy should be pursued with government aluminum and magnesium plants."

"Keep Plant in Stand-by Condition"

Senator Murray said that in the event it is not possible for private enterprise to operate the Geneva plant, it should "most certainly be kept in stand-by condition by the War Department" in preparedness for a future war.

Not mentioned by Senator Murray nor discussed by other members of the committee at the hearings is a fact which many private industrial leaders in the West, and elsewhere, see as the crux of postwar prospects for this area. This is the development of new markets to employ the war-expanded capacities built up in steel, magnesium, aluminum and many other lines.

This trend of thinking was voiced shortly before by Benjamin F. Fairless, U. S. Steel Corp. president, at a press conference in San Francisco which had no connection with the hearings being conducted by the Senate committee.

After emphasizing that the federal government, not U. S. Steel, would have the final say in regard to disposition of the Geneva works, Mr. Fairless indicated that postwar outlook for Geneva and all other steel producing facilities established in the West during the war would depend almost entirely on the extent markets could be developed for their output.

Mr. Fairless would make no commitment as to U.S. Steel's attitude on continued operation of Geneva, saying that when the government asked the corporation for its recommendation, a statement would be forthcoming. No such recommendation has been asked or given as yet, he said.

However, Mr. Fairless expressed cautious optimism that West Coast markets for steel could be built up after the war, especially in light rolled products. He also flatly stated his view that export prospects were bright, not only for the Pacific area, but for the country as a whole.

Accelerated oil well drilling in California thus far this year has expanded demand for pipe, oil field equipment and other steel products.

During the first half of 1944 a total of 795 oil wells was completed, as compared with 525 wells in the similar period. A total of 995 new rigs were set up on drilling sites.

Spokane—City of Small Plants

Eastern Washington center, with population increased 20 per cent, feels pains of war expansion. Business men believe they can hold prosperity after war ends

SPOKANE, WASH.

THIS eastern Washington city is experiencing all the pangs and pains of other areas which have suddenly found themselves in the center of war activities. It was, before 1941, a prosperous, easy-going center of the lumbering, mining and agriculture areas surrounding. Its population in 1940 was 122,000. Today it is estimated in excess of 150,000.

The war has brought three major manufacturing plants to Spokane. These are the aluminum reduction plant, the aluminum rolling mill and the magnesium reduction plant. In addition its small plants have expanded, most of them having received subcontracts from larger war industries in other sections.

The aluminum plants are not operating to capacity but at a ratio consistent with national needs. Recently the government ordered a 20 per cent cutback on magnesium output but the labor thus displaced has been absorbed mostly in the same plant which had not been running at capacity

As in other areas, Spokane, which is classed No. 2 by the Manpower Commission, is suffering from lack of workers. This is particularly true in lumber, mining and the railroads. All mining is restricted to essential materials.

Machine Shops, Foundries Active

Spokane is essentially a center of small plants. Machine shops are filled to capacity on war work. Some ship and airplane subassemblies are being fabricated at local plants, shops specializing in brass, aluminum and magnesium being in the foreground.

Foundry operations are active, plants running at capacity, particularly gray iron. Their contracts are essential war work, including lumber and mine replacements, agricultural machinery and some civilian replacements. In the large and prosperous farming area, the population has ample funds to purchase agricultural equipment but conditions naturally restrict sales. As soon as farming machinery is available as in normal times, there will be a market of great possibilities. The 1944 wheat crop is reported the largest on record and the rural population in eastern Washington is enjoying greater prosperity than in years. It is also a rich field for new automotive equipment as every farmer wants a new car, many of them new tractors and other machinery, purchases of which must necessarily be postponed.

The postwar outlook looks encouraging to Spokane business men and industrialists. They expect that the war plants, located here in the last three years, will continue. They point to the bright future for light metals. Now that the plants are here, trained labor at hand and ample raw materials and capital available, they see no reason why local industry should not be prosperous in the future.

Magnesium deposits of great magnitude are available within 50 miles of Spokane. Spokane's aluminum plants, it is expected, can compete in western markets even under present conditions of bringing bauxite from the South. If pending research can develop and perfect an economical process of extracting aluminum from local clays, the situation will be immeasurably improved as aluminum-bearing clays are found in ample quantities in nearby deposits. Spokane's aluminum rolling mill is the only plant of its kind west of Chicago and it is reasonably believed that its continued operation will be justified by the demand from West Coast centers. Lastly, Spokane's small plants, always a stable payroll, have expanded during the war activity, developed new methods and created new markets.

In one respect Spokane's labor problem is different fom that of Coast centers. The largest percentage of Spokane's working class is western labor. There has been little importation of negroes from the deep South and white labor from midwest and eastern states. Consequently the turnover is much less than in Seattle, Portland and California. In other words the situation is much more normal and stable and does not present the problem of the future of this working population which looms as a large question mark on the Coast.

POSTWAR PREVIEWS

STEEL PRICING— Industry marking time pending development of government policy with respect to product pricing in transitional period. Some advances expected. See page 67.

PLANT DISPOSAL— Government policy with reference to disposal of government-owned iron and steel plants is shaping up. See page 69.

RECONVERSION— Clew to Congress' temper seen in Senate vote on the George bill which is passed 55 to 19. Continuance of state unemployment payments approved. See page 76.

LOAN POLICY— Some principles of the V and VT loans are adopted by the Smaller War Plants Corp. in move seen as giving small business same loan advantages as big business in the transition period. See page 79.

POSTWAR EXPORTS— Trade expected to exceed prewar volume though Nazi fall may be followed by a lull. Factors at present apparent point to fairly early expansion in international trade. See page 82.

AUTOMOBILES— Allied nations impressed by efficiency of American automotive industry study its mass production methods. See page 85.

PLANNING—Need for advance planning by manufacturers and the government emphasized by Army Air Forces, Materiel Command, which is expanding its efforts to help war contractors by means of an extensive training program which covers contract termination, settlements, and property disposal. See page 88.

DIESEL-ELECTRIC LOCOMOTIVE—Fairbanks, Morse to offer in postwar period dual-service locomotives in standardized units for both freight and passenger service. See page 95.

SPOT WELDING HEAVY STEEL—Until recently regarded as unsuitable for joining heavy alloy steel sections in mass production, spot welding technique growing out of new conception of machine control permits welding of wide range of thicknesses. See page 99.

JOINING ALUMINUM— Minimum distortion, confinement of metallurgical changes in parent metal, less edge preparation and increased speed are proving potent factors in expanding commercial importance of the metallic arc process for welding aluminum alloys. See page 110.

HEAT-TREAT PICTURE— Many wartime developments in heat treating steel have made progress under pressure of emergency. See page 123.

Clew to Congress' Temper Seen In Senate Vote on George Bill

Conservative element in saddle as reconversion measure is passed 55 to 19. "Liberal" bill providing unemployment compensation benefits up to $35 a week tossed out as upper body approves continuance of state administration of payments

PASSAGE of the George reconversion and demobilization bill by the Senate marks the first major step toward enacting legislation covering the inevitable dislocations which will follow the collapse of Germany. The measure was favored by the more conservative element in the Senate over the Murray-Kilgore-Truman bill which would have granted unemployment benefits up to $35 a week (later reduced).

The George bill (approved 55 to 19) places primary emphasis on the "human side" of the reconversion problem, and covers the industrial and technical aspects in general terms in line with the blueprint laid down in the Baruch-Hancock report.

The measure provides that the states continue to administer unemployment compensation with the added provision that such benefits be extended to federal workers not now covered and establishes a federal revolving fund from which the states might be reimbursed for additional expense incidental to the payment of benefits to the federal workers.

In addition the George bill would:

Establish an Office of War Mobilization and Reconversion to be headed by a director approved by the President and who would serve two years at a salary of $15,000 annually. He would have broad powers over such problems as contract settlement, surplus property disposal, and retraining and re-employment.

Create a bipartisan committee in Congress and an advisory board to consult with the President and with the mobilization director on questions of policy.

Prescribe contract termination procedure aimed at channeling into civilian production plants and materials not needed in the prosecution of the war. Small business would receive especial consideration.

Establish a Retraining and Re-employment Administration comprising a director at $12,000 a year and representatives of government agencies. The agency would direct the retraining and re-employment of discharged service men and war workers. Transportation allowances up to $200 would be permitted for demobilized war workers.

Authorize the federal government to lend or advance money to states for public works projects. The amount would be based on population.

The "liberal" Murray-Kilgore-Truman bill, which had the active support of the CIO and other labor unions, drew the fire of both conservative Democrats and Republicans in the debate preceding passage of the George bill. Their remarks were indicative of the temper of Congress regarding radical proposals sure to be made during the reconversion period.

Sen. Alben Barkley, left, scans the demobilization and reconversion bill recently passed by the Senate with Sen. Walter F. George, sponsor of the measure. The bill, favored by the more conservative element of Congress, governs unemployment compensation, sets up contract termination procedure, creates an office of demobilization and reconversion to handle the transition from war to peace. NEA photo

Sen. Millard E. Tydings (Dem., Md.) warned:

"I don't know how many of us will be here during the next six years, but mark this prophecy and mark it well: By continued deficit spending to be carried out over a long period of time in the postwar period, we are laying the foundation for a depression which conceivably will make the 1932 depression look like Coolidge prosperity. Continuing the spending of money we haven't got is sheer demagoguery."

Sen. Warren R. Austin (Rep., Vt.) said the provisions of the Murray-Kilgore-Truman bill to set up industry committees were reminiscent of the NRA and possibly the first step in national socialism.

"It then would be just a question whether we would take another step and another step until the nation reached a state of national socialism like Germany under Hitler."

Says Government Controls Will Promote Unemployment

Charging that the government is promoting future unemployment by refusing to remove its controls over magnesium and that the recently announced relaxing of controls was deceptive, Dr. Willard H. Dow, president, Dow Chemical Co., Midland, Mich., in an open letter to Donald M. Nelson, chairman, War Production Board, asked that the controls be removed at once to prevent the possible destruction of a vast potential industry.

"Every day that the government now delays in freeing the industry means a greater delay later on in providing employment. As matters now stand," said Dr. Dow, "the industry is entirely capable in the ordinary course of production of supplying all possible needs of the government, either for domestic use or for export, and the stockpile is of such proportions as to give ample insurance against any kind of shortage. Therefore, as far as the needs of the war are concerned, there is no longer any reason to keep the magnesium industry under any form of control or allocation."

Dr. Dow declared that the order issued by the WPB on July 15 had been represented to the public as removing controls over magnesium. "That is not true," he stated. "The order M-2-b, while it modifies certain controls over magnesium products, leaves the industry in essential respects under the same control as it was before."

Saves Government $200 Million by Renegotiation

Total government savings of more than $200 million, through contract renegotiations by the Maritime Commission Price Adjustment Board since its inception two years ago, was announced recently by the Maritime Commission.

Processing about 2000 cases, the Commission effected price reductions of $217

615,931 on renegotiable sales and excessive profits at a total government expense of $300,000, about one-tenth of one per cent of the savings to the taxpayer. Three hundred and forty-five contractors were found to have realized excessive profits on renegotiable sales of $2,104,299,311, the total amount recovered being $140,811,831.

Clearance was granted to 335 firms with renegotiable sales totaling $416,228,686, where no excessive profit was realized. Further price reductions of $76,804,100 were effected through renegotiation with respect to contracts in force and subject to further review involving renegotiable sales of $511,280,247.

Approves Hiring of Seaman Without USES Clearance

Recognizing the vital importance of lake and river shipping and the peculiar operating factors of the industry, the War Manpower Commission has authorized vessel operators and labor unions having contracts with certain vessels, to hire male workers without clearance with the United States Employment Service, Paul V. McNutt, chairman of WMC, said recently.

Mr. McNutt's instructions to WMC regional directors are that they will be responsible for the periodic review of the arrangements from the standpoint of the effective use of manpower. This arrangement can be canceled by the chairman of WMC at any time if it appears that it is not working in the best interest of the war effort.

Labor unions and vessel operators will continue using the facilities of the USES whenever advisable. The USES office will refer male workers with previous experience in lake or river shipping to vessel operators and the unions when such workers apply for employment.

In spite of the great volume of this year's tonnage, the largest in the history of the industry, the job of moving it is being done, Mr. McNutt pointed out, with no delays attributable to manpower shortage. This season's movement of ore through June, he said, has been approximately 5 million tons greater than in the 1943 season; bituminous coal more than 7 million tons greater and grain approximately 50 million bushels greater. This required, he added, an all-time employment peak on Great Lakes vessels of approximately 29,000 seamen.

Wage Adjustments Approved For Steamship Companies

National War Labor Board recently unanimously granted requests of 30 steamship companies operating on the Great Lakes that they be permitted to put into effect a supplementary wage authorization issued by the board last June in a dispute case involving the National Maritime Union, CIO, and four other companies which operate Great Lakes ore boats. The authorization covers overtime and bonus pay.

Adjustments are designed to re-establish the relationship between the pay of those covered by the directive order and those working for the 30 companies. Board authorized a 95-cent-an-hour overtime rate for all unlicensed personnel. The overtime rate applies for all work except regular watches and for all work in excess of eight hours a day.

A bonus of 10 per cent of the wages earned during the season is to be paid to those who were on the vessels on or before August 1 and who remain until laid off during the lay-up of the vessels after the season closes.

BRITISH DELEGATES: Members of the British delegation to the Washington conversations on an international organization for peace and security, which open in the capital Aug. 21, arrive at Washington airport where they were greeted by American officials. Left to right: Lord Halifax, British ambassador; Edward Stettinius Jr., under secretary of state; Sir Alex Cadogan, chairman of the British delegation; and former ambassador Joseph Grew. NEA photo

Transportation Equipment Output Lagging Seriously

Production of some of the principal items of transportation equipment for civilian use lagged seriously behind schedule in the first six months of 1944 although the output was considerably greater than in the first half of 1943, the Office of Defense Transportation announced recently.

The production of items for railway, highway and water transport in the six months ending June 30, 1944, was generally less than anticipated when the programs were established by the War Production Board to meet ODT's requirements as claimant agency. However, the ODT announced, production generally was greater than in the same period of 1943, and most of the main ODT programs for transportation equipment showed the largest production of any six-month period since the United States entered the war.

A total of 32,680 medium, light-heavy and heavy-heavy trucks were produced for civilian use in the first six months of 1944 compared with a programmed production for the entire year of 101,298 vehicles. Railroad freight cars produced numbered 16,862 compared with a 1944 programmed production of 52,547.

Says Women Can Fill Foundries' Labor Needs

At a recent meeting of the foundry and forging operators of the Philadelphia Industrial Area, former chief of the WMC Manpower Utilization Division, E. J. Ronan, declared that American women can efficiently answer the call for labor in the foundry industry.

This statement was endorsed by representatives of the Philadelphia area's largest foundries and forge plants who attended the meeting—Midvale Steel Co., Bolt Anchor Chain & Forge Co., Penn Steel Castings Co., Dodge Steel Castings, Crucible Steel Castings, and Atlantic Steel Castings.

Their endorsement followed Mr. Ronan's outline of the means by which womanpower and the foundries can be co-ordinated: By job reclassification, plant mechanization, power utilization of women's skills, the use of part time employes.

New Loan Policy Liberalizes Regulations for Small Business

Some of the principles of the V and VT loans previously authorized by executive order are adopted by the Smaller War Plants Corp. Move seen as giving small business same advantages as big business

AFTER an investigation of the needs of small business during the contract termination period, the board of directors of the Smaller War Plants Corp. last week announced a new loan policy that liberalizes regulations with respect to suspension of payments on principal and reduction in the rate of interest.

According to Maury Maverick, chairman, the new policy sets forth the following conditions:

1. Type of Loan: Loans must be made to provide working capital in connection with a war contract. Loans made to provide fixed assets or for other purposes will not be eligible.

2. Termination of Contract: The war contract, for the completion of which SWPC supplied the working capital, must be terminated for the convenience of the government. Contracts terminated because of the default of the borrower will not be eligible. In the event of partial termination of the war contract, the new policy will apply to a proportionate part of the loan.

It was pointed out by Mr. Maverick that the new loan policy was not an innovation in government finance, but merely represented the SWPC adoption of some of the principles of the V and VT loans previously authorized by executive order and by regulations of the Federal Reserve Board and the war agencies. The importance of the new SWPC policy is that the little business man who has a loan from SWPC will have the same advantages as big business, he said.

Pays After Termination Settlement

Mr. Maverick stated further that under the new policy, when a contract is terminated for the convenience of the government, all payments on the loan made to finance that contract will be suspended until the termination claim of the contractor is paid. Heretofore, SWPC loan agreements have made no reference to the termination of war contracts, and the borrower was required to make regular payments even though his funds might be tied up in a termination claim that might take months to settle. Under the new policy, the contractor will pay SWPC when his termination claim is paid.

It was also pointed out by Mr. Maverick that the interest rate will be reduced to 2 per cent, which is the rate to be paid by the contractor by the war agency on the termination claim under the Contract Termination act, recently enacted by the Congress, and will be payable only upon settlement of the termination claim. The contractor, therefore, in paying SWPC a rate of 2½ per cent, will pay exactly the same rate he receives, and there will be no loss or profit to anyone on the transaction.

Contains Important Feature

Mr. Maverick emphasized that an important feature of the new policy is that it makes available to small sub-subcontractors the principal advantages formerly available only to prime contractors or to a few subcontractors on V or VT loans. For example, a V and VT loan could be made only if payment of a substantial part of the loan was guaranteed by a war agency. Because of legal and administrative difficulties, the war agencies found it difficult to guarantee loans to small subcontractors. In fact, the war agencies do not even know of the existence of thousands of small subcontractors. The small subcontractors, because they could not get the guarantee of a war agency, could not get a V or VT loan. Loans from SWPC do not require the guarantee of a war agency.

It was also stated by Mr. Maverick that the new SWPC policy will be applicable not only to future loans, but also to all SWPC loans made heretofore for financing war contracts, and will be applicable on loans made both to prime and to subcontractors.

Contamination of Carbon Steel Scrap Increasing

Contamination of carbon steel scrap with alloys is becoming a more serious problem, industry representatives have informed the War Production Board. Nickel and molybdenum residuals also have been rising.

Some mills are encouraging the mixing of alloy and carbon steel scrap by accepting mixed shipments, a WPB official said. Dealers and producers of scrap are not willing or able to maintain large inventories, it was explained. The pressure to keep alloy steel scrap moving from industrial plants and dealers' yards has resulted in increasing the mixture of these grades.

Some alloy steel scrap is moving at below carbon scrap prices, so that the incentive for maintaining proper segregation is lost in many instances. The inventory of alloy steel scrap in the hands of the steel industry consisted of more than 50 per cent triple alloy types, a recent WPB survey revealed. However, consumption of triple alloy scrap was not so large in relation to the percentages of triple alloy steels produced as was the consumed scrap of some of the other grades.

AWARDS . . . .

Additional war plants honored with Army-Navy-Maritime emblems for outstanding achievement in the production of war materials

Milwaukee Stamping Co., Milwaukee.

Stamford division, Yale & Towne Mfg. Co., Stamford, Conn.

Majestic Mfg. Co., St. Louis, awarded "M" pennant.

Norton Pike Co., Littleton, N. H.

Scaife Co., Oakmont, Pa.

Buffalo Pumps Inc., North Tonawanda, N. Y., adds fourth star.

B-G Machine Co., West Haven, Conn.

Camden Wire Co., Camden, N. Y.

Champion Spark Plug Co., Detroit.

E. I. du Pont de Nemours & Co., Newburgh, N. Y.

Franklin Lamp Co., Philadelphia.

Greer Steel Co., Anderson, Ind.

Industrial Rubber Goods Co., St. Joseph, Mich.

W. A. Moyers & Sons, Parkers Landing, Pa.

Perfex Corp., Milwaukee.

Reming Arms Co. Inc., Findlay, O.

M. H. Rhodes Inc., Hartford, Conn.

Sausalito Shipbuilding Co., Sausalito, Calif.

Scovill Mfg. Co., Racine, Wis.

Hamilton Beach Co., Racine, Wis.

Standard Piezo Co., Scranton, Pa.

Union Carbide & Carbon Co., Chicago.

Autopoint Co., Chicago.

Wales Strippit Corp., North Tonawanda, N. Y.

Wood Newspaper Machinery Corp., Plainfield, N. J.

Hickinbotham Bros., Construction division, Stockton, Calif.

Indiana Steel Products Co., Valparaiso, Ind.

Martin Band Instrument Co., Elkhart, Ind.

Montpelier Mfg. Co., Montpelier, O.

Resistoflex Corp., Belleville, N. J.

Strong Mfg. Co., Sebring, O.

Universal Electric Co., Owosso, Mich.

Rudolf Wendel Inc., Long Island, N. Y.

Chas. D. Briddell Inc., Crisfield, Md., adds star.

Perfect Circle Co., plants at Hagerstown, Richmond, Tipton, and New Castle, Ind., awarded pennants.

Handy & Harman, Bridgeport, Conn., receives fifth award.

Farrell-Cheek Steel Co., Sandusky, O. awarded third star.

Consolidated Engineering Corp., Pasadena, Calif.

Herschede Hall Clock Co., Cincinnati.

Kahlenberg Brothers, Two Rivers, Wis.

May Oil Burner Corp., Baltimore.

The Production Plating Works, Inc., Lebanon, O.

The Republic Stamping & Enameling Co., Canton, O.

United States Industrial Diamond Corp., Adamant Tool Co., Division, Bloomfield, N. J.

Nelson Appeals to Foundries, Forge Shops To Boost Output

WPB chairman says great need for heavy trucks and heavy artillery exists in war zones. Need for 20 per cent more castings during current quarter than WPB had figured as its needs for April, May and June

DONALD M. NELSON, chairman, War Production Board, last week issued an urgent appeal to the foundries and forge shops for increased production of castings and forgings critically needed in war industries.

Mr. Nelson's appeal, addressed to leaders of both management and labor in the foundries and forge shops, follows:

"Now, with the war at a crisis, I find it necessary to make an urgent appeal to the small group of men who are responsible for the production of the castings and forgings for American war industry. America's commanding generals in every war theater are asking for more equipment at once. They need heavy trucks and heavy artillery, especially, to speed up the destruction of the enemy and save American lives. We could increase production of these and other needed weapons—if we had enough of the required castings and forgings.

"Whether or not we can meet the imperative demands of the fighting fronts for more equipment depends on you and every worker in your shop. We appreciate the remarkable job you and your industry have been doing under difficult conditions. But we must ask you to do even more—to find somewhere, somehow, extra energy and ingenuity, and to give even more vigorous co-operation. . .

"The extra effort that you make today, tomorrow and in the days ahead, will mean speedier victory in the great battles that loom before our armies. The nation is counting on you."

Mr. Nelson's letter occupies the cover of the Forge and Foundry Action Edition of *Labor and Management News*, official publication of the War Production Drive, WPB.

WPB officials explained that while castings and forgings constitute only 1 per cent of the value of total U. S. war production, they are the basic components for war goods worth fifty times their own value. There are approximately 300 critical foundries and forge shops, which employ about 130,000 workers.

In discussing the forge and foundry situation, the WPB publication said:

"We need 20 per cent more castings during the current quarter than we had figured as our needs for April, May and June. But we aren't even caught up with our casting needs for the first six months of 1944. For the entire malleable industry, an increase of at least 20 per cent over present output is needed.

"In gray iron castings, the need for automotive castings for the truck and vehicle program is critical; also for chilled-iron wheels and brake-shoes for the railroads. Increased production needed is 25 per cent, except for brake-shoes where a 50 per cent boost is needed. In steel castings, the program now calls for both heavy and small castings. Twenty per cent more manpower or its equivalent is needed to meet the demand."

But it is pointed out that the forge industry is working at only about 70 per cent of its hammer capacity. Malleable foundries, likewise, are operating at only 70 per cent capacity and are unable to meet their orders, according to WPB.

Somervell Says Shortages Of Munitions Delay War

Lieut. Gen. Brehon B. Somervell, commanding general, Army Service Forces, has given the War Manpower Commission concrete evidence of shortages of essential war materials on the battlefields, WMC Chairman Paul V. McNutt announced recently.

In a talk before the Management-Labor Committee of WMC, General Somervell cited cablegrams from generals at the battlefronts showing that battle plans had been interfered with because of shortages of war materials.

General Somervell appeared before the committee to explain from a military standpoint the necessity for closer and more effective manpower control, under the recent directive of James F. Byrnes, Director of War Mobilization, to provide adequate manpower for war production.

Automotive Industry's Output Passes $20 Billion

Tempo of war production in the nation's automotive industry is being stepped up rapidly as a result of the invasion of Europe as deliveries from automotive plants of war goods passed the $20 billion mark since it began in September, 1939, according to the Automotive Council for War Production, Detroit.

The invasion has called for increased production of tanks, about one and one-half times as many as were delivered before the invasion, increased shell production for 155-millimeter guns, more aircraft engines, and an increase in heavy truck output, recently given top priority on par with B-29 bombers and heavy artillery production.

Manufacture of replacement parts for civilian vehicles has reached the $700,000,000 mark in the last 18 months.

During the last four months, some 18,000 civilian trucks in the heavier categories have been produced as compared with 2888 in all of 1943.

21 Warehouses Co-operate In Material Disposal Plan

Contracts have been signed with 21 warehouses and related interests to operate under direction of the Metals Reserve Corp. in disposal of surplus materials in aircraft plants, in accordance with provisions of the "Peterka plan" detailed in STEEL several months ago.

Under reorganization recently effected at Wright Field, disposal of surplus property is being directed in its entirety by Lieut. Col. A. E. R. Peterka, as assistant to Col. H. S. Rawlings who now heads the Readjustment Division of the Materiel Command.

It is understood the Glenn L. Martin Co. has disposed of surpluses valued at around $6,000,000 to the government for a nominal fee of $1, charging off the resultant bookkeeping loss against profits, thereby reducing excess profits taxes. Presumably the surplus materials will be disposed of by the MRC through its designed warehouses and its sales interests.

Similar plan is being developed for disposal of surplus by North American Aviation Inc.

Where possible, property disposal officers are urging contractors to dispose of surpluses by returning them to the original vendors at cost less an allowance for handling, since this is the quickest way of channelling such surpluses back into the trade. However, where vendors are unwilling or unable to take back such material, and where other contractors are unable to use it, the MRC plan appears to be the logical alternative.

Demand for Motor Graders Expected to Increase

Navy's requirements for motor graders during 1945 are expected to be approximately 75 per cent above those of 1944, the Motor Grader Manufacturers Industry Advisory Committe was informed by War Production Board officials at its recent meeting. Army requirements in 1945 will be about the same as those in 1944.

Civilian needs for 1945 will be about two and one half times greater than the number of motor graders authorized for production in 1944, WPB officials pointed out. However, 1945 civilian requirements have not yet been screened for essentiality.

PRIORITIES–ALLOCATIONS–PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives issued by War Production Board and Office of Price Administration

INSTRUCTIONS

DISTRIBUTORS: Distributor's application for preference rating, form WPB-547, used by wholesalers and retailers of hard goods, should be filed with WPB field offices, although distributors who sell more than 50 per cent of their total goods outside of their WPB region may continue to file directly with Washington.

SPROCKET CHAIN: Because of the extreme shortage of sprocket chain and attachment links, WPB has amended Limitation Order L-193-a to permit the exercise of greater control over deliveries of sprocket chain. Any person assigned a preference rating by means other than the use of WPB-547 (formerly PD-1X) is now required to write to WPB in Washington, giving the information requested in appendix A of the order if he proposes to receive in the succeeding month sprocket chain in excess of the following values: Steel detachable type, $500; malleable detachable type, $500; other types, $1000.

LIQUIDATION SALES: Additional types of liquidation sales made under statute or court order were exempted from price control by OPA, which said that these sales were so small a fraction of total sales that their exemption would not disturb the price stabilization program. These exemptions, contained in a revision of the original order governing judicial sales, effective Aug. 19, 1944, are for sales of many items by administrators and executors, as well as sales by sheriffs, constables or other judicial officers in carrying out their legal duties. Certain scarce durable commodities offered at all these sales are not exempt from price control.

HOUSING PROJECTS: Under terms of limited preference order P-55-c, housing projects authorized before the effective date of P-55-c, and for which authorization is still in effect, may be constructed under provisions of the specific authorization received or under the provisions of P-55-c, at the election of the owner. This means that the owner may take advantage of any relaxation in the war housing critical list or war housing contractions standards as they appear in schedules 1 and 2, respectively, of Order P-55-c. He may also take advantage of the method of using the preference rating and allotment symbol for acquiring materials as outlined in paragraph (d) and (e) of P-55-c.

CIVILIAN GOODS: Priorities regulation 25 establishes methods to be used in authorizing the resumption of civilian production as local conditions permit. It provides a way by which manufacturers may be authorized to make articles which are otherwise restricted or prohibited by WPB but only when they have labor facilities available which are no longer needed for essential purposes. Regulation explains products covered, nature of authorizations, policy in granting authorizations, and other important details.

CMP REGULATIONS

CONSTRUCTION: When a restriction on the use of an item is changed or removed by an amendment to general construction limitations order, issued after an authorization has been received, the builder may disregard the previous restriction and follow the new provision without obtaining specific authority. (CMP No. 6)

L ORDERS

SUPPLIERS: Repair and replacement parts for commercial refrigeration equipment and materials or finished goods sold to a supplier under priorities regulation No. 13 are exempt from Suppliers' Inventory limitation order L-63. By amendment, L-63 includes the above items in List A, which specifies goods not defined as "supplies" within the meaning of the order. L-63 established supplier inventory controls for such items as electrical, hardware, automotive, plumbing and heating supplies. (L-63)

RAILROAD COMPONENTS: Filing of monthly shipping schedule reports on critical railroad components, with the exception of five items, has been eliminated by issuance of direction 1 to L-97-d. The five items are locomotive and tender beds, clasp brakes, frames, live steam injectors, and mechanical lubrication equipment. (L-97-d)

AUTOMOTIVE PARTS: Anyone may now go into the business of distributing automotive replacement parts by acquiring up to $1000 worth of parts as an initial inventory and thereafter being subject to inventory limitations of order L-158. Any producer of parts for original equipment or replacement when such production will not interfere with any "frozen" schedule for the war program, is now permitted to use in any month for the production of the parts listed in schedule I 5 per cent of his total man or machine hours, or both, which were devoted during the preceding month to the production of automotive parts for original equipment and replacement, without restriction as to their use and without regard to priorities and controlled materials plan regulations.

Component manufacturers are given the same 5 per cent authorization for the production of automotive type components for the parts already listed. They are also authorized to ship each month against orders for replacement parts from producers up to 5 per cent of their total monthly production of automotive type components. (L-158)

TANKS: Production in excess of established quotas may be authorized for the manufacture of range boilers and expansion and storage tanks. Tank manufacturers are permitted to produce 70 per cent of their 1941 output of range boilers and expansion tanks, and 75 per cent of their 1941 output of hot water storage tanks. Additional authorizations will be made on form GA-1850. (L-199)

CONSTRUCTION EQUIPMENT: Restrictions which prohibited manufacturers from producing specified types of 10 kinds of construction equipment, if they were not manufacturing these types before certain dates, have been removed. The manufacture of these items is subject, however, to production control under order L-192. The amended schedules, which provide for the issuance of simplification and conservation schedules for various types of construction machinery and equipment, cover: Portable jaw and roll crushers; portable construction concrete mixers, truck mixer-agitators; pumps; tank car heaters and pumping boosters or circulators; bituminous paving finishers; bituminous heating kettles; bituminous materials maintenance units; bituminous patch plants; and asphalt surface heaters. Producers entering into production of any of the above types of equipment may have to appeal from the provisions of order M-9-c (copper) and M-43 (tin) to obtain necessary materials. (L-217)

INDEX OF ORDER REVISIONS

M ORDERS

CADMIUM: Additional uses for low-melting point alloys containing cadmium are permitted under a new revision of restrictions applicable to this metal. In announcing the revision, which is contained in WPB general preference Order M-65 as amended, Aug. 8, WPB officials pointed out that most low melting point alloys (those which melt at temperatures below the boiling point of water) contain cadmium and are therefore restricted by the order. (M-65)

CONTAINERBOARD: Sheet plants which use containerboard will be permitted to accept corrugated or solid fibre sheets and charge them to third quarter quota even though delivered Oct. 1. This action was taken by issuance of direction 5 to Order M-290. (M-290)

SILVER: Rules relating to the use of copper interliners in the manufacture of gold plate and gold-filled stock containing more than ½ of 1 per cent of silver by weight, exclusive of the silver content of the karat gold, for use in making items such as fountain pens, mechanical pencils and watch cases, have been modified to place manufacturers of these items on the same basis as manufacturers of jewelry. (M-199)

PRICE REGULATIONS

RADIO RECEIVERS: Price schedule previously governing manufacturers' maximum prices for consumer type radio receivers and phonographs has been revoked and the articles transferred to coverage by regulation affecting most other consumers' durable goods. Pricing formulas of maximum price regulation 188 will be in effect on radio receivers and phonographs. These are considered more adequately suited to pricing these articles than either revised price schedule 83 or the general maximum price regulation. (No. 188)

STOVES: Several changes in the regulation governing ceiling prices of domestic cooking and heating stoves were announced. There are several changes in definitions of domestic cooking and heating stoves, modification of the adjustment provision, and several new provisions added to the regulation. (No. 64)

Announce Freight Trailer Construction Program

Allocations of general freight trailer construction to American manufacturers calls for the construction of 14,466 trailers, of which 11,248 will be general freights, 263 lowbeds, 1570 poles, 130 milk tanks, 625 petroleum tanks, 375 highway and 255 miscellaneous.

General freight trailers to be produced under the allocations will be for the Office of Defense Transportation, Canada, Foreign Economic Administration and Maritime Commission.

Lift Restrictions on Metallurgical Fluorspar

Industry may resume its normal, prewar purchase and sale of metallurgical fluorspar, effective immediately, WPB announced recently. Some restrictions on fluorspar were lifted last spring. This latest action frees fluorspar for all purposes, including the metal industries.

Postwar Foreign Trad
Prewar; Nazi Fall Ma

WHAT effect will the collapse of Germany and cessation of war in Europe (now believed by many to be imminent) have on United States' export trade in steel and allied products? Immediately and for the longer pull?

Three major factors point to a considerable and fairly early expansion of international trade over prewar levels. One is the need for rehabilitation of devastated areas. A second is pentup demand and accumulated buying power in other countries. The third is this country's larger capacity to produce, born of the war, and the desire for a higher standard of living in the less industrialized countries.

However, due to the lag between cancellations of war work and reconversion to peacetime production, the settlement of treaties and the re-establishment of trade channels, many exporters expect a temporary lull. There will be, of course, considerable inquiry.

Substantial demand will appear in South America, in the Near East and in certain other countries which during the war have been receiving little or nothing from this country.

Such countries include Sweden, Norway, Denmark and Holland. Inquiries, in fact, already are being received by producers either through trade commissions in this country or through representatives of governments in exile. Sweden, for instance, has had a commission in the United States for some time.

Inquiries Being Brought Out

Inquiries are being brought out simply in an effort to get orders on mill books as quickly as possible for whatever preference may be obtained. These countries have little expectation of getting anything now because of the war; moreover they realize their requirement probably would have to be approved by our government before the mills could definitely enter their orders.

Sweden, which has always been a substantial producer of special steels, is particularly interested in ship plates and to a lesser degree in some of the other more common grades of steel. Denmark is especially interested in plates and tin plate, and Holland, in plates and structural material.

There is substantial demand from the Near East and some relief is already being afforded such countries as Egypt, Iran and others, through the Foreign Economic Administration. These countries are especially interested in pipe, tin plate, construction materials and railroad equipment. In fact, there should be much demand for rails and rolling stock from various foreign countries.

South American countries will continue actively interested in steel from this country for some time. Here requirements for railroad, road building and public utilities equipment and materials will come in for special interest. In addition there should be substantial demand for galvanized sheets, tin plate and certain specialties, such as stainless steel and other alloys. There will be substantial requirements for automobiles and at least a certain improved demand for electrical household appliances.

View of the port at Rio de Janeiro, Brazil, which is expected to be one of the major receiving points for American exports after the war. NEA photo

Most South American countries at present will have no trouble in establishing credit. In fact, several of the principal countries have plenty of money in American dollars. Neither does there appear to be any difficulty with respect to the financing of purchases by the Scandinavian countries and Holland. Sweden, for instance, can place cash right on the barrel, if necessary.

Exporters look for little from South Africa, where steel production is said to have practically doubled since the war began. South Africa, it is said, now has just about enough steel to meet her own requirements. India likewise has expanded production capacity. No special activity is expected from the Far East until after the war with Japan is ended.

Demands for the rehabilitation of Europe are expected to develop slowly after Germany's collapse. Treaty provisions will have to be worked out and surveys made. Some leading steel exporters believe there will be a considerable lag. Russia is expected to be a heavy importer of American goods, but steel for rehabilitation purposes likewise will be affected for reasons given above. She is in the market for considerable machinery and this equipment should be moving on to Russia with not much delay after Germany collapses.

As has been emphasized in export circles heretofore, Russia over a period of years will probably be the largest importer of American steel. Some exporters believe this will be true on an average for at least 10 to 15 years. Here again credit is regarded as satisfactory.

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alle Followed by Lull

China will have heavy needs, but credit will represent some complicated problems. Further, China will require many years of development before she will be a leading buyer of steel.

In some trade circles recently question has been raised with respect to Great Britain's steelmaking capacity. No official figures have been issued for security reasons. However, it is believed her ingot capacity has increased but little during the war for the reason, primarily, that she has had relatively little ore. Her normal supply from Sweden was cut off at the outbreak of the war (this surplus going to Germany) and for a long time her Mediterranean and South African sources were practically tied up because of shipping difficulties. England's own iron ore is of an inferior grade, so that supply has constituted quite a problem. Another factor with England has been shortage of manpower.

Testifying before the House Appropriations Committee recently, Will L. Clayton, surplus war property administrator, said most people are inclined to be too pessimistic regarding the buying power of Europe at the end of the war. Entirely aside from the $1.35 billion the United States has appropriated for the United Nations Relief and Rehabilitation Administration, said Mr. Clayton, Europe will have large quantities of spendable funds.

"I am informed by very good authority that France has about $2 billion in gold in a safe place, and in addition she has about $2 billion in foreign exchange which belongs to her citizens, but it is subject to requisition in exchange for francs."

Asked by Chairman Clarence E. Cannon (Dem., Mo.) if he realized that the Germans had swept France clean, Mr. Clayton said that would make French demands all the greater.

"Other countries abroad will have considerable buying power," said Mr. Clayton. "Holland will have considerable buying power; Belgium, Sweden and Denmark will have considerable buying power. Obviously Germany and Italy will have very little buying power. But Sweden, Spain and Portugal will have a good deal of buying power. Switzerland will have some buying power. So I think we need not be too pessimistic on that score."

Government Control Likely

The Russian situation, he added, will not immediately be good. "Her foreign balances now must be very small," he said. "But Russia is a considerable producer of gold and of other things which are readily marketable. I think Russia will soon have a considerable amount of buying power."

While the United States has $22 billion of the world's total of $33 billion of gold, said Mr. Clayton, he reminded the committee that the other $11 billion worth is scattered all over the world, thus constituting the basis of a large amount of foreign purchasing power.

With commercial arrangements likely to be given important consideration in the formulation of treaties many exporters believe foreign trade will continue to be governed to a large measure by the government not only immediately after Germany's collapse but after the war is over in the Far East as well.

Meanwhile, fourth quarter steel allocations are being set up with a reduction in lend-lease shipments and with general export provisions about the same. A reduction in lend-lease will affect Great Britain most. Russian allotments will be actually heavier than they were but not sufficiently so to offset the proposed drop in tonnage to Great Britain.

Two More Societies To Meet at Metal Congress

Two additional technical societies will participate in the forthcoming National Metal Congress and War Conference Displays, to be held in Cleveland the week of Oct. 16. They are the Society for Experimental Stress Analysis and the American Industrial Radium and X-Ray Society. Other co-operating societies in the congress are the American Society for Metals, sponsor of the event, the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers, and the American Welding Society.

The Society for Experimental Stress Analysis has national headquarters at the Massachusetts Institute of Technology, with Professor W. M. Murray of M.I.T. as president. Members of the executive committee are M. Hetenyi, Westinghouse Electric & Mfg. Co.; C. Lipson, Chrysler Corp.; and R. D. Mindlin, Columbia University.

During the Metal Congress the S.E.S.A. will have headquarters at the Carter hotel, Cleveland. Technical sessions will be held both morning and afternoon on Tuesday, Wednesday, Thursday and Friday, Oct. 17-20, with the annual dinner meeting on Thursday evening.

The American Industrial Radium and X-Ray Society will have technical sessions for mornings and afternoons on Thursday and Friday, Oct. 19 and 20, with a special meeting of the Cleveland section on Monday, Oct. 16, and the annual meeting of the society on Thursday afternoon. Convention headquarters will be at Hotel Hollenden.

The technical program of this Society is under the direction of Roy W. Emerson, metallurgist, Pittsburgh Piping & Equipment Co., Pittsburgh. M. B. Evans, Ternstedt Mfg. division of General Motors Corp., Detroit, is president; Philip D. Johnson is secretary with national headquarters at 25 East Washington St., Chicago. J. A. Catanzano is treasurer.

The American Society for Metals will have headquarters during the Metal Congress at the Statler and the Hollenden hotels; the A.I.M.E. will be at the Statler, and the American Welding Society at Hotel Cleveland.

To Discuss Progress in Fuels at Meeting, Sept. 14

Progress in fuels will be reported to the Division of Gas and Fuel Chemistry, American Chemical Society, in New York on Thursday, Sept. 14. Dr. Gilbert Thiessen of Koppers Co., Pittsburgh, chairman of the division, will preside. The sessions will be held in connection with the society's one hundred and eighth meeting.

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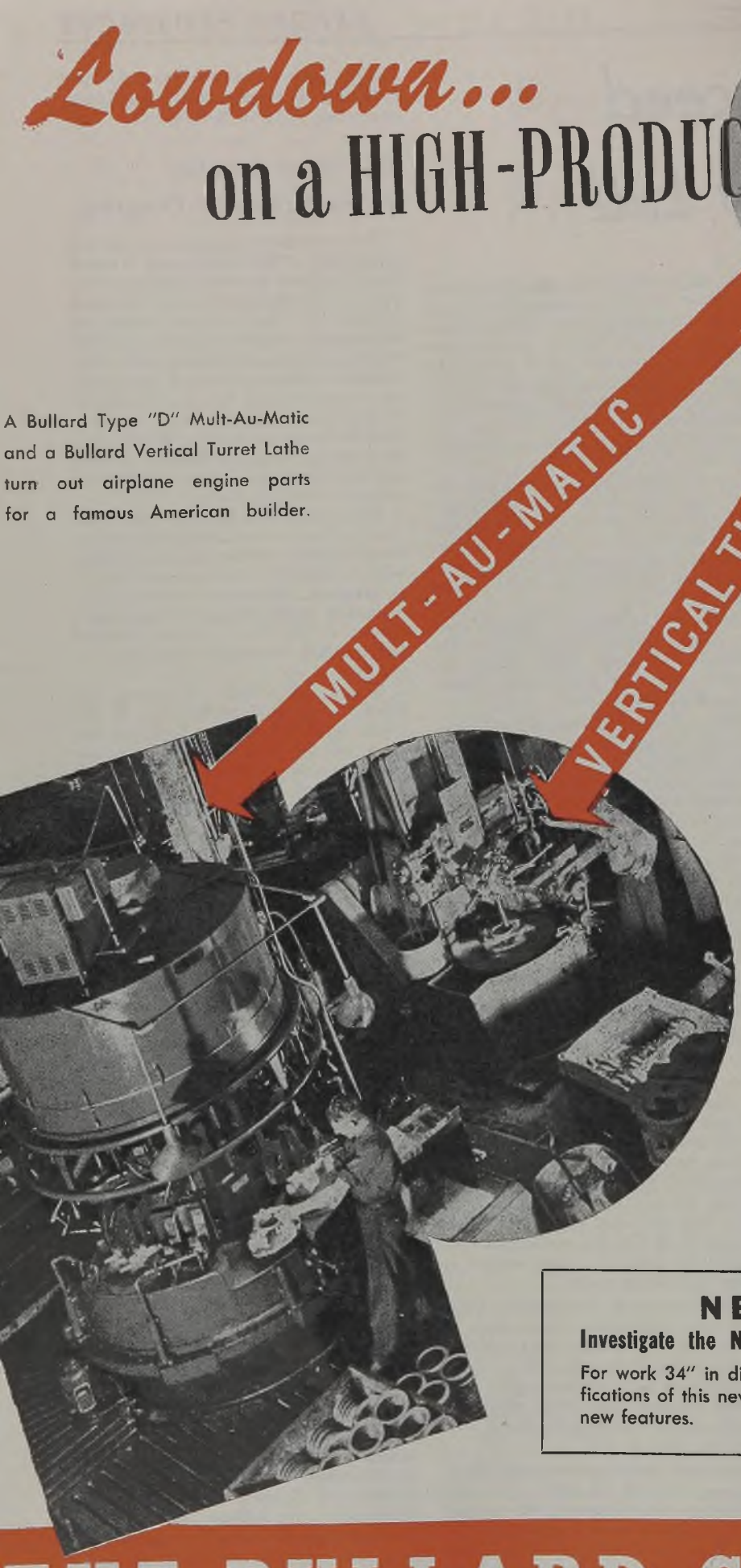
A Bullard Type "D" Mult-Au-Matic and a Bullard Vertical Turret Lathe turn out airplane engine parts for a famous American builder.



The productive genius of America's builders of airplane engines is nowhere more forcefully evidenced than in the wide use it is making of these two Bullard machines. The unique quality of both of these tools is that they spend more time each day in working . . . . because less time is lost in chucking. On many operations, indeed, they have cut production time to one-third less than the former time of outdated methods. Write today for an estimate.

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THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT, U.S.A.

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Frazer becomes chairman of board at Graham-Paige Motors Corp. Allied Nations impressed by efficiency of American automotive industry, study our mass production methods. Industry's war production exceeds twenty billion dollars

CLARIFICATION of the future status of Graham-Paige Motors Corp. has come direct from its new impresario, Joseph Washington Frazer, who, after acquiring 265,000 shares of Graham common stock from Joseph B. Graham and the Graham family, was named chairman of the board. The purchase was made by Mr. Frazer and his New York associates, including Oswald L. Johnston, attorney and director of the Atlas Corp. and other companies, who was elected to the Graham board. Three Graham directors have resigned—E. R. Harrel, R. E. Stone and W. L. Eaton.

Simultaneously, by the exchange of 150,000 shares of Graham common, the Warren City Mfg. Co., Warren, O., of which Mr. Frazer has been president, was acquired as a wholly owned subsidiary. This plant, built in 1942 by the Navy Department at a cost of $9,000,000, is an outgrowth of the old Warren Tank & Boiler Co. and in recent months has been turning out LCM-3 landing craft, diesel engine crankcases, generator bases and oil pans, gear drives for cargo ships, boiler turbine cases, 155-millimeter gun rails and miscellaneous parts for the Navy. Floor space totals 225,000 square feet, and equipment includes 21 planers, seven shapers, eight milling machines, six engine lathes, two turret lathes, four Bullards, 21 boring mills, 41 drills, 250 arc welders, 44 positioners, 120 grinders, 14 flame cutting machines, 55 cranes and hoists, along with brakes, saws, shears, rolls, furnaces, sandblast equipment and miscellaneous machinery.

Three top officials other than Mr. Frazer are former Willys-Overland executives—R. J. Fitness, W. A. MacDonald and Marvin J. Alef. Naturally, before the plant can be operated on peacetime work, it will be necessary to buy out title to the property and equipment from the Navy, but doubtless Mr. Frazer and his associates hope to be able to accomplish this on an economical basis. Facilities would hardly be adaptable to automotive work, but plans are being developed for a line of farm implements, and Frazer thinks there may be some good postwar business in building storage tanks for gasoline service stations.

Graham-Paige's automotive facilities in Detroit include only one plant in Detroit, with about 500,000 square feet of space. Part of this currently is under lease to another company and the balance is devoted in part to manufacture of amphibious tractors or "alligators;" designed some years ago by the Food Machinery Corp. and subsequently remodeled several times and armed, and in part to machining of components for Wright Aircraft engines. About half of the total number of machines in the plant are DPC owned, but in point of value the DPC share is by far the larger.

President and general manager of the new Graham-Warren combine is R. L. Hodgson, a former RFC official who took over the presidency of Graham-Paige several years ago, presumably in the interests of protecting RFC loans which at that time amounted to several million. According to Mr. Hodgson these have been virtually all repaid.

No World-Shaking Potentialities

A look at the manufacturing plant available at the moment, together with the engineering and managerial talent, and possible distribution outlets, does not seem to point up any world-shaking potentialities for Graham in the automotive picture. Mr. Frazer says they will have to depend on outside talent for styling and engineering, and that, except possibly for engines, manufacturing will be largely an assembly proposition. He thinks the company might be in production within a year after the close of the war and on the score of distribution says that "If we have a hot car, we won't have to worry about dealers."

Mr. Frazer is of course no novice in the automobile business, having spent the better part of 30 years in it. He was associated with the late Walter P. Chrysler for 15 years and was general sales manager and a member of the operations committee of Chrysler Corp. before leaving in 1939 to take over the presidency of Willys-Overland. During his tenure there for five years the company, thanks largely to the war, increased its annual sales volume from 9 to 170 millions, and its number of employes from 1100 to 16,000.

In forming the new company, there were an unusual number of stock transactions involved, and the SEC was prompted to ask a few questions, all of which were reported answered satisfactorily. Both Messrs. Frazer and Hodgson have options to purchase several hundred thousand shares more of Graham common, at prices well below the current market. Mr. Frazer, incidentally, is serving without salary for the first year.

Impressed with the stamina of American automotive military equipment as well as with its seemingly endless supply, representatives of the United Nations are reported by the Automotive Council for War Production to be investigating production methods and principles which are in vogue here. In studies of the matter by the British, some startling contrasts were uncovered. For example, they found that although American labor costs per hour ran twice their own during the immediate prewar years, the price of vehicles in the U. S. declined steadily while quality increased.

Comparing costs of materials used in a representative English vehicle and those used in a similar American product, the British found that without exception their prices ran considerably higher. A steering wheel cost the British manufacturer 81 per cent more than it did the American producer. A starter cost 79

ALL ABOARD: "Water Buffaloes," built by Food Machinery Corp. in Florida and California, not only carry troops, but also vehicles. Above, a jeep is driven into one of the amphibious tanks. The tank also is capable of carrying a heavy howitzer

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Ford reports the interesting fact that scores of dealer outlets throughout the country have been taken over by women —wives or relatives of men who have left for military service, most of them without any previous experience in running a business.

Speaking in Portland, Oreg., on the subject of diesel engines in war equipment, J. H. Moloney, of the Detroit Diesel division of General Motors, mentioned a recent development relating to the preconceived line of demarkation between the gasoline and the diesel engine. The former has conventional compression ratio of around 6 to 1, whereas the diesel uses ratio of 16 to 1. As the gasoline engine has advanced beyond ratios of 6 to 1, antiknock additives have been made to the gasoline. However, it has been found possible to inject gasoline in exactly the same manner as diesel fuel, that is, into a 16 to 1 compression ratio. As a matter of fact, when gasoline is injected into the hot air of the combustion chamber, ignition takes place more slowly than when diesel fuel is injected, contrary to what many might have expected.

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And Means MUCH LONGER PUMP LIFE

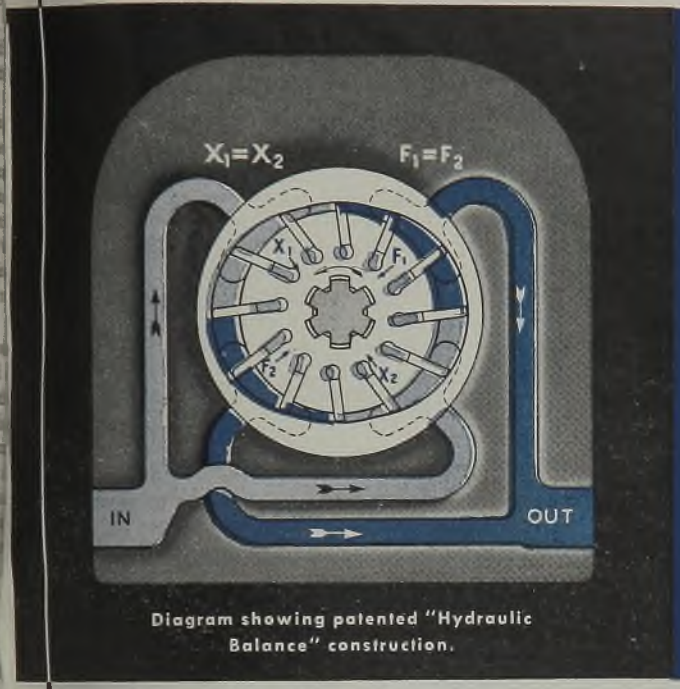

Diagram showing patented "Hydraulic Balance" construction.

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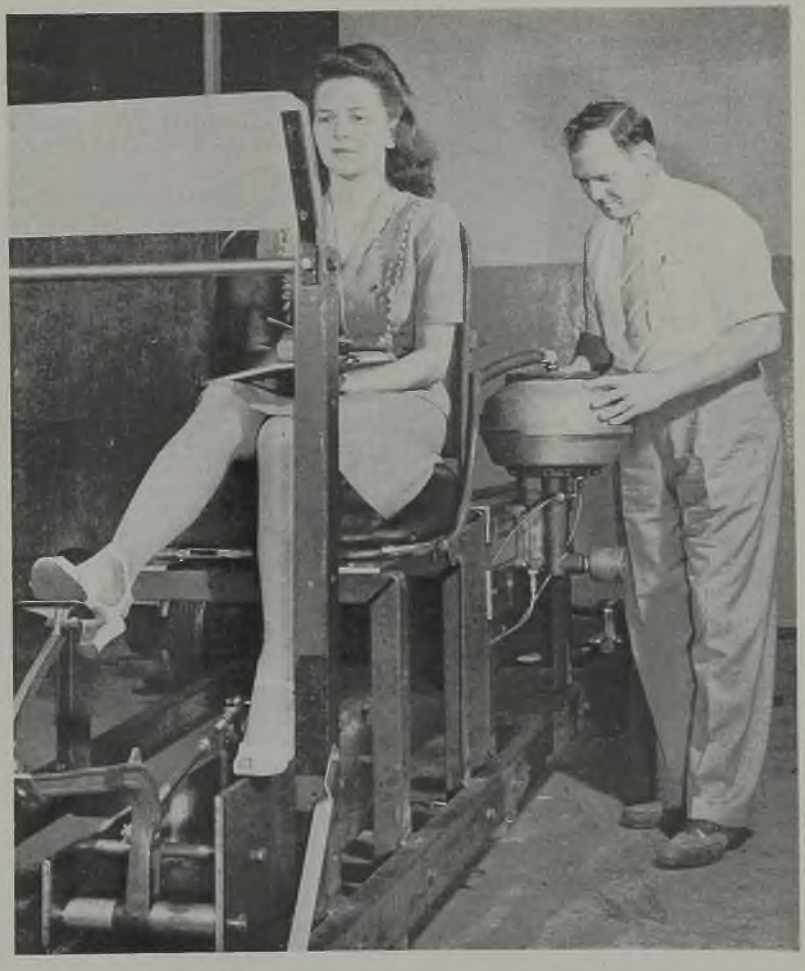

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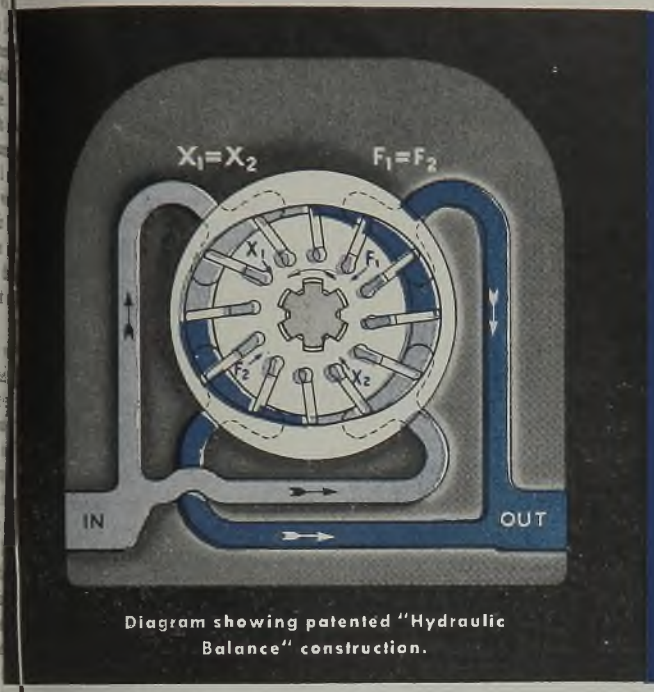

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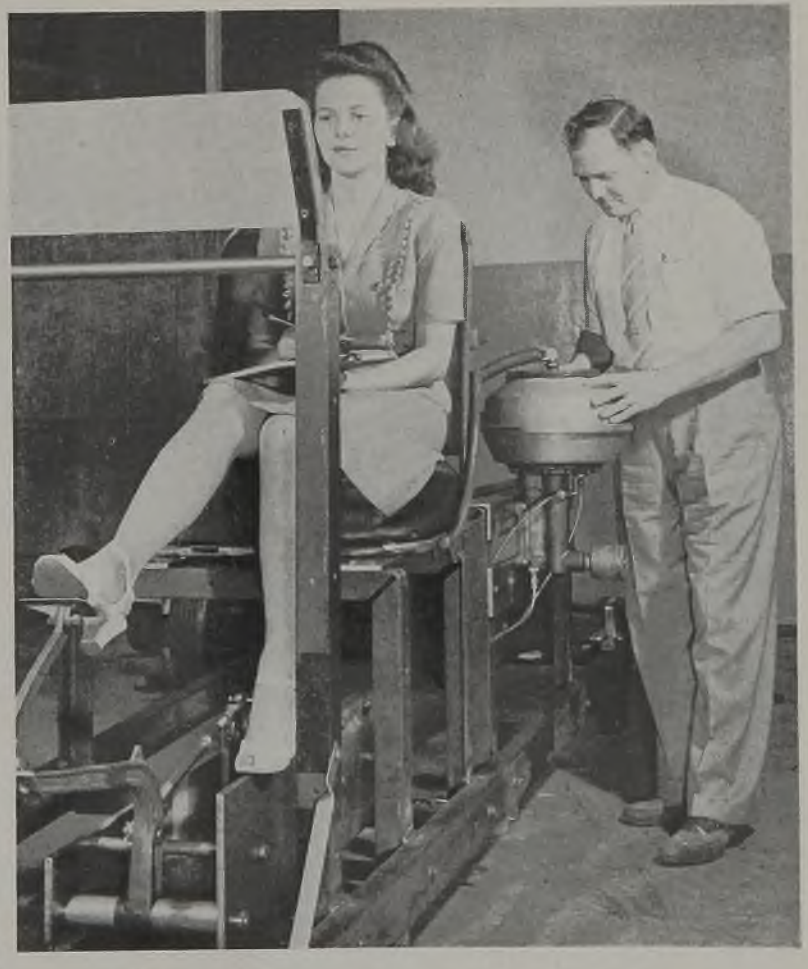

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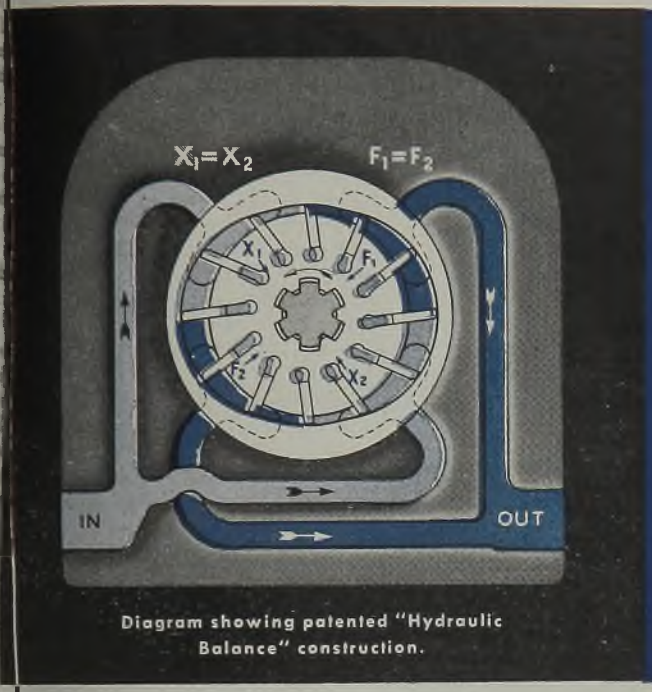

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VANE TYPE PUMPS

As illustrated by the diagram above, equal and opposing pressure areas are provided on the outlet side and on the inlet side of Vickers Balanced Vane Type Pumps. The equal and opposing radial hydraulic thrust loads cancel each other . . . consequently there are *no* bearing loads resulting from pressure. The major cause for wear is thus completely eliminated and the result is much longer pump life. This "Hydraulic Balance" construction is exclusive with Vickers Vane Type Pumps; it also permits an unusual design compactness and is an important reason for the exceptionally high efficiency of these pumps.

Vickers Balanced Vane Type Pumps are available in single-stage for 1000 psi (see Bulletin 40-25a); two-stage for 2000 psi (see Bulletin 40-16) and also two-pressure, large-small volume (see Bulletin 38-14). Vickers Application Engineers will gladly discuss with you the many different types of hydraulic power and control circuits on which these pumps have improved machine performance. Write the office nearest you.

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WING TIPS

Materiel Command of Army Air Forces expanding efforts to train manufacturers in necessary steps of terminating and settling contracts. Special courses for contractor personnel will be offered

EMPHASIZING the need for advance planning by manufacturers and the government, the Materiel Command of the Army Air Forces is expanding its efforts to help war contractors by means of an extensive training program which covers contract termination and settlements and property disposal.

A number of meetings have already been held throughout the country. Present plans provide for additional sessions developed by the six procurement districts of the Materiel Command, and the establishment of special courses for contractor personnel in important industrial areas.

A contractor training organization has been established within the Readjustment Division at Materiel Command headquarters at Wright Field, O., and similar units are being established in the districts.

It is basic War Department policy that terminated contracts be settled equitably and with the utmost promptness. Negotiation of settlements is stressed, and sound commercial practices will be followed. The Materiel Command, which has in effect approximately 11,000 prime contracts and many times that number of subcontracts covering more than half a million items, feels that its contractor training efforts will be an important contribution to the rapid and orderly change from a war to a peace economy.

There are three basic phases of the war contract termination picture. In the current phase, the great volume of cutbacks is dictated by changes in strategic requirements, improvements in design, and similar factors. This does not lower the overall volume of war production to any substantial extent. The second phase will come with the defeat of Germany, when a considerable cut will be made. The third phase will be at the end of the war when the war production cut will be very deep.

It is emphasized at Wright Field that contractors themselves must do most of the work in connection with terminations, although the AAF will give all possible assistance. The Materiel Command program is designed to inform war contractors of their responsibilities—what steps they should take in preparation for termination—and to outline the actual termination and settlement process.

Plans are being completed to make teams of informed experts available to address groups on the various aspects of contract settlement and termination. Sessions will vary from one-day meetings to complete courses of three, four, or more days.

Typical of the training already accomplished was a recent 4-day session in Los Angeles, attended by more than a thousand contractor personnel. In Dayton, a four-day course, called a contract readjustment forum, was held by the Materiel Command and the Chamber of Commerce. Active co-operation has been effected with such institutions as the University of Pennsylvania, while in prospect are a series of five, one-day meetings, sponsored by the Chicago Association of Commerce, in which the Materiel Command and other services will co-operate, and a three-day session in New York. A course at the University of Michigan will run for eight evenings.

An especially productive form of contractor training has been Materiel Command participation in conferences called by prime contractors for their subcontractors, and such participation will be greatly increased.

DOUBLE BOMB BAYS: The B-29 superfortress has two bomb bays which enable it to carry the heaviest bomb load of any military plane. The bays, one forward of the wings and one aft, are shown above

Willys Boosts Landing Gear Output 30 Per Cent

Production of landing gears for the Navy's Grumman fighter plane has been increased approximately 30 per cent by Willys-Overland Motors Inc., Toledo, O., during the past six months, it was announced recently by Ward M. Canaday chairman.

Mr. Canaday complimented employe for having turned out more than 350 sets of this vitally-needed precision equip ment without one single failure, poini ing out that to pass inspection all part must fit within tolerances of one thousandth of an inch. The landin gears are tested on a stand which simi lates the structure of the Navy fighte hydraulic mechanism for operating th gear in and out of the fuselage.

Willow Run Uses Immense Quantity of Aluminum

Deliveries of aluminum to the Fo Willow Run bomber plant to Aug. totaled approximately 133,000,000 poun with 120,000,000 pounds being in sh form. Sheet aluminum is used to fal cate internal structures in the bom and to form the outer surface or skir the entire assembly.

Approximately 6,000,000 pounds aluminum wire, rods and bars have used. Most of this went into the m facture of rivets, 400,000 of which used in each bomber. The rema 7,000,000 pounds was in the form of ing and extrusions.

Tubing alone is one of the most items in the B-24 Liberator. There more than 3600 feet of it, providin arterial system for hydraulic fluids, line, oxyen, vacuum and pressure speed indicators, engine oil, electrica duit and ventilation. Nearly 9,000,0 dividual tubes have been fabricat the Willow Run manufacturing s

Modifies Aircraft Bearin Material Specifications

Operating Committee on Aircra terials Conservation has directe precision antifriction bearings, co ing to Army-Navy Aeronautical cation AN-B-4, shall be used in t face control system of all airpla well as in other applications wher requirements so dictate. Plain b may be used for the surface contr surface control systems of targets, and other similar aircraft

plications where the added friction will not adversely affect the operation of the control evolved.

Commercial type antifriction bearings may be used as an alternate for precision antifriction bearings where low friction properties are necessary, or where lower capacities than those prescribed for precision ball bearings can be accepted.

The committee has adopted also the following program for reconversion in aircraft items: Reversion to or initial use of alloy steel, ferroalloys, copper, zinc, aluminum, and magnesium may be given consideration when military characteristics of the end products will thereby be improved or when a saving of labor, production time, etc., will result.

Ford Shrinks Parts on Assembly Line Basis

Combination refrigerating machine and dispenser used in the aircraft engine building at the Ford Motor Co., Dearborn, Mich., has cut in half the time necessary for a single assembly operation which depends on shrinking of parts by the liquid oxygen method.

Tappet guide inserts, 36 of which are used on each of the 2000-horsepower Pratt & Whitney engines manufactured at the Rouge plant, are shrunk by reducing their temperatures to 300 degrees below zero. The new type freezer and dispenser makes this possible on an assembly line basis.

Outwardly the dispenser resembles a soft drink vending machine. There are eight openings to accommodate various size guides. To obtain a shrunk part, the operator inserts one from stock and presses a solenoid button. A chilled part drops into a rubber receptacle at hand level. If desired, a shrunken part may be obtained without inserting a warm one.

The parts never come in direct contact with the liquid oxygen. They are chilled by their slow passage through tubes suspended in a tank of liquid oxygen. At normal temperatures the valve tappet guides are from 0.002-0.003-inch oversize. After emerging from the refrigerator they drop into prepared holes with ample clearance and expand as they warm.

The advantage of shrinking a part to size lies in the fact that no metal is removed or burnished by forcing it into position. Normal machining leaves tool marks around a part in a radial position to the center. Then these microscopic grooves expand, from the center out, they fill in the high spots and valleys of a prepared hole and create a much better seal.

Aluminum Plant Shuts Down Two Production Lines

The $12,000,000 aluminum plant of the Defense Plant Corp. at Riverbank, Calif., shut down its two production lines on Aug. 4, by order of the War Production Board.

The plant, which employed about 500 persons, first went into operation on May 15, 1943, and has been operated by Aluminum Co. of America under lease from DPC. A surplus of aluminum ingots was the reason for closing. A skeleton crew has been retained to operate the ingot furnace, and about 100 men will be kept on duty indefinitely.

Altitude Wind Tunnel Installed at Cleveland Research Laboratory

A NEW altitude wind tunnel has been placed in operation at the NACA aircraft engine research laboratory in Cleveland for investigation of new military power plants, including jet propulsion systems.

Built by the Pittsburgh-Des Moines Steel Co., Pittsburgh, the new wind tunnel is the first of its kind for investigating aircraft engines under altitude conditions.

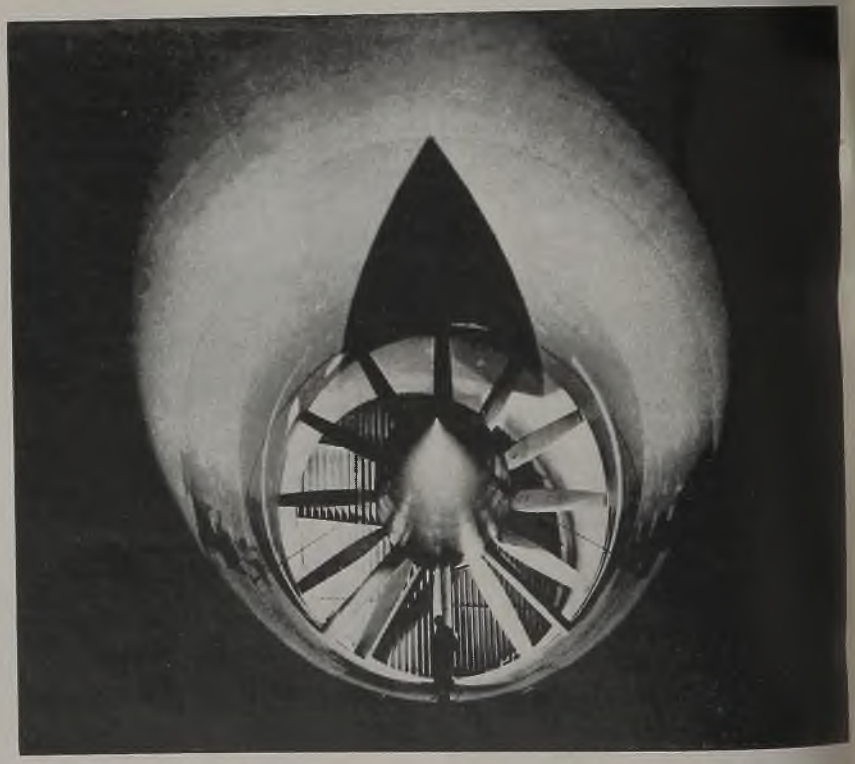
The test section of the tunnel has a diameter of 20 feet, sufficient for testing engines of 3000-horsepower or more. The tunnel is designed to simulate subzero temperatures encountered at 30,000 feet, and is strong enough to simulate pressures encountered at 50,000 feet.

The refrigerating plant provided to produce altitude temperatures in the tunnel test section has a refrigerating capacity which, if utilized for ice making, would manufacture 10,000 tons of ice each 24 hours. Twenty thousand gallons of cooling water per minute are required to transfer the heat removed to the surrounding air via the cooling tower.

The total power required by the tunnel to test a 3000-horsepower aircraft engine at 30,000 feet and 500 miles per hour airspeed, is in excess of 50,000 horsepower.

Because of the fact that power plants are operated in the tunnel, provision has to be made for cooling the air in the tunnel and disposing of the engine exhaust gas. The installation therefore includes cooling radiators, intake-air duct and an exhaust-air scoop that are not normally parts of an aerodynamic wind tunnel.

The tunnel is of steel construction using an alloy especially adapted to temperature changes and is supported through



steel rollers on concrete piers in such a manner as to provide for movement in any direction to permit expansion and contraction of the steel shell. Heat losses are minimized by an insulating layer of glass wool which is in turn covered by a steel cover. An 18,000-horsepower motor drives the 31-foot diameter, 12-bladed propeller, shown in accompanying photo, on an extension shaft from outside the tunnel shell.

Both tunnel and engine under test are controlled from an adjoining sound-proof control room, where the operator governs the pressure, temperature, air speed within the tunnel, angle of attack of the model and operation of the engine and propeller. Instruments indicate the forces on the model as well as complete performance data.

H. G. Bertram, President of The John Bertram & Sons Co., Limited, Dundas, Canada, says:

"We have always been very pleased with the installation we made and it has very considerably assisted our war work.

"The front bay with the eight cranes is the ideal layout for small shop work."

NOTE: The John Bertram & Sons Co., Limited, has long had a reputation of being one of the largest and foremost builders of fine precision machine-tools in Canada.

8 CRANES . . . . IN ONE SHOP BAY

To secure maximum crane service in the unit assembly department, The John Bertram & Sons Co., Limited, Dundas, Ontario, have installed two parallel runways with four cranes on each. This installation provides crane facilities for double the number of workers possible with conventional wall-to-wall cranes. Though not interlocking, the cranes may easily be so arranged.

Thus considerable time usually spent by costly, skilled mechanics waiting for crane service is greatly reduced and production of vital war machinery speeded. This is another of the manifold ways that Cleveland Tramrail equipment can be used to advantage.

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MEN of INDUSTRY

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R. A. HARTMAN

ARTHUR M. MORGAN

J. HARRY CHRISTMAN

M. J. Boho has been appointed assistant general manager of sales, Hagan Corp., Pittsburgh. Prior to joining the Hagan Corp. in 1936, Mr. Boho had been associated with Bailey Meter Co., Cleveland.

—o—

R. A. Hartman, for the past four years master mechanic, Crosley Corp., Cincinnati, has joined Kropp Forge Co. and Kropp Forge Aviation Co., Chicago, as superintendent of the machine shop.

—o—

Allen C. Chambers, for the past 17 years Detroit manager, Bendix Products division, Bendix Aviation Corp., South Bend, Ind., has been appointed director of automotive sales for the division. He succeeds **Frank B. Willis,** who will assume fulltime management of all Bendix Products war contract terminations and settlements.

—o—

Mark Noble is the new Pacific Coast sales representative of Pullman-Standard Car Mfg. Co., Chicago. He fills the vacancy caused by the death of Latham McMullin.

—o—

Walter A. Fairchild has been placed in charge of the new sales office which Bliss & Laughlin Inc., Harvey, Ill., has opened in Hartford, Conn. The office is located in room 827, 650 Main street, Hartford 3.

—o—

Robert C. Hardy, member of the firm of Willkie, Owen, Otis, Farr & Gallagher of New York, and general counsel for Barium Steel Corp., Canton, O., has been elected a member of the board of that corporation.

—o—

H. A. von Hacht has been named New York representative for Heppenstall Co., Pittsburgh, succeeding **C. G. Singleton,** resigned. **Sidney A. Pfaff** has been appointed sales representative for the company in Minneapolis and St. Paul.

—o—

International Business Machines Corp., New York, has announced appointment of **Margaret E. Hester** as head of the newly-created applications department for the United States. **Mary Emily Jones** has been made assistant manager, and **Margaret Bulmer** heads a similar new applications department for world trade.

—o—

Arthur M. Morgan, vice president in charge of sales, Latrobe Electric Steel Co., Latrobe, Pa., has been elected a director.

—o—

Paul Torre has joined Foxboro Co., Foxboro, Mass., as sales engineer in the New England territory.

—o—

New resident representatives in New York for Cherry Rivet Co., Los Angeles, are **Harold B. Thomas** and **P. J. St. James. William M. Rosborough** has been placed in charge of the Detroit territory.

—o—

William Bausch has been elected chairman of Bausch & Lomb Optical Co., Rochester, N. Y., succeeding his brother, the late Edward Bausch. New directors include **Alan Valentine,** president of the University of Rochester, and **T. Carl Nixon,** senior partner of Goodwin, Nixon, Hargrave, Middleton & Devans, the company's general counsel.

—o—

R. Wade Bowman, formerly sales manager, Pittsburgh Bridge & Iron Works, Rochester, Pa., has been elected a director and vice president in charge of sales.

—o—

Edmund C. Sulzman, formerly chief field engineer, Wright Aeronautical Corp., Paterson, N. J., has been appointed manager of the sales division of the engine company of the organization.

—o—

H. A. Lilly is in charge of the office which Aluminum Co. of America, Pittsburgh, has opened in Birmingham, Ala., at 1320 First National Bank building. He will be assisted by **James L. Frank.**

—o—

Fred A. Koepf has been named district manager for Northwest Pacific division territory, Link-Belt Co., Chicago, with headquarters in Seattle, and **George T. Lundquist** has been made assistant manager at Los Angeles.

—o—

J. Harry Christman, vice president, Milcor Steel Co., Milwaukee, who has been in charge of the company's Chicago branch since 1936, has been assigned new duties connected with special sales problems and merchandising policies. **Byron B. Barker** has been named to succeed Mr. Christman in Chicago, and the company also has announced appointment of **Don L. Rossiter** as district sales manager at Canton, O.

—o—

R. C. Stanbrook has been appointed marine engineer of the Pittsburgh Steamship Co., Cleveland, subsidiary of United States Steel Corp.

—o—

A. J. Hanlon, who retired recently as manager of the production department, International Nickel Co. Inc., New York, has been appointed production manager, Harvill Corp., Los Angeles.

—o—

Wilbur E. Geiser, who has been on loan to the scheduling department of WPB's Valve and Fittings Section, has returned to his post as manager of the Philadelphia office of Tube Turns Inc., Louisville, Ky.

—o—

Tube Turns Inc., Louisville, Ky., has announced re-opening of its Los Angeles office, Van Nuys building, with **James H. Withers** in charge.

—o—

Reginald B. Taylor has resigned as vice president and treasurer, Sterling Engine Co., Buffalo, to join the American Field Service.

—o—

Prof. Carl E. Schubert, for the past 18 years assistant professor of mechanical engineering at the University of Illinois, has joined Certified Core Oil & Mfg. Co., Cicero, Ill., as manager.

—o—

Frank L. LaQue of the Development and Research division, International Nickel Co. Inc., New York, has been elected chairman, American Co-ordinating Committee on Corrosion for the

current year. **Dr. George H. Young,** of the Mellon Institute of Industrial Research, was named vice chairman, and **George W. Seagren,** also of Mellon Institute, was elected secretary-treasurer.

—o—

J. J. I. Jamieson, formerly central district sales manager of the Steel and Tubes division, Republic Steel Corp., Cleveland, has been named manager of sales, Mechanical division. **D. K. Smith,** previously manager of the general sales office of Steel and Tubes division, succeeds Mr. Jamieson.

—o—

L. F. Weyand, general sales manager of the Adhesive and Coatings division, Minnesota Mining & Mfg. Co., St. Paul, has been appointed general manager of the division.

—o—

Martin K. Schnurr, formerly secretary-treasurer, Rustless Iron & Steel Corp., Baltimore, has been appointed comptroller of the New York Trust Co.

—o—

Harold W. Schaefer has been named assistant manager of the newly-formed Radio Receiver division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

—o—

Col. Francis K. Duffy, commanding officer of the New York Quartermaster's office since 1941, has been named manager, Industrial Bureau, Commerce and Industry Association of New York Inc.

—o—

Frederick C. Knowles has been appointed boron carbide engineer for Norton Co., Worcester, Mass., and will make his headquarters in Detroit, covering Cleveland, Detroit and Chicago territories.

—o—

Frank C. Moyer, previously chief estimator and process engineer, Willys-Overland Motors Inc., Toledo, O., has been appointed general sales manager, Barium Steel Corp., Canton, O.

—o—

Edgar W. Young has joined L. J. Miley Co. Inc., Chicago, as manager of the Eastern division. Previously he had been associated with Galena Oil Corp., and Valvoline Oil Co., both of Cincinnati.

—o—

Eugene B. Mapel has been appointed supervisor, administration planning, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **George A. Whitehurst,** resigned.

—o—

John J. Tansey, formerly assistant treasurer, General Alloys Co., Boston, has been elected vice president.

—o—

Charles B. Saunders, previously assistant sales manager, Lone Star Steel Co., Dallas, Tex., has joined the sales department of Woodward Iron Co., Birmingham, Ala.

—o—

Guy E. Hairston has been appointed manager of the Atlanta district sales territory for American Machine & Metals Inc., East Moline, Ill.

—o—

Karl A. Roesch has been appointed Cleveland branch manager, White Motor Co., Cleveland.

—o—

Edward C. Quinn has been named assistant sales manager, Dodge division, Chrysler Corp., Detroit.

—o—

Adolph K. Stoye, formerly associated with Reeves Sound Laboratories, has been elected president of Atmo Automatic Fire Alarm Systems.

—o—

Joseph S. Bennett, formerly manager of sales for American Engineering Co., Philadelphia, has been elected vice president.

—o—

Elmer C. Maywald, for a number of years vice president and sales manager of Chicago Molded Products Co., Chicago, has been appointed to represent Lester-Phoenix Inc., Cleveland, in the Chicago territory.

—o—

Louis W. Mason, formerly purchasing agent of Tubular Alloy Steel Corp., Gary, Ind., subsidiary of United States Steel Corp., has been appointed assistant to general manager of sales, National Tube Co., Pittsburgh, another United States Steel subsidiary. Mr. Mason will make his headquarters in Washington.

—o—

E. J. DelVecchio has been appointed field sales manager, Progressive Welder Co., Detroit, and will supervise all field sales activities outside the Detroit area. **Harry S. Rose,** formerly chief sales engineer, has been named sales manager for the Detroit district.

—o—

Capt. "Jimmy" B. Willis has returned to the technical laboratories of the Pemco Corp., Baltimore, after nearly four years with the armed services in this country, New Guinea and Australia.

—o—

Richard Conder has been appointed purchasing agent of the Hagerstown plant of Perfect Circle Co., Hagerstown, Ind. He succeeds **Robert Borst,** who has joined the United States Navy.

—o—

Samuel M. Stone has resigned as chairman of Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

—o—

National Carbon Co. Inc., New York, has announced reorganization of its electrode service engineering department. **T. L. Nelson** is in charge of the expanded department, which will consist of two divisions. **Dr. Charles H. Chappell** will be in charge of the electrothermic service division, and **Dr. Neal J. Johnson** has been named to head the department's electrolytic service division.

—o—

Earle R. Atkins has resigned as vice president and sales manager, Chiksan Tool Co., Brea, Calif.

—o—

G. H. Smith has resigned as general sales manager, Edison General Electric Appliance Co., Chicago. Mr. Smith has not made known his future plans.

—o—

Dr. Gerald F. Loughlin, for the past nine years chief geologist of the Geological Survey, United States Department of the Interior, has been appointed to the newly created post of special scientist

J. J. I. JAMIESON

D. K. SMITH

L. F. WEYAND

in the Survey. **Dr. Wilmot H. Bradley** has been appointed successor to Dr. Loughlin.

—o—

W. H. Loeber has been appointed eastern district manager, Electric Appliance division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

—o—

A. J. Kerr has been appointed general sales manager for Pittsburgh Equitable Meter Co. and Merco Nordstrom Valve Co., Pittsburgh. **M. D. Gilbert** succeeds Mr. Kerr as district manager of the Tulsa, Okla., office of the combined organizations, and other newly-appointed district managers are **C. K. Madison**, Houston, Tex., and **W. S. Andrews**, Pittsburgh.

—o—

Douglas Via has been named industrial insulation sales manager, Eagle-Picher Sales Co., Cincinnati, and **Andrew L. Harris** has joined the company as manager of sales promotion.

—o—

C. M. Cooper has been elected president, Bostwick Steel Lath Co., Niles, O., succeeding Commander Griswold Hurlbert, who died July 13 while acting as executive officer of a United States Navy advanced amphibious base in the European war zone.

—o—

Albert M. Marsh has been named food industries representative for Allis-Chalmers Mfg. Co., Milwaukee.

—o—

Grant Curry, who was retired in July as Lieutenant Colonel, United States Army, has been appointed chairman of the Pittsburgh Ordnance District's Price Adjustment Board. Until recently Colonel Curry supervised officer procurement for the Third Service Command.

—o—

Donald B. MacAfee has been named vice president in charge of sales, Benchmaster Mfg. Co., Los Angeles. Before the war Mr. MacAfee had been president of Mechanical Supplies Inc., Manila, Philippine Islands.

—o—

Joseph S. Kozacka, professor of mechanical engineering, Illinois Institute of Technology, Chicago, has been elected president of the Polish-American Technical Societies Council composed of engineers and technicians of Polish descent. **Frank Nurczyk**, secretary of the Polish-American Business Men's Association, Chicago, was named secretary-treasurer.

—o—

C. W. Perelle, vice president in charge of manufacturing, Consolidated Vultee Aircraft Corp., San Diego, Calif., has resigned to become associated with Hughes Tool Co., Houston, Tex.

—o—

T. D. Stay, for 27 years active in metallurgical work for Aluminum Co. of America, Pittsburgh, is now associated with Reynolds Metals Co. Inc., Richmond, Va., and will take charge of a new research laboratory which the company plans.

—o—

O. W. McMullan, for the past eight years metallurgist at the Indiana Harbor plant of Youngstown Sheet & Tube Co., Youngstown, O., has been appointed chief metallurgist for Bower Roller Bearing Co., Detroit.

—o—

Melvin E. Lanning has been named merchandise manager, Electric Appliance division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

OBITUARIES . . .

George F. Evans, 63, vice president and treasurer, Beals, McCarthy & Rogers Inc., Buffalo, died Aug. 12 in that city.

—o—

Harry S. Wherrett, 68, chairman of the board and former president, Pittsburgh Plate Glass Co., Pittsburgh, died Aug. 13. Associated with the organization for more than 53 years, Mr. Wherrett had the longest service record of any employe. He had been active in civic and philanthropic affairs of the city of Pittsburgh and served as a director of many companies, including Bell Telephone Co. of Pennsylvania, Westinghouse Electric & Mfg. Co. and Westinghouse Electric International Co.

—o—

James W. Madden, 69, owner of the Madison Plating Co., Oak Park, Ill., died recently.

—o—

Frederick C. Kroeger, 56, vice president and retired general manager of the Allison division, General Motors Corp., Detroit, died Aug. 10 in Indianapolis, Ind. Mr. Kroeger had been associated with the Delco-Remy division of the corporation for 23 years before he was placed in charge of the Allison division in 1940. He had retired several months ago.

—o—

Edwin Groves, who prior to his retirement several years ago had been prominently identified with the New York tin trade for half a century, died Aug. 12 in Long Branch, N. J. Mr. Groves joined J. W. Phyfe & Co. in the early Nineties' and when in 1896 that company succeeded Bidwell & French as the American agents of Edward Boustead & Co., London, they became one of the most important distributors of pig tin in the United States. This connection was retained until after Pearl Harbor when the government took over the entire importation and distribution of tin in this country. Mr. Groves was president of the old New York Metal Exchange during World War I and was one of the organizers of the American Tin Trade Association in 1928.

—o—

Alfred H. Kroenke, 42, president and general manager, Cleveland Pressed Steel Co., Cleveland, died Aug. 12. Mr. Kroenke had acquired the steel company five years ago.

—o—

Timothy W. O'Brien, 62, plant inventory manager of the Stanley Works, New Britain, Conn., died Aug. 9 in Hartford, Conn.

—o—

John Spiller, 62, who organized the Wisconsin Upholstery Spring Co., Sheboygan, Wis., in 1931 and served as president since that time, died Aug. 6 in Sheboygan.

—o—

Pritchard Stewart, 78, who retired in 1938 as vice president, Hibbard, Spencer, Bartlett Co., Chicago, died there Aug. 7. He had been associated with the company 53 years.

—o—

Frank C. Worthington, 78, former vice president, Western Wheeled Scraper Co., now the Austin-Western Co., Aurora, Ill., died Aug. 6 in that city.

—o—

Berthold H. Hastings, 55, Philadelphia district engineer of the American Institute of Steel Construction Inc., died Aug. 11 in Philadelphia. Mr. Hastings had taught engineering at Yale, Carnegie Institute of Technology and the University of Pennsylvania.

—o—

Raymond L. Schuyler, 61, general superintendent and treasurer of the Acme Bearings Corp., Buffalo, died there Aug. 11.

—o—

William B. Marvin, 64, secretary of Farrel-Birmingham Co. Inc., Ansonia, Conn., died Aug. 13 in New Haven, Conn. He had been affiliated with Farrel-Birmingham for 39 years.

—o—

Louis Falender, 73, who retired 14 years ago from Falender Iron & Metal Corp., Indianapolis, Ind., died Aug. 6.

—o—

Harry A. Craig, 56, assistant sales manager in the Chicago territory, Universal Atlas Cement Co., Chicago, died Aug. 11 in that city. He had been associated with the company 32 years.

—o—

Shelby M. Jett, 55, secretary of the B. F. Goodrich Co., Akron, O., since 1927, died Aug. 9 aboard a commercial transport plane approaching Cleveland. Mr. Jett also was head of the legal department and was a director of the company.

—o—

Joseph J. Federkiel, 54, president and general manager, J. C. Ulmer Co., Cleveland, died Aug. 10 in that city.

—o—

Samuel Shanker, 72, secretary and treasurer, Shanker Steel Ceiling Co. Inc., New York, for 25 years, died Aug. 6.

BRIEFS . . . .

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

International Business Machines Corp., New York, has placed contracts to add 10,000 square feet of floor space to its plant No. 4 at Poughkeepsie, N. Y.

—o—

Phillips Mine & Mill Supply Co., Pittsburgh, has been appointed district sales representative for the Hyster Lift Truck Co., Portland, Oreg.

—o—

Majestic Electric Appliance Co. Inc., Galion, O., has leased the former site of the Plymouth Stamp Metal Co., Galion, and started the manufacture of automatic flat irons for civilian use.

—o—

Timken Roller Bearing Co., Canton, O., announces plans to open a third bearing grinding plant at Zanesville, O. Operations will begin about Sept. 1 with about 250 women workers.

—o—

Kenosha Brass & Aluminum Foundry, Kenosha, Wis., has been purchased by Leland B. Pfost and Otto A. Sadofsky, both of Racine, Wis. They were formerly associated with the Iroquois Foundry at Racine.

—o—

American Steel Dredge Co. Inc., Ft. Wayne, Ind., is now producing a new 12-inch hydraulic dredge for the Army Engineers Corp. It was designed to handle sand, clay and silt to a depth of 16 feet.

—o—

Sterling Alloys Inc., Boston, announces the appointment of Associated Engineers Inc., Springfield, Mass., as its engineering service representative for western New England and eastern New York.

—o—

Klein Tool & Mfg. Co., St. Louis, virtually doubled its factory space by purchasing a property at 4375 Duncan avenue, adjoining its present holdings, for $30,000.

—o—

Buffalo Bolt Co., North Tonawanda, N. Y., has spent more than $1,000;000 in permanent improvements to its plant in North Tonawanda in the last four years.

—o—

Blaw-Knox Co., Pittsburgh, has published a 48-page catalog which takes the guess work out of the problem of selecting the proper bucket for a particular industrial job.

—o—

Paisley Products Inc., Chicago, reports development of a new synthetic resin adhesive capable of joining many combinations of materials. It reportedly is being used in many industrial operations as a replacement for rubber latex.

Fruehauf Trailer Co., Detroit, reports development of a steel-ribbed floor of new design for trailers which is capable of withstanding concentrated load of 1000 pounds per square foot. The new design comprises hardwood floor boards bolted down between 10 flanged steel ribs.

—o—

Ohio Crankshaft Co., Cleveland, announces appointment of Anderson Machine Tool Co., St. Paul, Minn., as a special distributor of its induction equipment in the Wisconsin and Minnesota area.

—o—

Meehanite Research Institute of America Inc., New Rochelle, N. Y., has available for use by interested societies or groups a motion picture entitled, "The Flow of Metal Into Molds."

Ferro Enamel To Build New Plant on West Coast

Ferro Enamel Corp., Cleveland, announced plans last week for construction of a new manufacturing plant located in the Los Angeles area.

The new plant will produce porcelain enamel and synthetic enamel industrial paints and will warehouse a complete line of its other products. Decision to build on the West Coast was made after surveys of the area's business by the company officials who are convinced of that section's continued business growth after the war.

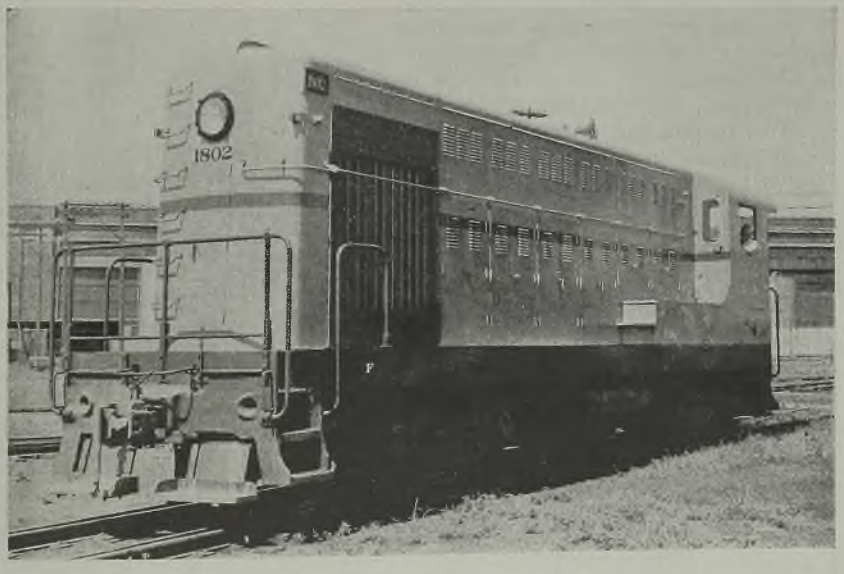
Fairbanks, Morse & Co. Delivers First Diesel-Electric Locomotive

FIRST of the new line of diesel-electric locomotives announced recently by Fairbanks, Morse & Co. (STEEL, May 15, p. 16) was presented by the company to its purchaser, the Chicago, Milwaukee, St. Paul & Pacific Railroad, in ceremonies at Beloit, Wis., Aug. 8. Among guests upon the occasion were 400 railroad officials, equipment and parts suppliers.

Significantly, the day chosen for the presentation was a two-fold anniversary —the 115th anniversary of the first successful run to be made by a locomotive in America, and the 115th year of the founding of Fairbanks, Morse & Co.

The diesel switcher was presented by Robert H. Morse Jr., general sales manager, Fairbanks, Morse, to James T. Gillick, chief operating officer of the Milwaukee road, after which it was christened by the latter's wife.

Weighing 120 tons, the switching locomotive is powered with a 1000-horsepower diesel engine of the opposed piston type, which develops 200 horsepower per cylinder. This radically different engine, in which two pistons move in opposite directions within each cylinder, was developed in 1930 with locomotive application specifically in view. During the war,



however, the Navy has taken the company's entire output for powering submarines and other craft.

In postwar, Fairbanks, Morse will offer both freight, passenger and dual-service locomotives in standardized units. Two or more units may be coupled and operated through multiple unit control to meet any speed and power requirement within the limits of drawbar and braking capacity. Switching locomotives, too, will be built in two sizes, the larger of which will have characteristics suitable for operating local freight and passenger trains.

War Output Expected To Record Little Change

ONLY minor fluctuations in munitions output from the current near record level is indicated through the remainder of this year—barring sudden termination of the European war. Government officials are insistent about the need to step up production, but this is necessary in only a relatively few although critically important items.

Expansion in production schedules on such programs as the heavier bombers, large shells and artillery, radar, military trucks and various type bombs, are expected to be offset in coming months by cutbacks and contract cancellations of other items of which the Army has enough regardless as to when the German war ends.

If the European war should suddenly be terminated, many observers feel that it will require six to nine months before civilian goods production would be sufficiently advanced to begin to take up the production slack caused by the wholesale cancellation of war contracts.

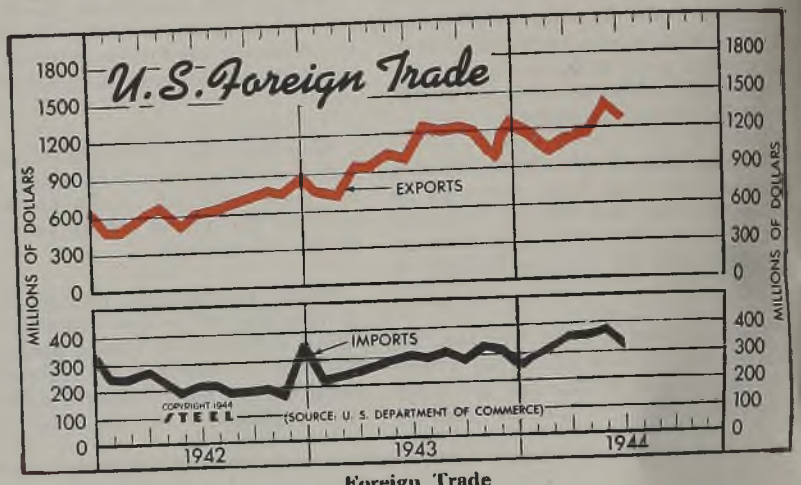
MACHINE TOOLS—Decreased military requirements resulted in a decline in machine tool shipments during the first half compared with a year ago of 59.5 per cent; net new orders were off 22.8 per cent; and unfilled orders on June 30 were 62.2 per cent below the like 1943 period. New net orders during June recorded the first monthly decline since December, 1943. Despite the easing in new orders, the industry's order backlog during June continued the upward trend underway since April last.

INVENTORIES—Value of manufacturers' inventories was reduced by almost $500 million during the first half of 1944. This liquidation, which began in the latter part of 1943, resulted in a book value of inventories on June 30 last which was about equal to that of two years ago. Allowing for changes in prices, the "real" value of inventories at present is lower than any time since Pearl Harbor. Virtual stabilization of overall war output since the close of last year has made it not only unnecessary to accumulate additional stocks but has also enabled manufacturing firms to reduce inventories in relation to output. This has resulted in a steady liquidation of raw materials and goods in process inventories.

Reflecting expanding output in some war lines, not all firms reduced their stocks the first six months this year. This was particularly true of the metal fabricating industries, whose inventories rose more than $60 million.

FOREIGN TRADE—United States June exports reached the second highest monthly total in history, valued at $1,271 million. This was about 10 per cent below the record May figure of $1,419 million, but 27 per cent above that reported in June last year. Lend-Lease shipments accounted for about 80 per cent of the June export total, and were 13 per cent below those of May.

General imports during June were 14 per cent below the May total, but 12 per cent above those registered in June last year.



Foreign Trade
Bureau of Foreign and Domestic Commerce
(Unit Value—$1,000,000)

	Exports				Imports			
	1944	1943	1942	1941	1944	1943	1942	1941
Jan.	1,192	730	481	325	300	228	254	229
Feb.	1,086	719	480	303	313	234	254	234
March	1,158	988	628	357	359	249	272	268
April	1,182	980	717	387	359	258	235	287
May	1,419	1,085	535	385	386	281	191	297
June	1,271	1,002	648	330	330	295	215	280
July	.....	1,262	650	365	...	300	213	278
Aug.	.....	1,204	703	460	...	315	186	282
Sept.	.....	1,233	732	425	...	285	196	262
Oct.	.....	1,193	802	666	...	329	200	304
Nov.	.....	1,074	787	492	...	317	168	281
Dec.	.....	1,241	873	653	...	278	358	344
Total	.....	12,716	8,035	5,147	...	3,369	2,742	3,345

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	97.5	97	96.5	98.5
Electric Power Distributed (million kilowatt hours)	4,415	4,399	4,377	4,288
Bituminous Coal Production (daily av.—1000 tons)	1,997	2,058	1,443	1,981
Petroleum Production (daily av.—1000 bbls.)	4,656	4,651	4,692	4,239
Construction Volume (ENR—unit $1,000,000)	$39.5	$31.8	$62.5	$31.8
Automobile and Truck Output (Ward's—number units)	18,895	20,220	19,420	19,800

*Dates on request.

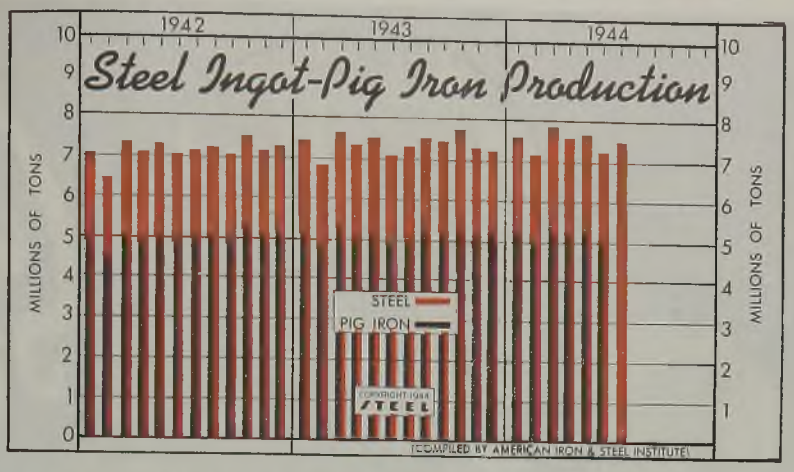
TRADE				
Freight Carloadings (unit—1000 cars)	880†	890	905	887
Business Failures (Dun & Bradstreet, number)	16	15	15	60
Money in Circulation (in millions of dollars)‡	$22,910	$22,134	$22,561	$18,101
Department Store Sales (change from like week a year ago)†	+11%	+11%	+11%	+11%

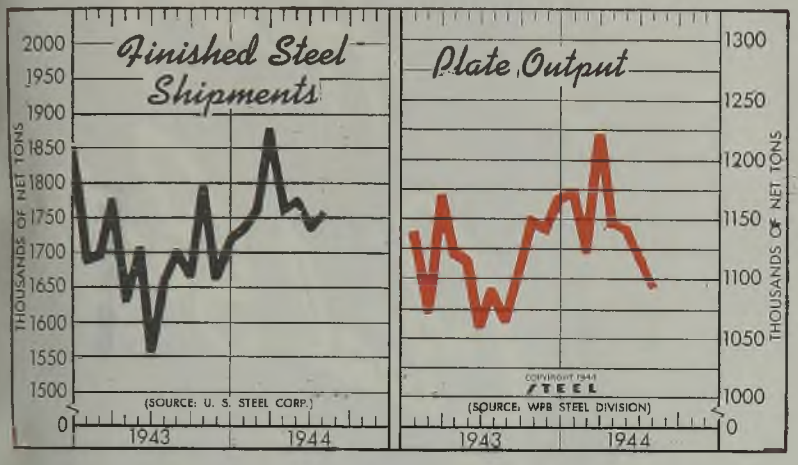
†Preliminary. ‡Federal Reserve Board.

Iron, Steel Production

(Net tons—000 omitted)

	Steel Ingots		Pig Iron	
	1944	1943	1944	1943
Jan.	7,587	7,425	5,276	5,194
Feb.	7,189	6,825	5,026	4,766
Mar.	7,820	7,675	5,434	5,314
Apr.	7,569	7,374	5,243	5,035
May	7,680	7,545	5,343	5,178
June	7,217	7,027	5,057	4,836
July	7,474	7,376	.....	5,023
Aug.	.....	7,562	.....	5,316
Sept.	.....	7,489	.....	5,226
Oct.	.....	7,786	.....	5,324
Nov.	.....	7,374	.....	5,096
Dec.	.....	7,266	.....	5,213
Total	.....	88,878	.....	61,777





Steel Shipments†—Plate Production‡

(Net tons; 000 omitted)

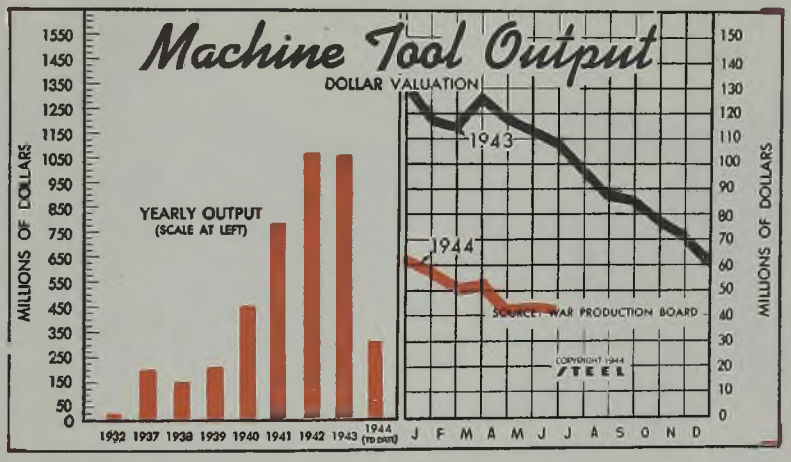
	—Shipments—		Plate Output	
	1944	1943	1944	1943
Jan.	1,731	1,686	1,178	1,185
Feb.	1,756	1,692	1,122	1,072
Mar.	1,875	1,772	1,223	1,168
Apr.	1,757	1,631	1,142	1,122
May	1,777	1,707	1,182	1,115
June	1,788	1,553	1,112	1,056
July	1,755	1,661	1,093	1,090
Aug.	.....	1,705	.....	1,061
Sept.	.....	1,665	.....	1,106
Oct.	.....	1,795	.....	1,147
Nov.	.....	1,661	.....	1,142
Dec.	.....	1,720	.....	1,169
Total	.....	20,245	.....	13,382

†U. S. Steel Corp. ‡War Production Board.

Machine Tool Output

(000 omitted)

	1944	1943	1942
Jan.	$56,349	$117,384	$ 83,547
Feb.	50,098	114,593	84,432
Mar.	50,799	125,445	98,358
Apr.	41,201	118,031	103,364
May	41,819	113,710	107,297
June	41,331	108,689	111,090
July	.....	97,428	113,596
Aug.	.....	87,405	117,342
Sept.	.....	85,842	119,883
Oct.	.....	78,300	130,008
Nov.	.....	.....	120,871
Dec.	.....	.....	131,960
Year			
1942			1,321,862
1941			812,462
1940			450,000
1939			210,000



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$8,864	$9,943	$9,832	$8,118
Federal Gross Debt (billions)	$210.5	$210.1	$207.8	$146.9
Bond Volume, NYSE (millions)	$30.5	$36.8	$55.5	$37.7
Stocks Sales, NYSE (thousands)	5,641	4,504	7,486	2,934
Loans and Investments (millions)†	$56,917	$57,065	$56,262	$46,954
United States Government Obligations Held (millions)†	$42,488	$42,460	$41,048	$34,464

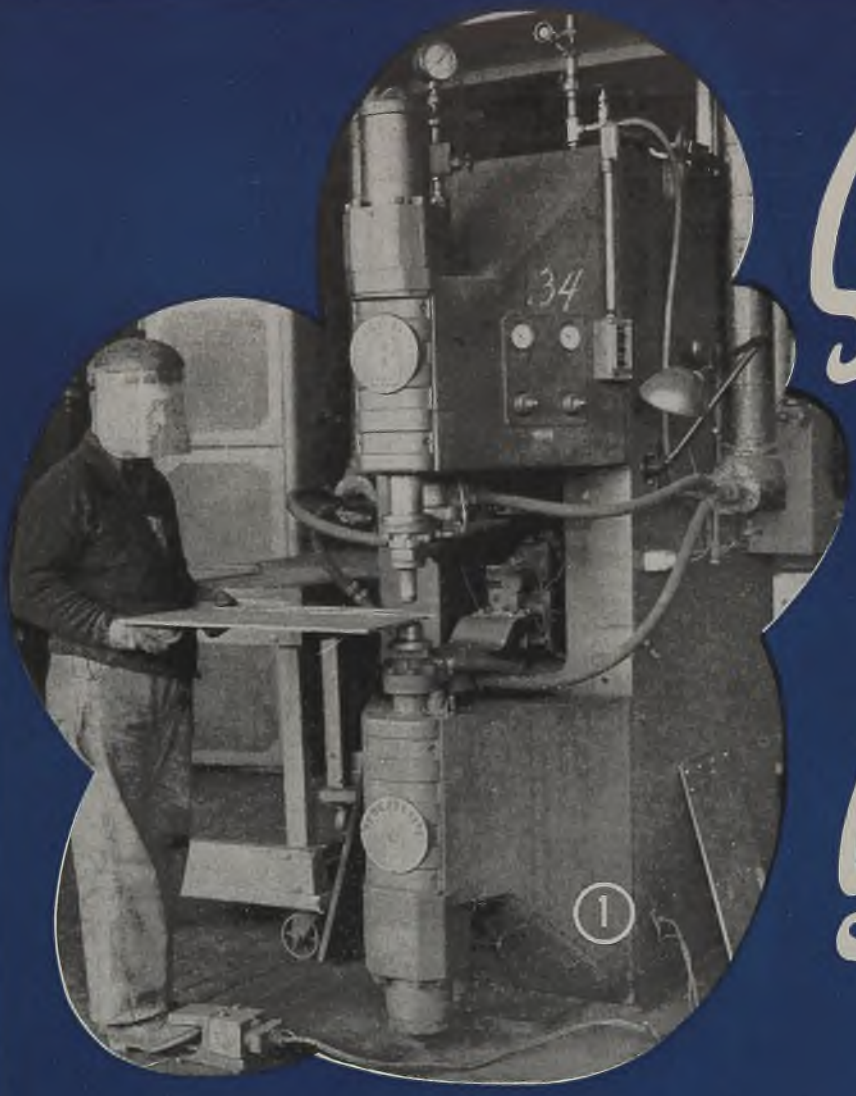
†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$56.73	$56.73	$56.73	$56.73
Spot Commodity Index (Moody's, 15 items)†	249.9	249.6	248.3	245.3
Industrial Raw Materials (Bureau of Labor index)‡	113.8	113.8	113.8	113.0
Manufactured Products (Bureau of Labor index)‡	101.1	101.1	101.0	99.8

†1931 = 100; Friday series. ‡1926 = 100.

Spot Welding Heavy Steel Sections



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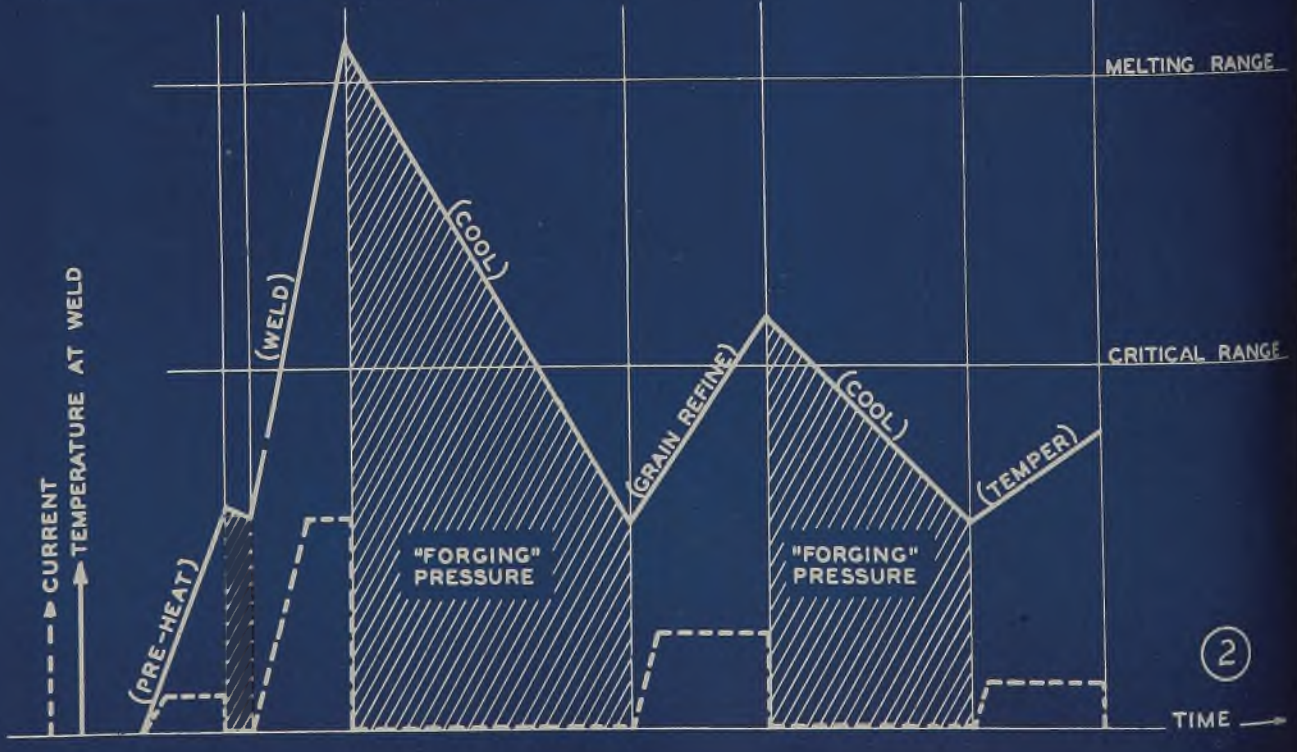

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International Harvester finds recent departures from conventional practice make joining of alloy steel plate a fairly simple procedure in fabrication of Army half-tracs

By FRED A. LEE
Assistant Superintendent
International Harvester Co.
Springfield, O.

ATTEMPTS in the past to use spot welding for the fabrication of heavy sections of alloy steels have been accompanied by enough difficulties to create the assumption that the process was not readily adaptable to such work in mass production, particularly where strength of and at the weld was vital.

As the result of recent new developments in spot-welding techniques, however, including an entirely new conception of welding machine control, International Harvester Co. found it possible to avoid the limitations previously imposed. The complete manufacturing process as worked out at the International Springfield plant represents a major departure from conventional spot-welding practice. However, the net result has been to simplify actual application of spotwelding from a plant operating of spot welding from a plant operating ter of fact that the findings here may have a major bearing on future applications of spot welding in other fields.

Inspect Outside Surfaces Only

One of the most important results of the development of the new spot-welding technique is that the physical characteristics of the completed weld can be ascertained by merely inspecting the outside surfaces of the parts which have been welded together. Relatively untrained operators, the use of which was also facilitated by the new process, can thereby inspect the quality of the welds as the machines make them. The development is of major importance not only in assuring consistency of optimum weld quality but also in speeding production of a large contract for half-tracs at the Springfield plant.

This was true despite the fact that only 38 spot-welding machines of a new type did the job of some 200 arc welders which would have been required had the usual fabrication procedure been employed. The ability to use spot welding and relatively untrained operators saved vast amounts of time—and some $240,000 of cost—in personnel training alone. The smaller number of unskilled operators required to operate the spot-welding equipment represented an important contribution to the conservation of industrial manpower. The same is true of war plant floor space, considering that much additional space would have been required.

The contract involved was the production in just one year of thousands of half-trac trucks in three armor-plated body types—antiaircraft gun mount, machine gun mount and personnel carrier. The plate panels were light-gage medium-carbon medium-alloy steel. To this plate numerous parts and fittings had to be attached—door battens, brackets, hinges, latches, etc. These were mostly of mild steel varying widely in thickness.

To cut production time, International decided to try out a new resistance welding process developed by Progressive Welder Co., Detroit, called Temp-A-Trol.

Temperature Controls Current

Tests on actual machines revealed that the new process would not only insure uniformity of welds but also would permit the making on a mass-production basis of welds of vastly higher quality than thought possible heretofore in the materials under consideration.

Major reason for this was that the time-honored method of controlling current input to the weld by adjusting the time of current flow was eliminated. With the new process and machines, the amount of current used is automatically determined by the weld itself—temperature at the weld being the controlling factor. In addition the process made possible for the first time the complete automatic heat treatment of spot welds in the spot-welding machine, before passing on to the next weld—including both grain-refinement and tempering.

The entire control of the process and machines is initiated by a thermocouple embedded in one of the electrodes to accurately "measure" the temperature at the weld. Dials calibrated in degrees of temperature at the weld, control actual functioning of the machines. These dials are merely set to values corresponding to the consecutive temperatures desired for preheating, welding, quenching, grain refinement, tempering, and the various cooling intervals between these heating stages.

As a result, the quality of the welds produced was maintained at a consistently higher level than was demanded by the Ordnance Department. The welds also exhibited an unusual freedom from blow holes, as well as excellent hardness, shear and tensile strength, and resistance to shock.

One factor contributing to the speed of production was the refrigeration of the electrodes with brine held at zero degrees Fahr. Such cooling made possible the successful use of a thermocouple embedded in the electrode; gave rapid quenching of the welds; and helped maintain electrode shape even at the high welding temperatures pressures and speeds used, thereby materially reducing the amount of down-time necessary for maintenance.

Visual inspection of the spot welds was made possible because of the temper colors which develop during the heat-treating cycles. These temper colors were found to furnish an accurate index to the hardness, strength and degree of grain refinement attained both in the weld proper and in the adjacent metal. It is unnecessary, therefore, to section or break a weld made by this process in order to determine its quality, as must be done ordinarily.

Eliminates "Trial-and-Error"

The importance of the development of this process may be more fully realized when it is remembered that in a conventional machine, induction losses and the short circuiting effect of previous welds in the same parts cause variable losses in actual weld current, vitally affecting weld size and quality. Compensation for such variable conditions in conventional processes can be made only on a trial-and-error basis. With the new process, compensation for such losses is automatic.

Moreover, with the conventional spot welding process, every change in thickness, change in alloy, etc., necessitates a separate trial-and-error adjustment of weld time and current. The new method, on the other hand, makes it possible with the same setting of the control panel to weld a wide range of thicknesses of metal, since the controls are actuated by *the actual temperature at the weld* and not by *the length of time the current has been flowing* nor *the total energy input.*

Types of Operations: The welding operations at International consisted of welding the various mild steel attachments, ranging in thickness from No. 19 up to No. 3 U. S. S. gage, to the plate panels. Typical welds required were the joining of ¼, 3/16, ⅛-inch and, in some instances, a 3/16-inch section of mild steel plus a section of ¼-inch mild steel to the plate. The most frequent weld operation made, however, was the joining of 3/16-inch mild steel to the plate panels.

Materials Handling: The 38 spot-welding machines are located 16 on the first floor and 22 on the second floor of the same plant. Machines on the second floor are used to weld subassemblies which can readily be lifted by the indi-

Fig. 1—Many small assemblies are hand held during the welding operation, as shown here

Fig. 2—Temperature-current-time chart showing typical results obtained with Progressive Temp-A-Trol process. Time for each stage varies automatically with stock thickness, size of plate, throat losses, etc.

vidual operator without the use of a power lifting device.

On the first floor are three lines of welding machines, five per line, to handle the right and left-hand combined side and rear panels. Each line accommodates the welding of six different types of panels. Right and left panels require different attachments, and hence different welding times. In order to balance up the work of welding a complete side panel on five machines per line, it is necessary for one machine to weld ¼, 3/16, ⅛-inch, and 10-gage mild steel to alloy steel. Some of these spot welds are located on the edge of the plate with practically no material in the throat of the machine. Others have a full 24-inch slab of steel in the throat.

Since many of the parts are relatively large and heavy, it obviously was undesirable to support parts manually during the making of several welds on one machine. However, instead of constructing complicated fixtures to support the parts while going through the machines —which fixtures would also tend to decrease accessibility to the machine itself—International developed a simple method of materials handling at welders.

Various Types of Conveyors Used

Low cost wooden tables, mounted on casters, were notched out so that they could be rolled into place around the welder electrode. For the parts themselves, simple dolly-type fixtures on casters were provided. These dollies were adjustable as to height so that merely rolling them across the table would locate the part in proper height relation with the electrode of the machines. With this arrangement the same flexibility was obtained with stationary welders as is normally available with permanent fixtures and gun-type welders. See accompanying illustrations.

Roller gravity type conveyor equipment is used to convey the larger panels from one machine to the next. At the machines, one section of these roller conveyors is of the cross transfer type and is designed to raise and lower the panel and move it at right angles to the electrode. This arrangement provides support and permits movement of large panels in all directions for locating the welds. At one station, the welding machine is actually suspended from the ceiling with the throat downward. This arrangement permits welding attachments to the leg of L-shaped panels without removing assembly from conveyor.

Tilting cross transfer conveyor sections are used to hold the assembly at an angle while welding the front end of the panel, which has a 12½-degree break. This permits horizontal movement of the assembly through the machine.

One machine on each line is set at an angle to the conveyor line in order to clear the turned-up end of the plate forming the rear panel. The remaining machines are set at right angles to the conveyor line. There is one turn-table section in each line which permits the panel to be turned end-for-end in order to avoid unnecessary steel in the machine's throat.

Making Heat Treated Spot Welds: In welding the various assemblies, four heating periods with cool periods in between are employed. The complete cycle is:

1. Preheat
2. Cool Forge
3. Weld
4. Cool and Forge
5. Grain Refine
6. Cool and Forge
7. Temper

During the cool periods, the pressure on the electrodes is increased by approximately 50 per cent. Identical pressures are applied to the electrode for all heating periods. Time control for the various heating and cooling periods is achieved automatically by means of an iron - constant t h e r m o c o u p l e, silver soldered into the lower electrode near the contacting surface. Each heating period is also independently adjustable as to rate of current flow.

1. Preheat: With the two pieces of steel in position, the machine is started. The electrodes come together under sufficient pressure to insure proper contact and heating. The current starts and continues until the maximum desired temperature has been reached, when current cuts off automatically.

This preheat period establishes an intimate contact between the mild steel attachment and the alloy steel plate, and also between the electrodes and the work and thus (1) reduces the proportion of current loss through short circuits through previous welds in the vicinity of the new weld; (2) helps to center the weld nugget directly beneath the electrodes; and (3) permits the use of high power levels in subsequent "melting" of the nugget.

The maximum amount of energy which can be quickly applied without any actual material fusion of the plates has been found to be most desirable during preheat. The duration of current flow during the preheat period is from 2 to 3 seconds for the heavy sections being welded.

2. Cool and Forge after Preheat: Actually, this particular stage in the welding cycle is not a true cool period although commonly known as one. In this period, pressure between the electrodes is momentarily increased with current "off" in order to establish maximum intimacy of contact at the weld. Only a slight amount of cooling is permitted by the thermocouple—equivalent to somewhere less than half a second, before weld current is initiated.

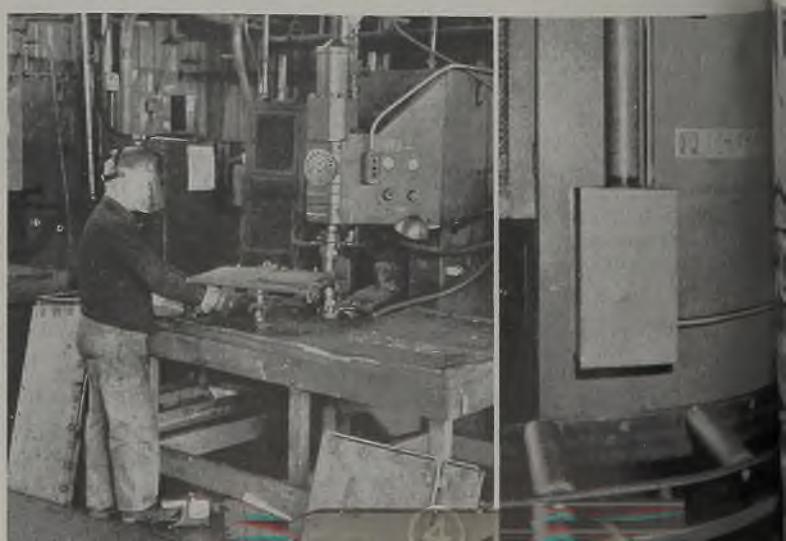
3. Weld: At the beginning of the weld period, the electrode pressure automatically cuts back to its original setting. When the preselected weld temperature — somewhat above melting range—is reached, the control automatically cuts off the welding current. Current intensity is of course much higher than during preheat.

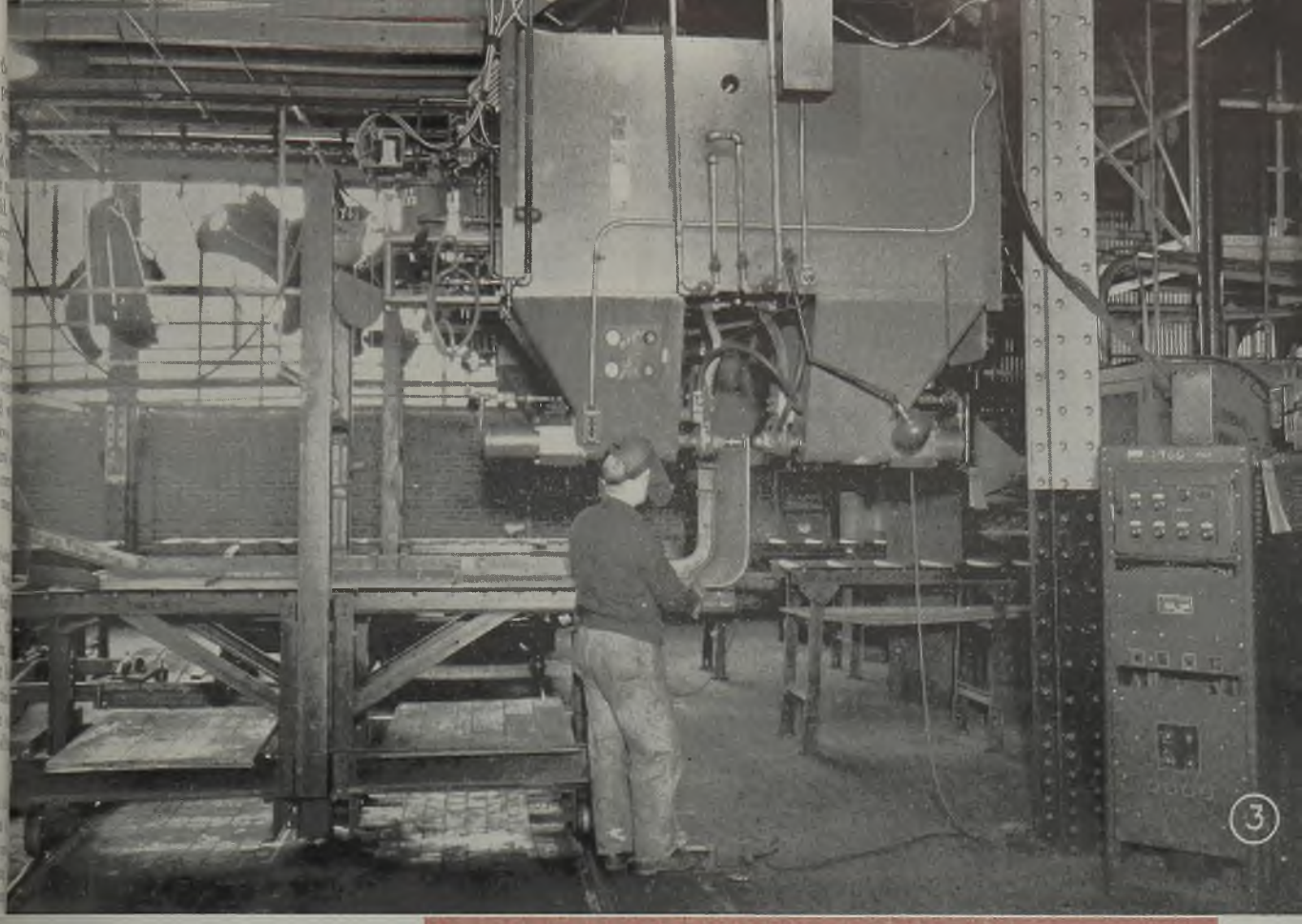
The weld is usually completed in from 2.5 to 3.5 seconds at the high current levels used. In general, higher power levels are used for thin attachments than for thick attachments, since this tends to displace the heat balance towards the thinner section, thus offsetting the unfavorable geometric center and lower electrical resistance of the thinner mild steel.

4. Cool After Weld: At the same instant that the weld current is automatically cut off, the electrode pressure is increased to produce a "forging" action by squeezing the plastic material in the weld nugget. This pressure is held throughout the entire cool period which may last approximately 12 seconds for heavy sections.

This particular cool period—which is really a quench after the weld—is extremely important in securing the high quality welds obtained. Its purpose is to transform the iron in the nugget from the gamma to the alpha condition, without which transformation grain refinement is impossible.

The length of this cool period permits a martensitic condition to be attained in the weld zone. No external quenching medium is necessary to obtain this result because the tremendous temperature differentials between the plate and the refrigerated electrodes—which are cooled by a brine solution at zero degrees Fahr.—give a quenching





rate higher than the critical quenching rate of the alloy steel used. Therefore, the hardness of the weld zone, immediately after this cool period, approaches the maximum hardness that it is possible to obtain in view of the carbon content of the steel.

An important metallurgical advantage of using a thermocouple to control cooling after welding is that it facilitates cooling the steels down below the critical "martensite arrest" point, and insures proper cooling of various thicknesses of mild steel attachments and different diameters of welds with the same setting of the control.

5. Grain Refine: After the weld zone has been transformed into martensite by

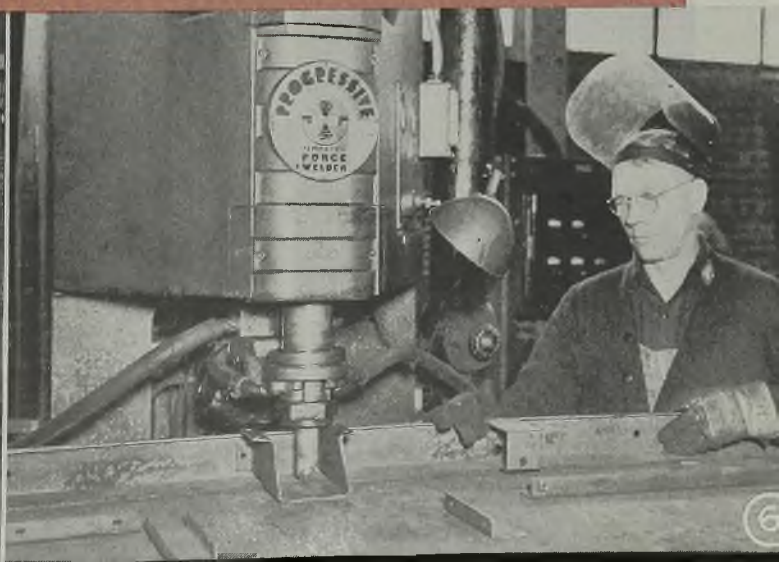
(*Please turn to Page* 144)

Fig. 3—Here welder is suspended from ceiling with throat opening downward to permit attaching brackets, etc. to the short leg of the L-shaped panel without need for a hoist. Note transfer conveyor for moving assembly through machine and over to gravity-type conveyor in background

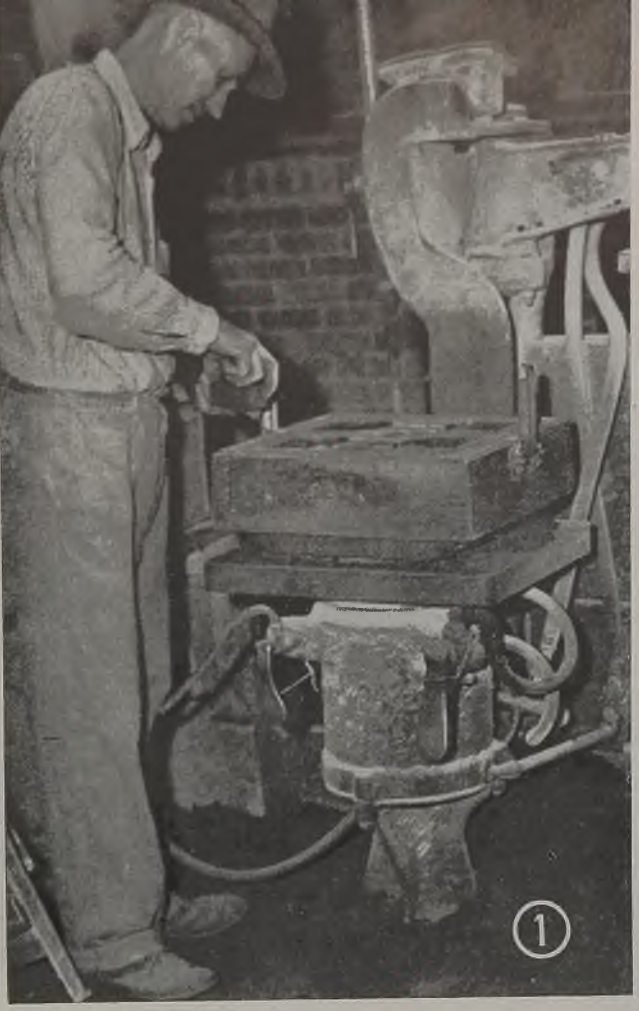
Fig. 4—Simple fixture mounted on casters here speeds up positioning of work piece. Tables of different heights can be used where fixtures require it, table being also easily movable on casters

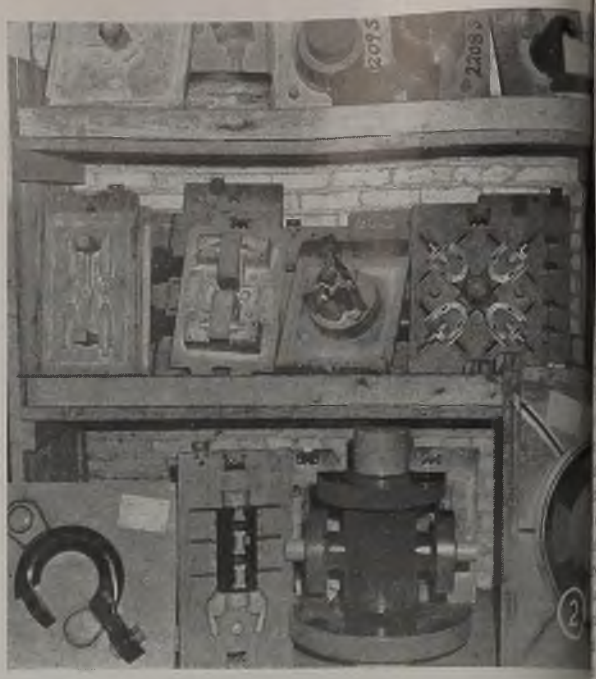
Fig. 5—Bent front leg of this long panel is put in horizontal position by a special cross-transfer conveyor fitted with an air-operated mechanism to tilt work to angle desired. This arrangement permits horizontal movement of work through welder while in tilted position

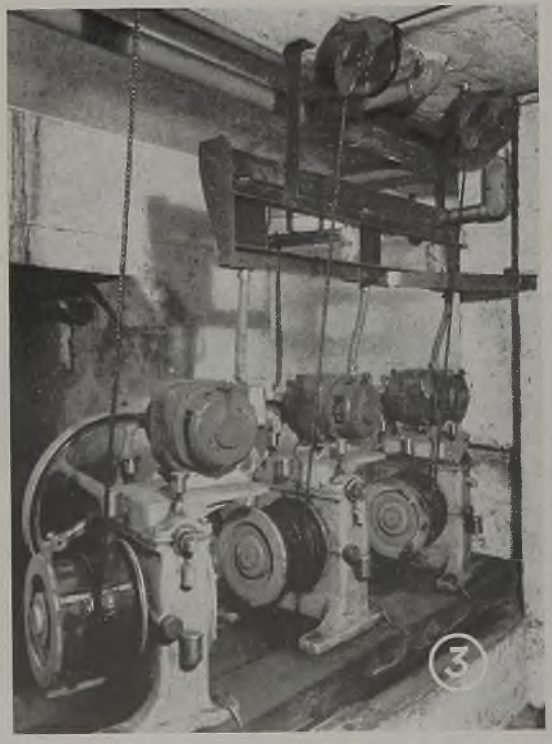
Fig. 6—Stationary straight-line conveyors carry the assemblies through the welders, for some of these plates are quite heavy to handle. Note variety of attachments welded here



By G. ELDRIDGE STEDMAN







STEDMAN

Casting Alloy Steel

For the Oil-Field Industry

INASMUCH as Tulsa, Okla. is the ter of one of the most productive oil ions in the world, it is by the same en an important center for the pro- tion of oil-field tools and equipment. re are 132 drilling operators working of Tulsa alone and many of these are plied with equipment made by manu- urers in the district.

n turn, many of these equipment ufacturers require quantities of high ngth castings, of which the Oklahoma l Casting Co. is one of the leading ducers. This company was founded 926 and now produces both static and trifugal castings in thousands of de- s and weighing from a few ounces to tons.

Many unique characteristics in plant tice are apparent. Patternmaking, nting and storage, molding, pouring shake out, welding, rework, straight- g and shot blast, heat treating, testing and inspection will not be covered, in detail but the accompanying illustrations provide a general picture of the more significant operations in making static castings.

A casting is no better than its pattern. So, the company starts with thorough customer-counsellor service on pattern design, a completely equipped pattern department, and a system of photographic records. Fluidity of metal, the law of gravity, rate of solidification, mold manipulation, necessitate extreme care and special rigging of patterns. In general practice, the author has found that the foundry is seldom consulted before the casting is designed and patterns are made. But by its pattern consulting service, by "prevamping" design, much additional customer expense is avoided as well as considerable foundry burden.

Particular artistry is shown in methods of gating and feeding. "There are various kinds of ways of gating," the works manager emphasized, "all having their advantages; such as bottom or fountain horn, bottom side in gate, gating in joint, step gates and the top or pouring type. These are used singly or in multiple, according to size, shape and metal section involved." Pattern designers here are adept at the selection of the particular gating and feeding that provides uniformity of metal distribution, equalization of shrinkage and avoidance of misruns.

One pattern showed the use of a center plate with the gate at an angle to prevent a hot spot which would develop a bowl crack at the base. Another flanged ring had gating at the joint and into the heads, permitting the metal to drop down from the mold joint, resulting in cold metal at the bottom, hot metal in the heads and excellent directional distribution.

Still another clutch pattern was gated into the head, using an extra metal pad to feed down and assure solid metal after machining the groove. A joint and head gating of a screw-type valve pattern which provided pad metal under the heads to feed the heavy underneath section was observed. Another unusual one was a valve bonnet pattern, gated into the flange with the head overlapping the flange and to one side and low to feed the hot spot caused by the gate, using a blind head to take care of center intersecting metal.

One head feeding two heavy lugs, gated into the head, formed a good grease cup valve flow pattern. A huge header, gated at one end, with seven heads to feed all intersections because of the square outside corners and large radius inside was another unusual arrangement.

The pattern counsellor group reviews each blueprint, determines the rigging as to proper metal, flow, risers, gates, varying cross sections—all to provide the soundest casting in relation to internal stresses and to prevent such faults and hazards as surface blemishes, spongy or porous sections. The size of the pattern determines whether the mold will be made on the floor or in squeezer molding machines; the production of small and large castings proceeding on two different lines in the plant.

The pattern shop is distinctive from the standpoint of new equipment, fa-

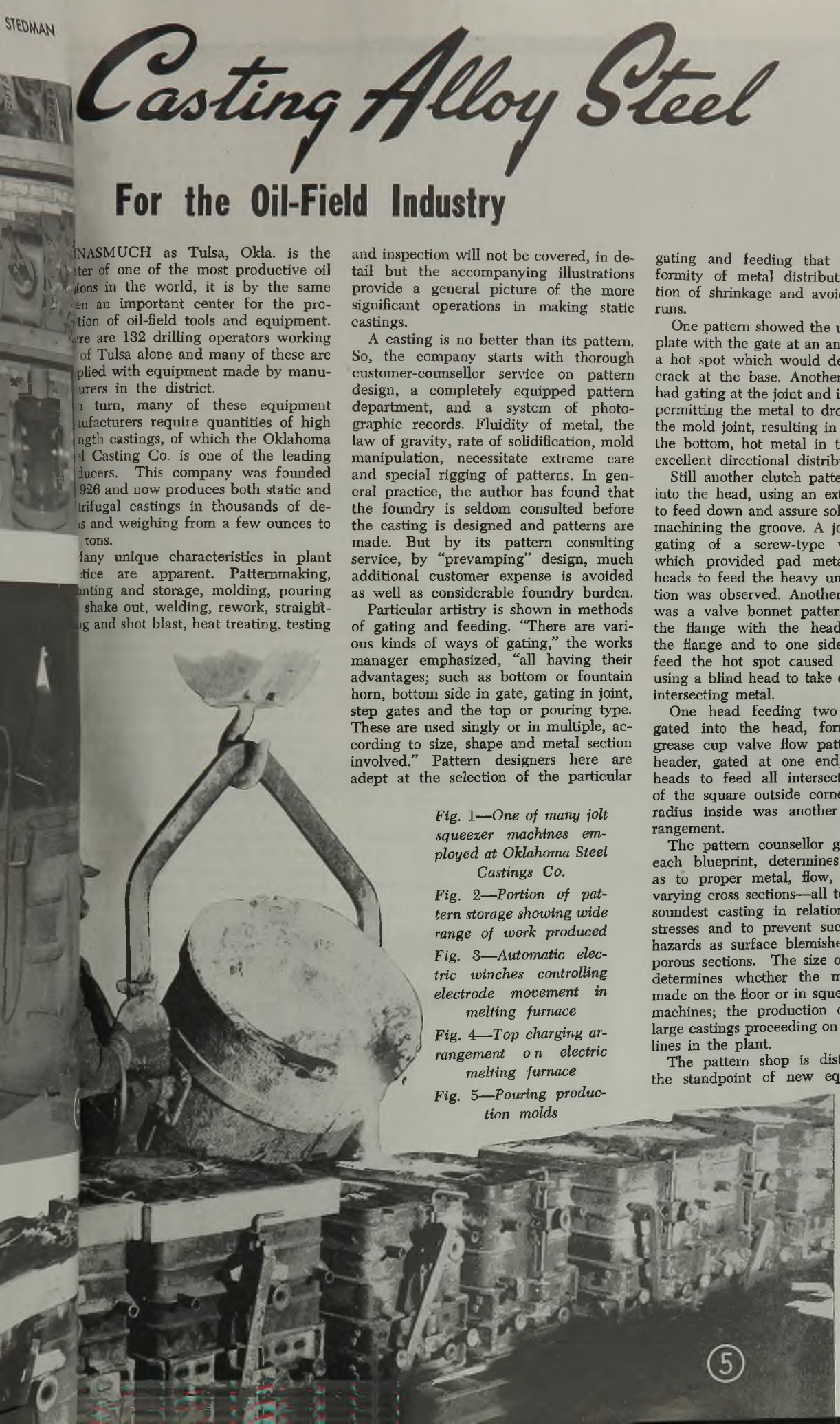


Fig. 1—One of many jolt squeezer machines employed at Oklahoma Steel Castings Co.

Fig. 2—Portion of pattern storage showing wide range of work produced

Fig. 3—Automatic electric winches controlling electrode movement in melting furnace

Fig. 4—Top charging arrangement on electric melting furnace

Fig. 5—Pouring production molds

Fig. 6—Pouring squeezer molds from monorail shanking ladle

cilities, skills and supervision. White pine, mahogany and some aluminum mounting material are used. Thousands of patterns are maintained in "active" and "dead" storage, the latter including those held over two years. A complete photographic filing record is kept of all patterns. This includes the entire inventory of parts and loose pieces. To place a pattern in work, the production manager orders the required number of castings, the store room man puts the pattern and equipment on the layout floor, the foundry foreman lines it up with particular attention to requirements of chemical composition and the molder makes the required number of molds for that day's operation.

The same care is used in molding. A thorough laboratory sand analysis is made, consisting of permeability, moisture content, green compression strength, dry shear strength, complete screen tests to check grain fineness. All sands are bought on a grain fineness specified by the company. From 50 to 75 per cent new sand is used in facing. Backing sand is all reclaimed material. Arkansas and Evansville sand brands are used.

Cores are made from several special sand mixes for strength retention, wash prevention and ready collapse. Molders are not permitted to use any stick or pipe that happens to be close at hand. Core and tile gates of special baked hardness also are employed to avoid improper down gating and ingating and to prevent misruns. Rough and dented gating is eliminated, preventing tearing sand grains. These core and tile gates prevent improper ramming, careless cutting, hard striking metal or washed-in sand. "A casting is no cleaner than its gate," is constantly emphasized. The same care is used in heading, proper placing of gates to avoid hot-spotting and the assurance of uniformity.

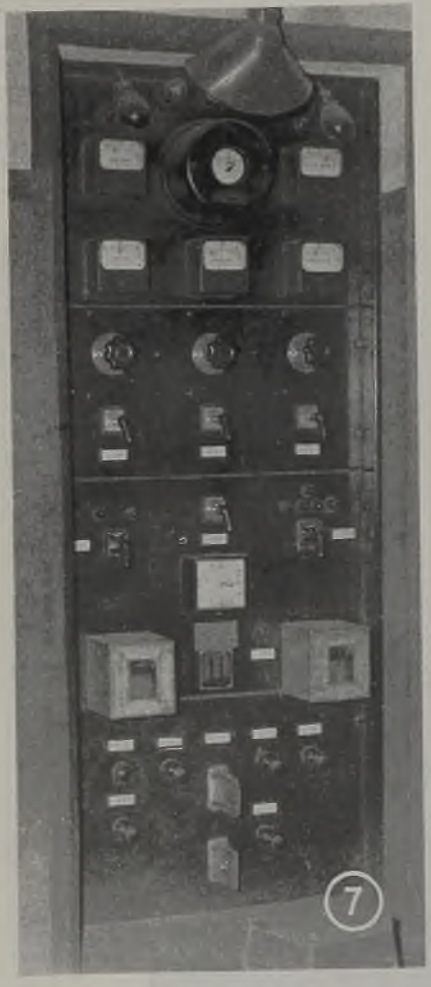
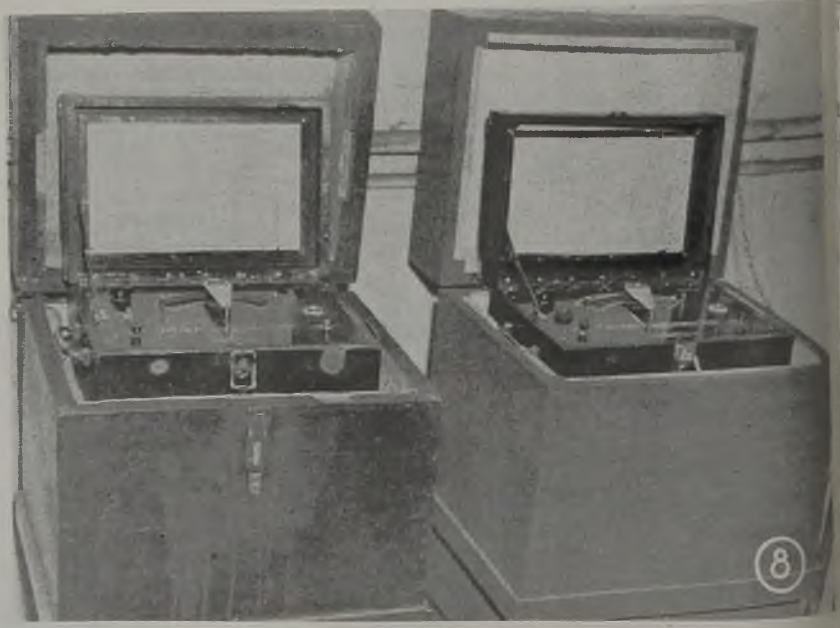


Fig. 7—Control board for electric melting furnace

Fig. 8—Fisher Carbanalizers used in melt control



Squeezer Machine Makes Small Molds

Molds are made on cope and drag roll-over molding machines, receiving a special mud wash, skin dried with a natural gas torch and air. Cores are inserted, molds finished and assembled, mating members being fastened with special cope and drag clamps designed by company engineers. The entire mold is then moved by roller conveyor to the pouring floor. Small molds are made on squeezer machines in a large department. Sand comes to them by monorail conveyor molds which are roller conveyed to the pouring zone which sets at right angles to the large mold pouring floor.

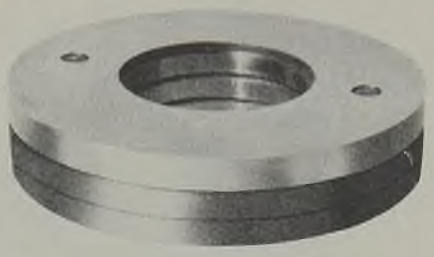
Cores are dried in special ovens, equipped with indicating pyrometers and with complete flame control and safety valves. After final segregation and cleaning, molds are ready for pouring.

Castings are poured from 300 to 500-pound pouring ladles, suspended from an overhead monorail and refilled by 2000-pound ladles which transfer the metal from the furnaces by overhead crane. The work comes to the shakeout area after pouring and cooling, and is thereafter "muled" by an overhead gantry crane equipped with hydraulic tongs. The work is placed into buckets

How One Plant Solved the Tool Steel Selection Problem

PRODUCTION BOTTLENECK BROKEN

A prominent metal parts manufacturer first became acquainted with Carpenter Matched Tool Steels because of a tool-caused production bottleneck. A shaving die used in a punch press operation wore rapidly and would not hold size. An oil-hardening steel had been tried but it lacked the necessary wear resistance. When Carpenter Hampden was selected for its maximum wear resistance and accuracy in hardening, production was increased from 99,600 to 504,000.

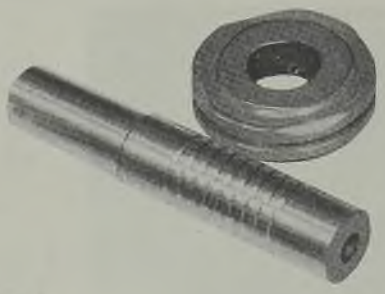


BREAKAGE ELIMINATED

After the first successful experience with Carpenter Matched Tool Steels, the tool room tackled another job. A staking punch used to stake nuts on a spindle had a short life that averaged 40 hours. The oil-hardening steel used, either failed by breakage when treated for maximum hardness, or battered out of shape when drawn for greater toughness. No. 11 Special, a tough timbre, straight carbon water-hardening steel, was tried with excellent results. Punch life went from an average of 40 hours to more than six months service, and punch was still in good condition at the end of that time.

TOOL LIFE UP 66%

Confidence in solving tool problems with Carpenter Matched Tool Steels increased with results and inspired a search for improved performance on other jobs. High speed steel had been used for a burnishing punch. The selector section in the Carpenter Matched Tool Steel Manual recommended K-W (Water-Wear) for burnishing tools. The slick glass-hard surface provided by K-W gave a smoother, cleaner finish and tool life was increased 66%.



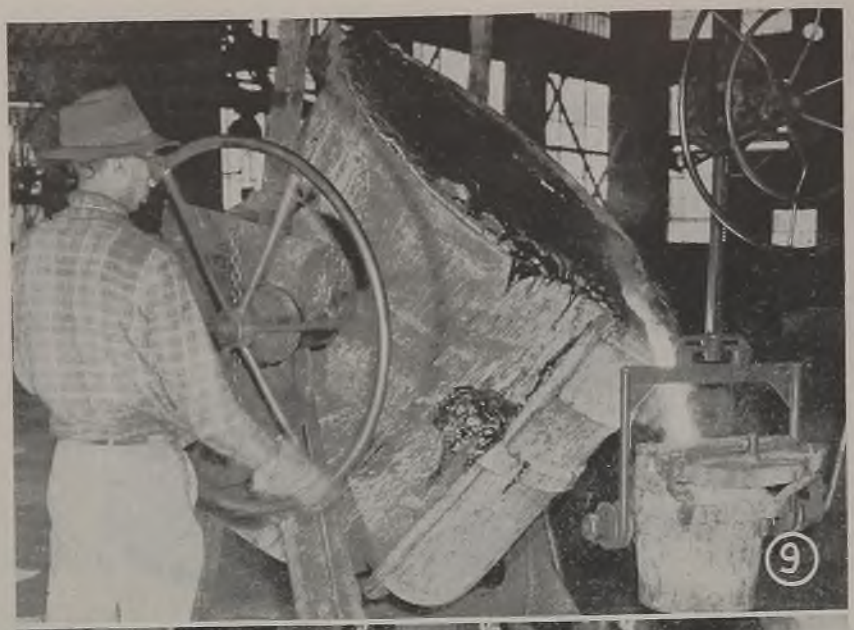
Lower Unit Costs and Increased Output Result from Carpenter Matched Tool Steels

These examples show how Matched Tool Steels provide an easier method of selecting tool steel to meet specific requirements, or to get improved results.

Many plants have discovered that this method of tool steel selection has many advantages—protection against hardening failures and premature service failures—greater freedom from tool troubles and very substantial increases in the service life of tools. If you are looking for a chance to lower unit costs and increase output, re-examine your tooling problems now with the help of the Carpenter Matched Tool Steel Manual. Write on your company letterhead, giving title or position, for your copy of this helpful 168-page manual

THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

Carpenter MATCHED TOOL STEELS



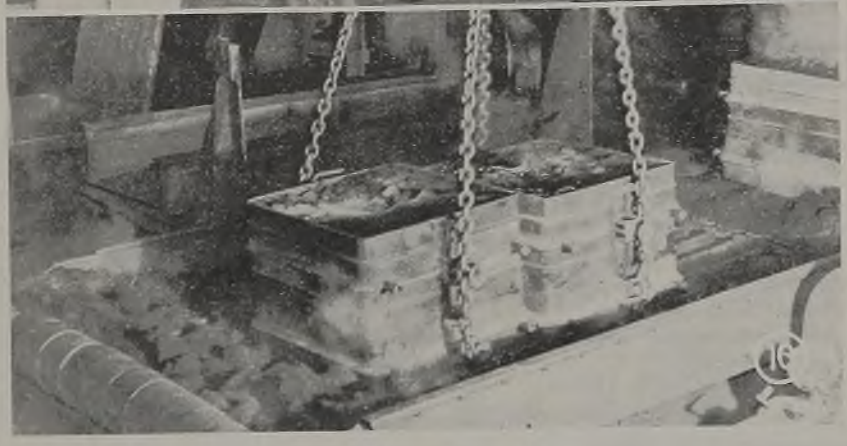


Fig. 9—Pouring from large ladle into monorail conveyed shanking pot for squeezer molds

Fig. 10—Shaking out flasks by means of a vibrating machine

Fig. 11—Stand grinder in operation, with section of roller conveyor in foreground

for shot blasting for removal of remaining foundry sand.

Shakeout is performed on an eccentrically vibrated table, the mold sand lumps being joggled into a trench grate serviced by an endless belt which continuously conveys the sand into a hopper for reclamation. Special blowers remove fines, magnets pick out all spills and screens sieve out all slag and aggregate. The reclaimed sand is then returned to the mill for use as backing sand.

Sand blasting equipment, for both rough and finished work, is specially designed by the organization itself. The rough shot blaster is completely automatic, having four 5-foot diameter revolving tables mounted on a pedestal and supported by a vertical shaft. The work is arranged on these for best shot blasting, and then proceeds on a regular cycle into the sandblast room, timed to ¼-turn cycles with a blasting interval of 2 minutes that proceeds continuously in its timed movement.

After rough sand blasting, castings are segregated into large and small classifications and moved into lines right and left along the cutoff floor. Gates and risers are removed and returned to the furnaces for remelting. Large castings moving left come to the swing grinders and chippers and are then rough inspected for misruns, scabbing and metal penetrations. Defective castings (and the record is unusually low) are sent to the welding room for repair and remachining. Small castings, moving to the right, are placed in boxes on roller conveyors and moved to chippers and sand grinders where, after such inspection and rework as is required, they are brought together with large castings into the normalizing furnace heating racks for homogenizing heat treatment.

All castings are normalized before leaving the shop to assure proper grain refinement, improve ductility and to relieve internal stresses. This is done on a battery of Mahr 10 and 5-ton gas-fired normalizing furnaces. The temperature, determined by the particular steel composition, ranges between 1650 and 1750 degrees Fahr., using the formula of 90 degrees per inch of maximum cross section; stepping up the soak 200 to 300 degrees per hour until normalizing temperature is reached. The work is received and discharged in racks, going to the cooling room.

90-Pound Air Pressure Test

The work then goes to final shotblast, coming to large final inspection tables by monorail, where it is classified into buckets for further handling, such as shipping, chipping, grinding, heat treating. All types of valve bodies, which constitute a considerable part of the output, are tested under 90-pound air pressure before shipment to weed out defective units. The cleaning room has modern equipment, is serviced by overhead crane, has special designed swing grinders and wheel presses for straightening—the latter with special fixtures to fit all valves.

Heart of any foundry is the melting practice, and observation proved this shop outstanding from the standpoints of equipment, technique, alloying range and metallurgical check analyses.

Two 2-ton Moore Rapid Lectromelt, top charge furnaces are used. The average heat is 1 hour 21 minutes, with charging time of 5 to 6 minutes and the pour per heat 7000 pounds. The acid electric melting practice is employed. Power consumption is 525 kilowatts per hour per ton.

The furnace hearth is rammed with Firegan and suitable binder. Sidewalls and roof are of silica brick. The furnace is 5 feet 11½ inches in diameter. Securing approximately 560 heats per roof and 280 heats per lining, the relining interval is: Week No. 1—new lining of sidewalls and roof; week No. 3—relining of sidewalls and not the roof.

The transformer room is neatly arranged. Power comes in at 13,000 volts and is handled by a 2000-kilovolt-ampere transformer equipped with four taps. The

That's what we're shooting for!

Szelepka, Herd, Tallerico, Sauchak, Goldstein, McMahon—maybe it sounds like a Notre Dame line-up. One thing sure—it's All-American. For whether it's at our plant or yours, they are Americans, regardless of their race, color or ancestry.

An equal opportunity for everyone; that's the American way, that's what we're shooting for!

LS-3

The LEVINSON Steel Company

WAREHOUSERS · FABRICATORS

33 Pride Street, Pittsburgh, Pa.

Fig. 12—Rollover jolt machine in operation

latest type of air circuit breaker to break the high tension under load, as well as the automatic winch-type unit to raise and lower graphite electrodes, are part of the installation.

Material of course, is charged into the furnaces cold and is brought up to a topping temperature of 3200 degrees Fahr., the pouring temperature being 2750 to 2850 degrees Fahr. Every heat is checked by optical pyrometer.

Complete Log of Every Heat

Charge is made up of cold scrap, 35 to 40 per cent of it comprising shop scrap, and the balance outside scrap consisting of heavy and light plate, forgings, punchings, etc. The charge is carefully controlled to prevent variance in metal analyses. The scrap is fed to the furnace by charging bucket, the furnace lid is swung back and the power is applied through graphite electrodes. Every heat is logged thoroughly.

A typical melt observed was poured in casting a pressure valve body 18 x 24 feet, overall pattern dimension, having a center core forming three outlets and with several varying cross sections, having to be rigged properly to accommodate three flanges and a pivot block, the core being anchored in three places only.

The details of the furnace log on this heat ran: Metal specification, "B"; total charge, 7015 pounds; power on 12:20—off 1:40 p.m.; elapsed heat time, 1 hour 20 minutes; kilowatt hours, 1820; started oring time 35 to 40 minutes; addition 250 pounds; low tap-time 1:00 p.m.; first preliminary reading 1:10 p.m. . . . estimated Carbanalyzer reading 88.15; slag condition light, color dark, viscosity thin; pig iron, addition 100 pounds; second preliminary reading 1:20 p.m. . . . . est. Carb. reading 83.18; slag condition medium, color blue; pig iron recarburizing addition 50 pounds (special pig low in silicon, sulphur, phosphorus); third preliminary reading 1:28 p.m. . . . . est. Carb. reading 85.17; slag pad medium density, color blue.

Preliminary additions at 1:30 p.m. with final test at 1:35 p.m. . . . . est. Carb. reading 82.18; medium density of slag pad, color blue; additions silicon-manganese 0.55, iron-manganese 0.60. Time power on to low tap, 40 minutes; low tap to preliminary addition 20 minutes; to tapping time 10 minutes.

Physicals analyzed: Ultimate strength, 70,900 pounds per square inch; yield point, 43,400 pounds per square inch; elongation, 34.0 per cent; hardness, 40 to 50 brinell; reduction of area, 55.7 per cent; fracture ¾-cup; analysis, carbon 0.20, manganese 0.69, silicon 0.35, sulphur 0.042, phosphorus 0.042; bend test, 180 degrees; pouring temperature, 2840 degrees Fahr.

Two Fisher Carbanalyzers are maintained in the transformer room and from three to five readings may be taken per heat. Since the shop is equipped to perform 24 hours each day, it maintains two of everything, furnaces, air pressure equipment, etc.

Pouring control is so precise as to score each melter and helper as to the number of chemical and physical analyses within specifications. The batting average, on this individual basis, was running 97 per cent perfect on chemical, and 99 per cent on physical tests.

The tapping is performed by a teapot 4-ton tapping ladle equipped with a slag pour-off spout. As the heat is tapped, a special deoxidizer, such as calcium-manganese-silicon is added, approximately three pounds per ton. The tapping ladle is weighed and checked against the charging weight to determine the melting loss which runs between 2 and 3 per cent. These tapping ladles are preheated on a wall. After weighing, they are placed in a pouring stand, a transfer ladle is brought from its preheater and filled with the liquid steel.

It requires 45 minutes to pour and less than five minutes to transfer. Thin section castings are poured first—heavy sections last.

Along the commercial grade steel, about 40 per cent of the shop tonnage goes into its own "Tuf-Wear" series of alloy steels which are medium manganese, nickel-molybdenum; low alloy chromium-molybdenum and creep resistant molybdenum steels—all designed to fulfill requirements of the oil, railroad and general purpose machining fields, capable of being heat treated to the desired physical properties.

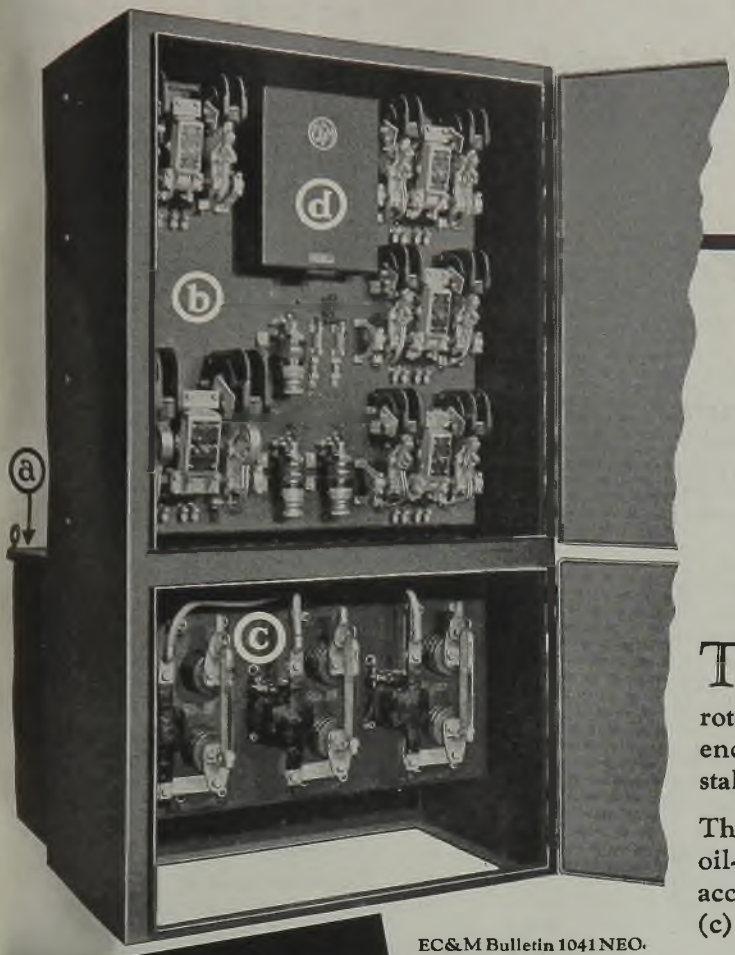
A completely equipped physical and

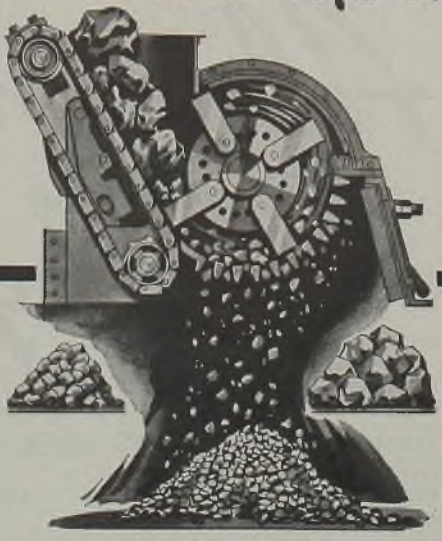
(*Please turn to Page* 154)

Fig. 13—Hand pouring of squeezer molds

EC&M Steel-Clad MOTOR CONTROL

FOR 2300 V. wound-rotor motors





—DRIVING CRUSHERS BELT CONVEYORS, ETC.

THIS is the EC&M Unit-type Starter of Steel-clad design for high voltage wound-rotor motors. It is completely wired . . . totally enclosed . . . shock-proof, hence quickly installed and *safe*.

The EC&M 2300 volt Magnetic Contactor is oil-immersed in rear tank (a) with secondary acceleration panel (b) and disconnect switches (c) mounted in front compartment.

Acceleration is by the EC&M NEO-TIME-CURRENT (d) method . . . a unique system for bringing a.c. wound-rotor motors up to speed automatically. It accelerates motors quickly on light loads . . . lengthens time *automatically* on heavy loads . . . yet forces motors to maximum torque when needed.

For complete information on these EC&M Magnetic Starters for a.c. wound-rotor motors, ask for Booklets 67 and 1041.

EC&M Bulletin 1041 NEO-TIME-CURRENT Starter.

Outstanding FEATURES OF DESIGN

1. Safety interlocks on all starter units.
2. Self-contained bus between units when arranged for group installation.
3. Semi - dust - tite enclosure (NEMA Type 1A).
4. Utmost accessibility through front doors and rear plates.
5. Removable plate on end unit for bus extension when adding units for a group installation.

Where more than one motor drive is involved, these motor control units can be centralized at a convenient location.

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

THE ELECTRIC CONTROLLER & MFG. CO.

CLEVELAND **OHIO**

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Joining Aluminum Alloys

Third section of series on fabricating light alloys covers the several variations in arc-welding procedure, including metal arc, carbon arc, carbon torch, tungsten arc, atomic hydrogen, automatic and semiautomatic carbon arc. First and second sections covered riveting and gas welding

By E. C. HARTMANN, G. O. HOGLUND and M. A. MILLER
Aluminum Research Laboratories
Aluminum Co. of America
New Kensington, Pa.

THE ALUMINUM alloys are welded with several arc-welding procedures, namely, the metal arc, carbon arc, carbon torch, tungsten arc, atomic hydrogen, automatic and semiautomatic carbon arc. Of these, the process of greatest commercial importance is the metal arc.

All of the arc-welding processes have the advantage that a comparatively large amount of energy can be concentrated in the weld zone. This is relatively of more importance in the case of the aluminum alloys than in the case of the ferrous metals because the effects of the welding heat can be confined to a narrow area.

For example, the amount of distortion that occurs during and after a welding operation is much less than when gas welding because the total expansion is confined to the narrower heated zone. Metallurgical changes in the parent metal structure are also confined in extent when arc welding. The rate of welding is increased and less edge preparation is required. All of these factors are important from the standpoint of reducing cost, and it seems apparent that wider use of the arc-welding methods can be expected.

Metal Arc Welding: Metal arc welding of aluminum alloys is done with the same equipment and general technique that are commonly used in the welding industry. Standard direct-current motor generator sets are suitable for welding these alloys. Alternating-current welding equipment of the type that superimposes a high frequency current on the welding circuit also makes good welds. The standard alternating-current sets, however, do not maintain a steady arc when welding aluminum and are not suitable for such work.

The capacity of the equipment and the electrode size are determined by the thickness of the material being welded. Table VI contains suggested sizes of electrodes and current required for welding. The proper polarity is determined by trial on the parts to be welded.

Metal arc welding is used for butt welding metal from 0.081-inch thick and thicker. No upper limit on thickness exists, and sound welds have been made in plate 2 inches thick. Fillet or lap welds can be made on 5/32-inch thick and thicker metal. It is difficult to control the operation to prevent melting through the underlying part on metal that is thinner.

An additional factor of importance in this connection is the soundness of metal arc welds. Because of the high thermal conductivity of aluminum, the welded metal freezes very rapidly. When welding thin material, gas may be entrapped in the joints. Improved soundness can be attained by preheating the parts at temperatures from 400 to 600 degrees Fahr. Such preheating is always necessary to make liquid or gas tight joints in metal up to ¼-inch thick.

All metal arc welding is done with heavily coated electrodes. The coating consists of fluxing ingredients that break down the oxide coating on the metal and stabilize the arc. Most of the coating materials are hygroscopic and exposure of the electrodes to atmospheric moisture results in excessive spatter during welding and a porous weld structure. This condition can be prevented and moist electrodes reclaimed by baking them for severel hours at 250 to 300 degrees Fahr.

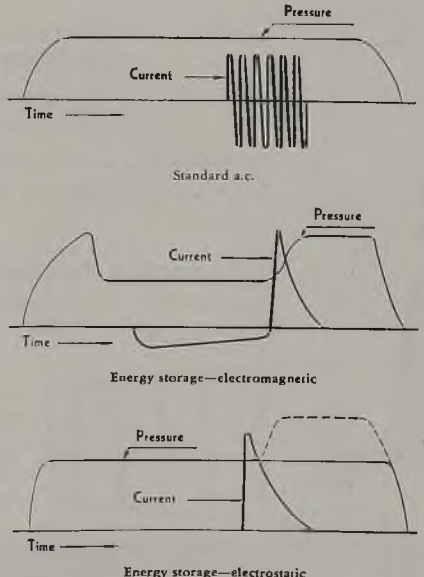


Fig. 10 — Comparative pressure and current cycles for alternating current and energy-storage resistance-welding systems

Edge Preparation Simple

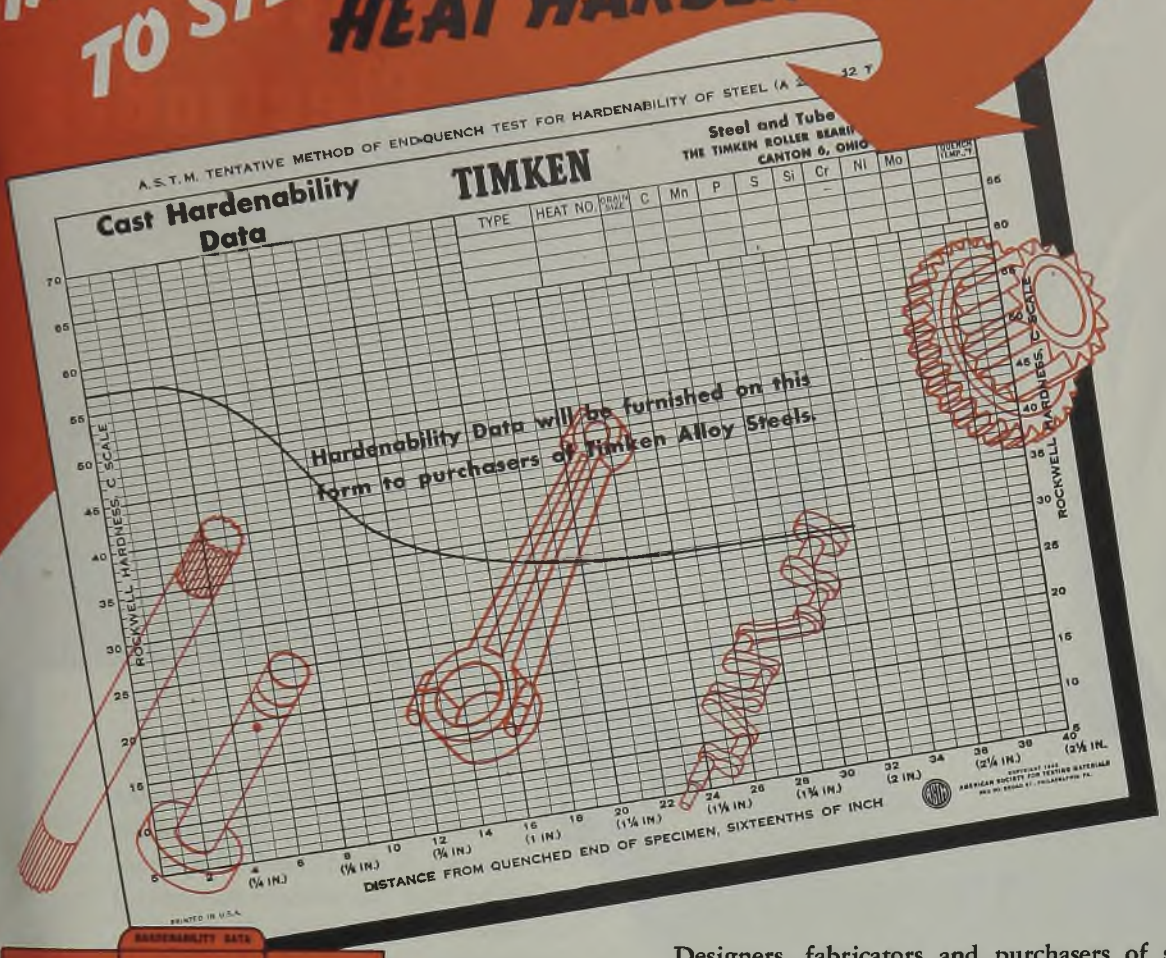
Electrodes contain a core wire of either commercially pure aluminum or 5 per cent silicon aluminum alloy. Specifications and electrode requirements and tests are shown in AWS-ASTM Tentative Specification No. B184-43T. These electrodes are suitable for all structural and general welding.

Edge preparation is simple for arc welding. Butt welds in metal up to ¼-inch thick need no special preparation. Heavier material is prepared with a 60 to 90-degree vee to within ¼-inch of the bottom of the section. Metal up to ½-inch thick can be butt welded without edge preparation if the welds can be made from both sides of the section.

Butt welds in the aluminum alloys are made by controlling the penetration bead with a copper or steel back-up strip that is grooved under the joint. A smoother penetration bead is obtained if the back-up strip is thinly coated with flux.

Arc welding fluxes are similar to gas welding fluxes in that complete removal of the slag must be accomplished after welding. The procedure is the same as that described for gas welds except that a preliminary chipping or wire brushing operation is usually applied

TIMKEN OFFERS A NEW TOOL TO STEEL FABRICATORS . . HEAT HARDENABILITY DATA



A request written on your firm's letterhead will bring a folder that contains a series of five messages on hardenability, an article on "Cast Hardenability Specimens" a bibliography of 44 basic references on the subject and a copy of the form which we will use to report the hardenability of Timken Alloy Steels. Write for your free copy today.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ALLOY STEELS

Designers, fabricators and purchasers of standard grades of engineering alloy steels from Timken have a new tool at their disposal — Heat Hardenability Data.

These new data are now being furnished on all heats of low carbon and medium carbon engineering alloy steels currently melted by us. Purchasers of these steels are receiving complete Jominy hardenability data expressed graphically as shown on the above chart. This information is being supplied on each heat of steel in every shipment and is mailed with the shipping manifest.

These hardenability data will prove to be an important tool in facilitating the selection and processing of the engineering alloy steels because they can be used to predict the mechanical properties of steel after heat treatment and in this way determine the suitability of the material for chosen applications. Until now the chemical composition has been the only guide to these facts.

The interpretation of hardenability data and their application to both design and production problems have been the subject of considerable study and research by our technical organization. The outstanding quality of Timken electric furnace and open hearth steels are the result of similar programs. We invite you to consult with us on your metallurgical problems. The Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

after welding to remove the brittle crust of slag on the welds.

Carbon Arc Welding: The carbon arc process is widely used for welding aluminum parts and is superior to the metal arc for many applications. The procedure is carried out manually or automatically. In the manual operations, it is possible to make butt welds in thinner material than with the metal arc, and the commercial range of application is for metal from 0.040 to ⅜-inch thick. Suggested values of welding current and electrode size are shown in Table VI. Sound welds can be made in this thickness range without preheating the parts, although preheating will speed up the welding operation.

The filler rod is fed in separately for carbon arc welding. Flux is applied to the filler metal by dipping the rod in a mixture of flux and water and drying the coating thoroughly before welding. Metal arc-welding electrodes are frequently used for this purpose. It is more economical, however, to apply a thinner coating of filler metal which works just as well from the welding standpoint and results in more feet of weld per pound of rod than is the case when using metal arc-welding electrodes.

The carbon arc has also been adapted to automatic welding, particularly for large type structures such as tank cars. Equipment has been developed for metal from 3/16 up to ¾-inch thick. The advantages of automatic welding are increased welding speed and substantially less distortion in the parts.

Control of the arc is accomplished by using a superimposed alternating-current field around the carbon electrode. The parts to be welded are clamped in a jig over a copper or steel back-up strip and flux is applied in powder form with a mechanically driven flux feeder. Filler wire is fed mechanically into the joint. Machine set-up variables depend upon the thickness of the metal, and Table VII shows suggested machine settings for various thicknesses.

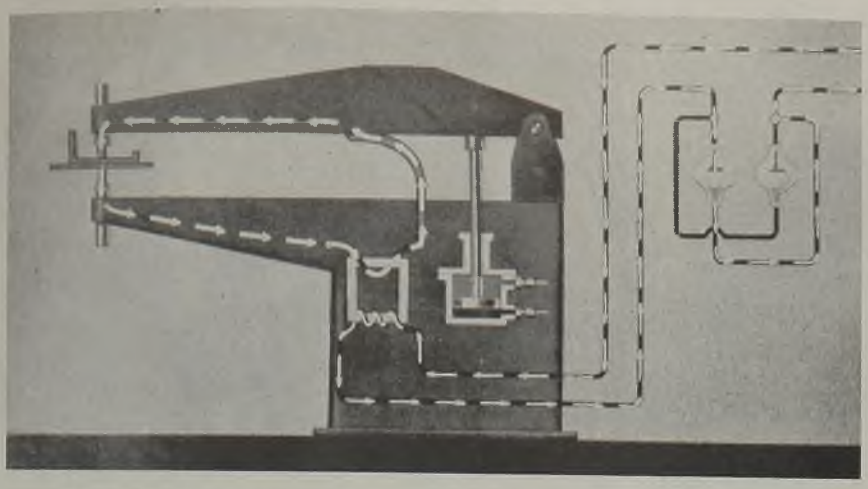


Fig. 11—Schematic diagram of an alternating current rocker-arm spot-welding machine. Shown are pressure mechanism and electronic tubes for current timing in primary circuit. Transformer secondary delivers high-amperage low-voltage alternating current for welding

The carbon arc is also used in a semi-automatic welding procedure. The technique and equipment are similar to that used for manual welding, but the carbon is mounted on a bracket that travels on one or two small wheels along the joint. This carrying device may be actuated manually or may be motor driven. The speed is adjusted by the melting rate and the metal thickness, and the wire is fed in manually or the edges are flanged to provide filler material. On edge welds particularly, this procedure results in a very smooth sound contour and increased welding speed. Flux is usually applied by painting a water mixture on parts before welding.

Atomic Hydrogen Welding: The atomic hydrogen welding process has been adapted to welding aluminum alloys, particularly for sheet parts, in a thickness range from 0.064 to ⅜-inch, and its commercial use so far has been limited to manual operation of the torch. Experimental welding automatic equipment has also been accomplished with excellent results from the standpoint of soundness and strength.

In this process, an arc is drawn between two tungsten electrodes in a hydrogen atmosphere. For manual welding, control of the melting rate can be accomplished by moving the torch away from or toward the work, and consequently the process has some advantage over the metal or carbon arc from this standpoint. Filler rod is applied manually and in much the same manner as when gas welding. The same fluxes used for gas welding are used with the atomic hydrogen torch and the flux is usually applied by dipping the rod in a water mixture of the flux. Suggested machine settings for various thicknesses of material are shown in Table VIII.

Tungsten Arc Welding. A great deal of experimental work and some commercial applications have been made in arc welding aluminum by an arc drawn between the work and a tungsten electrode in an atmosphere of helium or argon. Sufficient experience with this process has not yet been obtained to permit making specific recommendations on equipment and machine settings. The indications are that the procedure can be used for welding thinner metal than has been possible with other arc welding procedures. Welding flux is applied to the filler wire, and the filler metal is handled in much the same manner as when gas welding or carbon arc welding.

TABLE VI
ELECTRODE SIZE AND MACHINE SETTING FOR METAL AND CARBON-ARC WELDING OF ALUMINUM

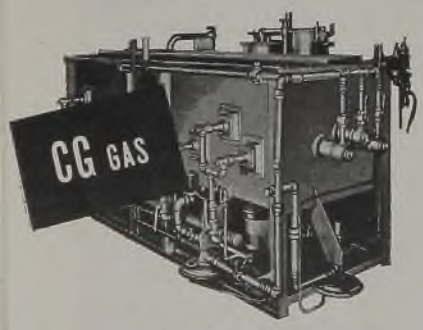
Metal Thickness, in.	Electrode Diameter, in.	Approximate Current, amperes	Number of Passes Lap and Butt	Number of Passes Lap and Fillet	Electrode Consumption, lb. per 100 ft. Butt	Lap	Fillet	Electrodes per lb.
0.081	1/8	60	1	1	4.7	5.3	6.3	32
0.101	1/8	70	1	1	5.0	5.7	6.3	32
0.125	1/8	80	1	1	5.7	6.25	6.3	32
0.156	1/8	100	1	1	6.3	6.5	6.5	32
0.187	5/32	125	1	1	8.7	9.0	9.0	23
0.250	3/16	160	1	1	12.0	12.0	12.0	17
0.375	3/16 for laps and fillets; 1/4 for butts	200	2	3	25.0	29.0	35.0	17
0.500	3/16 for laps and fillets; 1/4 for butts	300	3	3	35.0	35.0	35.0	17

TABLE VII
DATA FOR AUTOMATIC CARBON-ARC WELDING OF ALUMINUM ALLOYS
(Butt Joints)

Thickness, in.	Current, amperes	Arc voltage	Wire Size, in.	Wire Speed, in./min.	Wire per 100 ft. Weld, lb.	Flux per 100 ft. Weld, lb.	Welding Speed, in./min.
0.188	310	35	5/32	16.8	2.5	17	16.0
0.250	360	36	5/32	20.3	3.7	21	14.0
0.312	380	38	1/4	9.6	4.8	26	12.3
0.375	390	38	1/4	10.2	5.0	28	12.0
0.500	410	39	1/4	9.3	7.8	51	7.1

Qualification of Welding Operators, Procedure Specifications and Codes

Arc and gas-welding operations on the aluminum alloys require operator training to make joints that will meet production standards for sound and strong



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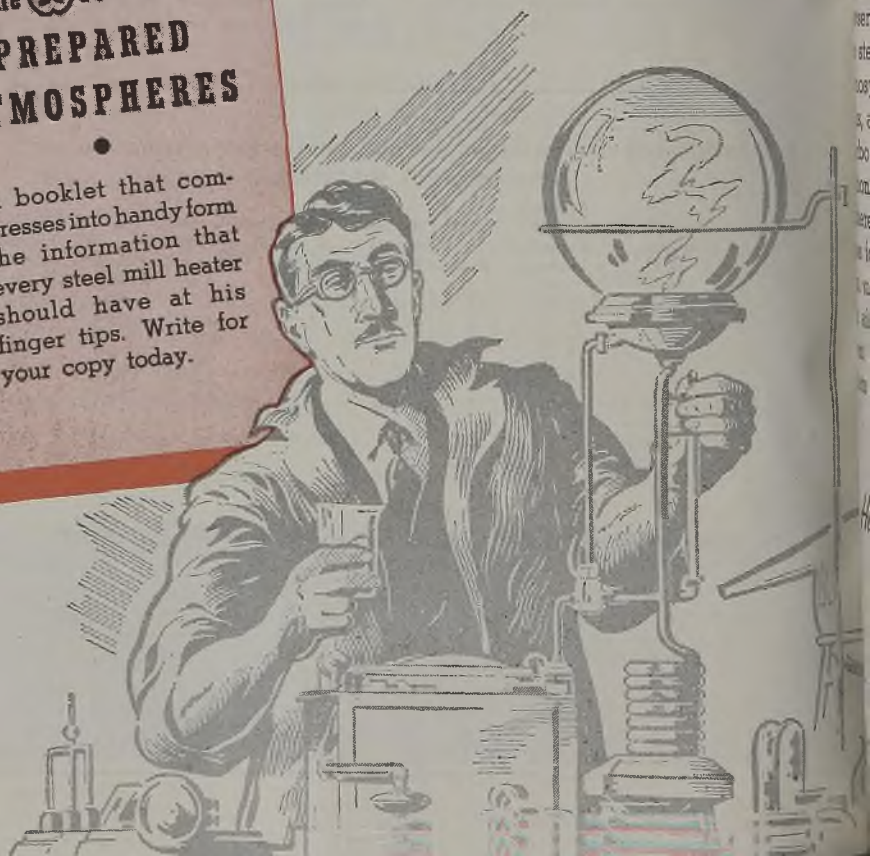

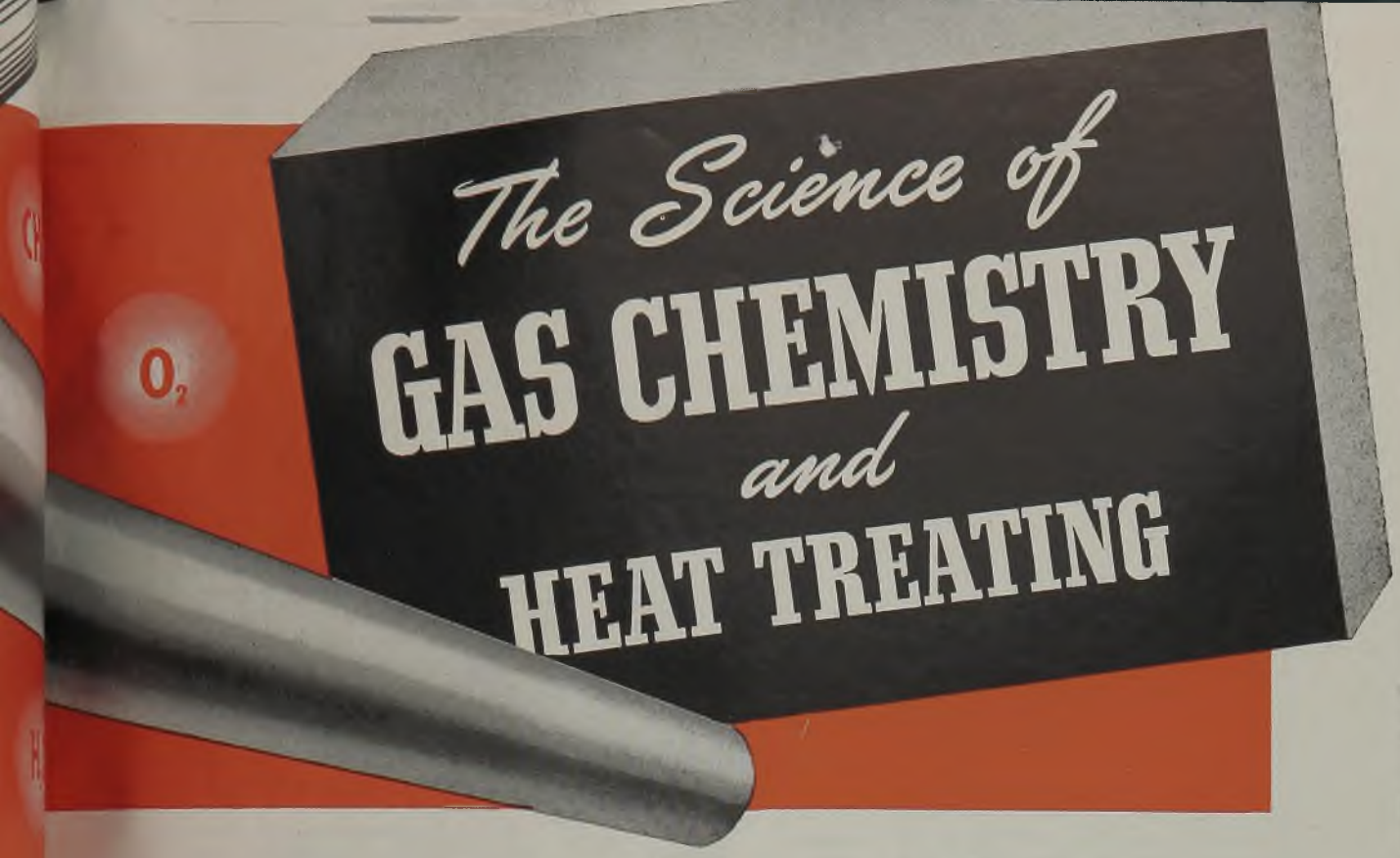

Surface Combustion research in the use of gases for atmospheres in the heat treatment of metals, has made possible metallurgical results of such significance that it goes far beyond the mechanical details of furnace construction.

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In addition to these surface treatments, recent developments have shown marked effects of small amounts of gases within the physical structure of metals. Some of these gases are retained from the melting operation and some are entrapped during heat treatment. Some gases cling tenaciously to a metal surface just short of chemical union, while others are readily driven off into the surrounding medium. It is desirable to eliminate harmful reactions between metals and gases, and to develop superior metallurgical properties here-to-fore unknown. Gas quenching and dry pickling are recent outstanding Surface developments embracing the science of gas chemistry and heat treating, that have been industry proven. Other major developments are in the making.

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welds. Experience has indicated that there is little difference in training individuals whether they have had previous experience in welding other metals or not. An adept individual will acquire sufficient skill to pass the qualification test with about 40 hours on various types of welds. Another 30 to 40 hours' training is given certain operators who cannot acquire a skill as quickly. Unless the qualification test can be passed in 80 hours of training, it is usually best not to attempt to use an individual for welding operations. Both men and women operators have been trained with little difference in results from the standpoint of quality of welds.

Most welding operators are qualified by the procedure laid out in Section 9 of the ASME Unfired Pressure Vessel Code, the Bureau of Ships' Specification E-1 and E-2, Appendix 7—Welding, or the Army-Navy Aeronautical Specification ANT38, depending on the type of work to be done. Further details on training method to qualify operators to meet these specifications are available from many sources and will not be repeated here.

The welding of tank structures under the ASME Unfired Pressure Vessel Code is handled in accordance with the special provisions listed in Case 994. This code specifically covers vessels made from aluminum manganese plate, and there are no code provisions for vessels made from other alloys.

Resistance Welding

The aluminum alloys are electric resistance welded by spot or seam welding, depending on the requirements and design of the parts. The aluminum materials have high thermal and electrical conductivity and are covered with an oxide coating; all of these factors affect the welding characteristics, and consistent and strong welds can be made only if equipment designed to take these factors into account is provided. It follows that the welding equipment used on the ferrous materials is not usually suitable. On the other hand, equipment designed for aluminum can be used on practically all other weldable metals with good results.

TABLE VIII

APPROXIMATE MACHINE SETTINGS FOR ATOMIC-HYDROGEN WELDING

($\frac{1}{16}$-inch Diameter Electrodes)

Thickness, in.	Current, amperes	Hydrogen Pressure, psi	Filler Wire Diameter, in.
0.064	10	7	$\frac{1}{8}$
0.081	15	7	$\frac{5}{32}$
0.101	21	8	$\frac{5}{32}$
0.125	27	8	$\frac{3}{16}$
0.187	33	11	$\frac{3}{16}$
0.250	39	14	$\frac{1}{4}$
0.375	45	14	$\frac{1}{4}$

TABLE IX

MACHINE SETTINGS FOR A.C. SPOT WELDING ALUMINUM ALLOYS

Gage B. & S. No.	Gage Inch	Time, cycles	Current amperes	Tip Pressure, lb. Minimum	Tip Pressure, lb. Maximum
26	0.016	4	14,000	200	400
24	0.020	6	16,000	300	500
22	0.025	6	17,000	300	500
20	0.032	8	18,000	400	600
18	0.040	8	20,000	400	600
16	0.051	10	22,000	500	700
14	0.064	10	24,000	500	700
12	0.081	12	28,000	600	800
10	0.102	12	32,000	800	1000
8	0.128	15	35,000	800	1200

TABLE X

SPOT WELD ELECTRODES—TIP RADIUS

Thickness, in.	Annealed and As-extruded	Intermediate Temper of non-heat Treated Alloys	Heat Treated
Up to 0.020	2	2	1
0.021-0.032	3	3	2
0.033-0.064	4	3	3
0.065-0.094	4	4	4
0.095-0.125		4	4

If a minimum of indentation on one surface is required, one tip is made to the above radius and the other is flat. On thickness 0.064 inch and above, use a 10-inch radius instead of flat.

Spot welding is the most widely applied resistance welding process. Many aircraft applications of spot welding can be made wth a lower labor expenditure by spot welding than by riveting. War effort has accelerated the development of equipment and procedure so that spot welds are now used in both structural and nonstructural aircraft applications for cowling, wing skin, attaching stiffeners to fuselage wing, or control surfaces, and many other parts.

This experience points to wider use of this joining method for the assembly of automobile parts, railroad, bus and truck structures, refrigerator parts, furniture, cooking utensils, in fact, almost any field where the aluminum alloys will be used. Equipment has been developed to weld material on a production basis in a thickness range from 0.010 up to 5/32-inch thick. Experimental programs are under way to design equipment and develop procedures to permit spot welding two sections having thicknesses up to 3/16-inch, which is the maximum thickness for which spot welding is generally used.

Three Types of Electrical Circuits

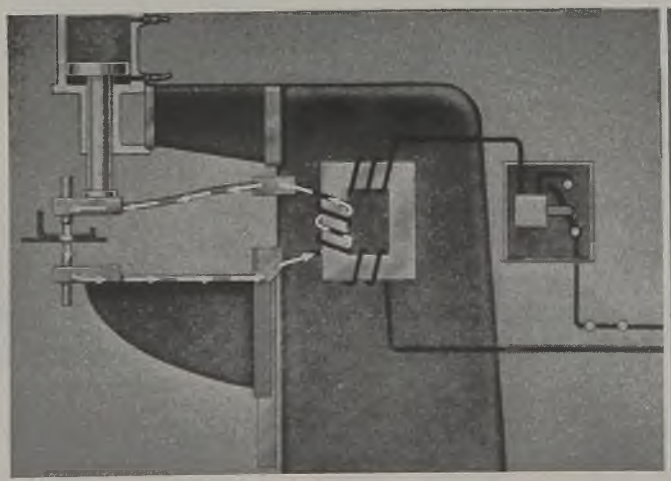
Three general types of electrical circuits have been developed for commercial spot welding, namely, alternating current, magnetic energy, or condenser energy storage. The superiority of any of the three types has not been established in industrial practice. Each of the three has specific advantages which makes it quite likely that all three types will continue to develop. The current pressure and time cycles of these types of equipment are shown schematically in Fig. 10.

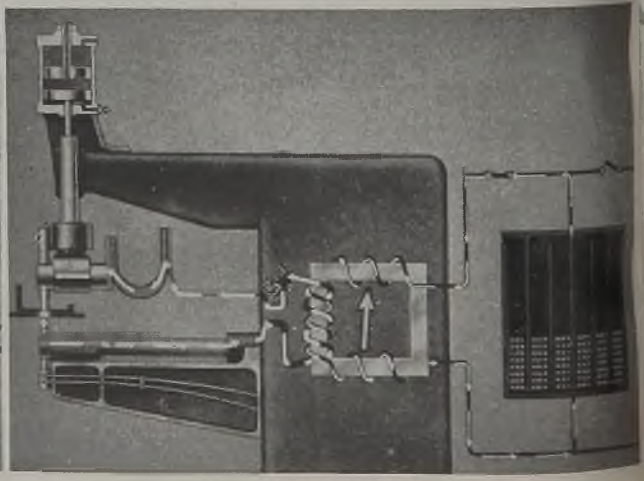
Alternating-current equipment is lowest in first cost and has been widely used for nonstructural applications, such as cooking utensils, refrigerator parts, etc. The welding circuit consists of a transformer that will deliver relatively high currents, depending on what is required for a specific metal thickness.

(*Please turn to Page* 156)

Fig. 12 (*Left, below*)—*Schematic diagram of a magnetic-energy spot-welding machine. Energy is stored in transformer primary and welding current is formed in secondary when primary circuit is open*

Fig. 13 (*Right, below*)—*Schematic diagram showing operation of electrostatic spot-welding machine. Current is stored in condensers and discharged to welder primary. Welding current of high amperage in the secondary makes the weld. Pressure mechanism can be adjusted for either single or double pressure during the weld cycle*





The Parable of the Boy Who was Short-Suited

ONCE UPON A TIME there were a father and a mother who had a son. This, of course, was strictly according to the rules, since, to qualify as a parent, one must have either a son or a daughter. In this case it happened to be a son, and, as is the custom with all male children, this particular son grew up into a boy. Not all at once, mind you. In fact, his growth was almost imperceptible. First he was a baby; then a small boy; then a larger boy. Nothing sensational, you understand. So it isn't hard to see why his Pa and Ma hardly realized that Sonny was growing at all.

And then—all of a sudden—the kid started to sprout. In the short span of a summer vacation he shot up here, stretched out there, and bulged in various places. Luckily for the kid, his skin could stretch—but unluckily for the Old Man, the kid's clothes couldn't! Which was very sad indeed, because the Old Man had spent plenty of good green stuff on those same clothes only a few months back.

MORAL: If the Old Man had been smart, he would have bought clothes roomy enough to let the kid expand. 44248

The lesson of the foregoing is obviously this: Now, in the advanced stages of postwar planning, is the time to bring adequate wiring into the picture. Talk to your consulting engineer, electrical contractor, your utility power engineer. *Unwired planning will cost you a lot more than planned wiring.*

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Application of METALLIC RECUPERATORS

Reducing temperature of flue gases to 1700 degrees Fahr. by diluting them with air from two points practically eliminates all maintenance of recuperators and assures satisfactory life of elements. Greater turbulence is secured by the addition of more cast needles. Data covering skelp, batch and rotary-hearth furnaces are presented

By JOHN H. LOUX
Engineer
Salem Engineering Co.
Salem, O.

COMBUSTION AIR blown directly into and through the elements of a metallic recuperator is in the cold state. The blower is capable of delivering air to the recuperator at 16 ounces per square inch pressure and the recuperator is capable of withstanding this pressure. One particular reason for using 16-ounce combustion air is that a more uniform distribution may be supplied to a 300-burner installation on a furnace than if a lower pressure were used. A second reason is that any leakage will result in air being forced into the flue gases rather than flue gases being sucked into the recuperator. The combustion air control system for the furnace with metallic recuperators is similar in every way to the control that would be applied on a furnace without recuperators*.

Because the metallic recuperator is unable to withstand the full temperature of the hot flue gases, it is necessary to add dilution air equipment. This consists of an individual blower for each recuperator plus a controlling valve. This controlling valve is actuated by a potentiometer, controlling from a thermocouple installed at a point directly above the metallic recuperator. The maximum temperature of gases allowed to pass over these recuperator elements is 1800 degrees Fahr. Years of actual operation have shown that practically all maintenance can be eliminated if this limiting temperature is reduced to 1700 degrees Fahr.

Dilution air is mixed with the hot products leaving the furnace at a point at least 4 feet away from the first bank of recuperator elements. At one time it was thought advisable to distribute this dilution air so that it would thoroughly mix with the hot gases. Experience has shown, however, that if the air is blown into the products from at least two points and from a distance not less than 4 feet from the top of the recuperator, a satisfactory recuperator life will be obtained.

A secondary effect of this dilution air is to reduce the temperature difference between the hot products and the combustion air. To offset this condition, the recuperator is made into two passes with the combustion air entering the cooler pass and discharging from the hot pass. The result is that the products of combustion being discharged to the stack are extremely cool.

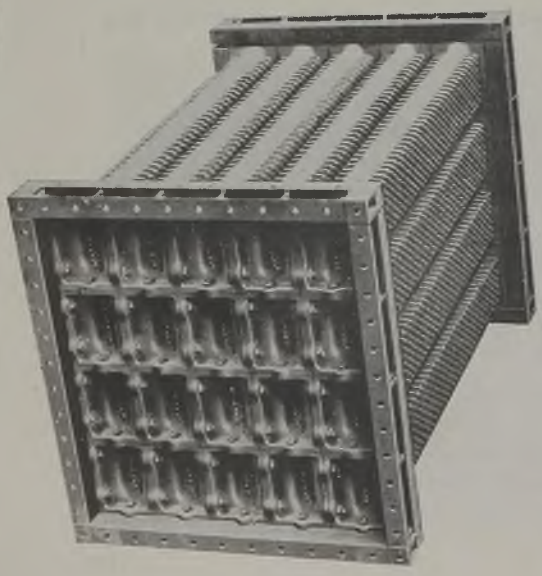
The efficiency of any surface heat exchanger is dependent upon (1) velocity and turbulence of the heating medium, (2) conductivity of the material, (3) area exposed both internally and externally, and (4) upon the velocity and turbulence of the medium being heated.

All types of recuperator elements may be spaced close enough to give the desired velocity outside and core busters or cast needles may be installed internally to produce the desired turbulence inside. The turbulence outside however, can best be obtained around the metallic elements by the simple addition of more needles. These needles serve two purposes: They create turbulence and they increase by many times the exposed surface.

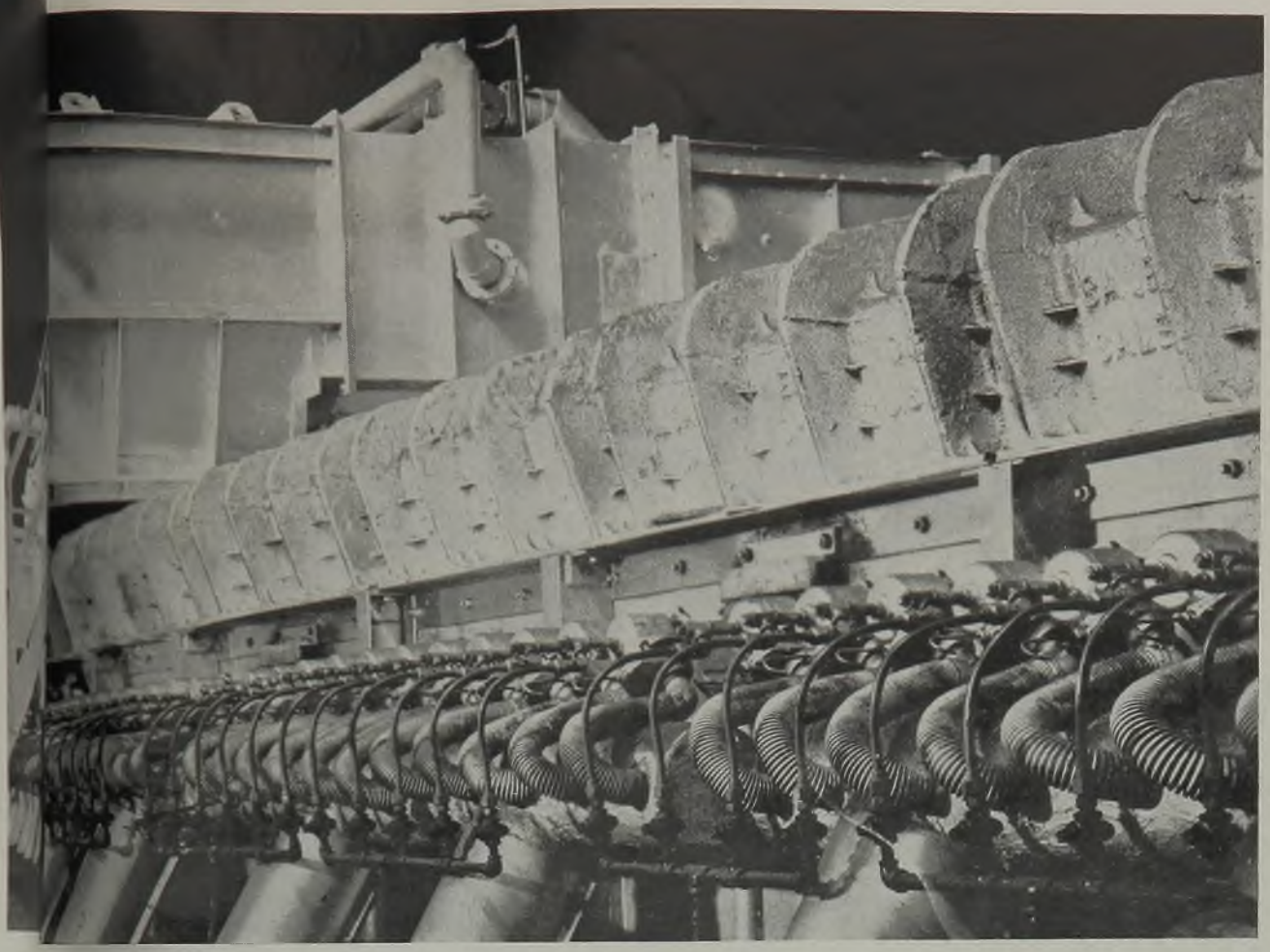
The two remaining factors that control efficiency, are the conductivity of the material and the velocity of the air through the recuperator elements. The thermal conductivity, or K factor of cast iron at 400 degrees Fahr. is 220. Metallic elements have a maximum thickness of approximately ¼-inch. Because a much higher pressure can be carried in the metallic element a much greater velocity of air through the element is allowed.

Rated velocity through metallic re-

*In a previous article, STEEL, June 12, p. 116, the author considered postwar possibilities of metallic recuperators.

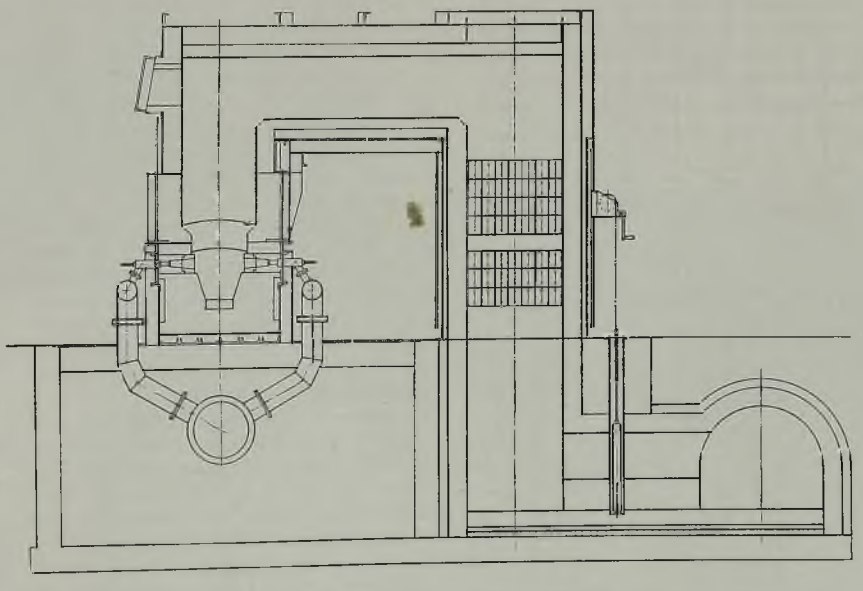


Bank of elements for metallic recuperator



(Above)—Skelp-heating furnace showing cross-over to recuperator with dilution air pipe feeding into cross-over

(Right)—Elevation of heating furnace showing location of metallic recuperators



cuperator is 68 feet per second at 600 degrees Fahr.

Allowable inlet pressure for metallic recuperator is 16 ounces.

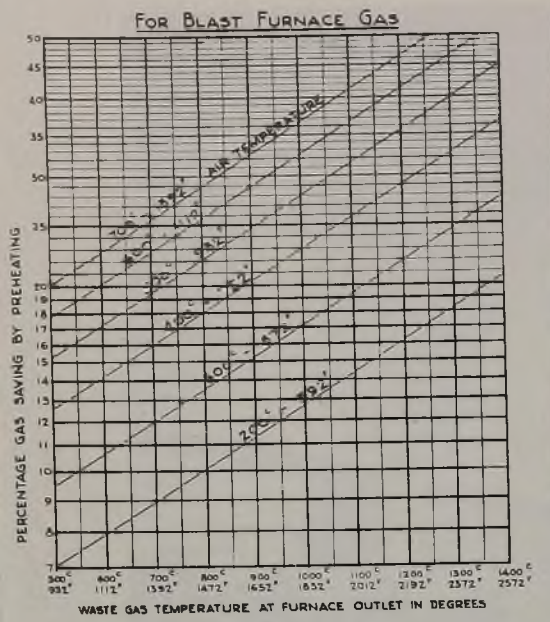
Rated heat transfer for design purposes through metallic recuperator is 50 B.t.u. per hour per element per degree temperature differential.

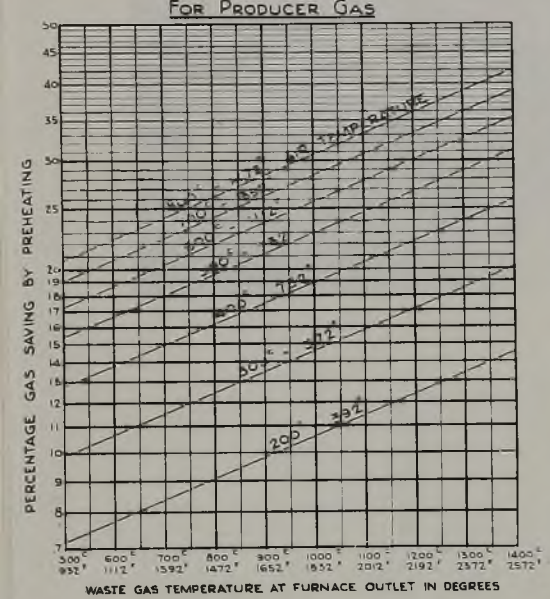
If the velocity through any recuperator element is increased, with all other factors kept constant, the B.t.u. transfer will also increase. This is shown in the accompanying table.

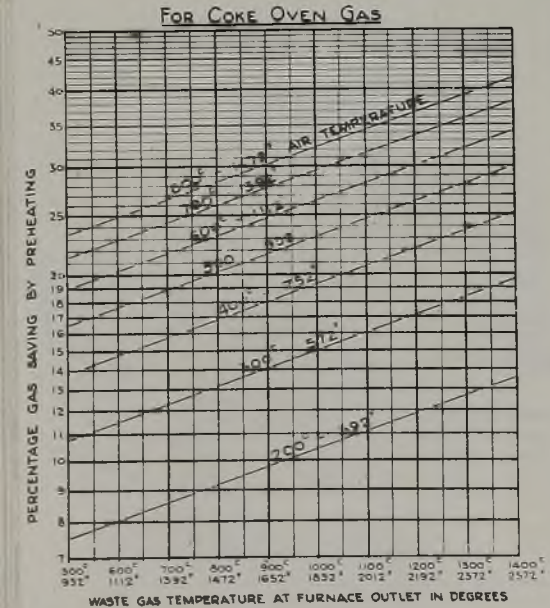
The number of recuperator elements required for ¾ metallic unit is low. This feature is especially desirable where floor space is at a premium. Metallic recuperator elements are mounted in a cast frame and held together by alloy bolts. This assembly is tight and a packing material is used around the end of each element to improve the sealing still further. The analysis of the elements is such as to prevent excessive growth or expansion and the maximum leakage ever measured after years of service at

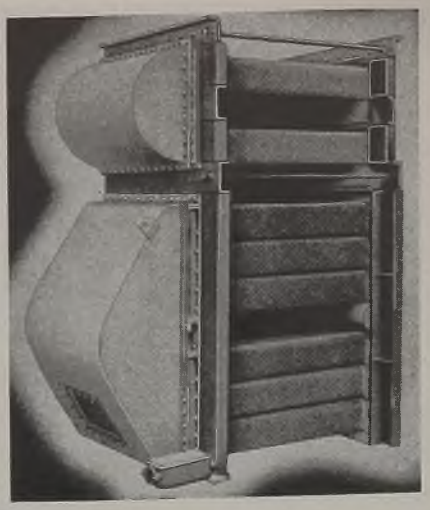
RELATION BETWEEN VELOCITY AND HEAT TRANSFER

Pressure drop through recuperator element, in. water col.	Velocity through recuperator element, ft. per sec.	Difference between air and chamber temp., deg. Fahr.	B.t.u. transfer/hr./deg. Fahr. difference between avg. air and chamber temp.
1	60	1337	57.6
2.1	90	1352	84.2
4.3	120	1356	95.5









(Above)—Complete assembly of air and gas recuperator

(Left)—Percentage fuel saving obtained by preheating air required for combustion in industrial furnaces

16 ounces inlet pressure was 7 per cent.

The maintenance on one large installation of these metallic recuperators on a continuous skelp heating furnace taken over a period of six years has been the replacement of one bank of elements.

For several years now a group of these metallic recuperators has been in service on five batch-type heating furnaces which operate at forging temperature. Products of combustion are brought to a collector and led through a downtake to the stack flue. The recuperators are placed in this downtake and the combustion air is blown through the tubes in the usual manner. Savings in fuel are estimated to exceed 20 per cent.

The fact that these batch-type furnaces could have been installed with all controls, and then later equipped with recuperation without changing the combustion air control system whatsoever, will be of particular interest in later years when it is desired to convert present equipment to recuperation with a minimum of investment. The only investment required will be the addition of the recuperators themselves, the necessary ducting and collector flues.

Another interesting installation of metallic recuperators has been made on two standard rotary-hearth forging furnaces. In this case all of the hot gases are collected into a flue mounted on top of the furnace and the recuperators set in the downtake leading to the stack. Hot combustion air is piped around the outside of the furnace shell.

It is realized that there are many applications for heat-saving devices on which the metallic recuperator has not been proven and may not, at the moment, seem suitable. One of these is the open-hearth furnace. Because of the tremendous quantity of particles carried in the exhaust gases, an extremely efficient settling pit would have to be installed to prevent these particles from depositing on the needles of the recuperator, and clogging the passages. It is believed, however, that the installation of such a pit, along with an occasional cleaning with a steam or air lance, might make such an application practical.

Bendix Will Operate Navy Plant at Elmira

Appointed as official operating agency for the Army Air Forces, the Eclipse Machine Division of Bendix Aviation Corp. will take over operation of the United States Navy—Remington-Rand "N" plant at Elmira, N. Y., to expand mass production of new equipment for the B-29 Super-Fortresses.

Production of the new equipment, developed by Bendix and Eclipse over a period of 15 years in conjunction with Army Air Forces engineers, to anticipate specialized global tactical requirements of America's newest long-range bombers, will get under way as soon as possible, it was stated in a joint announcement by Eclipse and the Army Air Forces officials.

The Carl L. Norden Co., which has operated the plant as managing agent for the Navy, since November, 1943 now is gradually terminating in Elmira its production of Norden bombsights, due to fulfillment of the Navy's current requirements, it was recently disclosed.

As soon as accountability for the structure officially passes from the Navy to the Army Air Forces, the factory will be designated as "Eclipse Plant No. 3", it was stated. The division operates two other Bendix-owned plants in Elmira.

How Space Will Be Utilized

The more than 400,000 square feet of floor space in the newly acquired plant will be utilized mainly for the multitude of precision manufacturing processes involved in mass production of the new B-29 equipment, Eclipse officials said.

In carrying out the newest in its long series of important war-production assignments, Eclipse will employ and train the majority of qualified workers presently employed in the Norden-operated plant and will carry on an immediate recruiting program to insure an adequate working force for the new B-29 equipment manufacturing program, it was stated.

The Eclipse also will continue such long-established war tasks as production of 20-millimeter automatic cannons, mechanical time fuzes, ordnance equipment, aircraft magnetos and Bendix starter drives, it was pointed out.

The plant to be taken over by Eclipse was built by the Navy Bureau of Ordnance and completed late in 1942. Production was launched by Remington-Rand Inc., in the summer of 1943.

In November, 1943, the plant was turned over to the management of the Norden company.

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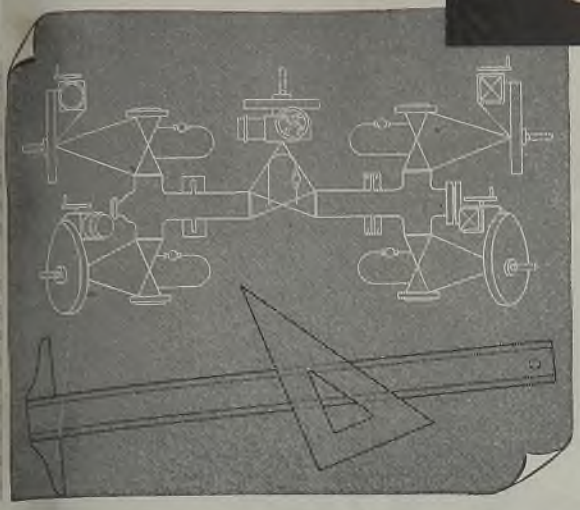

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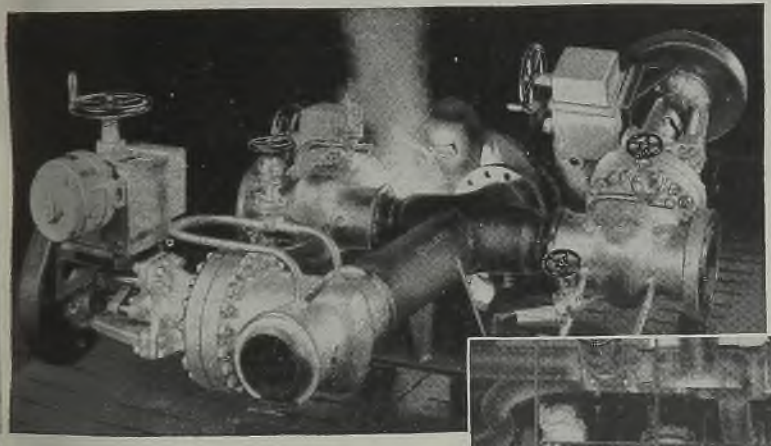

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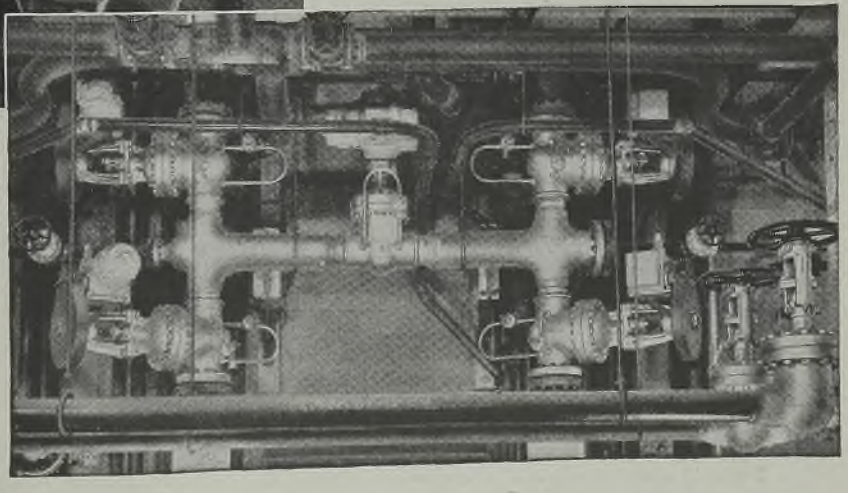

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Wartime developments in

Heat Treatment of Steel

and their effect on design

By Harry W. McQuaid
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MANY wartime developments in the heat treating of steel actually have been under way for some time but have made great progress under the pressure of wartime requirements and have reached the commercial application stage because of the war. Some might be listed as follows: Induction and flame heating; isothermal heat treating; improved quenching; shot blasting; controlled atmospheres.

Strictly wartime developments might be limited to the following: Use of multiple lower alloy steels to replace simpler steels of higher alloy content, and water quenching of alloy steel armament.

The induction-hardening technique has of course some metallurgical and mechanical limitations which must be considered. Properly worked out, however, induction heating promises to give more leeway to the designer, and hence its scope and value should be of interest to every designer. It permits in objects of simple symmetrical shape, such as pins and bushings, the use of lower alloy and higher carbon combinations, which can be water quenched without excess distortion or internal stresses. This means higher hardness and more useful available load carrying capacity. The use of induction hardening should be primarily limited to shallow hardening steels, i. e., lower alloy steels; otherwise the severe quench may result in a highly stressed surface, which, if it does not crack, has decreased load carrying capacity.

The principal advantage of induction heating to the designer lies in its application to localized zones. It makes possible the designing of parts where it is not necessary to heat the whole piece, and hence distortion from this cause is eliminated. Parts can be designed so that the stresses in a finished piece, at a given point, can be relieved by local heating. Parts can be designed with only internal surfaces, or projections to be hardened, so that welded or brazed assemblies might be built up prior to heat treating. The induction heating has valuable application in brazing operations and the distortion incidental to overall heating of welded assemblies in heat treating could be eliminated. The use of induction heating of gears by applying the heat to the rim section only permits wide latitude in built up webs and easily machined hubs.

Much that has been said about the use of induction heating can be said about flame hardening. Where there are less limitations due to the external nature of the heat application, as in large gears, a concentrated high-temperature flame is used which is brought directly in contact with the surface to be heated. This surface rapidly reaches a temperature determined by that of the flame and the heat conductivity of the metal being heated. The rate of heating from then on proceeds at a uniform rate, determined by the temperature of the surface and the heat conductivity. The tendency is for somewhat deeper heating than by induction.

Not all the advantages possible with properly applied induction heating are available in flame hardening, but for some applications there is little choice between the two methods. Every possibility should be carefully studied so that if flame hardening will satisfy then the advantages in much lower cost of installation should be obtained. In any event, the metallurgical and operating aspects, involved in the use of induction or flame-heated parts, should be obtained by the designer before deciding on the design or the equipment.

Isothermal Heat Treatments

While isothermal heat treating was practiced many years ago, it was in the undeveloped state until the advent of the constant temperature transformation curves of Bain and Davenport, about 1930. This work led to the development of constant temperature transformation heat-treating practice as a commercial practice which, because of limitations of size and analysis, was usually confined to small sections and carbon or low-alloy steels.

The underlying factors governing the results obtained by the process are:

(a) Uniformity in temperature throughout a part is approached before transformation starts.

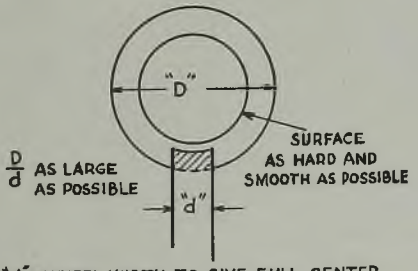
(b) Transformation takes place at close to the same time throughout a given part, thereby preventing high stresses due to non-uniform volume changes.

The development of such a practice, while requiring perhaps the use of a

(*Please turn to Page* 164)

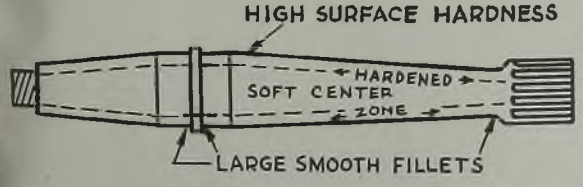
[a] From data presented by Mr. McQuaid before the National War Materiel Meeting of the Society of Automotive Engineers in Detroit.

A METALLURGICAL VIEW OF A WORM AND WHEEL



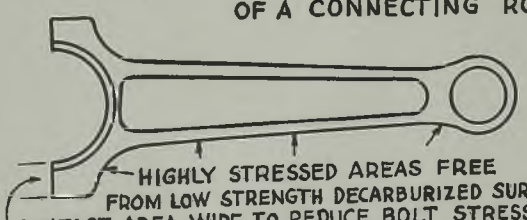
"d" = WHEEL WIDTH TO GIVE FULL CENTER CONTACT WHEN FULLY LOADED. BRONZE AS HARD AS POSSIBLE WITH HIGH YIELD

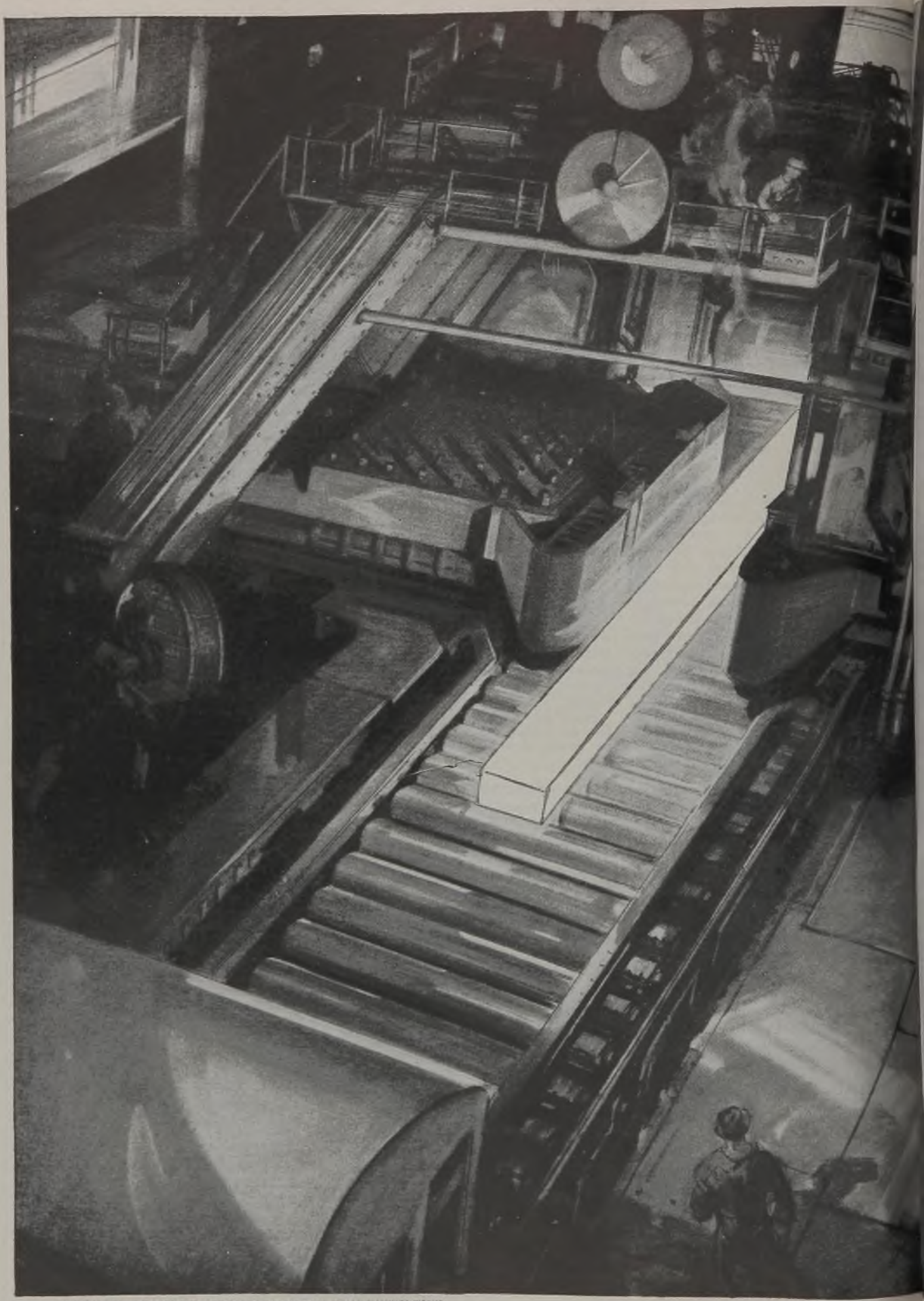
A METALLURGICAL VIEW OF AN AXLE SHAFT



SMOOTH SURFACE IN COMPRESSION NOT COLD STRAIGHTENED - SHOT BLASTED

A METALLURGICAL VIEW OF A CONNECTING ROD





FROM AN ORIGINAL DRAWING AND SKETCHES BY ORISON MACPHERSON, AT J&L ALIQUIPPA WORKS

BLOOMS

Bloma was Anglo-Saxon for a small mass of malleable iron from which the dross or slag was beaten out with hammers in the hands of dawn-of-civilization workmen. This primitive method of making "blooms" was pushed aside by progress centuries ago. But the word for the product survives to give a name to the heavy blooms rolled from steel ingots on today's giant modern blooming mills.

Locomotive drove first reversing mill that became a blooming mill. In early mills the rolls moved in one direction only. An Englishman, John Ramsbottom, in the 1860's, manager of an iron works and a railroad, too, conceived the idea of a mill that could be reversed for repeated rollings back and forth. He coupled a railroad locomotive to one of his rolling mills and introduced the reversing mill to the iron and steel industry. This type mill evolved into today's great, powerful blooming mills, gateways for the vast tonnages of steel that made invasion possible.

2 World records made on J&L mill. The rolling of 171,440 tons of ingots on the blooming mill of the Aliquippa (Pa.) Works of the Jones & Laughlin Steel Corporation during the month of March 1943 established a world's record in production of steel for war. During the establishment of this monthly world record, one of the three crews of the mill set up a world record for an 8-hour turn by rolling 512 ingots. This is at the rate of more than an ingot a minute.

Roller, manipulator, engineer constitute the operating crew of a modern blooming mill. They control the mill and the ingot from the "pulpit," a small room high above the floor of the three-story mill. Several hundred other workmen round out the rolling team that works together in close timing and coordination to obtain record production while rigidly maintaining high quality.

Army-Navy "E" was awarded Otis Works, Cleveland, of Jones & Laughlin Steel Corporation on July 24, 1944 with patriotic ceremonies. In his letter to the 5,000 employes, Robert P. Patterson, Under Secretary of War, said: "Your record will be difficult to surpass; yet the Army and Navy have every confidence that it was made only to be broken." Replying for the employes, H. E. Lewis, President of J&L said in part: "This recognition by our Army and Navy of a job well done will serve to inspire all of us to strive for even greater production in the critical days now upon us and yet to come." This is the third J&L plant to receive the award, the Aliquippa and Pittsburgh Works having been so honored previously.

First iron rails used by railroads in this country were imported from England in 1831, were 18 feet in length and light in weight. Standard steel rails today are 39 feet in length and weigh as much as 152 lbs. per yard.

ALIEN PATENTS

Available to Industry

STEEL is presenting a list of enemy patents of interest to the metalworking industries. Many of these are available on a nonexclusive royalty-free basis under simple licensing terms. Copies of any patents listed may be obtained by addressing the Commissioner of Patents, United States Patent Office, Washington 25. Include 10 cents for each patent, specifying serial number.

These patents are classified by types of operation, such as metal founding, metalworking, metal rolling, metal bending, metallurgy, metal treatment, metal forging and welding and the like. Included are enemy patents, patents pending and patents in enemy-occupied countries.

CLASS NO. 189—METALLIC BUILDING STRUCTURES

LIST OF ENEMY PATENTS

DESCRIPTION	PATENT NO.
Safety magazine for explosives and ammunitions	1567893
House construction of tubes or tubular members	1622071
Building structure	1796481
Building construction	1988075
Wall or roof construction	2074656
Portable shed structure	1845946
Steel or iron pillar particularly adapted for mounting electric wires	1674120
Steel or iron pillar particularly adapted for mounting electric wires	1707871
Structural member	1895667
Structural element	1910608
Heat insulating wall	1965636
Building element	1975043
Hollow structural element	1978494
Structural member	1989259
Carrier consisting of a braced metal frame	1995248
Metal structure	2012198
Apertured structural elements and machine parts	2075546
Internal construction of ships	2091415
Metallic wall structure	2108885
Constructional element	2140709
Composite sheet metal wall structure	2158234
Chain link bar	2199500
Wall fastener	2137911
Pipe joint	1642981
Joint for flanged steel beams	1724519
Fuselage fitting	1785615
Connection between the longitudinal and transverse bracing members in hollow bodies for aircraft	1802438
Wall structural unit	2185916
Means for connecting metal sheets	2268636
Metal girder for light metal structures	1571239
Metal girder	1571240
Girder	1604150
Light weight girder	1604151
Hollow light metal girder	1643577
Hollow girder for light structures	1656810
Assemblage point device	1665872
Building structure	1702406
Structural metal member	1743327
Light weight girder	1746344
Girder	1855902
Light weight girder for aircraft	1943256
Girder for struts or the like	2083226
Welded structural element	2163209
Light weight girder especially for aircraft	2170458
Construction element for aircraft	2259624
Hollow metal beam	1928009
Thermostatically controlled latch	1950843
Automatic door and like controlling device	1987330
Heat responsive closure	1868253
Metal door	2010520
Blind for shop fronts, doors, windows and the like	1643074
Fireproof shutter	1707287
Roller shutter for shop fronts, doors, windows and the like	1720850
Shutter	1723487
Protective rolling screen for windows, doors and the like	1985828
Blade member for rigid roller blinds	2093054
Shutter	1715424
Projected window	1688545
Sliding window	1935559
Holding means for glass	1793127
Collapsible grid	1612771
Steel framework for walls, ceilings, roofs and the like	1952807
Street service structure	2146915
Transportable bridge	1960355
Tubular pole	2036771
Construction material for aircraft	2316569
Crank and like case	1694585
Girder	1604150
Sash window	2289960
Window structure	2313488
Glazing and the like	2088884

LIST OF PENDING PATENT APPLICATIONS

DESCRIPTION	SER. NO.
Construction material for aircraft	268,643
Process and means for the construction of houses with standard paneling	335,199
Demountable hangar for airplanes and seaplanes	369,500
System for joining parts of metallic structures to each other	411,588
Compression resistant chains	412,904
Compression resistant group of flat link chams	412,905
Semi-tubular section with lateral flanges for use in mine gallery framing	414,002

LIST OF PATENTS FROM ENEMY-OCCUPIED COUNTRIES

DESCRIPTION	PATENT NO.
Light metal barrack	2297247
Shelter or shed for aircraft	1773656
Portable metallic structure	1863746
Support for the pylons of staging and the like	1679254
Supporting frame for electric lines	1727811
Constructional element	1710350
Building element	1837374
Member for frame work	1983612
Cellular structure for panels and other applications	1996490
Metallic construction	2147552
Metallic plate element for building parts	2164681
Construction of composite walls	2218675
Construction of walls	2263354
Construction of walls, partitions and the like	2263355
Roofing fastening	1638671
Fastening for overlapping roofing plates	1909559
Joint connection of the rods in structures, girders and the like	1821736
Fastening	2088320
Concealed fastening	2200158
Assembly of metallic elements or the like	2293239
Frame component	1677577
Articulated beam	2143953
Automatic fire protection door or screen	1682634
Manufacture of thin panels	1963890
Screen for internal combustion engines	1713337
Horizontally sliding sash window frame	2238691
Sheet metal structure	2197761
Metallic sash for windows and like bays	2148950
Grille or guard for bays of windows or doors	2032401
Anchoring device	1721436