

Columbia Steel to operate \$150,000,000 Geneva Works by year's end. Page 94

# STEEL

The Magazine of Metalworking and Metalproducing

## JUNE 7, 1943

Volume 112

Number 23

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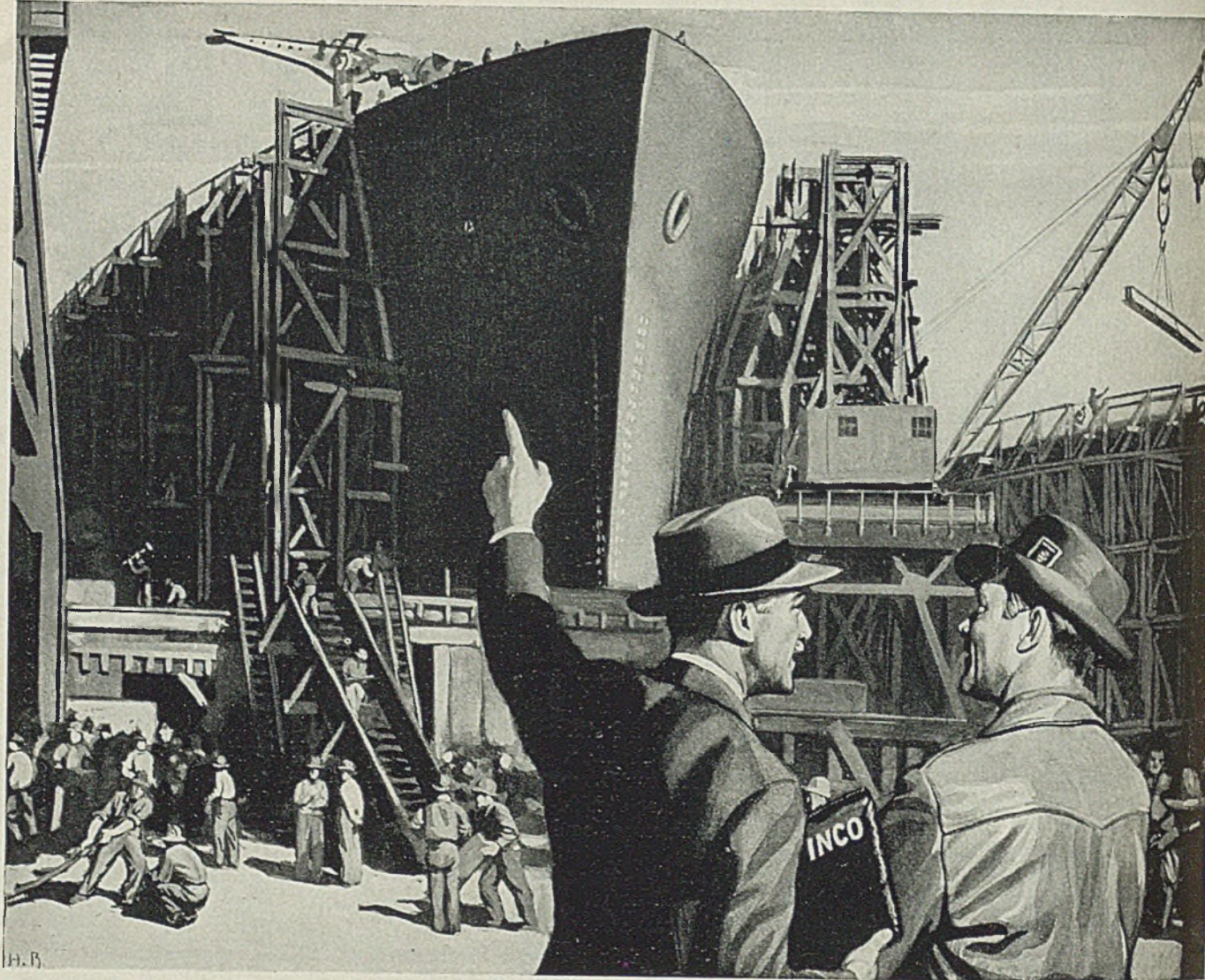
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## NICKEL AIDS THE MARINE INDUSTRY to KEEP 'EM SAILING!

"Uncle Needs His Ships." That sign in a shipyard, a thousand miles from the sea, typifies the fighting spirit of America's ship builders. These men will turn out new tonnage faster than Axis bombs and torpedoes can sink it.

In peacetime, their engineering-thinking created efficient power plants that pushed ships of commerce through the seven seas. They designed propelling machinery—turbines, valves, pumps and gears—to move the ship and intricate instruments to guide and guard it on its important mission.

From turbine rotors to propeller shafts, from reduction gears to condenser tubes, those engineers relied

upon ferrous and non-ferrous alloys strengthened and toughened by additions of Nickel. They used the properties of Nickel to fight corrosion and fatigue.

During wartime, when uninterrupted operation of America's bridge of ships means so much, the continued and widespread use of Nickel is convincing evidence of its many advantages. Now that sea-going metals must withstand repeated demands for stepped-up performance, a little Nickel goes a long way to insure utmost dependability.

Marine engineers and

designers have long known and builders and fitters... as well as repair crews at bases 'round the globe... are learning that, properly used, a little Nickel goes a long way to "keep 'em sailing."

For years the technical staffs of International Nickel have been privileged to cooperate with the men who build and operate ships of all types. Counsel, and printed data about the selection, fabrication and heat treatment of Nickel alloyed materials, is available upon request.



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**THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York, N.Y.**

**FROM GRASS ROOTS UP:** If there is an employer who reads this publication who is not familiar with the work Paul G. Hoffman and his Committee for Economic Development are doing, we suggest that he rectify the oversight immediately. Next to winning the war, the idea sponsored by Mr. Hoffman is industry's most important objective.

The idea is simply that American employers do everything possible to stimulate markets so that production after the war will engage such a large proportion of persons desiring to work that the federal government will not need to provide large numbers of jobs through nonsensical public works programs.

One of the outstanding features of the CED program is that it is not a crusade in the ordinary sense. It does not work from the "top down," as do most drives for action. The strategy of CED is to implant the idea of stimulating postwar initiative in the minds, first of individual employers, and secondly in the minds of employer leaders in a community. It is the idea of CED that if every individual employer and every community group of employers works hard for postwar activity, then the national situation will take care of itself.

The practical application of this "grass roots" technique (p. 97) is simple. John Jones in Peoria, pondering over the question of how he can keep his plant going profitably after the war, hits upon a plan of great promise. Meantime, Stanley Smith in Chester, Pa., engaged in a similar line of business, has evolved a good plan for his company. Through CED machinery, Jones and Smith compare notes and each profits from the other's thinking.

Multiply this by the thinking power of the 2,100,000 employers in the nation and you have a strong motivating force for postwar enterprise.

**A USEFUL CHECKLIST:** In the early stages of the war production program, one heard considerable complaint about the difficulties involved in subcontracting. Prime contractors sometimes voiced impatience over the abnormal time required for some subcontractors to get going on a satisfactory operating basis. In turn, numerous subcontractors complained that some of the prime con-

tractors were not explicit in their instructions, that they changed specifications and schedules without due regard for the subcontractors' problems, etc.

Today one hears fewer complaints of this kind. By dint of hard-earned experience most manufacturers have learned that a successful contractual relationship involves careful attention to detail by both parties. Particularly it involves intelligent cooperation between the inspection departments of both companies. Mutual assistance in setting up procedures also is an important factor.

Those who still are encountering difficulty in subcontracting can profit from the experience of a Chicago manufacturer (p. 104) who has obtained excellent results in farming out 300 high precision jobs to 110 subcontractors. His check-list of five things the prime contractor should do and five the subcontractor should do to insure a well engineered program is worthy of consideration by every manufacturer engaged in war work.

o o o

**WHO MAKES THE LAWS?** Manpower Commissioner Paul V. McNutt's order making the 48-hour week for the steel industry effective Aug. 1 instead of July 1 (p. 72) contains a curious reference to the right of representatives of labor unions to be consulted in the hiring and firing of employes.

Among the instructions issued to regional war manpower directors is the following: "Regional manpower directors shall approve or initial release schedules, or applications for exemptions, or applications for the approval of hiring only after consultation with representatives of management and of the union which has been recognized as the collective bargaining agency in the establishment."

This probably is not as innocent as it looks. If it is intended to apply only to those cases where employes are released or hired as a result of the effect of the 48-hour week, one might concede that there is no great danger in the order. In such instances the hiring or firing is done largely to comply with the technicalities of a government order. The hiring or firing probably would not directly involve the employe's qualifications for the job.

But it is difficult to understand how the order

could be made to apply only to cases of this type. If the representative of a labor union must be consulted under these circumstances, then it will only be a matter of time until the unions will demand to be consulted on hiring and firing under any and all circumstances. We may just as well face the issue squarely and ask ourselves now whether or not it is the will of the American people that management shall share with labor union representatives the right of hiring and firing.

The suspicious circumstances under which this joker was injected into the WMC order again emphasizes the fact that we are living under bureaucratic directives and not under laws. Here is a provision which is as important as many which are included in laws passed by Congress. While it is only the off-hand idea of somebody in WMC, its potentialities for good or bad are as great as if it possessed the validity of a law passed by Senate and House and signed by the President.

If this joker is what it seems to be—a sly way of amending the Wagner act—it should be fought vigorously. It is for Congress to decide whether or not a fundamental right of management is to be extended to others.

**RECESSION IS ORDERLY:** Recent discussion of the "screening" of new orders for machine tools has given rise to an impression in some quarters that the backlogs of machine tool builders are being reduced rapidly. The true state of affairs in this respect shows how unwise it is to generalize from isolated instances.

It is true that there have been many cancellations of orders and that backlogs are lower than they were. However, cancellations for the entire industry since the first of this year (p. 96) have been averaging \$16 million monthly, whereas during 1942 the monthly average of cancellations was \$22 million monthly.

As for backlogs, the machine tool industry had orders on its books for \$1,073,000,000 of business in July, 1942. This was the peak. By January, 1943, the backlog had receded to \$770,000,000. At the end of April, 1943, it had dropped to \$616,000,000.

The volume of backlog varies according to type of equipment. Deliveries on gear grinders, thread grinders and some other machines extend from nine to 12 months. Some other machines, such as tapping and threading units and cut-off and sawing machines, can be obtained in less than four months.

The peak of machine tool demand has passed, but

thus far the recession in new orders has been gradual rather than precipitous. The industry faces an active last half year and already is engaging in sub-contract work to take up capacity released by the easing in machine tool demand.

**ACCENT ON MARKETS:** How much the impetus of war will change the map of steel-making operations in the western hemisphere is a question of importance for postwar planners. Aside from noteworthy expansion in the traditional centers of production, new furnaces and mills are being erected in localities where heretofore iron and steel output had been of minor significance.

In the United States, considerable interest is being evidenced in the pronounced tendency to expand steelmaking facilities in the far western states. Some of the existing plants on the Pacific coast have been enlarged. The Kaiser works at Fontana represents a completely new enterprise in iron and steel circles. The Geneva works at Provo, Utah, now being erected by the Columbia Steel Co. for the government's Defense Plant Corp. (p. 94), attracts attention because it will be the largest integrated steel mill west of the Mississippi river.

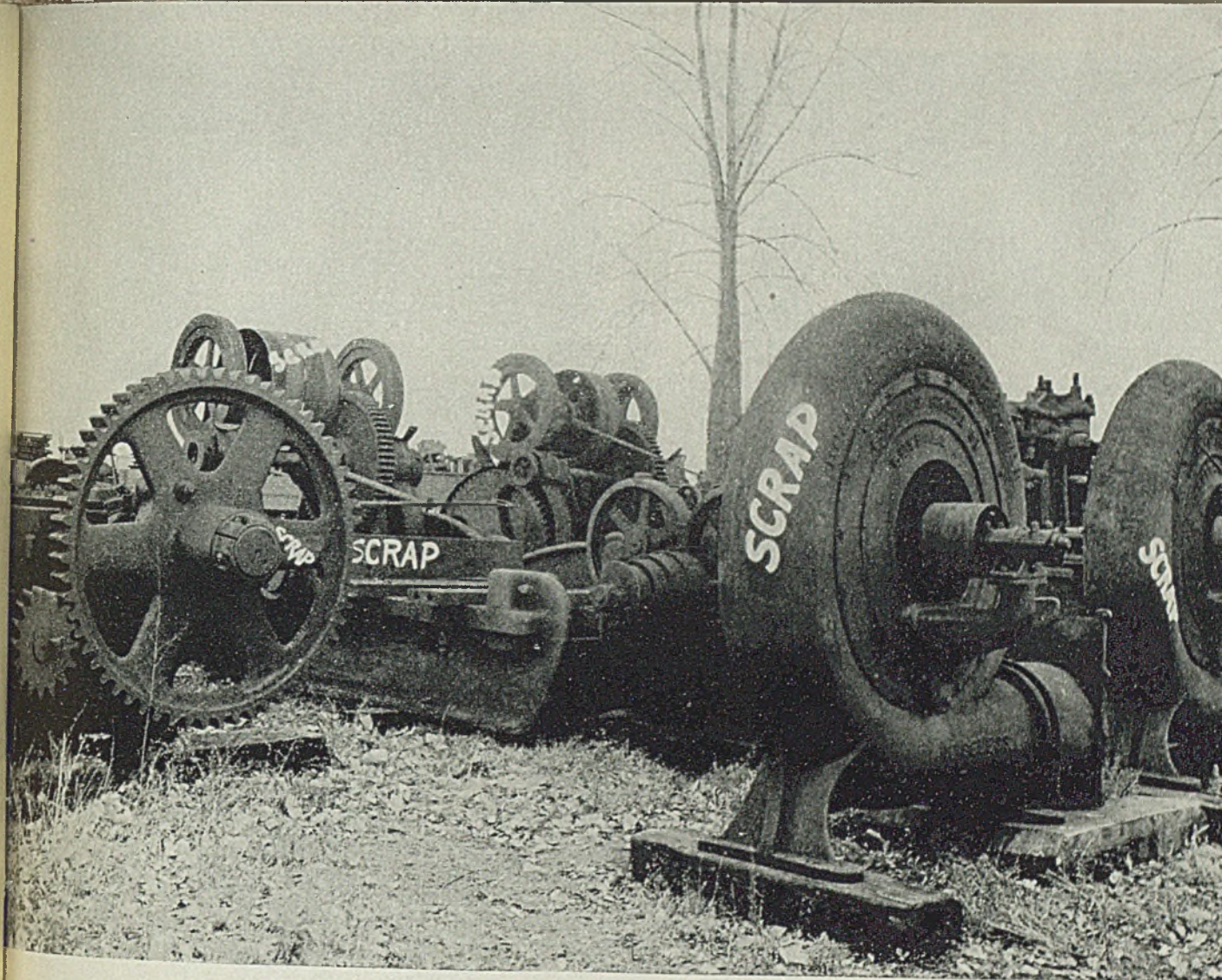
At the same time, expansion in iron and steel is progressing in northern Mexico. In Brazil, where a privately-owned iron and steel enterprise of moderate proportions has been operating (p. 79), a government financed works consisting of four blast furnaces, a by-product coke plant, three open-hearth furnaces and blooming, slabbing, rail and structural, plate and strip mills now is under construction.

It is true, of course, that the total annual capacity of these plants being erected in these relatively new sections is very small compared with that of facilities in long-established centers. However, the effect of some of them upon certain competitive markets may be considerable.

When one adds to these complications the certain violent impact of a drastic realignment of European steelmaking facilities, it is apparent that more intelligent marketing must be one of the outstanding postwar objectives for every steel producer.

*E. L. Shaner*

EDITOR-IN-CHIEF



## Make the "Slackers" Fight

One by one your friends have marched away to fight for America. They are brave men and you are proud of them. As each one has gone to the front, you have resolved anew to do all you can to help them defeat our enemies.

But have you stopped to think of the "slackers" that may be at your elbow—"slackers" that will fight for America only when you say the word? These "slackers" are the tons of potential scrap that have not been marked for quick removal and shipment to steel mills.

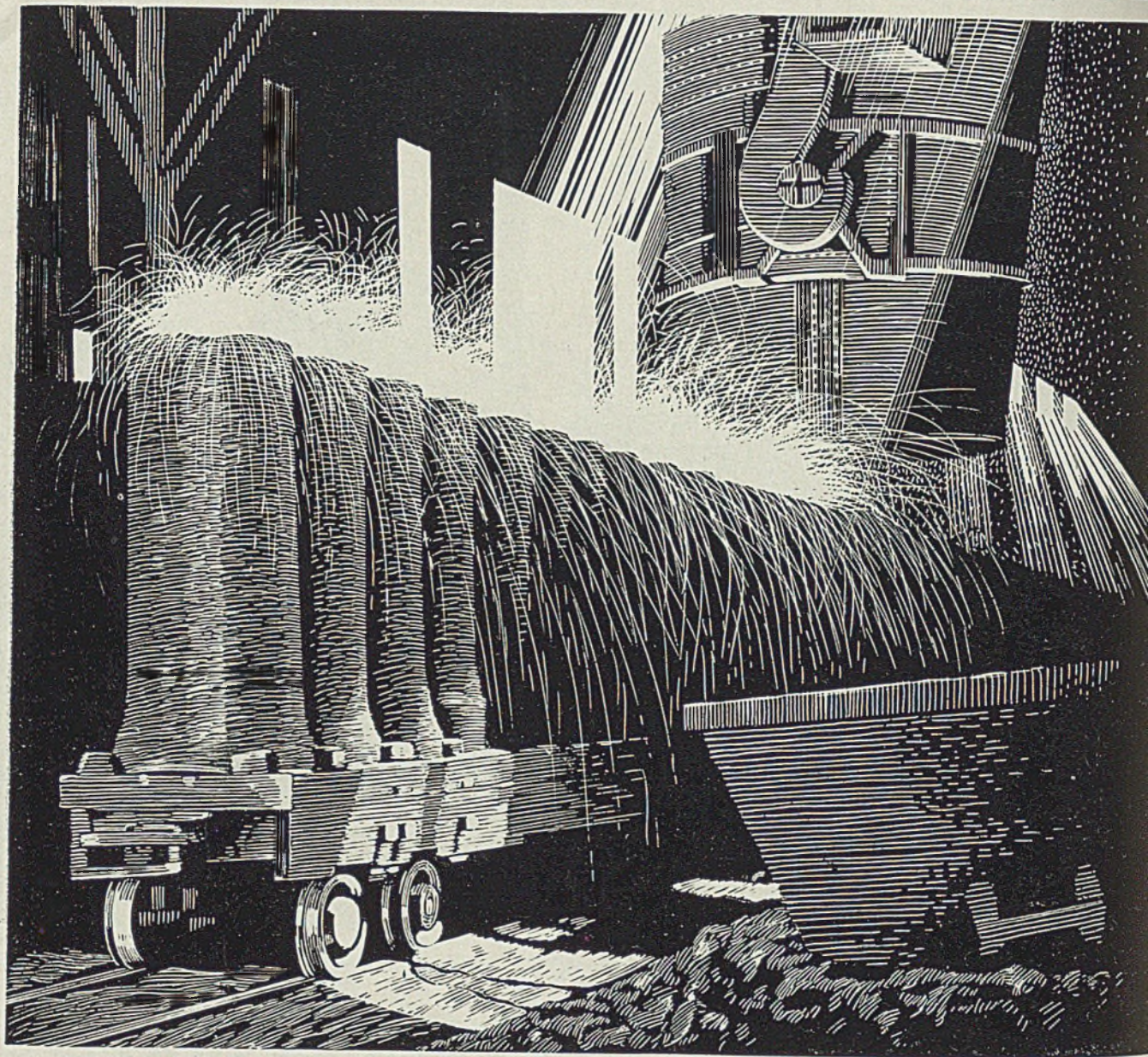
Hungry steel mill furnaces are cutting deeply into stocks of scrap. It is the "slacker" scrap that may be in and around your plant that can be moved regardless of weather. That is the scrap which will help steel mills produce at capacity.

Start today! Mark *scrap* on buildings, tanks, machinery, tools, dies, etc., that cannot be used either to win the war or win the peace.

Make the "slackers" fight!



# INLAND STEEL CO.



## Your Scrap keeps the heat on The Axis

According to Donald M. Nelson, WPB Chairman, "Nothing is more important to war production than scrap."

Forty-five million tons of scrap metal must find its way into the mills to produce 90 million tons of steel . . . the industry's quota for 1943. Collecting enough scrap to meet the ever-increasing demand for more steel requires the combined efforts of every American. Scrap metal collection must be maintained. There can be no letup in the salvaging of scrap if we are to keep the heat on the Axis.

Are you doing your part in the scrap metal campaign?



DIVISIONS

THE NEWPORT ROLLING MILL COMPANY  
THE GLOBE IRON ROOFING & CORRUGATING CO.

# Wage Stabilization Attacked

*Local unions thrust at anti-inflation line in attempt to obtain raises and influence decisions of War Labor Board. . . "Unauthorized" strikes plague war production. . . Coal strike outstanding*

ASSAULT on the wage stabilization sector of the anti-inflation line is underway.

Hundreds of work stoppages in war plants in recent weeks have been aimed at obtaining wage increases in excess of the "Little Steel" formula or at influencing the decisions of the War Labor Board.

They are hampering war production.

These strikes—with the notable exception of the coal miners' walkout—are "unauthorized", although frequently they have been participated in by shop stewards and local union representatives. They often appear to have been supported by union instructions and strategy, although top union officials deny any connection with them and deplore the stoppages as violations of the no-strike pledge of December, 1941.

The interruptions generally are brief, lasting from 30 minutes to several days, and obviously are designed as demonstrations against the wage-freeze order and to hurry along decisions of the War Labor Board.

## 2,000,000 Tons Lost Daily

By far the most important recent strike is the walkout of the bituminous coal miners, affecting more than 400,000 workers and halting production of more than 2,000,000 tons of vitally needed coal daily.

Each day of coal mine idleness is a serious threat to the war program. Estimated soft coal requirements for 1943 are 600,000,000 tons, an increase of 20,000,000 over last year. Capacity operation of the mines and full use of transportation facilities will be essential to attain this goal.

In the stoppage of coal mining sharp and early drop in steel production is threatened, power output will be halted, and practically all the basic raw materials made dormant.

Responsibility for the coal, and for the other strikes, must be shared by the administration. The party in power, which since it accepted a half million dollar campaign "loan" from John L. Lewis' United Mine Workers, and made strong appeals for labor's vote, has nurtured and supported unions at every opportunity.

As the unions advanced with more and

more demands, the administration retreated. It has emboldened Mr. Lewis by its lack of firmness. Belatedly, in the midst of history's most widespread war, it has attempted to make a stand. But even now, it is pursuing a policy of appeasement.

The President's "hold-the-line" order last April sounded very strong: "We cannot tolerate further increases in prices affecting the cost of living or further increases in general wage and salary rates except where clearly necessary to correct substandard living conditions. The only way to hold the line is to stop trying to find justification for not holding it here or not holding it there."

No time was lost by organized labor in trying the line. The War Labor Board appeared unable to resist the pressure and sought devious ways in certain cases to permit increases.

In the case of the coal miners, for example, who had received more than a 15 per cent increase since Jan. 1, 1941, and whose weekly earnings have increased more than the increase in the cost of living, the WLB hinted that the operators should give a disguised increase in the form of portal-to-portal pay. This was accomplished by an in-

congruous combination of arbitration and collective bargaining whereby the board denied the straight \$2-a-day increase but sent the portal-to-portal issue back for more negotiation. The hint was contained in the board's statement that it found it "difficult to understand why the operators failed to advance any constructive bargaining suggestions on any of the numerous items in dispute."

While awaiting developments in the coal wage dispute, other large unions have held general wage increase demands in abeyance. Any considerable victory for the miners is expected to unleash a wave of similar demands in other industries.

## Antistrike Law Demanded

The coal strike and the many "wildcat" stoppages have renewed public pressure for an antistrike law. The Smith Connally bill now before Congress would prohibit strikes in government-operated plants, curb them in other war industries, require unions to file annual financial and membership statements.

Opposed by the administration and, of course, by the labor unions, the bill has been passed by the Senate and is under consideration by the House. Congressional wrath over the coal mine strike and over the wildcat strikes impeding war production at week's end indicated the bill might be passed.

While the time lost in many of the brief wildcat strikes often is not great,



*Sixty-six game takes place of picks and shovels. Idle miners, part of the more than 400,000 out on strike, pass the time by playing cards in a tavern near the Coverdale No. 8 mine in the Pittsburgh area. Acme telephoto*

their effect is more disastrous than the lost man-hours would indicate. Often these stoppages halt the shipment of component parts to another plant which may be forced to interrupt production. This second plant in turn falls behind on scheduled deliveries to an assembly plant whose production likewise is interrupted for want of parts.

Number of strikes and workers involved increased during the first quarter of this year over the comparable 1942 period, according to Labor Department statistics. Man-days lost were 850,000 for the first three months, 450,000 in January, 170,000 in February and 230,000 in March. In April this figure rose to 675,000.

In May, the most serious outbreak of stoppages since Pearl Harbor was experienced. Although figures still are incomplete, three major stoppages, the coal mines, in Chrysler's plants at Detroit, and in four rubber plants at Akron, raised the time lost figure to a new high. Only in the coal stoppage were the issues clearly defined.

Issues Not Clear

The Chrysler strike involved 28,000 employes in six plants. Their walkout appeared to mystify even R. J. Thomas of the UAW-CIO, who said he was going "to get to the bottom of this thing". If he ever did, no one appears to be the wiser.

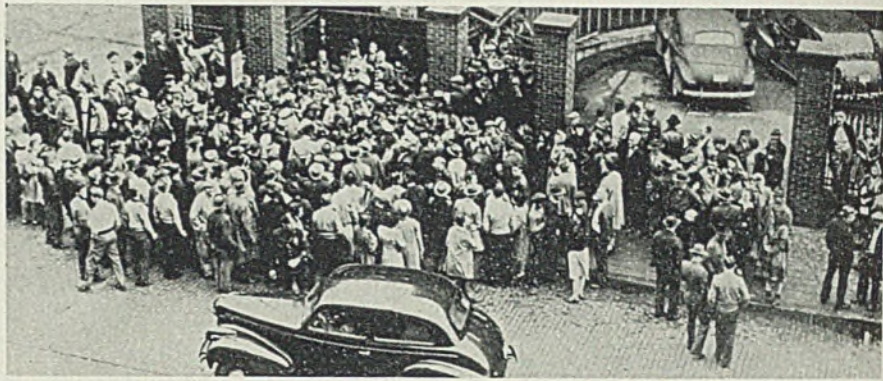
The Akron rubber strike affecting more than 50,000 workers for five days was touched off by a WLB wage decision.

More than 20,000 struck at Packard Motor Car Co., Detroit, over the upgrading of three Negroes.

Other Detroit stoppages involved fewer men but nevertheless represented irretrievable loss of production time. These included strikes at Timken-Detroit Axle Co., American Metal Products Co. and Budd Wheel Co.

Strange aspect of the walkouts was that while denounced as unauthorized by UAW-CIO officials, union sound trucks and specially painted signs appeared almost instantly after the men left their jobs and started parading around the plant gates.

It is possible the recent wave of "unauthorized" strikes ties in more than a little closely with a publicity campaign which the UAW-CIO has instituted for home-front reforms. In the latest full-page newspaper advertisement the union pulls no punches in an attack on Congress. In part it reads: "Congress is turning OPA over to the food profiteers . . . Congress is refusing to permit a roll back of prices . . . Profiteers have established pill-boxes in the committee rooms for Congress. They are shooting at all price control . . . Congress has bowed to the



Workers in hundreds of war plants reporting to work in recent weeks have been met with a blockade formed by union pickets. Usually, the strikes have been called for minor causes and have lasted only a short time. NEA photo

Wall Street-manipulated farm bloc, but it has refused to help small farmers . . . Congress has removed the \$25,000 ceiling on big salaries, but it has insisted that your wages and ours be frozen. Congress continually snipes at President Roosevelt. Too many Congressmen hate Roosevelt more than they hate Hitler."

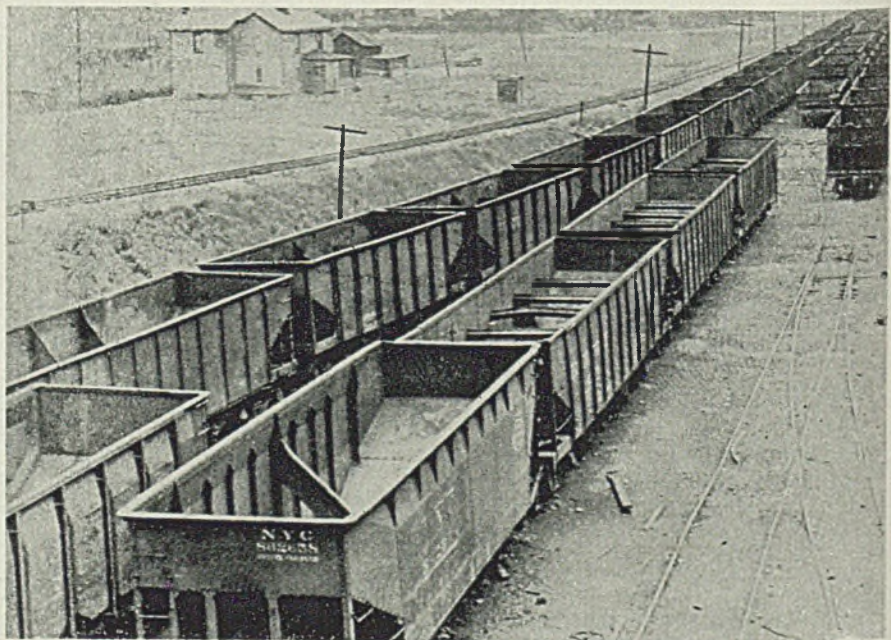
The UAW-CIO urges its 979,267 members to write or wire their Congressmen, asking for prices to be rolled back to the May 15, 1942, level, strengthen the OPA, give the War Labor Board power to adjust all industrial disputes, and extend aid to millions of small farmers. "Tell him you're keeping score for '44," the UAW rhythmically admonishes its members to advise each Congressman.

Chicago metalworking plants have suffered numerous petty strikes but, for the most part, these have affected specific departments rather than whole plants.

Chiefly involved have been units of one large steel producer, foundries, tool and die shops, etc. Production lost in most individual cases has not been heavy, but in the aggregate it has been a blow to the war effort.

Explained as unauthorized in practically every instance, these strikes appear to have wage rates as their cause. Even though grievances have been presented formally and are under negotiation between management and labor representatives according to prescribed collective bargaining procedure, workers apparently champ at the bit over delay and attempt to force action by walking out.

Union officials publicly brand the resulting work stoppages as illegal and violations of contracts. Nevertheless, they appear unable to control their rank and file and get them back to work, which leads one to suspicion that unions



While empty coal cars await much-needed coal on a siding at a Pittsburgh area mine, nearly half a million miners awaited signing of a contract before they would return to work. Acme telephoto



may to a degree condone the acts which the workers precipitate.

Among steelmakers at Chicago, Carnegie-Illinois Steel Corp. is the sole target for work interruptions. For weeks disturbances have been going on in its various plants almost continuously. During April, more than 20 strikes occurred in one two-week period, and a flare-up starting May 15 did not bring a complete work resumption until May 31.

The wave of strikes and work stoppages at Carnegie-Illinois in April significantly interrupted production of steel for ordnance and other war equipment.

All production at Wickwire Spencer Steel Co.'s plant at Buffalo was halted late last week by a strike of approximately 1500 workmen. General Superintendent William A. Steele said the work stoppage followed a union grievance over employment of 13 workers on a part-time basis. The men walked out leaving steel in the open-hearth furnaces and left the blast furnaces unbanked. Three open hearths and two blast furnaces were affected.

In the New York metropolitan district loss of man-hours has shown a sharp increase this spring. In April at least 113,396 man-hours were lost, as a result of seven strikes, involving 3973 employees. This compares with 27,859 man-hours in March, 69,512 in January (the largest up to that time in a number of months), and only 1272 in April last year. Actually the figures probably run heavier, as those used here are based solely on items appearing in the New York press.

Much of the recent trouble has been attributed to dissatisfaction over government wage-freeze orders and particularly over the War Labor Board's disposition to adhere to the "Little Steel" formula in meeting demands for higher wages.

The Cleveland area experienced 17 strikes in May, involving 5400 men and causing a loss of 35,000 man-hours. All were unauthorized and most were designed to force the WLB to speed up action on wage increase demands. During the first five months, Cleveland has had 53 strikes resulting in a loss of 255,000 man-hours.

## WLB Tightens Restrictions On Wage Adjustments

National War Labor Board last week tightened restrictions around individual wage and salary adjustments which can be made without board approval. The board's general orders Nos. 5 and 9 had authorized employers without further board approval to grant individual increases for merit, length of service, promotions, or reclassifications, or increases which were called for by the operation of an apprentice or trainee

system. Such increases had to be within established wage or salary rate schedules and could not be made if they increased price ceilings.

The board has found, however, the wage stabilization program was being circumvented by granting wage increases on the grounds they were within an established wage or salary rate schedule when, in fact, no bona fide schedule was in existence. To plug this loophole,

and to remove any doubt as to whether individual increases can be granted without board approval, the board adopted general order No. 31, amending general order Nos. 5 and 9.

Individual increases now may not be made without board approval after May 31, 1943, unless they are within a salary or wage rate schedule which conforms to various conditions listed by the commission.

## Present, Past and Pending

### ■ SHIPYARDS TOP 1943 PRODUCTION GOAL RATE

WASHINGTON—Merchant shipyards delivered 175 vessels aggregating 1,782,000 deadweight tons in May, a new monthly record, the Maritime Commission reports. Output now has reached an annual rate of 20,000,000 tons or 1,000,000 above the 1943 production goal.

### ■ RECORD PRODUCTION OF BRASS REPORTED

WATERBURY, CONN.—Production record was set by American Brass Co. during the first quarter of 1943. Since 1939 the company has been able to almost triple its output of brass and fabricated copper with its production of brass for ammunition alone increased more than eighty times its production total that year.

### ■ MAY PLATE SHIPMENTS SATISFACTORY

WASHINGTON—May plate shipments are reported at 1,114,920 net tons. Showing for the month is described by WPB authorities as "very satisfactory performance" against directives which were set up for the industry. All-time production record was set in March.

### ■ ALUMINUM FOIL SCARCITY DISCUSSED

WASHINGTON—Scarcity of aluminum foil was reported at a recent meeting of the aluminum pigment manufacturers with the WPB and action was recommended to halt remelting and to uncover new supplies.

### ■ BANKS STACK AS COAL SUPPLY SHRINKS

CLEVELAND—Republic Steel Corp. late last week advised government authorities it was being forced to bank one of its two blast furnaces at Birmingham, Ala., at once because of inadequate supplies of coal which the company estimates amount to five full days of operation. Second stack will have to be banked within a few days.

### ■ COOPER-BESSEMER BROADENS OPERATIONS

NEW YORK—Although its plants are busy building diesel engines and generator sets for the Navy, Coast Guard and Maritime Commission and diesel and gas engines and compressors for vital war industries, the Cooper-Bessemer Corp. also is producing a large volume of machine tool shanks for other war industries.

### ■ RADIO INDUSTRY HOLDING HUGE BACKLOG

NEW YORK—Radio manufacturing companies have an estimated \$6,000,000,000 backlog of war orders on their books. This is enough business to keep them going for a year and a half based on current production rate. Developments in the electronics field make postwar prospects highly promising.

### ■ REPORT TUBULAR GOODS PRICES STUDIED

PITTSBURGH—Reports are current here that the Office of Price Administration is considering a rollback of some tubular goods prices. The report follows a recent meeting of producers here recently.

### ■ PRIME CONTRACTORS PASS PAYMENTS ON

WASHINGTON—More than half of government payments involved in prime war contracts placed with companies holding the bulk of war orders is being passed along to subcontractors or spent with outside firms for the purchase of materials and services, study by the National Association of Manufacturers shows.

# Steel Union Given Consultive Rights in Hiring and Firing

*War Manpower Commission confers privilege in new order putting Longer Hours regulation into effect Aug. 1 instead of July 1. . . First time CIO has been so favored*

LABOR unions are granted the right to be consulted on hiring and discharge actions in steel plants under an order issued last week by War Manpower Commissioner Paul V. McNutt placing the iron and steel industry on a 48-hour work-week effective Aug. 1 instead of July 1.

This was believed to be the first time the government has ever permitted labor unions the right to be consulted on what has been held to be a purely management function.

Instructions for extension of the 48-hour week to all branches of the industry were issued to all regional war manpower directors in pursuance of general order No. 8 issued on May 1. Under that order plants which could not obtain a minimum wartime work-week of 48 hours by July 1 were required to submit by that date a release schedule indicating when workers made available by increased hours of work can be released.

## Release by Aug. 1

The new instructions require that workers released under the provision must be released by Aug. 1 except in exceptional cases requiring special approval.

The instructions permit regional directors to grant temporary exemptions only for reasons beyond the control of the employer and only as long as the circumstances on which the exemption was based continues to exist.

Regional manpower directors shall approve or initiate release schedules, or applications for exemptions, or applications for the approval of hiring only after consultation with representatives of management and of the union which has been recognized as the collective bargaining agency in the establishment.

Workers and jobs exempted from the maximum hour provisions of the federal fair labor standards act, office and clerical workers of executive sales and administrative offices as distinguished from general mill offices, shall be exempted from the requirements of section III and V of order No. 8 as long as and to the extent that employment opportunities are not generally available to such workers upon their release.

The War Manpower Commission es-

timates this action will have the effect of adding the equivalent of 50,000 workers to the labor force by Aug. 1.

It is contended by steel leaders, industry wide application of the 48-hour week will add \$100,000,000 annually to payrolls by compelling employers to pay time and one-half wages for hours in excess of 40 weekly.

## Steel Advisory Committee Holds WMC Hours Regulation Confusing

EXPRESSING concern over the likely effect on steel production of the 48-hour week ordered into effect in the industry Aug. 1 by the War Manpower Commission, Walter S. Tower, as spokesman for the Steel Industry Advisory Committee, last week in a letter to Hiland Batcheller, chief of the WPB Steel Division, states preliminary studies of the commission's order indicate the committee's apprehensions with respect to the longer week as set forth in a statement on May 13 are fully justified.

"The Steel Industry Advisory Committee of the steel division, WPB, is seriously concerned over the likely effect upon steel production of the amendment to regulation No. 3 just issued by the War Manpower Commission dealing with the establishment of the 48-hour week in the steel industry," it is stated in the letter.

"The committee has not had time to explore all of the possible effects of the regulation but preliminary studies indicate that the apprehensions set forth in the statement presented to the chairman of the War Manpower Commission on May 13 were fully justified.

"The regulation purports to define and interpret, but it only confuses. It fails to answer most of the practical operating problems which have been clearly pointed out by the industry in statements to the commission.

"The industry has repeatedly declared its approval of the 48-hour week or any number of hours that may be necessary to produce enough steel to win the war. Your advisory committee has earnestly sought to co-operate with the War Manpower Commission to the

The steel industry right along has maintained production above 98 per cent and can not be increased by lengthening the hours of work.

According to Mr. McNutt the industry was averaging 41.5 hours of work per week on May 1 with some plants running as low as 37 hours.

McNutt, speaking to reporters, said the regulations were not put before the Management-Labor Policy Committee of the War Manpower Commission for approval, but stated they were discussed with representatives of management and labor in the industry. He further said these representatives agreed to most of the points covered by the regulations and that the commission followed a middle-of-the-road policy in deciding points on which there was disagreement.

end that 48-hour week could be made effective without retarding production in any way.

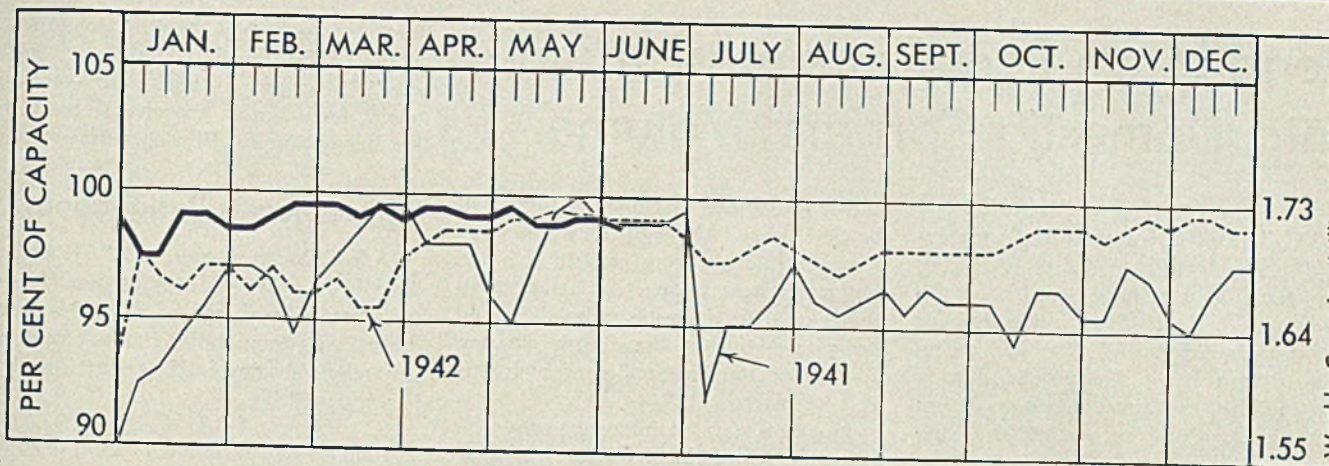
"That committee has submitted detailed suggestions based on practical experience in scheduling and operating steel plants. It hoped that these suggestions would be included in the commission's formal instructions but, in the main, they have been disregarded. Actually, the instructions as issued fail to clarify and, in some cases, fail to mention at all certain provisions of vital importance to uninterrupted production.

## Must Get Permission

"Specifically, the regulation requires steel companies to get the permission of the regional directors of the War Manpower Commission in all cases of exemption from the 48-hour week or in the hiring of all new employees. These regional directors, it is assumed, would consult with the regular established management-labor advisory committees. However, the regulation requires that they must consult in each specific case with the union which is the collective bargaining agency in the particular company involved.

"Consider what that means in order to keep mills operating at current capacity levels. The steel industry must hire about 20,000 new workers monthly to provide for the turnover, which is averaging about 4 per cent monthly. This turnover is expected to increase sharply with greater inroads of the draft. Already the industry is having difficulty in finding the thousands of new workers it must have monthly.

(Please turn to Page 182)



STEEL INGOT PRODUCTION BY MONTHS

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670	7,374	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,386
1942	7,124	6,521	7,392	7,122	7,044	6,792	0,812	6,997	6,811	7,236	6,960	7,184
1941	6,922	6,230	7,124	6,754	7,044	6,792	0,812	6,997	6,811	7,236	6,960	7,184
PIG IRON PRODUCTION												
1943	5,194	4,766	5,314	5,035	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,236
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,236
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,000

## Steel Output Heavy

*Institute reports production for four months totals 22,196,829 net tons*

STEEL manufactured for sale by the industry in the first four months of 1943 is reported by the American Iron and Steel Institute at 22,196,829 net tons. At the same average rate through the remainder of the year the total would be 66,590,497 tons.

The Institute figures include reports from 184 companies, which in 1942 represented 98.8 per cent of total output of finished rolled steel products produced by the industry.

Production figures for the first three months appeared in STEEL, May 17, page 76.

Plate production led in April with 1,070,060 tons, at the rate of 141.5 per cent of rated capacity. Mechanical tubing was second with 65,071 tons, at 132.3 per cent of capacity. High records were made also by steel bars at 91.1 per cent and drawn wire at 83.8 per cent in the month of April.

Conversion of strip mills to production of plates resulted in output of hot-rolled strip being only 49.9 per cent and cold-rolled strip 57.9 per cent of rated capacity.

Diversion of steel to other purposes cut deeply into production of steel rails, standard rails over 60 pounds being at only 45.6 per cent of capacity, rails under 60 pounds 63.2 per cent and other rails, including girder and guard rails, at 30.4 per cent.

## DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended June 5	Change	Same week 1942	1941
Pittsburgh	98.5	-0.5	95.5	100.5
Chicago	97	None	104.5	101.5
Eastern Pa.	95	None	96	97
Youngstown	97	None	94	97
Wheeling	94	+1	81.5	88
Cleveland	95.5	-0.5	94	93
Buffalo	90.5	-2.5	90.5	93
Birmingham	100	None	95	95
New England	95	+5	89	90
Cincinnati	94	+10	91.5	91.5
St. Louis	91.5	+4.5	98	98
Detroit	80	-14	87	92
Average	98.5	-0.5	99	99

\*Computed on bases of steelmaking capacity as of those dates.

## Ingot Rate 98½%

*Steelworks operations declining slightly. One blast furnace stack blown out*

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week declined ½-point to 98½ per cent, mainly because of necessity for furnace repairs. Four districts advanced, four declined and four were unchanged from the preceding week.

Largest increase from preceding week was at Cincinnati, where the rate advanced 10 points; New England and St. Louis districts reported increases of 5 and 4.5 points; respectively.

Jones & Laughlin Steel Corp. blew out its No. 4 Aliquippa blast furnace stack June 1 for relining.

## Canada's Steel Volume Shows Slight Decline

Canadian steel and iron production continues to run below the high marks of 1942. According to figures by the Dominion Bureau of Statistics output for April and for four months this year was under totals for the corresponding periods last year.

Production for April and four months, with comparisons, in net tons, are as follows:

	Steel ingots castings	Pig iron	Ferro-alloys
April, 1943	264,357	150,486	17,094
March, 1943	270,962	160,101	18,611
April, 1942	264,988	160,408	18,128
4 Mos. 1943	987,915	565,154	69,493
4 Mos. 1942	1,032,828	634,653	73,751
4 Mos. 1941	845,780	447,568	65,032

## Commercial Slag Yields Large Iron Tonnage

Production of air-cooled and water granulated blast furnace slag in 1942 totaled 19,122,718 net tons, compared with 14,678,266 tons in 1941. Sales were 19 per cent greater than in 1941 and average value per ton was one cent less.

These figures are based on a survey by the National Slag Association, covering 31 companies that prepare slag for commercial use, results being assembled by the Bureau of Mines.

Practically all the commercial output is produced east of the Mississippi river, chiefly at steel centers in Ohio, Alabama, Pennsylvania, Illinois and Indiana.

Incident to crushing and screening of slag, particles of metallic iron were recovered to a total of 165,679 net tons, the yield being about 24 pounds to each ton of slag processed.

# Lend-Lease Requirements Cutting Into Domestic Carriers' Volume

PITTSBURGH

INCREASING volume of rails for export under lend-lease orders is cutting into the volume of rails available for the domestic market. Steel directives for conversion into rails have been maintained at a fairly steady level during most of this year and there is no reason to believe with the present critical situation in steel that rail directives will be increased to meet the higher export demands. For that reason rail mills expect the domestic buyers to be cut back substantially from current expectations.

The car situation remains virtually unchanged. Because of manpower and material difficulties, the program is lagging. The 39,000 Army cars, plus 20,000 domestic cars, which were originally set up as the program for the first half of 1943, will probably not be completed until the end of the third quarter. The Army program certainly will not be finished before the end of September, and while there may be some lag in the domestic car program, in all probability there will be little idle time in carbuilders' shops until after the end of the third quarter. Thus far the fourth quarter is uncertain. There are 1600 cars already placed by the Army which will be produced during that period, including 1200 troop cars and 400 kitchen cars. There is talk now of an additional 10,000 cars to be placed by governmental agencies,

and it is assumed that most of these will be lend-lease, although there may be some additional Army cars in this lot. Originally it was expected 10,000 additional cars for domestic railroads would be placed during the fourth quarter, and it is certain a number of such cars will be placed.

Programs for maintenance and for construction of locomotives will continue as planned and probably will show some increase. Pressure for materials for repair and maintenance work is constantly increasing. Wear and tear on cars is great, and some railroad sources claim that if substantial increases in materials for repair and maintenance are not given shortly, there may be a general collapse next winter. This is particularly true of hopper and tank cars.

## Impossible To Classify Cars

Another serious problem is the fact that because pressure for rapid shipment is so great, there is insufficient time to classify box cars, with the result high-grade cars normally restricted for the shipment of quality products, including grain and other material which must be kept clean, have been used for the shipment of lower grade commodities, have not received the proper maintenance, and no longer are fit for hauling high-grade or perishable goods.

The locomotive program is dependent

to a large extent on the number of locomotives to be placed by lend-lease. Substantial increase in lend-lease commitments, including an expected large order for locomotives for Russia, is rumored.

## Appointments-Resignations

Donald Wallace and A. C. Hoffman have been appointed acting deputy administrators in charge of the OPA price department, temporarily succeeding deputy administrator J. H. Galbraith who has resigned.

William K. Frank has been appointed director of the Equipment Bureau, WPB, succeeding Harry Rapelye who has resigned to resume his executive position with the Continental Can Co.

Paul R. Taylor, Upper Montclair, N. J., has been appointed director of the Natural Gas Division, Office of War Utilities. He has been vice president of Stone & Webster Service Corp., New York.

Clyde Vandeburg has resigned as deputy director of the Office of War Information and as chairman of the government's Inter-Agency Production Information committee. Mr. Vandeburg returns to private business.

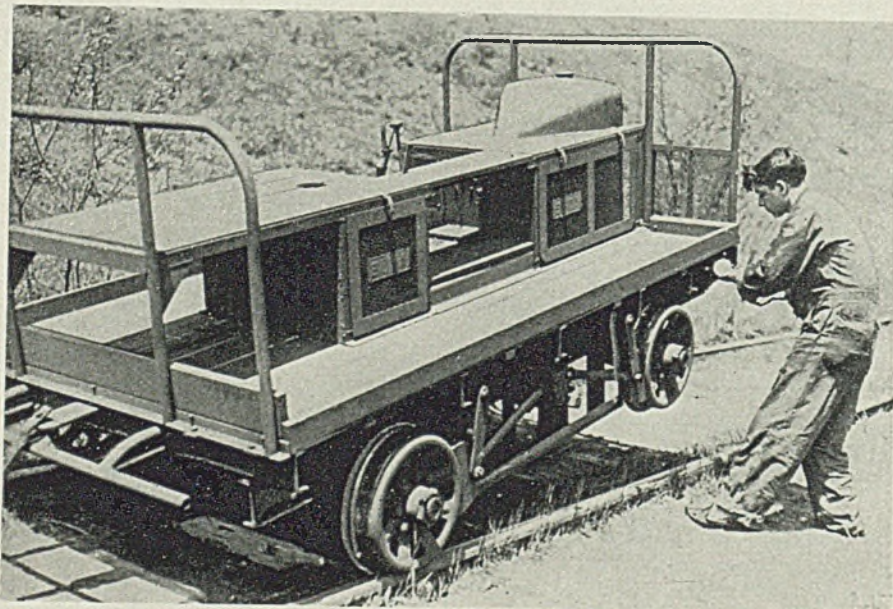
Phillip B. Hofmann has been appointed deputy director of the field service of Smaller War Plants Corp. and will assist in organizing and servicing regional and district offices throughout the country. He has been granted a temporary leave of absence as president of Ortho Products Inc., Linden, N. J.

## Carnegie is Indicted in Ship Plate Investigation

While indicting the Carnegie-Illinois Steel Corp., subsidiary of the United States Steel Corp. on charges of "concealing and destroying" records of ship plate tests at the company's Irvin works, a federal grand jury at Pittsburgh failed to indict four employees named with the company in a presentment to the court.

Indictment of the company grows out of an investigation by the Senate Truman committee last March.

Commenting on the grand jury investigation, J. L. Perry, president of the company, said if any concealment or destruction of records occurred, it was done without the knowledge or approval of the management. He farther stated he had the utmost faith in the employes of Irvin works and believed they have done a remarkable job of production of plates vitally needed in the war production effort.



*This self-propelled car has wheels so attached that they may be adjusted to fit any gage track from the 30-inch Australian roads to the 66-inch Russian tracks. The new car comes in three models for light inspection, heavy duty or heavy trailer work. It was designed especially for the Army and is being built by the Buda Co., Harvey, Ill. NEA photo*

# Have We a War Cabinet?

*Byrnes takes over control of home front, charged with resolving interdepartmental controversies, eliminating duplication and co-ordinating military machine and essential civilian economy*

CREATION of the Office of War Mobilization, headed by James F. Byrnes, former director of economic stabilization, has been met with mixed reactions.

Theoretical advantages of the new organization are not disputed. It is compact. It is the nearest approach to a real war cabinet, long urged by industrial leaders, that has been set up since the defense program was launched in mid-1940. It promises to dovetail more closely the civilian economy and prosecution of the war. It is designed to resolve the many inter- and intra-departmental controversies that long have plagued the war effort.

However, the country has been through too many reorganizations in the past three years not to temper optimism with cautious doubts. While most of these reorganizations in themselves were improvements, their effect was to disturb further the war production, pricing and other machines. Able executives, doing an effective job, suddenly found their authority swept from under them, or at least endangered. The effect has been wholesale resignations and changes in personnel.

Another question that arises is whether the President this time actually is delegating real powers to Mr. Byrnes, and his advisory committee, or whether he will make these powers nominal, reserving important decisions for himself.

On the surface, there is good reason to expect that the new organization will accomplish its mission: "Streamline our activities, avoid duplication and overlapping, eliminate interdepartmental friction, make decisions with dispatch and

keep our military machine and our essential civilian economy running in team and at high speed."

Mr. Byrnes takes over at a time when war production is well over the hump, as indicated in his radio address last week citing impressive figures. He takes over also at a time when many of the elements of an economic crackup are pressing against the administration's tenuous "hold-the-line" policy.

Subordinated to Mr. Byrnes are WPB Chairman Donald M. Nelson, who directed the make-ready and production phases of the war program, and the military procurement agencies. Mr. Nelson, Secretary of War Henry Stimson, Secretary of Navy Frank Knox are members of the OWM advisory committee, as are Harry Hopkins, the President's man Friday, and Fred M. Vinson, former justice of the District of Columbia. Justice Vinson succeeds Mr. Byrnes as director of economic stabilization.

## War "Czars" Omitted

Omitted from the advisory committee are such war "czars" as Chairman Paul V. McNutt, War Manpower Commission; Harold L. Ickes, fuel co-ordinator; Chester Davis, food administrator; William H. Davis, War Labor Board; Prentiss Brown, price administrator.

Some observers called the new office a war cabinet, while others held this term could not be applied in a strictly literal sense because matters of military strategy clearly are outside its jurisdiction. It is, however, an organization for disposing of issues which have hampered progress on the home front simply be-



JAMES F. BYRNES

cause there was no one except the President empowered to handle them.

Commenting on his position, Mr. Byrnes pointed out the new agency will relieve the Chief Executive of many burdens and allow him more time to concentrate on the problems of military strategy and to confer with other leaders of the United Nations.

The new OWM head often has been referred to as assistant president since Mr. Roosevelt persuaded him to relinquish a lifetime \$20,000 a year job as Associate Justice of the Supreme Court to become director of economic stabilization, with offices in the White House.

Justice Vinson had served five years on the United States Court of Appeals after 14 years in the House of Representatives.



DONALD M. NELSON

FRED M. VINSON

FRANK KNOX

HENRY STIMSON

HARRY L. HOPKINS

# 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

**COPPER CABLE:** War Production Board has ordered major cable companies to ship a definite amount of copper cable into their regular warehouses each month. Cables accumulated in warehouses will be available for withdrawal, as requirements of the mining industry demand, by the mine's certification of its serial number or the certification of a mine serial number by a manufacturer. The cable will be handled through the regular distribution organization of each cable manufacturer.

**STEEL DRUMS:** Users of new steel shipping drums have been advised by War Production Board of the correct procedure in obtaining a preference rating required prior to submitting application on PD-835 for authorization to purchase new containers. A user not operating under CMP or PRP, who does not have an assigned preference rating, must first obtain such rating on PD-25F or CMP-4B. After receiving the rating, he should apply for authority to purchase new steel shipping drums on PD-835. A user operating under CMP or PRP, who does not yet have an assigned rating, must file for such rating on PD-1-A.

Forms PD-25F and CMP-4B should be addressed to the WPB in Washington while PD-1A's should be filed with the local WPB field office. If the amount involves \$500 or more, PD-1A's and PD-835's should be filed simultaneously, thereby saving the time required to obtain preference ratings and purchase authorizations separately.

**Machine Tools and Capital Equipment:** Two new tests will be applied by WPB regional offices before approval is given to priority ratings assigned by officers of the Army, Navy, or other government agency for delivery of machine tools and capital equipment. These are: (1) item requested must be required urgently, and (2) no suitable second-hand equipment or subcontracting facilities are available. These checks are waived, however, when deliveries are valued at \$500 or less; when the counter-signing by the procurement officer takes place outside of the continental United States or Canada; and when purchases are approved by commanding officers and other listed in Priorities Directive 2 in emergencies precluding advance approval by a WPB official.

## CMP REGULATIONS

**ARMOR PLATE:** WPB classifies rolled armor plate in the form and shape into which it is rolled and prior to any subsequent fabrication as a controlled material; rolled armor plate further processed as a Class A product and not a controlled material, irrespective of whether its shape is changed; forged armor plate, irrespective of form and shape, as Class A product and not controlled material. (Directive 10, CMP Reg. No. 1)

**CONDENSER TUBES** have been exempted from the limitations on deliveries of brass mill products from warehouse stocks. Under CMP regulation No. 4, brass mill warehouses may deliver up to 500 lb. on single deliveries of any one item on authorized controlled materials orders or on orders rated AA-5 or higher but such deliveries may not exceed 2000 lb. in any one month. (CMP Reg. No. 4)

## L ORDERS

**ICE REFRIGERATORS:** An additional 25,975 units to manufacturers' quotas for the second quarter have been assigned. Total production of 239,575 ice-boxes has been authorized for civilian use. This is in addition to units that may be produced for National Housing Administration projects. Quotas have been assigned to

the following six new companies: Chattanooga Stamping & Enameling Co., Chattanooga, Tenn.; Getz Bros. & Co., San Francisco; Minton Lumber Co., Mountain View, Calif.; C. Nelson Mfg. Co., St. Louis; Seneca Furniture Co., Seneca, S. C.; and Victory Mfg. Corp., Baltimore. Quota of American Fixture & Mfg. Co., St. Louis, has been raised to 10,000 units from 5000. Although ten ice-boxes are now being produced from the same amount of steel that was used in one unit in pre-war years, supply of steel for civilian use remains scarce. (L-7-c)

## INDEX OF ORDER REVISIONS

Subject	Designation
Armor Plate	CMP No. 1
Coal Stokers	L-75
Condenser Tubes	CMP No. 4
Construction Machinery	L-192
Copper Cable	CMP Directive
Farm Machinery	M-330
Farm Supplies	PR-19
Galvanized Ware	L-30-a
Hand Tools	L-216
Ice Refrigerators	L-7-c
Lead	M-38
Pressure Gages	L-272
Radio Tubes	L-76
Refrigerating Equipment	L-38
Steel Shipping Drums	CMP No. 3
Utilities	U-1

### Price Regulations:

Chrome Ores	No. 258
Insect Screen Cloth	No. 40
Iron, Steel Scrap	No. 4
Machines and Parts	No. 136
Pressure Cannery	No. 188

**GALVANIZED HOUSEHOLD ARTICLES:** Iron and steel may be used in production of garbage and ash cans and pails up to 75 per cent of amount used in 12 months ended June 30, 1941. This compares with the previous rate of 50 per cent. Kerosene and gasoline storage cans, previously banned, may be produced up to 50 per cent of the base period rate of use of iron and steel. Buckets for bored wells and cans in which oil is sold to consumers and which are produced in fulfillment of a purchase order accompanied by a WPB authorization as described in M-255 are exempted from restrictions. (L-30-a)

**REFRIGERATING AND AIR CONDITIONING EQUIPMENT:** Orders for industrial and commercial equipment must bear preference ratings of AA-5 or higher compared with AA-4 previously required. (L-38)

**COAL STOKERS:** "Grate area" has been re-defined to provide that side dump plates designed to burn coal are to be considered a part of the "grate area." (L-75)

**RADIO TUBES:** Manufacture is permitted to fill orders carrying a minimum rating of AA-1 instead of A-1-j. (L-76)

**CONSTRUCTION MACHINERY:** Prohibition of sale of certain types of following machinery and equipment in inventories has been removed: graders, levellers, scrapers and other items listed in Schedule D of the order (L-192)

**HAND TOOLS:** Production of wrenches, pliers and nippers has been simplified by addition of two schedules to the applicable order.

Number of sizes has been reduced and use of alloy steel curtailed. (L-216)

**PRESSURE GAGES AND REGULATORS:** The following have been added to order L-272: Schedule IV which specifies sizes and pressure ranges in which gages may be manufactured; and Schedule V which specifies sizes and pressure classes for steel, iron and bronze regulators as well as materials to be used for inner valves and seat rings and for bolting material. Exceptions are allowed to meet requirements of the armed services. Where Schedule V conflicts with L-134, which curtails use of chromium and nickel in industrial instruments, the less restrictive order will govern. (L-272)

## M ORDERS

**LEAD:** Use of lead as a substitute for more critical materials going into essential production has been made more readily available. The 90 per cent limitation which existed on all uses has been eliminated and restrictions now apply only to non-essential uses. Certain items under the heading "building supplies" in the order have been omitted to make the prohibitions on such supplies conform to those of the Army and Navy list; non-essential uses of foil which are prohibited are specified; lead may be used for certain limited purposes in caskets and casket hardware. The following orders have been formally revoked: old M-38, 38-a and b, and 38-d to i, inclusive; M-38-c has been superseded. (M-38)

**FARM MACHINERY:** A new general preference order provides for issuance by WPB of directives to manufacturers and distributors to make certain farm supplies available. Order provides for emergency action by manufacturers and distributors to get into retail channels without delay adequate quantities of some 66 items most urgently needed by farmers. Additional details are given on page 99. (M-330)

## PRIORITIES REGULATIONS

**FARM SUPPLIES:** Farmers have been granted a priority to buy 144 items needed to increase food production. Dealers must fill all orders for items covered in the regulation if accompanied by a signed certificate; as specified in the order. Dealers may use farmers' certificates to get priority on orders for farm supplies up to 75 per cent of dollar amount of his sales. Additional details given on page 99. (Priorities Regulation No. 19)

## U ORDERS

**UTILITIES:** Minor changes have been made in the order covering materials required by utilities to provide a more equitable inventory base for MRO supplies for water utilities. In effect, changes make 1940 the operating base year instead of 1942. (U-1)

## PRICE REGULATIONS

**IRON AND STEEL SCRAP:** Twelve changes, designed to adjust pricing requirements to changing conditions in iron and steel scrap field, have been made by Office of Price Administration. Changes include establishment of provisions covering weights to govern pricing of scrap shipments, addition of new listed grades of scrap, establishment of a "floor" of \$14 per gross ton for No. 1 heavy melting steel, and designation of new "remote" points to which preparation in transit privileges will apply. Details of the revisions are published on page 178 of this issue. (No. 4)

**BUILDERS' HARDWARE AND INSECT SCREEN CLOTH:** Methods for pricing new models or types of cloth sold by manufacturers and jobbers have been revised to conform to methods being used by manufacturers of other consumer goods. Four pricing methods contained in regulation No. 188 (Manufacturers' Maximum Prices for Specified Building Materials and Consumer Goods Other Than Apparel) will now be applied by manufacturers for determining prices of builders' hardware or

bronze or copper insect screen cloth, but not painted steel or galvanized screen cloth which was not manufactured during the period between Oct. 1 and Oct. 15, 1941. A jobber's maximum price on new models or types sold or offered for sale by him after June 3, 1943, is determined by a 33 1/3% mark-up over price paid by him plus transportation charges paid in obtaining delivery. (No. 40)

**PRESSURE CANNERS:** Specific prices have been established for pressure canners to be placed on the market immediately by National Pressure Cooker Co., Eau Claire, Wis.; Burpee Can Sealer Co., Barrington, Ill.; and Wisconsin Aluminum Foundry Co., Manitowoc, Wis. Allocations of steel have been made for production of 150,000 units which have enamel-covered steel bottoms and tin-plated steel covers. (No. 188)

**CHROME ORES:** Sellers may increase their maximum prices by an amount equal to the extra expense entailed in loading when a buyer of metallurgical-chemical chrome ore asks that a shipment be made by box car rather than gondola car. (No. 258)

## OPA Sets Ceiling on Tinny and Zincy Bronze

Maximum prices have been established for following new grades of copper alloy scrap: 10.50c for tinny bronze (phosphor bronze) solids and 8c for zincy bronze solids, both subject to established deduction for non-metallic impurities. Amendment No. 1 to price regulation No. 20 also establishes maximum of 6.04c per pound, f.o.b. point of shipment, for lead-covered telephone and power cable scrap. It exempts from price control the charge made for processing copper-bearing material on toll. Yellow brass castings are moved to Group 2 from Group 3 in quantity premium classifications.

## Turnover Requirement for Auto Graveyards Suspended

The 60-day turnover requirement for automobile graveyards has been suspended to allow owners to comply fully under the WPB order M-311. This order provides that on and after June 1, no auto wrecker or scrap dealer, regardless of any previous contract, agreement or other commitment may scrap, sell as scrap, or deliver as scrap serviceable used automobile parts of the principal functional types.

## Monthly Purchase Limits In CMP Reg. No. 1 Removed

War Production Board has eliminated the monthly percentage restrictions previously imposed on placement of controlled material orders. CMP regulation No. 1 prohibited, prior to the amendment, placement of orders calling for delivery of more than one-third of amount of a quarterly allotment during the first month of a quarter, or more than two-thirds during the first two months of the quarter.

# Facilities Bureau Seeks Maximum Utilization of Present Plants

**ORGANIZATION** of the Facilities Bureau to attain maximum utilization of the nation's existing plant facilities and to plan minimum of new war construction was announced last week by the War Production Board.

The bureau will be headed by Charles E. Volkhardt, who was named director April 1. The bureau reports to Vice Chairman Ralph J. Cordiner.

Directors of the three divisions are F. J. C. Dresser, Projects Division; J. B. Campbell, Production Resources Division; W. E. Mullestein, Progress and Scheduling Division. These divisions will replace Facilities Program Division, Construction Division, and Facilities Division, all of whose functions will be absorbed by the new units.

Realignment of the Facilities Bureau has been carried out to provide a close-knit organization to administer the new WPB policies controlling future facility expansion. The bureau will provide staff services for the newly-organized Industrial Facility committee and Non-Industrial Facility committee, bringing together figures on requirements and supply of facilities and will recommend programs to the Program Vice Chairman.

The Construction Division, which has been located in New York, will be transferred to Washington where it will be absorbed into the Project Division. Actual transfer will be completed by June 30.

The Facilities Division will become the Production Resources Division. The order provides for transfer of the redistribution function of the Redistribution Division relating to used machine tools and metal working machinery to the Facilities Bureau. This latter does not include the functions involving requisitioning, financing, and pricing.

As now organized, the Facilities Bureau will perform the following functions:

1. Review and analyze requirements for, and supply of, facilities and construction.
2. Analyze essentiality of facility and construction programs and make recommendations to the appropriate facility committee.
3. Review unfinished facility and construction programs to determine current essentiality and recommend to the appropriate facility committee the elimination of nonessential programs.
4. Assist industry divisions and claimant agencies to increase maximum utilization

of existing buildings and facilities.

5. Reduce to a minimum the use of critical materials for construction, capital equipment, tools and machinery.

6. Plan the scheduling of facility programs and projects.

7. Maintain current information on progress of facilities or construction and render whatever assistance as required in completing such programs and projects.

8. Initiate limitation and conservation orders and promote development and use of construction standards and specifications necessary to conserve materials, labor, and facilities, and administer these orders which regulate the amount and character of construction.

9. Establish procedures and standards for processing through WPB proposed facility and construction projects.

10. Furnish staff services to the facility committees in carrying out their functions.

The general functions of the three divisions will be as follows:

**Project Division**—to be responsible for prescribing the procedures and criteria by which the essentiality of programs and projects will be established.

**Production Resources Division**—to promote effective utilization of existing facilities and equipment.

**Progress and Scheduling Division**—to assist appropriate agencies in assuring that facilities and construction programs and projects are scheduled in accordance with the needs of the war production program.

## Construction Machinery Builders Get WPB Aid

War Production Board's Construction Machinery and Equipment Division has received through a special section 165 requests from manufacturers within the past five weeks for assistance in obtaining necessary production materials. In all cases the section has either expedited the orders or made surveys for the applicants on the situations of their purchase orders for critical material. The section's researchers enable manufacturers to anticipate and often eliminate bottlenecks before they become acute. It also assists manufacturers in obtaining steel plate and alloy; in setting up yearly bearing and engine requirements, and in finding suppliers for a number of manufacturers who are unable to place their purchase orders.

## Steel Program Delayed

THE IRON and steel expansion program originally was to have been completed by June 30 of 1943. Delays due to different reasons have caused a sharp modification in this schedule. A check at the Steel Division of the War Production Board reveals progress made toward this goal as of June 1: Electric furnace expansion program 65 per cent completed; blast furnace program 57 per cent completed; open-hearth furnace program 42 per cent completed; sinter program 53 per cent completed; coke oven program 36 per cent completed; iron ore program 45 per cent completed. Present outlook is the program will not be completed prior to the end of this year. Its execution is not permitted to interfere with pressing military needs.

## No Use Kidding Anyone

Victories in North Africa do not mean that oil from the Near East will now supply all of the needs of the United Nations in the European theater of action, thus freeing East Coast stocks for home consumption, Petroleum Administrator Ickes warns. He points out supplies originating in the Near East have long been earmarked for specific purposes, and even if oil from there was made available to the armed forces in the Mediterranean it would serve not to decrease shipments from the Atlantic seaboard, but, rather would be used to intensify even more the activities of the United Nations in the European combat zones.

"There is no use in anyone kidding anyone else about it," says Mr. Ickes. "Petroleum stocks on the Atlantic seaboard are down and supplies available for civilians will be tight for some time to come."

## Unpredictable

Far-reaching repercussions may come out of complaints being registered against the Office of Price Administration. Hosiery industry leaders on May 25, before the Patman and Boren committee of the House, declared it a fraud on the public to insist rayon hosiery be sold under grade labels. They defied OPA to prove grade A hosiery will last any longer than, or as long as, grade B.

"Any woman will tell you," declared one witness, "that when she puts on a pair of rayon stockings she has no idea whether they will last five minutes, or five days, or five weeks."

Witnesses said many OPA branch officials pay no attention to recommendations of trade associations or industry representatives. Policies, it was contended, aim at destroying the value of

brand names. Also, they tend to destroy small retailers and manufacturers according to one witness who said a high OPA official told him large merchants are more efficient, and that the smaller ones had no legitimate place.

## Cold Welding Urged

Detailed directions for using cold welding to repair cracks in various types of engines are given in a manual issued last week by the Office of Defense Transportation. The manual names ten types of engine cracks which can be cold

### NEED WILDCATS

At least 4500 wildcat oil wells must be drilled this year to meet wartime emergency requirements, Petroleum Administrator for War, Harold L. Ickes states, emphasizing wildcat operations must be substantially stepped up.

Fourteen oil-country tubular goods depots—location not yet determined—will be established throughout the country by the third quarter to meet emergency needs for minimum stocks of materials for use in wells that are completed by the wildcat operators.

An aggregate of 20,000 tons of rolled oil-country tubular goods will be kept on hand at steel mills for emergency use by operators who drill less than 40,000 feet annually. For emergency use of all wildcat operators 10,000 tons of tubular goods will be kept in stock in the 14 depots.

welded, lists the required tools and supplies, and details, with illustrations, the steps involved in making the repairs.

It is estimated at least 95 per cent of the engines damaged by the ten different types of cracks can be successfully repaired by cold welding. This process has been used on all types of liquid-cooled engines.

## Canal Comes High

Here is the bill of critical materials that would have to be presented if the proposed Florida barge canal were to be completed, as figured in net tons by the Army Corps of Engineers:

Sheet steel piling 4300, reinforcing steel 3875, structural steel 6480, castings and forgings 430, machinery 370, copper and bronze 35, rubber 20, dredge and dragline parts, pipes and cables 13,690.

## Third Anniversary

This month marks the third anniversary of the establishment of the Iron and Steel Branch of the Advisory Commission to the Council of National Defense. Originally the organization consisted of three individuals: W. L. Batt, as director of materials; W. S. Tower, as group executive, Iron and Steel; and W. A. Hauck, assistant group executive, Iron and Steel.

In the early days they had no assistants, not even stenographers.

After passing through a number of reorganizations, the group now takes the form of the Steel Division of the War Production Board. Headed by H. G. Batcheller, as director, the Steel Division personnel numbers more than 700.

## Equal to the Task

The Soviet embassy in its official information bulletin has just published a story, "Airacobras in the U.S.S.R." which gives names, dates and places in which this plane has been used on the Russian front. Airacobras have been in operation against the Germans for about a year but there are no American correspondents at that front and few detailed reports have been received here of its operation under the difficult conditions prevailing in Russia. It is particularly gratifying to learn from the article that although the Airacobra was not designed and built for operation in Russian winters, very little modification was necessary to adapt the P-39 to that type of service. Also the article brings out the fact that the Airacobra has been in combat against the German's Focke-Wulf 190, and in every way has proved the equal of that highly touted plane.

## Red Tape Language

This is from the well-known column by Jerry Klutz, "The Federal Diary", which appears in the *Washington Post*: "Washington dictionary of red tape language:

"Under consideration (means): never heard of it. Under active consideration: Will have a shot at finding it in the files. Has received careful consideration: A period of inactivity covering time lag. Have you any remarks? Give me an idea of what it's all about. That project is in the air: Am completely ignorant of the subject. You will remember: You have forgotten, or never knew, because I don't. Transmitted to you: You hold the bag—I'm tired of it. Concur generally: Haven't read the document and don't want to be bound by anything I say. In conference: Gone out—don't know where he is."



# Pushes Industrialization As Wartime Curbs Limit Imports

*South American neighbor extends heavy industry as it seeks to raise living standards in face of restricted supplies. . . . Postwar trade outlook promising*

CONSIDERABLE space has been devoted in recent issues of STEEL (see STEEL of Jan. 11, Jan. 18 and April 19) to our postwar trade relations with Latin American countries as a group.

As has been stated, industrialization is proceeding rapidly throughout Latin America and most of these countries are accumulating a favorable position in dollar exchange. All of them want to buy American manufactured goods of various types, in quantity, but the wartime priorities system prevents them from obtaining all that they want. Hence, indications are that Latin America will present good postwar markets for United States' products.

Of all the Latin American countries Brazil appears to present the best possibilities. With her large population—around 45,000,000—and with her immense reserves of diversified raw materials, Brazil's economy is peculiarly well constituted to mesh with our own. Today she is selling us iron ore, manganese ore, chromite, tungsten ore, bauxite, coffee, rotenone, hemp, rubber, quinine, hardwood, mica, quartz crystals, industrial diamonds and other products. There is reason to believe that she will keep right on selling many of these products to us after the war.

## Needs Are Diversified

What will Brazil buy from the United States in exchange?

Discussions of this question with informed Brazilians reveal that it generally is believed in that country that Brazil can be expected to buy large quantities of goods from the United States. Brazilians expect that a large percentage of their country's imports for years to come will include capital goods such as machine tools and other engineering equipment required to build up industry. They also expect to import equipment for further development of water power, mines, coal and other resources. They expect to import refrigeration equipment on a large scale. Much equipment likewise will be wanted from abroad to develop railroads and other forms of transportation. Then, too, there should be a large volume of diversified needs, such as automobiles, aircraft, and various household goods, including electrical refrigerators, radio receiving sets and so on.

That, in a general way, is a rough catalog of those items that Brazilians themselves expect to buy from abroad.

Brazilians are thoroughly sold on the Good Neighbor policy. They are molding their economy on Western Hemisphere lines. They expect to sell in large

## STEEL PROBLEM

Best estimates of possible steel receipts by Argentina in 1943 will total only 85,000 tons, the annual report of the Argentine Central Bank points out. Only 45,000 tons are expected to come from the United States, the report reveals, and it is hoped the remainder will be supplied from Brazil and Spain, though these sources are insecure. The United States already has cancelled the allotment of 15,000 tons for first quarter, in favor of the United Nations, to which Argentina does not belong.

According to the bank report average steel and iron imports during 1938-40 were 641,400 tons annually, with an additional 185,100 tons included in machinery, automobiles, etc. In 1942 imports were down to 127,000 tons. Steel and iron production is expected to reach 70,000 tons in 1943, about one-fourth of minimum requirements.

volume to other Western Hemisphere countries, particularly to the United States. In return, they expect to import principally from other Western Hemisphere countries, and particularly the United States.

The trend toward greater industrialization of Brazil stems from two main causes. The primary one is that at present Brazil is unable to import from abroad on such a large scale as previously because of wartime shipping scarcity and shipping hazards.

The second cause, and this appears now to be the dominating consideration, is the growing realization in Brazil that the plane of life for the average Bra-

zilian family not only is much lower than it should be but much lower than it needs to be. It is Brazil's definite conviction that this state of affairs can and will be improved materially by carrying out the large-scale industrialization plan. This policy of industrialization is geared up so as to accomplish the double purpose of making more goods available and at the same time providing the Brazilian people with the wherewithal with which to acquire those goods.

Contrary to a rather general impression in the United States, Brazil already has important industries. The value of industrial products in that country before the war was, on an average, substantially double that of the value of her agricultural products.

Most important of Brazil's industries prior to the war was the textile industry, an industry that already is some 50 years old. While unquestionably this industry will continue to thrive in the future as it has in the past, it now is being superseded in importance by those rapidly growing industries which are based on production of ore, production of metals, and consumption of metals.

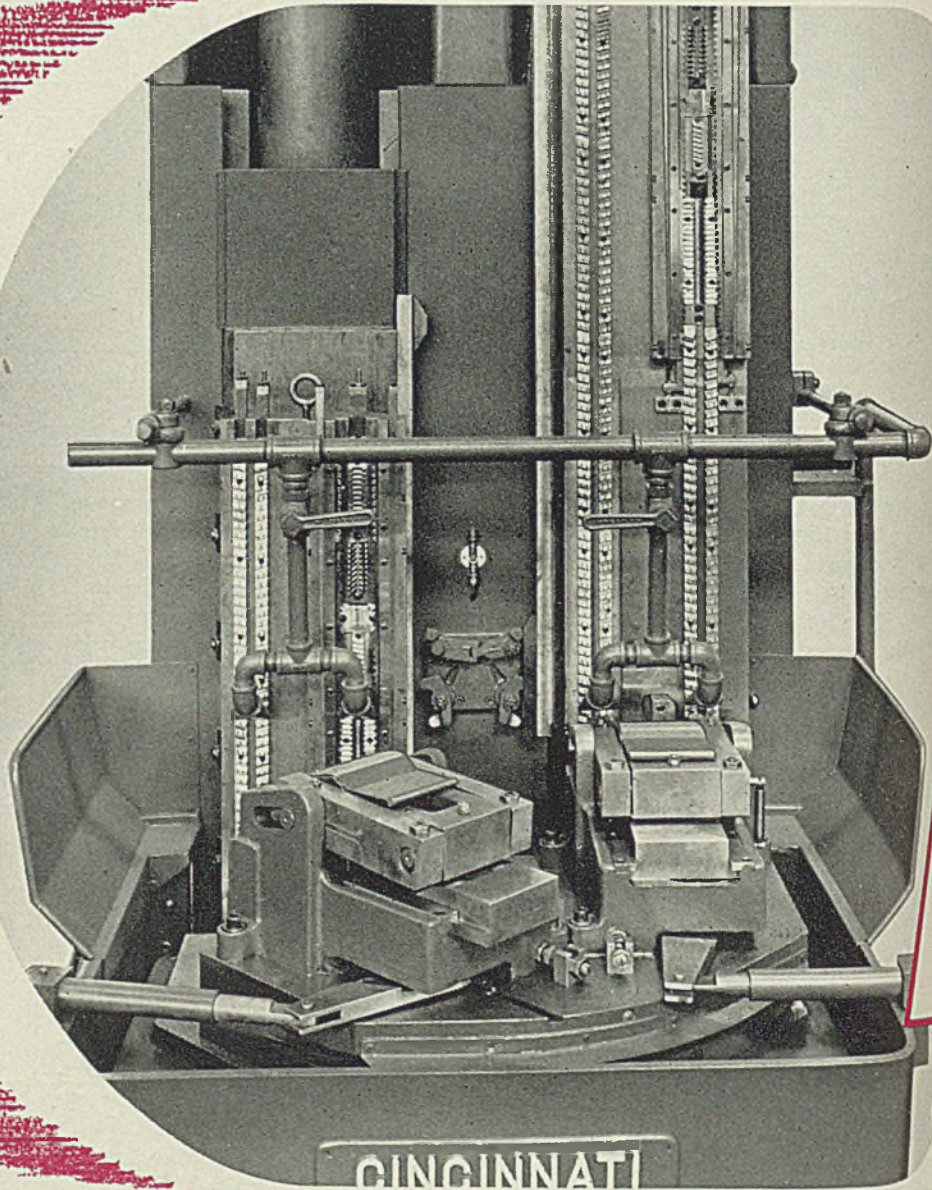
Brazil has shipyards with sufficient capacity to build cargo and passenger vessels, and warships up to the size of cruisers. She also has well-equipped railroad maintenance shops. While in the past these shops were used for maintenance only, the fact that recently a locomotive actually was built at one of them indicates which way the wind is now blowing. Brazil's industries include many other types of establishments, particularly such service facilities as foundries, forge shops and machine shops. Hence she already has a firm foundation on which to build up more extensive industries.

## Expansion Is Underway

One of the basic factors for accelerated industrialization is the big expansion in Brazil's iron and steel industry—now in progress. Prior to the war that industry in Brazil consisted only of 25 small charcoal iron blast furnaces; two merchant mills capable of rolling bars and shapes up to 4-inch sections; together with limited facilities for producing blooms, wire rods and wire. Total output of pig iron and rolled steel in 1940 was reported as 461,917 metric tons. About 150,000 tons of this total were consumed by foundries in the form of pig iron, while the remainder was represented by finished rolled steel. The output did not include any rails, plates, sheet or tubing.

Most important iron and steel producer in Brazil up to this time is the privately owned Companhia Siderurgica Belgo-Mineira, described in STEEL of Jan. 19, 1942, Page 56. With plants


# THINGS HAPPEN



## THE CINCINNATI

MILLING MACHINE

★ ★ ★ ★ ★ ★ ★ ★ ★ ★



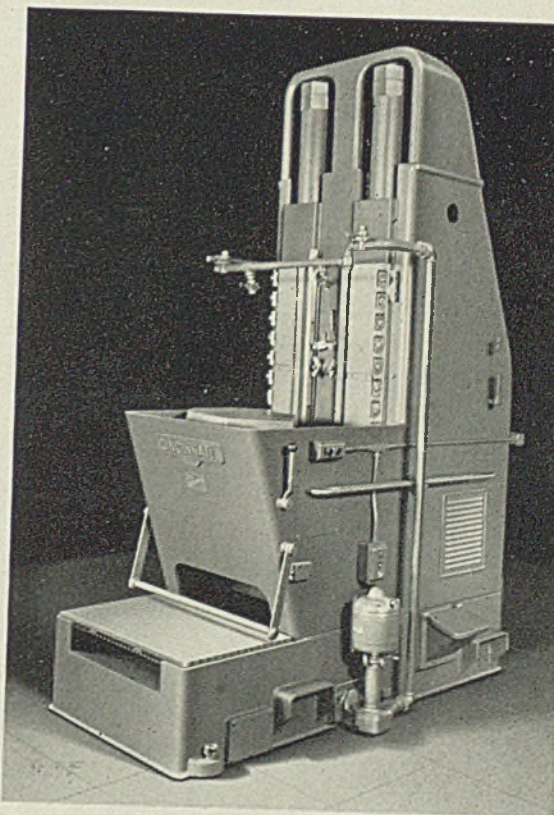
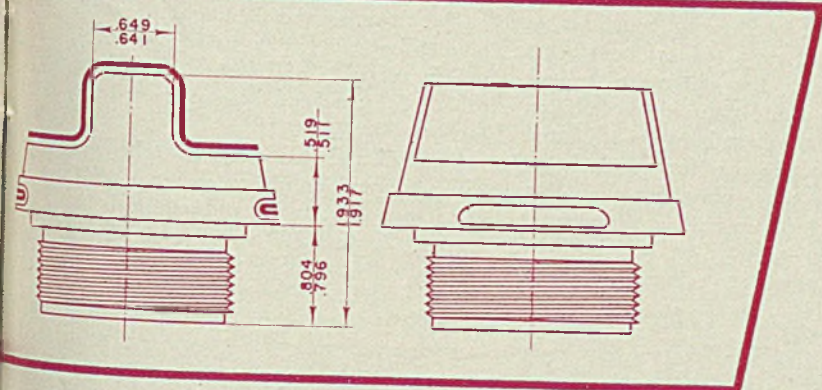
Navy E awarded March 6, 1942. Renewal Star awarded September 6, 1942, along with Army-Navy E.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

# ...when Hydro-Broaches get their heads together

By using a CINCINNATI No. 10-66 Vertical Duplex Hydro-Broaching machine and disregarding the conventional, it was possible to remove four times as much metal on this particular operation. Usually broaching machines remove up to 5/32" stock. For heavier cuts other types of machines are used. But in this instance the performance of the Broach was increased far beyond that generally accepted and at no sacrifice in accuracy. Here two parts are handled simultaneously. 5/8" stock is being removed in broaching the tang and two wrench slots on fuse bodies at the rate of 306 per hour. This arrangement produces two parts per machine cycle and is a most unusual method of stepping up production.

No doubt, in your own shop there are many parts which could be completed more rapidly by the broaching process. Why not talk to our Field and Factory Engineers about it? They will be glad to make a careful study of your situation and give you their recommendations.



*Catalog M-894 covers all features and benefits of CINCINNATI No. 5-42 Duplex Hydro-Broach illustrated at right. This catalog, another official communique from Milling Headquarters, will be sent on request. These and other machines are illustrated in our catalog which appears in Sweet's file.*

MILLING MACHINE CO. CINCINNATI, OHIO, U. S. A.

BROACHING MACHINES

GRINDING MACHINES

LAPPING MACHINES

at Sabara and Monlevade in the state of Minas Geraes, it had four charcoal blast furnaces; five 35-ton basic open-hearth furnaces; a 38-inch blooming mill; a rod mill; a wire plant and a merchant mill.

This company now has under construction two additional blast furnaces, one 85-ton and the other 35-ton. In 1941 it had on order in the United States two additional blast furnaces, two additional open-hearth furnaces and a structural mill for rolling 40 to 100-pound rails and 3 to 15-inch structural sections. This program will push the company's pig iron capacity from 86,000 to 141,000 metric tons annually and its finished steel capacity from 66,000 to 254,000 metric tons. New products will include rails, plates and tubing. The company has facilities for galvanizing wire and pipe.

#### Test Brazilian Coal

Shortly the dominating producer in Brazil will be the government-financed, Companhia Siderurgica Nacional now under construction at Volta Redonda in the state of Rio de Janeiro, about 90 miles inland from the port of Rio de Janeiro. This will be the first plant in Brazil to use coke as blast furnace fuel. Whereas it originally was planned to mix about 50 per cent of Brazilian coal with 50 per cent of coking coal imported from the United States, it has been found possible to utilize Brazilian coal 100 per cent. Important tests first were made at Kopper's Rheolaveur Laboratory and later at Battelle Memorial Institute, Columbus, O. Results obtained in the Kopper's laboratory confirmed the assumption

that it would be possible to use Brazilian coal, 100 per cent. Tests made at Battelle Institute also showed the last procedure to be followed is the washing of the coal, thus reducing its excessive sulphur content to an average of 1.34 per cent, with a final analysis of about 1 per cent in the coke. A feature of the fuel is its high ash content; the washed coal will have about 15.5 per cent ash and this rises to about 20.2 per cent in the coke.

There is a big reserve of this coal in the Brazilian state of Santa Catharina, a supply adequate to support steel production for an indefinite period extending far into the future. This coal is located about 700 miles from Volta Redonda, its transportation involving an ocean haul sandwiched in between two short rail hauls.

Iron ore for the blast furnaces will be shipped by rail a distance of some 250 miles from mines in the state of Minas Gerais. The burden will be obtained from three grades of typical ores containing, respectively, an average of 58, 62 and 66 per cent iron.

The plan includes provisions for erecting four blast furnaces of 1000 tons capacity, with 25-foot hearth diameter. Due to the character of the ore, engineers associated with the enterprise believe that daily output from this installation should be somewhere between 1200 and 1300 tons. Only one furnace is being built at this time, plans for the other three being held up until conditions are favorable.

The coke plant is to comprise 55 ovens

at the start and will have capacity for coking 600,000 metric tons of coal per annum. Associated with the coke oven plant will be a by-product plant for reclamation of coal tar, sulphate of ammonia, benzol, toluol, xylol and naphtha. While the first blast furnace is not scheduled for completion until December, 1943, the coke oven plant is scheduled to start in September of 1943. Until the blast furnace is lighted the coke production will be sold to foundries in Brazil; the foundry industry there having run into wartime difficulties in obtaining sufficient coke from the previously dependable sources outside the country.

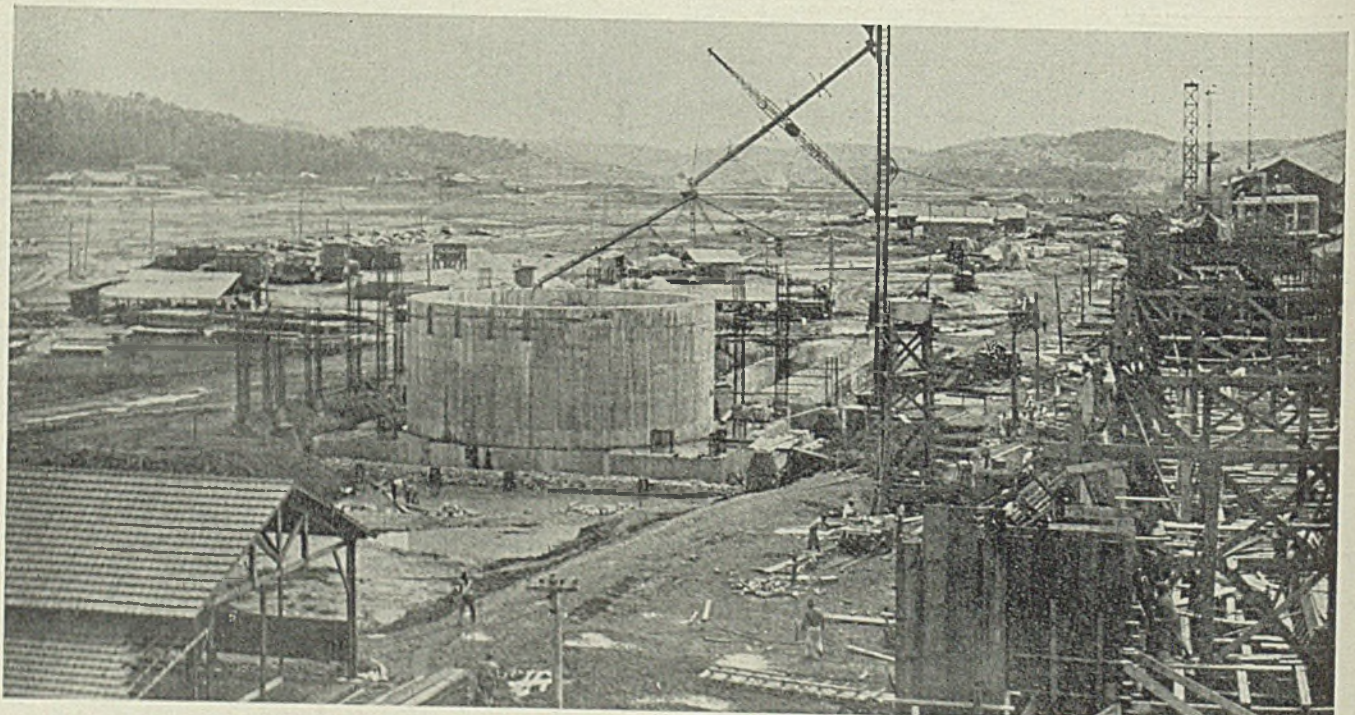
#### Building Open Hearths

The open-hearth plant now being built consists of three furnaces, two stationary and one of the tilting type. Each one has capacity of 150 metric tons. Estimated capacity is about 270,000 metric tons of ingots annually. These three furnaces are to be supplemented as soon as possible by a fourth open hearth of the same capacity. The first three open-hearth furnaces are scheduled to go into production in April, 1944.

The blooming and slabbing mill scheduled to be in operation in June of 1944, will be capable of rolling billets down to 5 x 5 inches and blooms over 8 x 8 inches.

The rail and structural mill scheduled to be in operation in September of 1944, is to consist of two stands, these being 23 and 29 inches, respectively.

The universal plate mill scheduled to



Site of the new iron and steel plant of Companhia Siderurgica Nacional is at Volta Redonda, Brazil. Con-

crete foundation for the blast furnace is shown in foreground. Future plans call for three more stacks

be in operation in December of 1944, will be capable of rolling universal plates up to 66 inches and sheared plates up to 60 inches.

Rolling facilities also will include a continuous hot strip mill, a continuous cold strip mill, a temper pass mill and a skin pass mill—all capable of rolling widths up to 44 and 42 inches. These mills are scheduled to go into operation in April of 1945.

Output of finished steel at Volta Redonda is to be at the start about 220,000 metric tons a year, which will not be enough to make Brazil self-sufficient in iron and steel. It is estimated that with this particular enterprise the production of iron and steel products in Brazil will not provide more than 60 to 70 per cent of the iron and steel which that country now normally could and would consume if the needed additional iron and steel could be brought in from outside. Summing up the whole situation, it seems certain that considerable further expansion of the iron and steel industry can be expected, this in keeping with the national industrial expansion program with its obviously greater needs of the many industries involved.

Purchasing and engineering activities in the United States of the Companhia Siderurgica Nacional began in the latter part of 1940 and until the beginning of 1942 were under the direction of Lt. Col. Edmundo de Macedo Soares e Silva. On December, 1941 Col. Soares returned to Brazil to take charge of construction activities there. His duties in this country were taken over and continue to be exercised by Col. Sylvio Raulino de Oliveira.

#### War Retards Construction

In the latter part of 1940, a contract was placed by the Companhia Siderurgica Nacional with Arthur G. McKee & Co., Cleveland, covering complete engineering services including the preparation of designs, assistance in purchasing in the U. S. A. and supervision of construction in Brazil. Although war emergency has retarded all phases of work to some extent, the designing now is in the final stages, purchasing is practically complete and about 10,000 people are actively engaged in field construction activities. Except for materials and some equipment which were available in Brazil, all other items necessary for the construction of the plant have been purchased in this country.

Brazilians contend that, because of their shortage of working capital, it will be advisable for United States manufacturers to sell to them on the same liberal credit terms that characterized Brazilian purchases from Europe before the war. This contention should be no bar-

rier to our exports to Latin American countries, for the reason that the Export-Import Bank, Washington, is willing to finance sales involving long-term credits. It set up its procedure in 1936 and since then a number of industries have availed themselves of its benefits. To date, these mainly have been locomotive and car builders, certain manufacturers of electrical goods, and certain manufacturers of textile machinery. Also, the steel industry made use of the setup to some extent. It is extremely important that all manufacturers—especially those of heavy durable goods—should realize that they too can make use of the facilities of the Export-Import Bank in selling their products abroad, also that the arrangement will continue, according to present plans, after the war.

#### Credit Presents Problem

Here is all there is to it. Let's say that a turret lathe manufacturer sells 12 of his machines to a buyer in Rio de Janeiro. This Brazilian customer does not have the money to pay for them but his credit is good—a condition which incidentally is common among many good customers in the United States. The turret lathe manufacturer gets this customer to sign a note covering a period, say, of anywhere between 3 and 5 years. The machine tool builder then mails this note or takes it to the Export-Import Bank at Washington, where the bank immediately makes a check on the customer's reputation and credit status.

If the bank finds that the customer on the basis of his record is entitled to credit, it authorizes a bank—any bank in the United States—to buy the note, which usually is on a 5 per cent interest basis. This interest is split between the Export-Import Bank and the purchaser bank upon a mutually satisfactory basis. The Export-Import Bank, in effect, guarantees the face value of the note but may charge a discount varying between 2 and 2½ per cent to allow for risks. Should there be no purchaser bank for the note the Export-Import Bank itself will provide the cash to the turret lathe manufacturer.

A good example of the liberal attitude of the Export-Import Bank is presented by certain details in the financing of the Volta Redonda iron and steel project. Originally it was estimated that the venture would require an investment of some \$50,000,000, and on the basis of that estimate the Export-Import Bank agreed to loan \$25,000,000 to the Brazilian government at 4 per cent to help finance the project. Later it was found that the necessary capital outlay actually would come to about \$70,000,000 so Brazil asked for an increase in the loan. While no re-

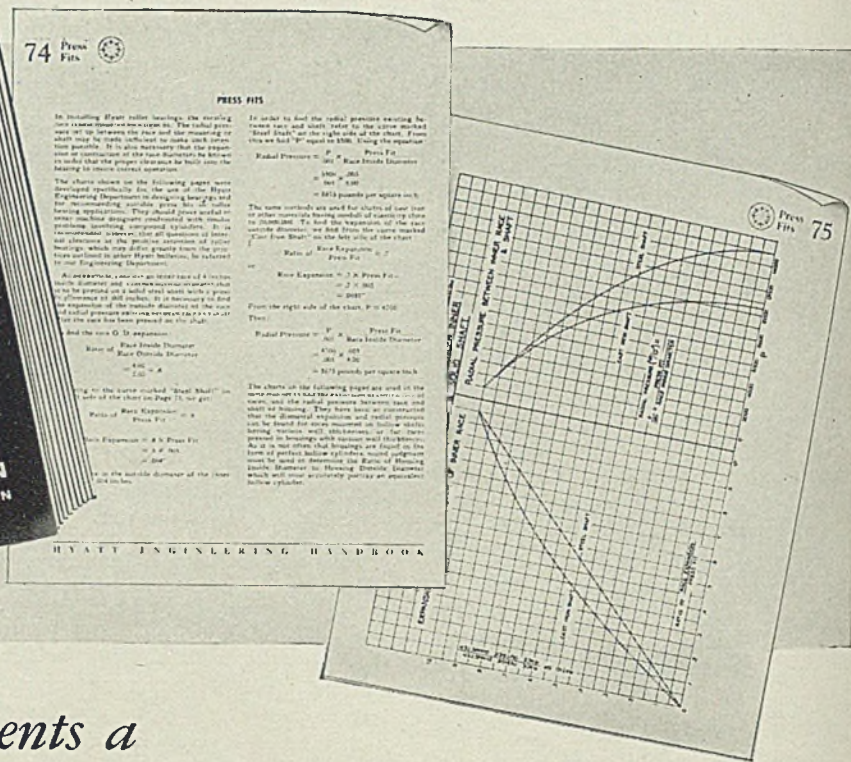
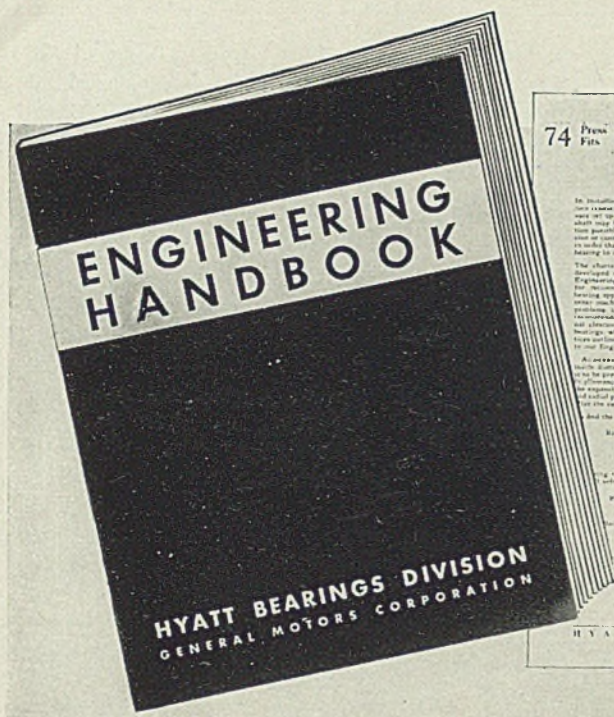
vised contract has as yet been signed, the Export-Import Bank recently announced that it would add another \$20,000,000 to the original \$25,000,000 loan. Under the first contract the Brazilians were to repay the original \$25,000,000 over a period of 12½ years. Now Brazil has asked for a longer amortization period in which to take care of the \$45,000,000 loan. This request will be granted although no announcement yet has been made as to the length of the extension in time. In other words, the present policy of the bank makes it possible for our manufacturers to do business with these other countries on whatever basis the particular economic situation of those countries may seem to warrant.

Latin-American countries, including Brazil, have presented and still do present another handicap to our export sales—this being the unduly high value of dollar exchange. However, authorities in Washington are convinced that after the war this will cease to be the serious handicap that it has been. As Latin-American countries improve their economies and raise their standards of living toward our own levels, the value of their products automatically will tend toward the value of our products. With this balancing of the economic scales, Latin-American people should find themselves doing business with us on a much more even basis of exchange.

#### No Clear Prediction Possible

The extent to which this improvement in the purchasing power of Latin American countries will benefit the United States cannot be clearly predicted. It may be recalled, for example, that prior to the war Brazil bought her machine tools and other industrial equipment mainly from three countries, in this order: Germany, Great Britain and the United States. Just what the order will be after the war cannot be stated since the postwar international picture is beclouded and we do not have any clear-cut ideas as to just what sort of competition we will meet.

What can be stated definitely at this time is that Latin American countries, particularly the largest of them, Brazil, are going ahead rapidly with industrialization programs that will make them far better markets for all sorts of capital equipment than they ever have been before. Therefore, if we continue to buy from these countries on the scale that now is indicated, if we keep on with the Good Neighbor Policy, and if we do a tactful and well-planned selling job, we can look ahead confidently toward postwar sales of a much larger volume of products to our Latin-American neighbors than ever before prevailed during peacetimes.



*Hyatt Presents a*

## **TIME-SAVING, WORK-SAVING SERVICE**

*for Engineers and Designers of War Products*

Just as Hyatt Roller Bearings are helping to speed up Victory in war equipment and in the machines that produce it, now the new Hyatt Engineering Handbook is in the fight.

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Fits, charts are used to determine the expansion and contraction of compound cylinders and the radial pressure existing between them. Desired information can be read directly from the charts.

A limited edition of this new 96-page Roller Bearing Engineering Handbook is now being distributed to leading engineers and designers throughout the country. A request on your company letterhead, stating your position, will bring you a copy with our compliments. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey

# **HYATT ROLLER BEARINGS**

## Henry Ford at 80 reassumes presidency of motor company after son's death. Detroiters speculate on disposition of vast automobile empire . . . Ford Foundation, a charitable institution, holds key to final settlement

SUDDEN passing of Edsel Ford at the age of 49 shocked the motor world from the highest ranks of management down to laborers on the war production lines. It was common knowledge that the Ford Motor Co. president had not been in robust health for the past 18 months, but the serious nature of his ailment in recent weeks was screened from the public eye. In fact there are those who feel Mr. Ford's own family may not have realized how far his health had deteriorated, for in many respects the son of Henry Ford was an enigma and appeared to walk pretty much alone a large part of the time.

Few people claimed to know him intimately, but those who were acquainted with him declare he was one of the few rich men's sons who remained unaffected by wealth. Like the rest of his family, Edsel Ford preferred the simple, unostentatious life, worked long and hard—too hard in fact—in furthering the progress of the vast Ford empire and the war production effort.

### Taxes Could Absorb Holdings

His death throws into sharp focus one of the questions which Detroiters have liked to ponder for years—what happens to the Ford estate at the death of its owners. Edsel reportedly controlled about 40 per cent of the company's stock. His father controls some 50 per cent, his mother around 3 per cent, and his sons a nominal number of shares. Conceivably estate taxes could absorb 75 per cent of Edsel Ford's holdings, but it is not likely since unquestionably steps were taken years ago to prevent such an eventuality as the tax collector assuming control of the company.

While details never have been made public, it is likely the Ford Foundation, organized in 1935 with Edsel Ford, his personal attorney, Clifford B. Longley, and B. J. Craig, secretary and assistant treasurer of the company, as trustees, holds the key to settlement of the Ford estate. The foundation is a charitable institution, finances the Edison Institute and other Ford historical exhibits, contributes generously to a wide list of charities, and more recently has sponsored an extensive real estate and home building operation in Dearborn.

The Fords may have turned over to the Foundation the bulk of their holdings in the company, perhaps in the form of non-voting stock, retaining active

direction of the company through their own holdings of voting stock. With this setup, the only estate tax involved would be on Edsel's personal fortune and on his small amount of voting stock. Included in his personal holdings is a block of something like \$4,500,000 worth of stock in the Manufacturers National Bank of Detroit, an institution which the younger Ford's financial wizardry is credited with rescuing at the time of the bank holidays in 1933.

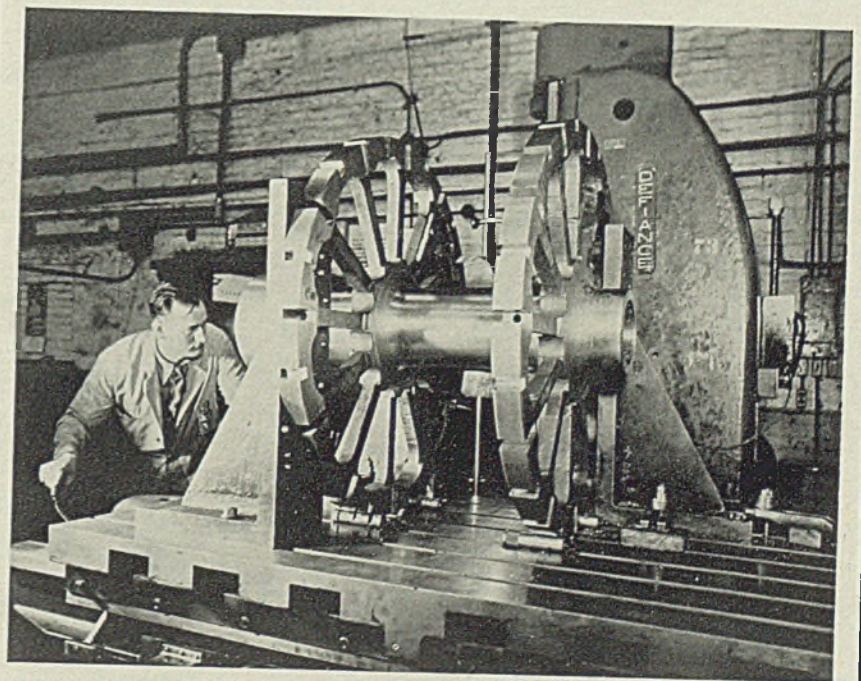
Thus, if the actual ownership of the Ford Co. has been signed over to the Ford Foundation, the executors of the younger Ford's estate will not have to worry about raising something like \$300,000,000 for estate taxes. By the same token, the bulk of profits earned by the company and paid out in dividends must now be going into the Foundation till, but this is as it should be, since the funds are spent for the benefit of humanity. Dividends on the voting stock, are more than ample to take care of the Ford family's needs.

Last week Henry Ford again took over the reins of the company as president, a post which he relinquished 25

years ago to Edsel. He will be 80 on July 30, but appears to be an ageless individual who takes the new responsibility in stride. At his right hand will be Charles E. Sorenson, gifted and tough production genius, who is given much of the credit for making the Ford production machine click. Other executive realignments announced last week include the elevation of B. J. Craig, former secretary, to the post of vice president, treasurer and director; H. L. Moekle will succeed Mr. Craig as secretary and H. E. Schluchter will succeed Mr. Moekle as assistant secretary and assistant treasurer.

Four directors were re-elected: Henry Ford, Sorenson, Henry Ford II and Benson Ford. Five new directors were appointed—Harry Bennett, personnel director and one of the men closest to Mr. Ford, Mrs. Edsel Ford, Mr. Craig, M. L. Bricker, general manager of the Willow Run Bomber plant, and R. R. Rausch, superintendent of the Ford Rouge plant.

Henry Ford II and Benson Ford, sons of the late Edsel Ford, are both serving with the armed forces and are not expected to be associated actively with the company until after the war, but one or the other probably will be president of the company one day. Before entering the service Benson Ford was getting experience in purchasing work for the Pratt & Whitney Airplane Engine Division at the Rouge plant. Their mother,



HONING TOOL MACHINED ON BORING MILL

PAUL BUNYAN size honing tool, 4½ inches in diameter, is shown here being machined on a Defiance boring mill at the Micromatic Hone Co., Detroit

by virtue of her election as a director, becomes one of the first women in the country to have a voice in the operation of a company the size of Ford. Naming of Bricker as a director could logically be a recognition of the capable organizing job he has done at Willow Run, where the handicaps in attaining peak production have been numerous to say the least.

Unannounced has been a recent shake-up in the personnel of the Ford purchasing department, directed for a num-

ber of years by A. M. Wibel who has now resigned ostensibly because of poor health. It is not clear who will succeed him, but Claude M. Nelles and H. C. Kellogg, both veteran Ford buyers, are reportedly now in top positions in directing activities of the purchasing department. Retirement of Mr. Wibel likely was occasioned more by personal than by physical reasons, according to those who are familiar with some of the behind-the-scenes pulling and hauling in the Ford executive family.

tion on the training experience in the auto industry, so that all employers would benefit from the combined experience of those who have well organized plans in operation.

"The question today," the report says, "is not 'Should we train?' but 'How shall we train?'" And the answers are provided in a review of tested methods of non-supervisory and supervisory training. It lists the types of training methods available and reports on how these types have been best applied to meet specific problems and attain particular ends.

Under the sponsorship of T. P. Archer of General Motors Corp., and R. H. Daisley, Eaton Mfg. Co., the report was prepared by the following:

H. W. Roberts, Fisher Body Division, General Motors Corp.; W. H. Mitchell, Eaton Mfg. Co.; T. C. Perrin, Briggs Mfg. Co.; John M. Amiss, Chrysler Corp.; S. D. Mullikin, Ford Motor Co.; R. L. Packard, Packard Motor Car Co.; A. B. Ueker, Murray Corp.; J. Scott McKibben, Electric Auto-Lite Co.; Orlo L. Crissey, A. C. Spark Plug Division, General Motors Corp.; Albert F. Koepecke, Hudson Motor Car Co.; and Irwin A. Prabel, Automotive Council.

To employers faced with emergency needs for the training of workers, it offers the aid and advice of all the manufacturers who are now co-operating on war production through the Automotive Council.

"While efficient training programs are obviously essential during the war," the report concludes, "they also will do a great service for industry and the nation immediately after the war by assisting . . . in training war workers and discharged soldiers for postwar industries. The fact that management is equipped to bridge this production gap without undue delay should contribute no small improvement to morale."

## Arc Welding Papers Win \$6750 in Prizes

A paper entitled "Arc Welding versus Casting in the Design of Jigs and Fixtures" won Herman J. Brenneke of New York University first prize of \$1000 and four scholarships of \$250 each presented in his name to his university in the award program of the James F. Lincoln Arc Welding Foundation.

Robert Edson Lee of Iowa State College received the second cash award of \$500 and two scholarships of \$250 each for his university for his paper on "An Arc Welded Chair." Third prize of \$250 and one scholarship of \$250 was awarded jointly to Charles L. Sammons and John H. Stewart of Ohio State University.

# Motor Industry Concentrating On War Effort, Not Postwar Planning

AUTOMAKERS are planning no postwar model changes at this time, and are concentrating all their facilities and engineering talent on war production, according to George Romney, managing director, Automotive Council for War Production.

Mr. Romney's declaration followed speculation by newspaper and magazine writers on possible extreme types of pleasure cars being developed for the postwar period.

"Because the nation's interest, both in the war and the reconstruction period, is directly and vitally involved, I want to emphasize at this time that I do not know of any motor vehicle company that is doing experimental work on new postwar cars. To my knowledge, every company in the industry is concentrating completely on its war jobs."

Experimentation on postwar products is ruled out by several factors, Mr. Romney declared.

"There is no material available for experimental purposes," he said. "And, to the best of my knowledge, the government has not authorized the use of any material for such postwar products. If material were being used experimentally, it could only be on a black market basis.

"The engineering and technical talent of the country does not exceed the requirements of this total, technical war. Automotive technicians are therefore devoting, and should continue to devote, their full energies to improvement of the weapons our boys are using. We have still a long way to go to win the war."

The industry's plan to resume production on the 1942 models at the end of the war has not been altered.

"By using 1942 model tools and dies our workers, including returned soldiers, can be put back to work almost a year earlier than if it were necessary to de-

sign, test, tool and produce new models from scratch.

"Loose talk about extreme postwar models has not taken the industry's eye off the ball. It would be very unfortunate if such public talk should start a competitive race in the automotive industry on postwar model work. Such competition is out and should be kept out until raw materials are available that cannot otherwise be used for war production."

Mr. Romney observed that, under the circumstances, resumption of work on postwar models would require government authorization.

### Asks For "Equitable Production"

"If, for any reason, government should order resumption of passenger car production before final victory, it should, if at all possible, be done on an industry-wide basis," he said.

"On the same equitable basis," he added, "the industry heartily approved and, in fact, invited curtailment before Pearl Harbor, and complete stoppage afterward, to permit an orderly transfer to war production without impairing the competitive relationships. Any company actually producing passenger cars at the end of the war would have a very decided advantage over a company confronted with the full job of converting from armament production."

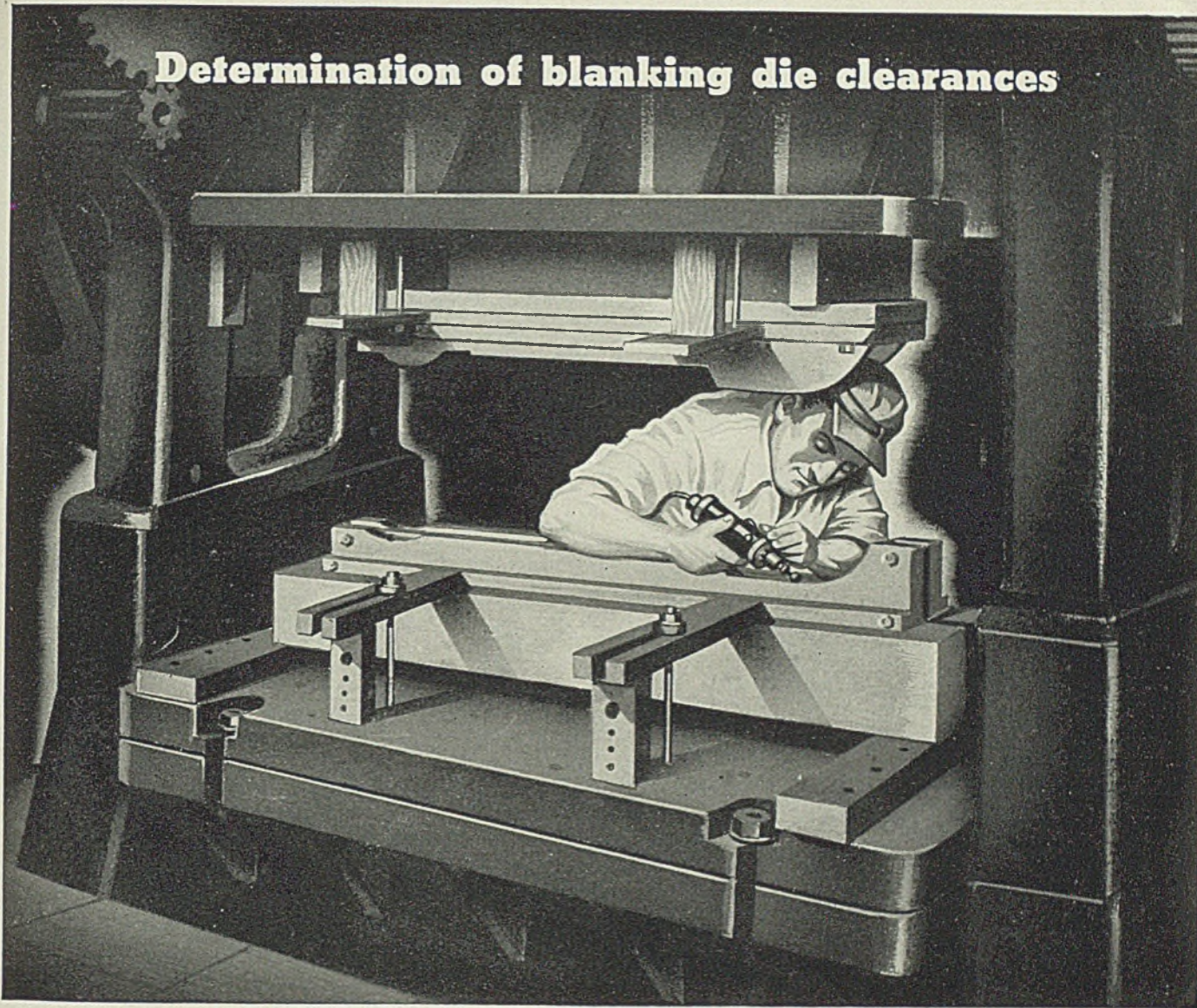
Current experiments and experiences with methods of personnel training, though aimed primarily at winning the war, are expected to be of great service to the nation in the reconstruction period.

This is the consensus of a group of the automotive industry's experts on training, as expressed in a report released by the council.

The report, prepared by a subcommittee on training and upgrading of war production personnel, is the first fruit of a co-operative effort to pool informa-



# Determination of blanking die clearances



*Information supplied by an Industrial Publication*

Determination of proper blanking die clearance depends on several factors; thickness and physical properties of stock, relation of punch diameter to stock thickness, specified part tolerances and press power and size.

Recommendations of material suppliers regarding clearances for every type of blanking operation can usually be followed. Lacking recommendations, or when clearance must be determined by experiment certain simple rules give reasonably accurate results.

The amount of clearance varies from 5 to 12% in direct proportion to the stock thickness. Closer

tolerances call for smaller clearances. The following table gives general average total clearances.

	Close Tolerance	General Run
Brass and Soft Steel	5%	8%
Medium Rolled Steel	6%	10%
Hard Rolled Steel	5-7%	12%

When the blanking or piercing hole must be held to a close tolerance, clearance is added to the punch dimensions. When the blanked part must be held to close tolerance, clearance is subtracted from the dimensions.

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*Production of complete B-24 bombers and of parts and subassemblies for a Ft. Worth plant reported ahead of original schedules at Ford's Willow Run plant . . . Manpower problems now appear to be "under control"*

PRODUCTION of complete B-24 bombers, and of parts and subassemblies for a Ft. Worth assembly plant, is "ahead of original schedules" at the Ford Willow Run bomber plant, according to a recent progress report issued by E. L. Cushman, deputy district director of the WMC at Detroit and chairman of a coordinating committee of federal agencies interested in solving the plant's manpower and housing problems.

The report also states production is abreast of required month-to-month increases after three upward revisions by the Army, although the planned peak has not yet been attained. No actual figures are cited on output.

Manpower problems at the large bomber plant, once the bottleneck in stepping up production, now are said to be "under control," with 17,000 additional workers planned to bring the plant to peak employment.

Early in the year, employment totaled around 30,000, and it was stated that 50,000 to 60,000 more were contemplated. However, since that time a large

share of production at the plant has been farmed out to subcontractors and other Ford plants.

During April, labor turnover at Willow run was only 6 per cent, according to the Cushman report, comparing with 7 per cent in March and 11 per cent for the 6-month period prior to March. Peak employment will be reached in November and from 50 to 67 per cent will be women who now number 38 per cent of the total.

Most of the new workers for the plant will be hired through the United States Employment Service and will come from other states. For example, in March 3700 were hired through the USES from Kentucky, Tennessee and Texas.

## Aircraft Parts Industry Job Dictionary Published

Less than three years ago Aircraft Parts Manufacturers Association was founded on the West Coast, and the young organization has kept constantly

busy with current problems.

One that was touched off by Paul R. Porter, special representative of the War Labor Board, was stabilization of wages. The aircraft parts men made a protest last January, before WLB in Washington, against classing their workers in the same category with airframe company employees, due to the difference in nature of jobs and problems encountered in the parts plants.

The recent wage stabilization decision by WLB in the airframe case has affected all industries in the West Coast area, and since it established a schedule of job evaluations and labor grading, Aircraft Parts Association considers such a schedule as vitally necessary for every manufacturer. It therefore, on June 1, published a Job Dictionary for the aircraft parts manufacturing industry.

This dictionary contains descriptions of approximately 300 jobs, with evaluations in points of the factors involved in the duties to be performed.

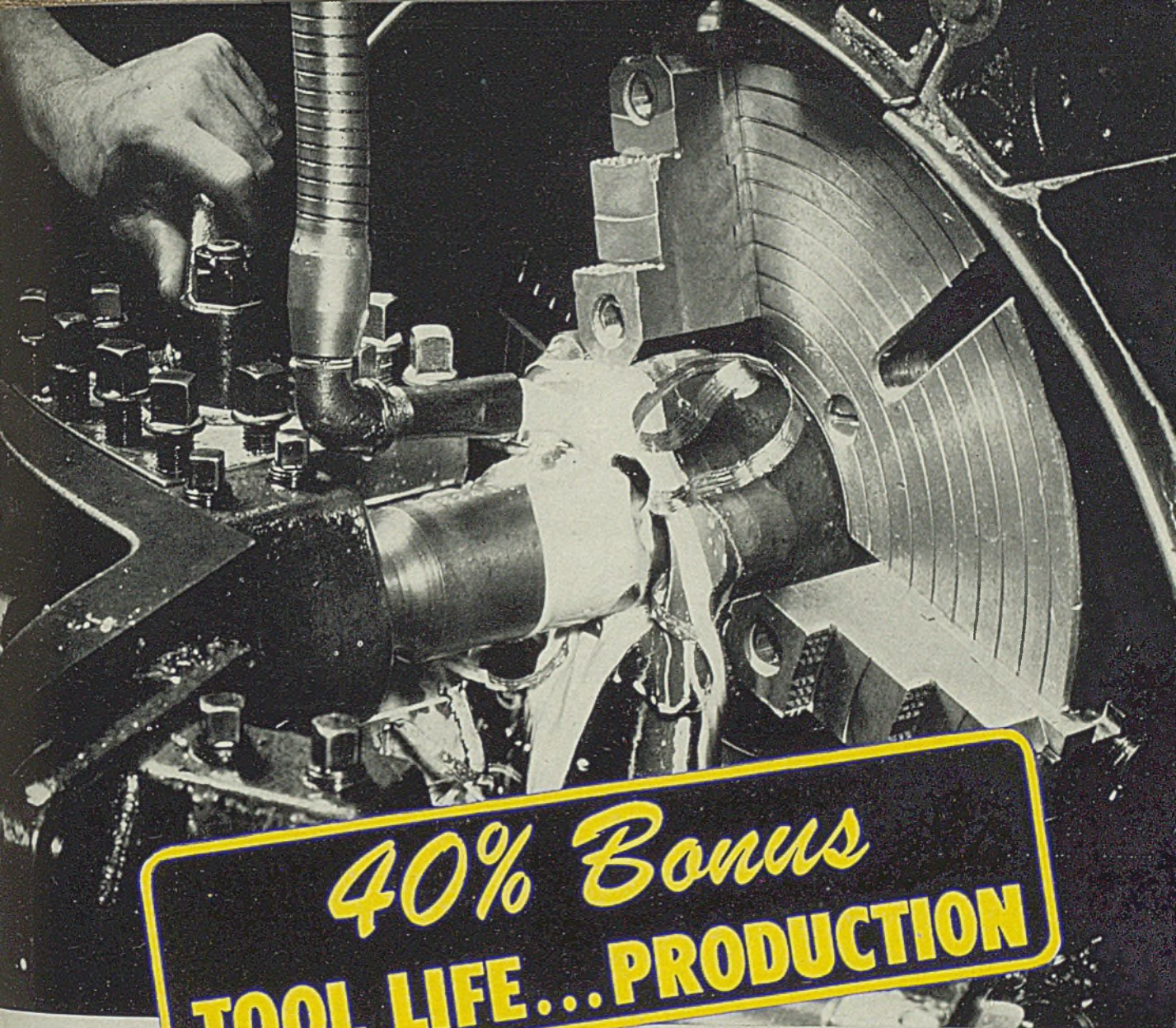
Dr. Vernon D. Keeler of the University of California, Los Angeles, was technical consultant and coordinator of the survey that formed the basis for the dictionary. A representative group of aircraft parts plants in the Los Angeles area was studied. His findings support the contention of the parts men regarding separate



## NATIONAL AIRCRAFT WAR PRODUCTION REPRESENTS 90% OF INDUSTRY

WITH membership numbering 90 per cent of the aircraft manufacturing interests in the country and encompassing a total backlog of war orders exceeding 17 billions of dollars, the new National Aircraft War Production Council Inc., sits for one of its first photos at a recent meeting in Los Angeles. Included in this notable group of top aviation executives are: (left to right seated) F. F. Russell, director of the council; J. Carlton Ward, Fairchild; Glenn L. Martin, Martin Co., president of the council; L. T. Coahu, Northrop, vice chairman; T. Claude Ryan,

Ryan Aircraft; L. D. Bell, Bell Aircraft. Standing, left to right, are: Dr. A. E. Lombard; Col. Nelson Talbot, L. C. Goad, Eastern Aircraft Division, General Motors; R. E. Gross, Lockheed; Harry Woodhead, Consolidated-Vultee; J. H. Kindelberger, North American; Guy W. Vaughan, Curtiss-Wright; C. S. Gross, Vega; R. S. Damon, Republic Aviation; Col. D. F. Stace, Capt. Lucian Grant and I. M. Laddon, Consolidated-Vultee. For further details of the new council's program and organization, see STEEL, April 19, p. 78



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job classification of their employees. He says:

"The skill, training and experience required . . . in the aircraft parts industry appear in many instances to be much greater than that required for the airframe industry, due to the closer tolerances in the aircraft parts industry and the nature of the particular industrial operations."

The magnitude of the aircraft parts manufacturing industry is not realized by most people. Although many of the plants are small in size, their numbers run into several thousand over the country. These factories supply the vital parts to the airframe plants and in all probability they employ as many thousands of workers as do the airframe companies.

Any steps, therefore, that the heads of plants in this individualistic industry may take toward standardizing the duties in the jobs involved, and stabilizing their individual plant wage structures, are bound to have a far reaching effect. Widespread use of the Job Dictionary would contribute toward such desirable results as reduction in labor turnover and absenteeism, encouragement of capable workers, more uniform advancement,

more equitable wage scales, and the promotion of better management-workers understanding. The dictionary will not accomplish these things of itself, but it forms a reliable, helpful guide and reference book.

The Job Dictionary will serve as a working standard in personnel departments in such ways as: a guide in the selection and hiring of employes; in upgrading within the plant to replace experienced workers leaving for the draft, to establish uniform and equitable wage rates throughout a plant; in negotiations between the manufacturer and the union; in presenting wage rate requests to the War Labor Board.

**To Organize Procurement District At Chicago**

Col. Alonzo M. Drake, supervisor of the central procurement district, Army Air Forces Material Command at Detroit, has been transferred to Chicago to organize and direct a new Mid-Central Procurement District there. He will be succeeded at Detroit by Col. Alfred H. Johnson, formerly assistant chief of

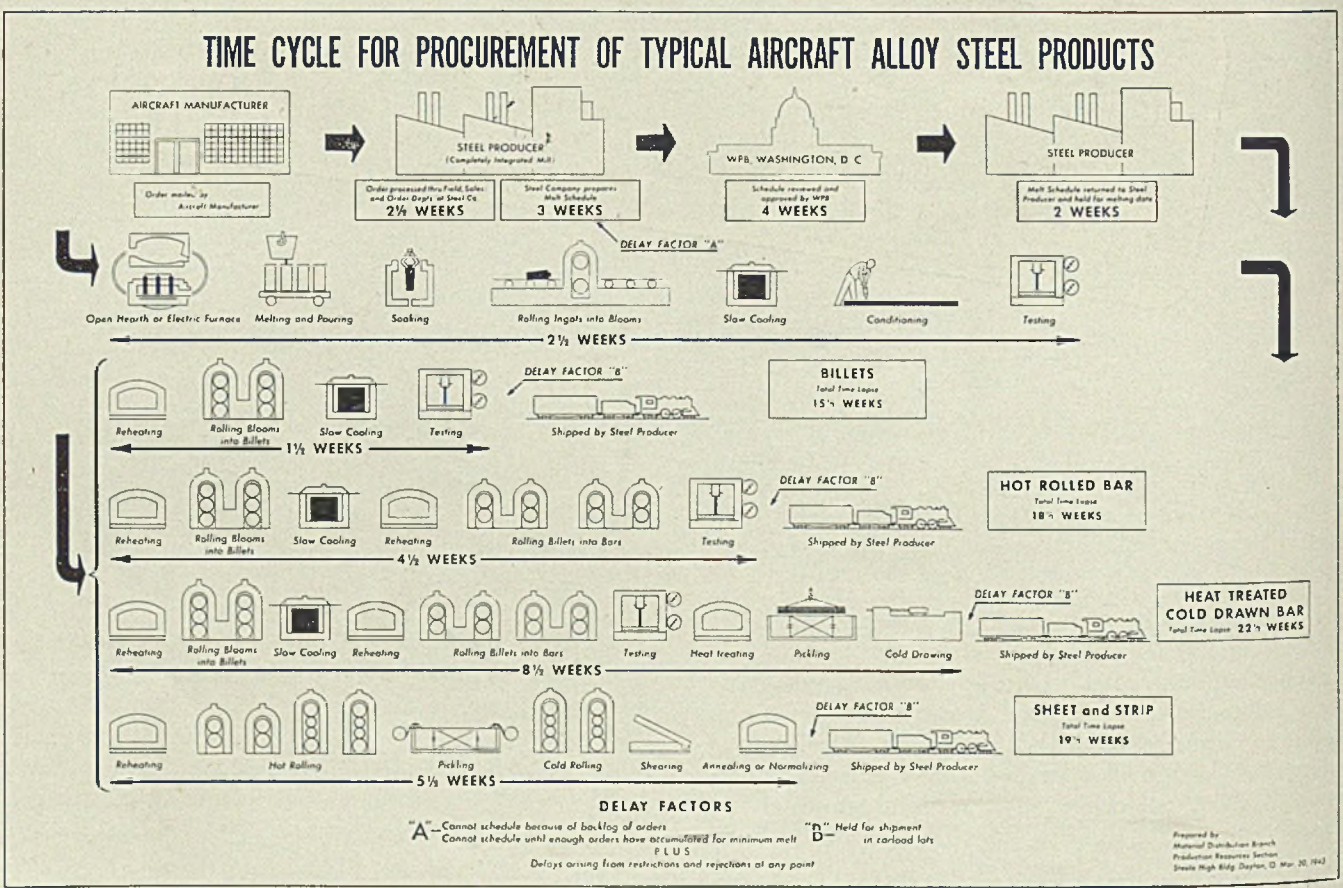
the Production Division at Wright Field, Dayton, O.

**Bolt Institute Sets Up Aircraft Fasteners Group**

An Aircraft Fasteners Division within the American Institute of Bolt, Nut and Rivet Manufacturers has been established to handle requests for information or co-operation.

Steady increase in questions as to standards in dimensions and tolerances, sources of supply, types of steels, cadmium plating, plating tolerances and decarburization has occurred in recent months from the Interdepartmental Screw Thread Committee, Army-Navy Aeronautical Board, Wright Field, Army-Navy Air Corps, Society of Automotive Engineers, and WPB.

R. O. McCully, Russell, Burdull & Ward Bolt & Nut Co., Port Chester, N. Y.; J. W. Fribley, Cleveland Cap Screw Co., Cleveland; A. M. Jones, Buffalo Bolt Co., Buffalo, and C. F. Newpher, National Screw & Mfg. Co., Cleveland, have been appointed as a committee to establish this division.



STEPS involved in the production of four types of aircraft steel, billets, hot-rolled bar, heat treated cold-drawn bar and sheet and strip, are graphically illustrated in above time cycle chart prepared by the Materiel Command,

Wright Field, Dayton, O. The time cycle presupposes the absolute minimum time under best possible conditions not including delays caused by backlog, minimum melt requirements, carload lot shipment, credit details, etc.

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EARL C. WEBB

Dr. C. Earl Webb, designer of bridges and western division engineer, American Bridge Co., Chicago, has been elected president, Western Society of Engineers, Chicago. Philip R. Elfstrom, assistant chief engineer, Chicago, North Shore & Milwaukee, and Chicago, Aurora & Elgin railroads, has been elected first vice president, and Henry T. Heald, president, Illinois Institute of Technology, second vice president. T. G. LeClair, supervising development engineer, Commonwealth Edison Co., has been re-elected treasurer. New members of the board of direction are Paul Hansen, partner of Greeley & Hansen, and H. C. Townsend, Western Electric Co.

Bruce W. Burroughs, formerly with WPB, Cleveland regional office, has become general manager, National Bronze & Aluminum Foundry Co., Cleveland.

Robert H. Leach, vice president, in charge of production and research, Handy & Harman, Bridgeport, Conn., has been awarded the Wetherill Medal of the Franklin Institute, Philadelphia, for



J. T. WHITING

work in the field of low-temperature brazing alloys.

D. K. Ballman has been named head of the newly organized service and development division of Dow Chemical Co., Midland, Mich. For eight years with the Dow company, Mr. Ballman has been engaged in product development and technical service work.

Bert Conway until recently in charge of manufacturing and production testing at Allison division, General Motors, Indianapolis, has been named manufacturing co-ordinator for Aviation Corp.

Cornelius B. Dorgan has been made factory manager, Cleveland Welding Co., Cleveland, to succeed the late Harry Bound. Serving 18 years as master mechanic, Mr. Dorgan has been associated with the company for the past 30 years.

Lawrence W. Wallace, vice president, Trundle Engineering Co., Cleveland, has been given an honorary degree of doctor of engineering by the Agricul-

tural and Mechanical College of Texas, College Station, Tex.

John T. Whiting, president, Alan Wood Steel Co., Conshohocken, Pa., has been appointed deputy director, WPB steel division, and Julius A. Clauss, special assistant to Mr. Batcheller, has been assigned to head the steel division's plant facilities branch, which is supervising the steel expansion program. A steel plant operating man for many years, Mr. Whiting joined Illinois Steel Co. in 1909, served later as superintendent of blast furnaces for various companies and from 1927 to 1938 was vice president and general manager, Hamilton Coke & Iron Co., Hamilton, O. Since 1932, Mr. Whiting has held various positions with Alan Wood, becoming its president in 1939. Mr. Whiting succeeds Alexander C. Brown, vice president, Cleveland Cliffs Iron Co., who resigned recently. Harry Bryant, chief of Steel Division's construction division, has been appointed assistant to Mr. Clauss, and G. H. Beaumont has taken Mr. Bryant's former post. P. M. Reinartz, chief of planning section, plant facilities branch, has resigned to return to the American Rolling Mill Co.

Walter E. Ellsworth, Indianapolis manager, Claud S. Gordon Co., Chicago, since 1939, has been elected chairman, Indianapolis chapter, American Society for Metals.

Frank Parker, formerly president, Iron & Steel Products Inc., Chicago, has been named chairman and Albert G. Bladholm, formerly secretary, has been named president. John F. Parker, vice president, has been made treasurer and William J. Parker, vice president, has been made secretary.

Edward G. Budd, founder and presi-



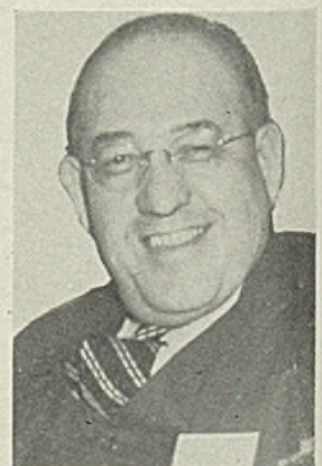
R. H. LEACH



CORNELIUS B. DORGAN



L. W. WALLACE



WALTER E. ELLSWORTH

dent, Edward G. Budd Mfg. Co., Philadelphia, has been awarded the first of a series of annual "Pioneers of Industry" awards by Murrell Dobbins Vocational School, Philadelphia.

William H. Hoover, general counsel for Anaconda Copper Mining Co., New York, has been elected vice president and general counsel.

Raymond R. Ridgway, associate director of research, Chippawa, Ont., plant Norton Co., has been awarded the Jacob F. Schoelkopf Medal for 1943 which is awarded annually by the Western New York Section of American Chemical Society. Mr. Ridgway has been with Norton Co. since 1922 and is considered one of the outstanding research men in electrochemistry.

Irving S. Olds, chairman of the board

of directors, United States Steel Corp., has been elected a trustee of Cooper Union, New York, to succeed the late J. P. Morgan.

Walton L. Woody has been elected vice president in charge of operations, National Malleable & Steel Castings Co., Cleveland. Mr. Woody has been assistant to the president and in charge of the Sharon, Pa., and Melrose Park, Ill. works. He joined the company in 1914.

Eric Dudley, materials and standards engineer, Curtiss-Wright Corp., New York, has been elected chairman, National Aircraft Standards Committee, continuing also as eastern division chairman of NASC, which post he has held since 1940 when he helped to found the organization. Mr. Dudley is also a member of WPB's technical advisory committee on emergency steel and a member of

the Society of Automotive and Aeronautical Engineers' committees on accessories, airframe materials and processes.

J. L. Trecker has been appointed executive vice president, Kearney & Trecker Corp., Milwaukee. R. W. Burk has been named vice president in charge of sales; E. W. Trecker, vice president in charge of manufacturing; J. B. Armistage, vice president in charge of engineering, and R. W. Bischoff, treasurer and assistant secretary.

William V. Burley, manager St. Louis branch of National Lead Co. since 1939 has been elected a vice president of the company.

Alfred Marchev, vice president and general manager, Aviation Corp., Farmingdale, N. Y., has been made executive vice president.

## OBITUARIES . . .

I. L. Jennings, 58, retired vice president and treasurer, Lamson & Sessions Co., Cleveland, died May 30. Prior to becoming vice president and treasurer in 1935, Mr. Lamson served as assistant superintendent, sales manager, secretary and factory manager in charge of operations. He joined the company in 1904.

Fred Wellington French, 79, vice president, American Brass Co., Waterbury, Conn., and founder and general manager of its French small tube division, died May 31 in that city. Mr. French became vice president in 1929 when the French Mfg. Co., which he founded in 1905, merged with American Brass Co.

Royal M. Bates, president, Jamestown Metal Corp., Jamestown, N. Y., died May 23.

Herbert L. Gray, 66, assistant vice president and in charge of western sales with offices at Chicago, Weirton Steel Co., Weirton, W. Va., died May 25 in Evanston, Ill. He had been associated with the company 25 years.

Harry Cleveland, 58, chief engineer, Inland Wire Products Co., Chicago, died May 27 in Kendallville, Ind.

Marvin C. Parsons, 85, founder, Parsons Casket Hardware Co., Belvidere, Ill., and president until his retirement 18 months ago, died May 31 in that city.

John K. Shaw Sr., 67, coal mining operator and active as a director in many

Baltimore corporations, died recently in Green Spring Valley, Md. He was owner of Shaw Bros. Coal Mining Co.

Frank Allen Brown, 55, assistant superintendent, Cleveland division, Nickel Plate railroad, died May 25, in Cleveland.

H. Leslie Meyer, 64, vice president and project manager, Mason & Hanger Co. Inc., New York and Lexington, Ky., died May 29 at Shreveport, La.

Harry Glaenger, 67, former vice president in charge of engineering, Baldwin Locomotive Works, Eddystone, Pa., died May 24 at Conshohocken, Pa. Mr. Glaenger retired from the company in 1940.

Frank A. Lawler, 59, executive vice president, Ziv Steel & Wire Co., Chi-



I. L. JENNINGS

cago, and secretary, Suburban Tool & Mfg. Co., La Grange, Ill., died May 25 in Chicago. Prior to joining the Ziv organization in 1928, Mr. Lawler had been associated with Crucible Steel Co. of America, New York, for 22 years.

Andrew V. Cleland, 88, owner and founder of Cleland Mfg. Co., Minneapolis, died recently in that city.

Charles White Hubbard, 77, retired president of American Axe & Tool Co., Pittsburgh, died May 16 in New York.

H. McDuffee, 64, vice president, Electric Auto-Lite Corp.; president, Prest-O-Lite Battery Co., Toledo, and a pioneer automobile builder, died May 13 in that city.

Fred W. Venton, 61, who retired in 1942 as head of railroad sales department, Crane Co., Chicago, died May 25 in that city. Since his retirement Mr. Venton has been treasurer, Allied Railway Supply Association, Chicago.

Oscar T. Oram, 64, secretary, John S. Oram Co., Cleveland, died in that city May 31.

William Babcock Prince, head of Prince & Izant Co., Cleveland, and a director of Bishop & Babcock Mfg. Co. and Standard Tool Co., Cleveland, died June 1 in that city.

Glen M. Daily, 48, assistant sales manager, steel fittings department, Weatherhead Co., Cleveland, died May 31 in that city.

# Geneva Works To Operate by Year's End

*First blast furnace to be completed by August. . . Project delayed by inability to obtain materials and equipment. . . Concrete substituted for steel in many structures*

COLUMBIA Steel Co.'s Geneva works at Provo, Utah, will be ready for operation by the end of the year, unless delays not now foreseen are encountered, officials of the United States Steel Corp. subsidiary announced last week.

One of the three blast furnaces is approaching completion and should be ready for operation by August, if desired.

Although progress on the project has been retarded materially by inability to obtain early deliveries of essential items of equipment, the works rapidly is becoming a "bastion of steel."

This will be by far the largest integrated steel mill west of the Mississippi, and is a plant of the most modern design. It is being erected by Columbia Steel for the Defense Plant Corp. at a cost of \$150,000,000. It was ordered by the government to provide steel for war shipbuilding needs on the Pacific Coast.

While a number of units are ahead of schedule, other phases of construction are behind the original schedule, due primarily to stringent priority regulations and need for similar equipment in other government war projects. The priority situation has been improved recently through the efforts of the War Produc-

tion Board. Another factor which has slowed up work at Geneva has been a labor shortage.

Despite these obstacles, the tremendous size of the Geneva mill, covering 1600 acres, is apparent, now that many thousands of tons of structural steel have been erected.

The plant will have four batteries of by-product coke ovens, each battery containing 63 ovens. The batteries are at least 70 per cent completed.

Three blast furnaces each will have an approximate capacity of 1200 tons of pig iron daily.

The continuous plate mill, now under construction, will be one continuous building 3750 feet long.

Other indications of the size of Geneva

can be gained from the fact that 70 miles of conduit pipe are becoming part of the slabbing and rolling mills. There will be several steel girders in one of the steel furnace buildings which weigh well over 100 tons each. So large are they that more than 6000 rivets were used to secure reinforcing plates to them. Huge cranes will ride these girders carrying tons of molten steel from the nine open hearth furnaces, each with a steel capacity of 225 tons daily.

Shortage of materials has made necessary the use of great quantities of concrete in place of steel. Four hundred thousand cubic yards of concrete have already been poured into the various structures. Before the project is completed, this figure will approximate 500,000 cubic yards.

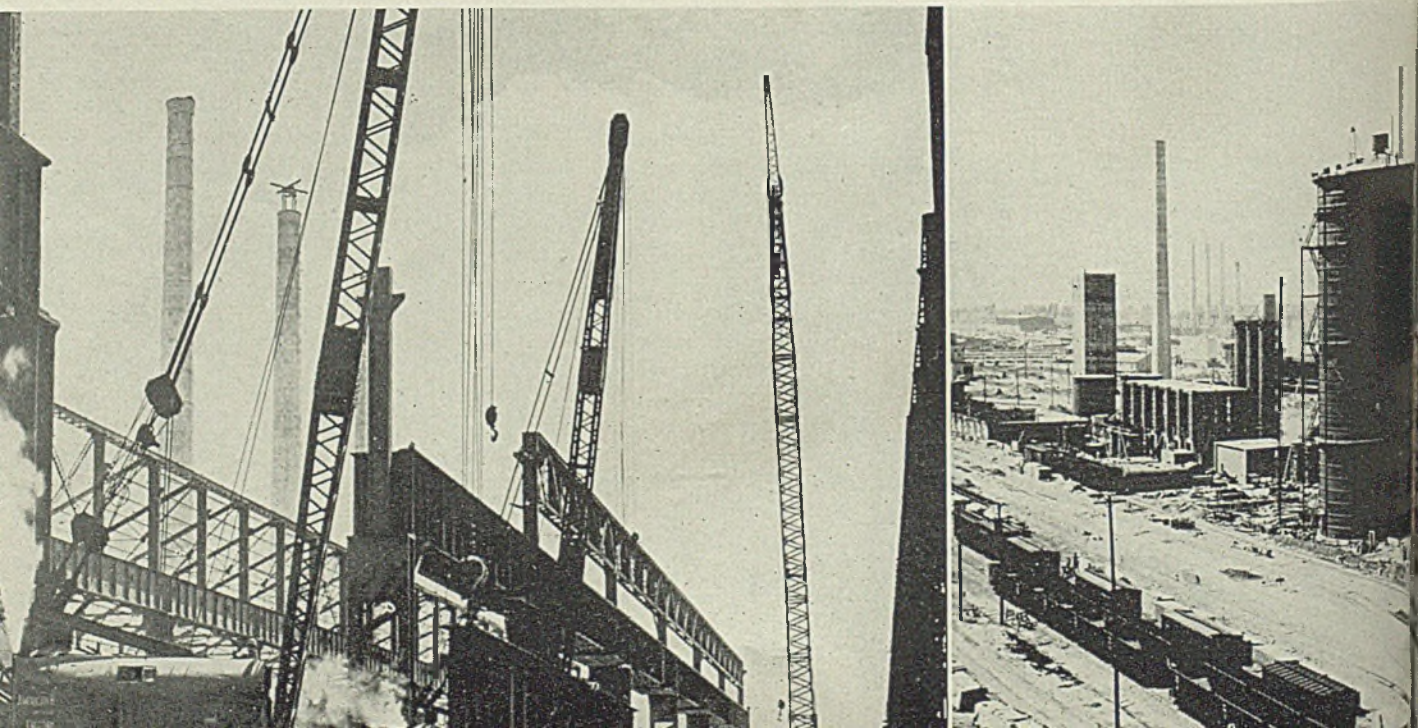
From one vantage point on the plant site can be seen elevated conveyor ways, coal and ore storage bins, and stacks, all made of concrete, resulting in conservation of from 25 to 30 per cent of steel

*Snow-capped Wasatch mountains form an unusual setting for the new Geneva plant, right above. On the left is the power house. On the right is No. 1 blast furnace*

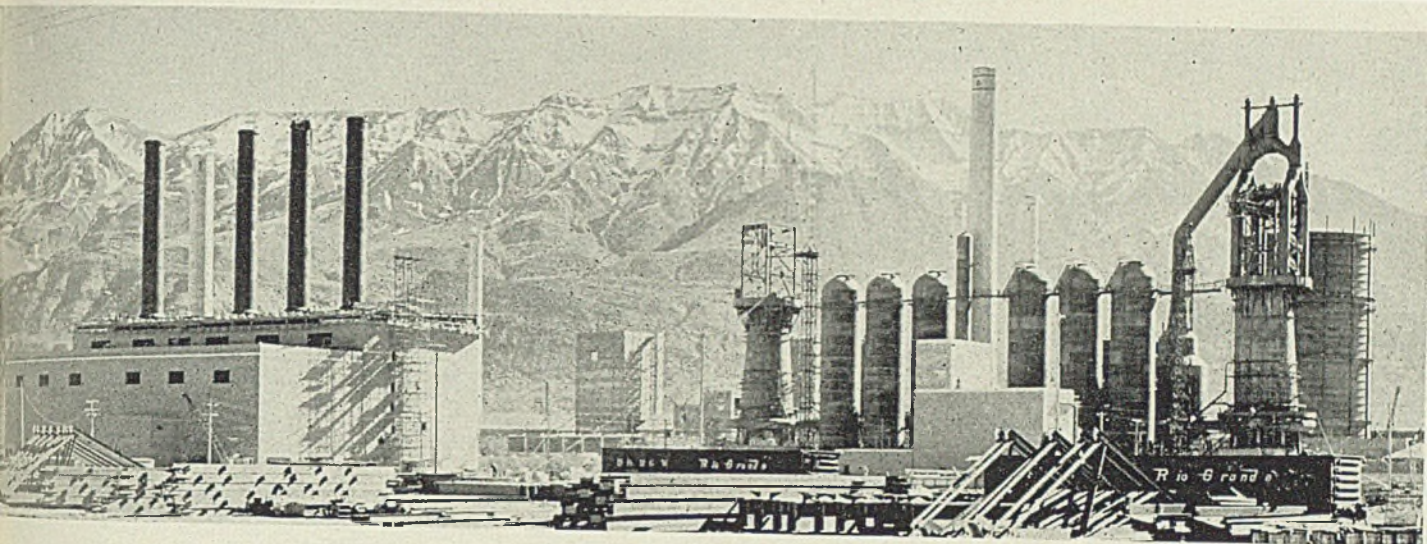
*Left below, steel erection work on the open hearth plant. The works will have nine open hearths, with a combined daily capacity of 2200 tons*

*Center below, railroad cars and other equipment at the Geneva mill are dwarfed by the huge by-products plant. In the right background is blast furnace No. 1*

*Right below, No. 2 blast furnace, one of three being built on the 1600-acre site. Each will have daily capacity of 1200 tons*







of which they ordinarily would have been made.

Winding around the site are miles of railroad tracks to service the mill facilities. When completed, 65 miles of railroad tracks will have been laid within the plant site.

### DPC Authorizes Plant Expansions, Equipment

Defense Plant Corp. recently authorized the following expansions and equipment purchases (figures are approximate):

Canton Drop Forging & Mfg. Co., Canton, O., plant facilities in Ohio costing \$4,000,000.  
International Harvester Co., Chicago, plant equipment in Illinois costing \$50,000.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., plant facilities in Illinois costing \$435,000.

Woodall Industries Inc., Detroit, plant facilities in Michigan costing \$125,000; overall commitment \$700,000.

Armstrong Cork Co., Lancaster, Pa., plant facilities in Pennsylvania costing \$40,000;

overall commitment \$1,135,000.

McDonnell Aircraft Corp., St. Louis, plant facilities in Missouri costing \$116,000; overall commitment \$650,000.

General Motors Corp., Detroit, facilities for plants in Michigan costing \$1,125,000; overall commitment \$3,000,000.

Goodyear Aircraft Corp., Akron, plant facilities in Ohio costing \$300,000; overall commitment \$8,700,000.

National Cylinder Gas Co., Chicago, plant facilities in Georgia costing \$60,000; overall commitment \$150,000.

Pittsburgh Equitable Meter Co., Pittsburgh, equipment for plant in Pennsylvania costing \$300,000; overall commitment \$440,000.

Aerojet Engineering Corp., Pasadena, Calif., plant facilities in California costing \$100,000; overall commitment \$250,000.

Rheem Mfg. Co., South Gate, Calif., plant facilities in Alabama costing \$350,000.

Aluminum Forgings Inc., Buffalo, equipment for Pennsylvania plant costing \$440,000; overall commitment \$9,425,000.

General Electric Co., Schenectady, N. Y., plant facilities in New York costing \$560,000; overall commitment \$3,500,000.

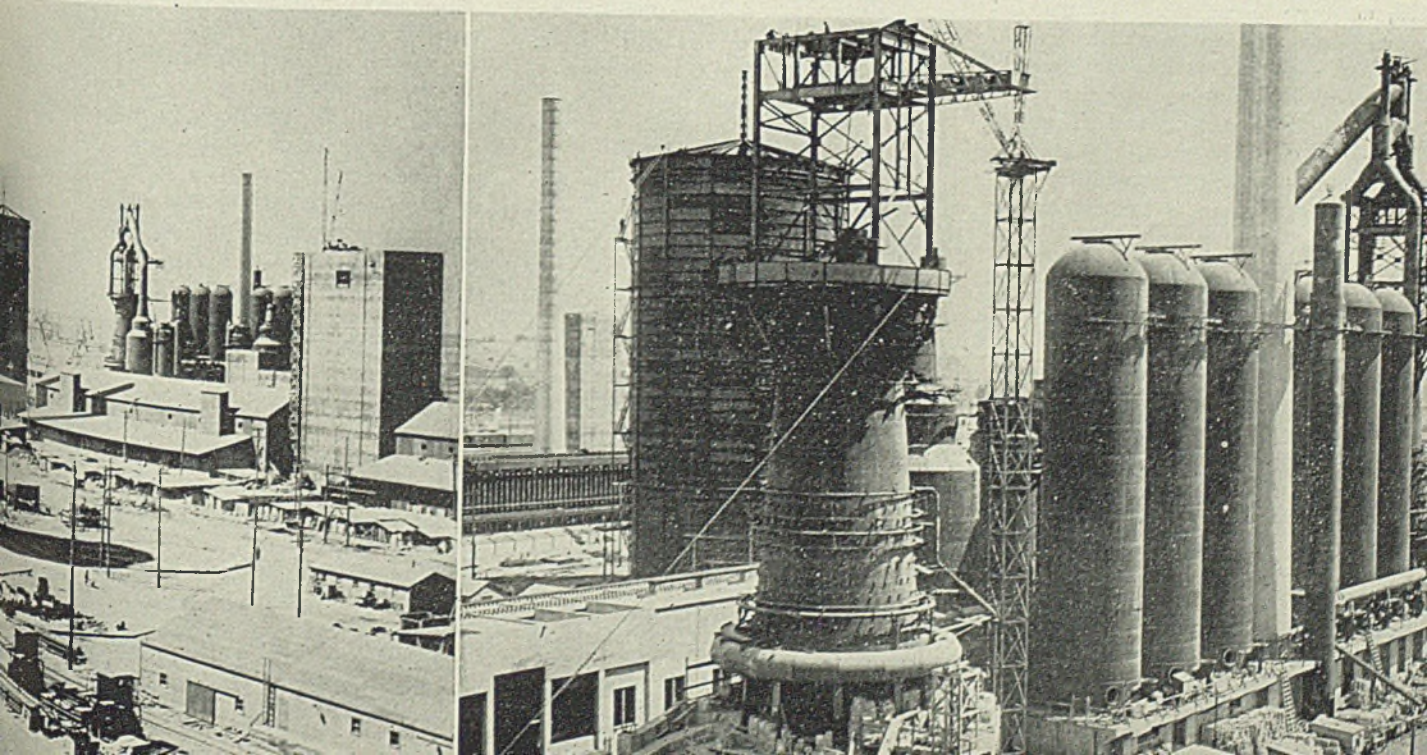
Sheffield Steel Corp., Houston, Tex., plant facilities in Texas costing \$650,000; overall commitment \$24,000,000.

### New Plant Will Quadruple Prewar Magnesium Output

First units of new government-owned magnesium plant at Spokane, Wash., have gone into operation. The plant is being built and operated by the Electro Metallurgical Co., subsidiary of the Union Carbide & Carbon Corp., for Defense Plant Corp.

Completed in 11 months from the time construction was started, the plant is the first and largest completely integrated mill for production of magnesium from dolomite by a thermal reduction method. Capacity, when plant is in full operation by the end of this year, will be approximately four times the annual prewar domestic production.

Equipment was designed by the company. In its process, calcined dolomite is smelted with ferrosilicon in large electric furnaces.



# Industry Facing Active Last Half Year Despite Rescheduling Plans

*Screening of new orders and proposed cutback of backlogs not expected to immediately affect plant operations. . . . Cancellations less than year ago*

SCREENING and scheduling of all new machine tool orders by the recently established WPB Facilities Review Committee is not likely to materially alter the industry's production outlook over the remainder of this year, industry officials believe. The committee is expected to also review order backlogs toward eliminating those units not essential under the present procurement program.

"Since July, 1941, tool builders have been in constant touch with the various procurement agencies to aid in scheduling and placement of orders," Tell Berna, general manager, National Ma-

chine Tool Builders' Association, states. "At that time they reviewed the machine tool requirements necessary to complete the ten most urgent plant expansion contracts. Tool builders have repeatedly urged no more units be built than absolutely necessary, for they have felt any machine tool not purchased now will ease the postwar prospects to just that extent.

"The industry has gone one step further in asking WPB to inspect war plants to see whether or not all the new tools in these plants are actually being used. In spite of these efforts it is estimated

## Big Postwar Demand Backlog Seen

*Conference Board survey indicates deferred expenditures and undermaintenance will provide huge volume in the reconstruction period. . . . Capital goods shortages likely*

"DEFERRED expenditures and undermaintenance are expected to provide large backlogs of demand in the reconstruction period," according to The National Industrial Conference Board, which has just completed a general survey of the economic background for postwar planning.

After 1930, the board points out, a period of attrition and deterioration of capital assets began, which by 1940 resulted in a situation in which some 70 per cent of all metalworking machinery in American industry was over ten years old. Although machine tool shipments have been of record breaking proportions during the past few years, "private purchases of machinery and equipment for nonwar industries were drastically curtailed," the Board adds, and at the same time recalls that "following World War I new manufacturing capital expenditures exceeded depreciation charges on manufacturing capital assets until 1930."

The total disposable income (after taxes) of all individuals in the country is found to have been fully \$8.5 billion greater in 1941 and nearly \$30 billion greater in 1942 than in 1929. From 1929 through 1935 employee compensation averaged about 65 per cent of total realized national income; by 1940 it had risen above 70 per cent, and in 1942 it is tentatively estimated by the Board at

about 72.5 per cent.

Further analysing the financial position of the consumer in the postwar period, the board points out that accumulated funds available for social security purposes will total nearly \$11.5 billion by June, 1944. "This postwar cushion," it adds, "is equivalent to the total amount of salaries and wages paid out in all manufacturing in 1939. It is nearly twenty times the gross benefit payments distributed in any prewar year. It exceeds by more than \$200 million the aggregate relief and work relief expenditures of the federal government for the years 1932-1938, inclusive."

As another factor supporting the position of the consumer, the board cites the fact that "consumer debt was reduced by almost \$3.5 billion last year. While retail sales in 1942 were the highest ever recorded, consumer debt was nevertheless well below the debt outstanding at the close of 1938.

Postwar backlogs of demand will not be confined to this country, the board finds.

"Shortages of both subsistence and capital goods will be pronounced in many nations in the period of reconstruction," it says, citing the fact that "following World War I similar shortages raised our exports to about a third above their wartime peaks.

that idle new machine tools are equivalent to three weeks' output."

Trend in machine tool orders in recent months has tended downward; currently averaging about 70 to 80 per cent of output. Rate of cancellations is estimated at about 20 per cent of new orders. This is substantially less than recorded during the closing months of last year. It is believed new orders will continue to exceed cancellations by a healthy margin despite a more concerted effort to "screen" requests for new machine tools. Cancellations have averaged \$16 million monthly to date this year, against \$22 million a month during 1942.

Order backlogs vary widely among machine tool interests, but are said to average between five and six months. Deliveries on gear grinding machines, precision boring, thread grinders, multi-spindle automatic bar machines, engine lathes and cylindrical grinders are extended anywhere from nine months to a year. Rifle working machines, tapping and threading units, vertical boring, vertical knee type milling and cut-off and sawing machines can be obtained in less than four months.

On a dollar basis order backlogs at the close of April totaled \$616 million, against \$770 million the first of the year and \$966 million in April, 1942. The peak of \$1,073,000,000 was reached in July, 1942. Order backlogs are still more than double any peacetime period. However, production capacity has been quadrupled. Over one-third of the orders are scheduled for lend-lease, while most domestic requirements are for aircraft and shipbuilding.

### Forward Needs Covered

Machine tool builders are in a dilemma because in helping to rearm the nation they apparently have anticipated at least 10 years of their postwar markets—assuming that manufacturing conditions continue substantially unchanged. The tools built for war purposes are not expendable to any such degree as other wartime equipment. A great many standard machine tools built for war purposes will therefore be equally useful for peacetime operations, while many special purpose units will undoubtedly be converted to peacetime use. It is estimated that well over 90 per cent of the tools built in the past four years can be turned immediately to civilian goods production for a while at least. However, continued use of these tools depends on postwar developments in tool design, manufacturing technique and product development.

Stocks of machine tools have about doubled since 1939. In this four-year

period production has averaged \$700 million annually or equivalent to a normal demand through 1965. Sharp upturn in machine tool shipments is also illustrated in the fact that during January, 1942, output amounted to \$83 million, rising to a peak of \$132 million in December. Shipments to date this year have been averaging slightly under \$120 million monthly.

Even if the radical revision in designs of military equipment or changing emphasis on type of equipment needed doesn't sustain capacity output, it is said that machine tool interests are ideally situated to take on subcontract work. Close to 50 companies in the industry are already augmenting output with work of this nature, while about 100 others have been preparing plans to do likewise. One interest is making complete turbines, while others are producing diesel engine parts, aircraft wheel hubs, cutting gears, valves for ships and governors for ship turbines. The balance of the industry, numbering about 30 companies, is booked far ahead and these companies haven't given much thought to this type of work.

Subject of contract renegotiation has not yet been clarified for machine tool interests. Various procurement agencies have been negotiating with those companies under their jurisdiction for some time but have not been able to determine a fair profit return for the individual interests concerned. The industry's problem is unusual in that machine tool builders are said to have practically produced themselves out of business for at least a decade in the period following termination of hostilities.

## OPA To Form Tool Steel Advisory Committee

Eight executives in the nation's tool steel industry have been invited by Price Administrator Prentiss M. Brown to become members of a Tool Steel Advisory Committee being formed to confer with OPA on tool steel pricing matters.

The eight are: Russell M. Allen, general manager of sales, Allegheny Ludlum Steel Corp., Brackenridge, Pa.; T. H. McGraw Jr., president, Braeburn Alloy Steel Corp., Braeburn, Pa.; J. H. Parker, president, Carpenter Steel Co., Reading, Pa.; A. T. Galbraith, vice president in charge of sales, Crucible Steel Co. of America, New York; L. Gerald Firth, president, Firth-Sterling Steel Co., McKeesport, Pa.; M. W. Saxman Jr., president, Latrobe Electric Steel Co., Latrobe, Pa.; J. O. Rinek, vice president, Universal-Cyclops Steel Corp., Bridgeville, Pa.; Floyd Rose, vice president, Vanadium Alloys Steel Co., Pittsburgh.

## "Grass Roots" Effort Is Required

*Committee for Economic Development Chairman says it is up to nation's 2,100,000 employers to provide 10,000,000 more jobs at end of war than they did in 1940*

SOME idea of the job which industry must do in the postwar period was outlined in Pittsburgh last week by Paul G. Hoffman, president, Studebaker Corp., and national chairman, Committee for Economic Development. Mr. Hoffman was aided by Walter D. Fuller, president, Curtis Publishing Co. and regional chairman of the committee for the states of Pennsylvania, New Jersey and Delaware.

Mr. Hoffman cited the need for ten million more jobs at the end of the war than industry provided during 1940. He emphasized these jobs must be full productive jobs and not merely spread-the-work employment. Industry, he stated, must avoid blind alleys such as cessation of technological development and a ridiculously short work-week.

### Suggests Marketing Studies

In order to provide these necessary jobs, our annual output of goods must total between \$135,000,000,000 and \$145,000,000,000. If industry is to fulfill this obligation, two things must happen. In the first place, individual plans for production of both prewar and postwar products and marketing studies affecting these products must be started now. In the second place, a concerted effort must be made to be sure that the economic factors in the United States after the war will be favorable to business.

The function of the Committee for Economic Development is to aid industry in doing this job. Mr. Hoffman emphasized the fact that this is to be a "grass roots" effort, that the 2,100,000 individual employers in the United States are responsible for providing these jobs. If industry does not do this job and does not provide sufficient employment, the country is faced with two bitter alternatives—either a high rate of unemployment with its consequent depressing influence or too much government employment, which will make available a tremendous political power which could easily be grabbed by another "Huey Long". If we are to win the peace and maintain the American form of government, such political power must be avoided.

The Committee for Economic Development will assist in providing this proper "economic climate" for industry after the war by an ambitious program of

research which will analyze the policies of government, labor and industry in order to point out which of these policies should be challenged because of its possible effect on business expansion. This job is already under way and its effectiveness is being guaranteed by concerted effort of a large group of the best business and economic minds in the country. The work of this research body will be ineffective, however, unless industry lays the groundwork.

To prepare plans for such a job, industrial areas of the country are being segregated into small packages, each with a committee composed of leading employers, such as the one which has been organized in the Pittsburgh district (see STEEL, May 31, Page 48). It will be the job of these employers' committees to determine the number of jobs which must be provided, the means by which these jobs can be provided, and establishment of a basic plan which can be put into operation as soon as the end of wartime restrictions makes it possible.

These small area committees will be the success or failure of the plan. Rather than centering power in a committee in Washington or any other central location to make recommendations and to draw up plans for postwar employment and postwar production, the Committee for Economic Development believes that concentrated effort within a community is the only possible answer to this problem and therefore all its functions will be carried on at the community level.

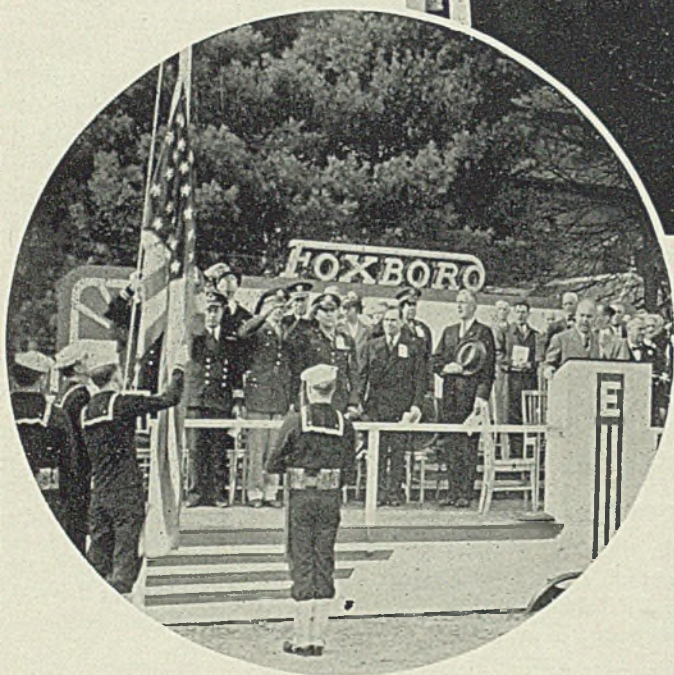
### "Postwar Production Must Increase"

A 50 per cent increase in production in the immediate postwar years will be necessary in order to do the job, according to Mr. Fuller. This means that every company which was active in the prewar market should study its prewar record and make plans so that the value of its product can be stepped up almost immediately to a figure beyond its best year. Not only must production methods be studied in order to accomplish this feat, but also thorough marketing studies must be made to determine whether or not all such production can be sold. Only by such a herculean effort can industry expect to absorb our potential unemployed and thereby avoid the necessity for regimentation of industry.

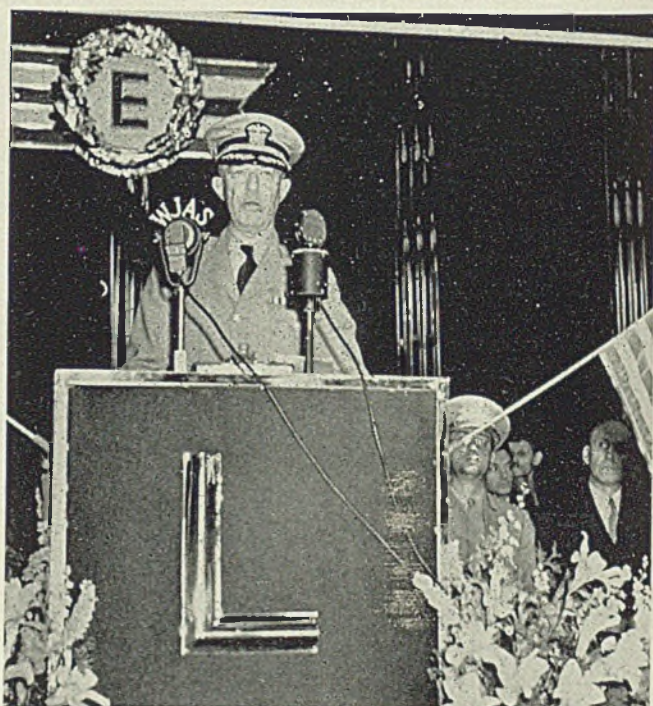
*Michiana Products Corp., Michigan City, Ind., receives the "E", right. Army, Navy, and company officials are shown*



*Color guard raises colors, below, at "E" presentation ceremonies at the Foxboro Co., Foxboro, Mass.*



*Lewis Foundry & Machine Division, Blaw-Knox Co., Coraopolis, Pa., which produces antiaircraft gun mounts and 6-inch gun slides, is presented the burgee, below, by Capt. F. L. Oliver, chief inspector, Pittsburgh Naval Ordnance District*



*John Hosack, below, executive vice president and treasurer, of the Mahoning Valley Steel Co., Niles, O., whose company's sheet mill, and employes recently received the "E" award*



## Industrial Plants Cited by Armed Services

Additional industrial plants have been granted the Army-Navy production awards for outstanding performance on war contracts. They include:

Alloy Steel Products Co., Linden, N. J.  
 American Cyanamid & Chemical Corp., Selden Division, Bridgeville, Pa.  
 Badger Meter Mfg. Co., Milwaukee.  
 Bridgeport Brass Co., Bridgeport Brass Ordnance Plant, Indianapolis.  
 Cleveland Tractor Co., Cleveland.  
 Curtiss-Wright Corp., Propeller Division, Beaver, Pa.  
 Defiance Automatic Screw Co., Defiance, O.  
 Erie Foundry Co., Erie, Pa.

Evansville Ordnance Plant, Chrysler Division, and Sunbeam Division, Evansville, Ind.  
 Federal Cartridge Corp., Twin Cities Ordnance Plant, Minneapolis.  
 Jacob Finkelstein & Sons, Woonsocket, R. I.  
 International Industries Inc., Plant No. 2, Ann Arbor, Mich.  
 Jones & Laughlin Steel Corp., Pittsburgh.  
 Link-Belt Co., Indianapolis and Chicago.  
 Northwestern Machine Corp., St. Louis.  
 St. Charles Mfg. Co., St. Charles, Ill.  
 Thomson Machine Co., Belleville, N. J.  
 United States Rubber Co., Eau Claire Ordnance Plant, Eau Claire, Wis.  
 Wald Mfg. Co. Inc., Maysville, Ky.  
 Western-Austin Co., Aurora, Ill.  
 Wilson & Co. Inc., Chicago.

# Numerous Items Made Available By New Priority Regulation

*Order M-330 directs manufacturers to provide 144 items urgently needed by farmers in food program as action intended to meet both emergency and long range requirements*

WAR PRODUCTION BOARD last week put into operation a program worked out by the Office of Civilian Requirements to provide farmers with supplies needed to increase food production.

It issued priorities regulation No. 19 providing procedure for buying certain farm supplies, and to enable retailers to obtain such supplies.

Simultaneously, it issued general preference order M-330 providing for issuance by WPB directives to manufacturers and distributors to make certain farm supplies available. This will be accomplished by directing manufacturers or distributors to produce, schedule, segregate, earmark or deliver listed farm supplies for sale at retail for farm use.

This action is intended to meet both emergency and long range needs.

## Anticipates Long-Term Needs

The M order provides for emergency action by manufacturers and distributors under directions from WPB to get into retail channels without delay adequate quantities of some 66 items most urgently needed by farmers. The priority regulation grants the farmer a priority to buy not only the 66 items comprising the emergency program but also 78 additional items in the long-range program, a total of 144.

It also provides that whenever a farmer orders any of the supplies covered by the regulation from a dealer who has them in stock, the dealer must fill the order.

A farmer is defined as "a person who engages in farming as a business, by raising crops, livestock, bees or poultry. The definition also includes custom operators. It does not include a person who just raises food or other agricultural products entirely for his own or family use.

A dealer can use the farmers certificates to get priority on orders for farm supplies up to 75 per cent of the dollar amount of his sales.

The priority order becomes effective June 7.

The 66 items covered by the M order are listed as follows:

Auger bits; batteries—flashlight, radio, fence control, telephone, ignition; belt fasteners; metal, cans, five gallon kero-

sene and gasoline; chains—halter, cow tie and tie out harness, trace, breast, heel and butt, log, tractor tire, welded coil under ½-inch, repair links; clevises and swivels; cold chisels, standard.

Grease fittings and oil cups; grease guns, hand operated, including hoses and adapters; hames; handles—small tool (hickory and oak); steel goods (ash); harness, leather; harness hardware; hoes; horsecollars; knives, stockmen's; motors, fractional under 1 HP; nails; oilers; drills, carbon steel—blacksmith; bit stock; straight shank; forks, agricultural; grain scoops; pliers, fence, slip joint; plow bolts; poultry netting; punches—machine, pin; rings—bull, hog; rope—(1 inch and under); saws, dehorning; screw drivers, regular pattern, wood handle.

Shovels—round pointed number 2 regular, round pointed number 2 irrigating, square pointed number 2 regular; pails, galvanized; pipe, wrought iron water pipe (2 inch and under); well casing pipe fittings (2 inch and under); stock watering tanks; tackle blocks, wood; tire gages, low pressure; tire pumps, hand operated; tubs, galvanized; valves (2 inch and under); wagon wood stock; wire—barbed, bale tie, woven fencing, staples; wrenches—adjustable, general purpose, pipe wrenches.

The long-range program includes the 66 items in the emergency program plus the 78 items listed below. Other items may be added from time to time. The additional items follow:

## Many Items of Steel

Axes; baskets; bit braces; blacksmith's pincers; blacksmith's hoof knives; blow torches; blowers and forges; bolts and nuts; boxes; brooder thermometers; brushes, motor repair; burlap bags; eave troughs and conductors; egg cases; feed troughs; files; food choppers; BX or non-metallic sheath cable up to 75 feet in length.

Calf weaners; copper wire, insulated, up to 75 feet in length; crates; curry combs; drills of the following kinds—breast drills, hand drills, post drills.

Rakers, hand; ridge roll; rivets and burrs; roofing corrugated; safety switches; saws and saw blades; grind stones, mounted; grinders, tools; hacksaw blades; hacksaw frames; hammers; hampers; hand cultivators; hand sprayers; hoof

rasps; hoof snippers; horseshoe nails and calks; horseshoes; horseshoe tongs; husking pins and hooks; jacks for farm tractors.

Knives of the following kinds—butcher knives, corn knives, grafting knives, hay knives, hoof knives; lanterns; tin snips, valley tin; vises; wagon hardware; wedges; welding rods and electrodes; well points; wheelbarrows; wire screen wiring fittings; mattocks; mauls; meat choppers; milk pails; milk strainers; motor starters under 1 horsepower; mule shoes.

Padlocks; picks; plow shares; post hole diggers; potato forks; potato hooks; poultry hardware; pump cylinders; pump rods and couplings.

# Canada Not To Slow Production In War Shift

TORONTO, ONT.

WHILE there will be no slowing down in Canada's war production effort, C. D. Howe, minister of munitions and supply, stated there will be some readjustments of the Canadian program in line with revisions by the United States and Great Britain.

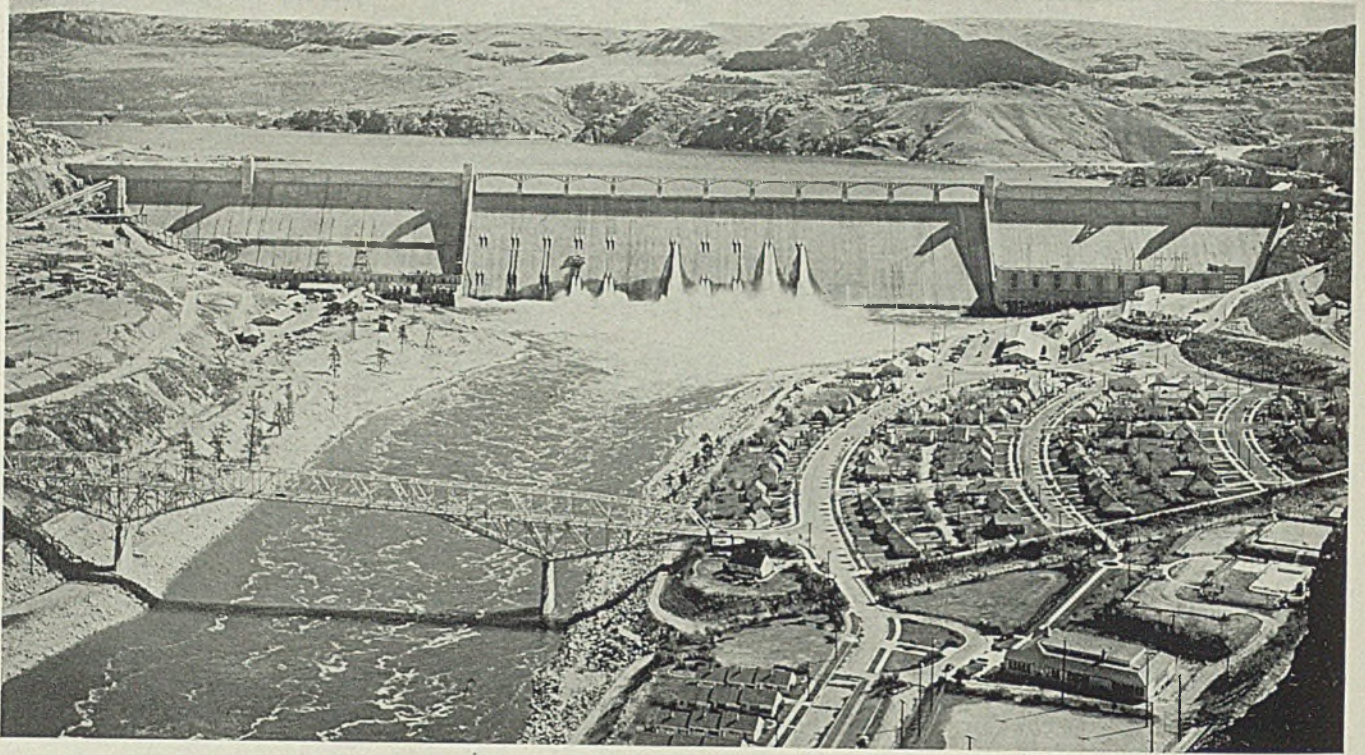
Mr. Howe said the Canadian program is being examined in detail and it will mean a shift in emphasis on war supplies and perhaps a relaxation of some controls on civilian goods.

Certain plants making shells and other war supplies will be retooled for other lines, but no widespread unemployment is expected.

New and more powerful weapons are planned for the future in Canadian plants. There have been substantial requests for lend-lease assistance, Mr. Howe said, and he gave as an example the order for 145 locomotives for India being filled by the Montreal Locomotive Works and the Canadian Locomotive Co., at Kingston, Ont. He stated the Combined Production and Resources Board surveyed the locomotive industries of all available countries and decided that Canadian facilities could be utilized to the best advantage.

In the reshuffling of Canada's industry, Mr. Howe said, "there will be some left over for civilian needs." Some restrictions will be eased slightly, particularly with respect to farm implements, railroad equipment, and repair parts.

Canadian plants now are being retooled for production of new types of guns, and by October plants that have been laying off workers again will be operating at capacity with full crews.



Low-cost electric power from government-built dams like Grand Coulee, above, and Bonneville supply the life blood for the Pacific Northwest's booming war in-

dustries. West Coast industrialists hope this factor will enable them to sustain their new industries in the postwar era. NEA photo

## Power Sparks District's Industry

SEATTLE

ELECTRIC power is the new tonic which has sparked the industrial blood pressure of the vast Pacific Northwest, flowing from its triangular heart bounded by Seattle, Spokane and Portland, Ore. War industry, too, of course has had its pulsating effect, but basically it is electricity from the great dams at Grand Coulee and Bonneville on the Columbia River which are at once the driving power for industry today and the hope of industry here in the post-war world.

Power naturally is closely allied with the metals industries, ferrous and non-ferrous, and already it has brought the great new aluminum reduction plants to Longview, Wash.; Troutdale and Vancouver, near Portland, and shortly may magnetize new aluminum and magnesium industries to the area.

Power has brought the new calcium carbide and ferrosilicon and chromite ore reduction plants of Electrometallurgical Co. to the Northwest, and this company, too, is keeping hold of important nearby acreage for future plant development.

Power drives the sawmills of Washington and Oregon which have long lent to the district the reputation of lumber center of the country. A by-product has been the pyramiding of production

and demand for plywood, so intensive that the Portland area now supplies an estimated 2,500,000,000 feet of plywood a year, based on  $\frac{3}{8}$ -inch 3-ply material.

The lumber industry, under pressure of the war and shortage of labor in the camps and mills, is becoming efficientized. Timber cutting is more careful and scientific. Wastes are being put to use, and it will not be long before a pile of burning sawdust will become a rarity. Sawdust is being compressed with suitable binders into Prestologs and sold for around \$10.50 per ton.

### New Electric Steel Foundries

Power has brought the Northwest important new electric steel foundries, practically all of them now busy on navy work altogether, but some of them certainly destined for an important post-war role.

For example, the new Oregon Electric Steel Rolling Mills at Portland, now on the verge of beginning melting operations in two 25-ton electric furnaces and planning eventual production of 75,000 tons of steel ingots a year, all of which will be rolled on merchant mills being installed now at the plant. Already, 10,000 tons of choice shipyard scrap are piled at the plant awaiting the start of melting operations.

Electric power and war have combined

to give the impetus to such important operations as now under way at Pacific Car & Foundry Co. in Seattle where production of medium M-4 tanks has been in process for a year.

With the assistance of 348 subcontractors, this plant, according to the reports, is building a tank weighing 32 tons, of which 70 per cent represents steel produced from Northwest scrap. Before the war, the Pacific Car plant was building trolley coaches, buses and railroad equipment; today it is on the basis of 95 per cent war production, principally tanks. Among the new facilities involved is a large electric steel foundry.

In the nearby city of Kent is Northwest Metal Products Inc. which formerly produced garbage cans and downspouts, now is grinding out clips for Garand rifles.

Aircraft and shipbuilding are two other "war babies" which have zoomed to major significance with the war. Four plants of Boeing Aircraft Co. sprawl over the south and east sections of Seattle, while two more are producing planes for Canada in Vancouver, B. C. Boeing is no newcomer to the airplane field, having celebrated its twenty-fifth anniversary two years ago, but only in recent years has it attained its present stature. It is the breeding ground of the famed B-17 Flying Fortress, Stratoliners and other new planes as yet unveiled.

## Armament Output Near Peak; Slower Rise Seen

GAGES of industrial activity which have recorded the very rapid expansion of the past year are showing a disposition to level off. Factors helping to produce this situation are the ever-increasing stringency in labor supply and the approaching limits of critical metals production.

Recognition of the fact certain military essentials still are not flowing in required volume will no doubt make for fresh gains in aircraft and related ordnance, but decreases caused by strikes, contract cancellations and time lag in shifts to other lines of essential production conceivably can hold down a general increase.

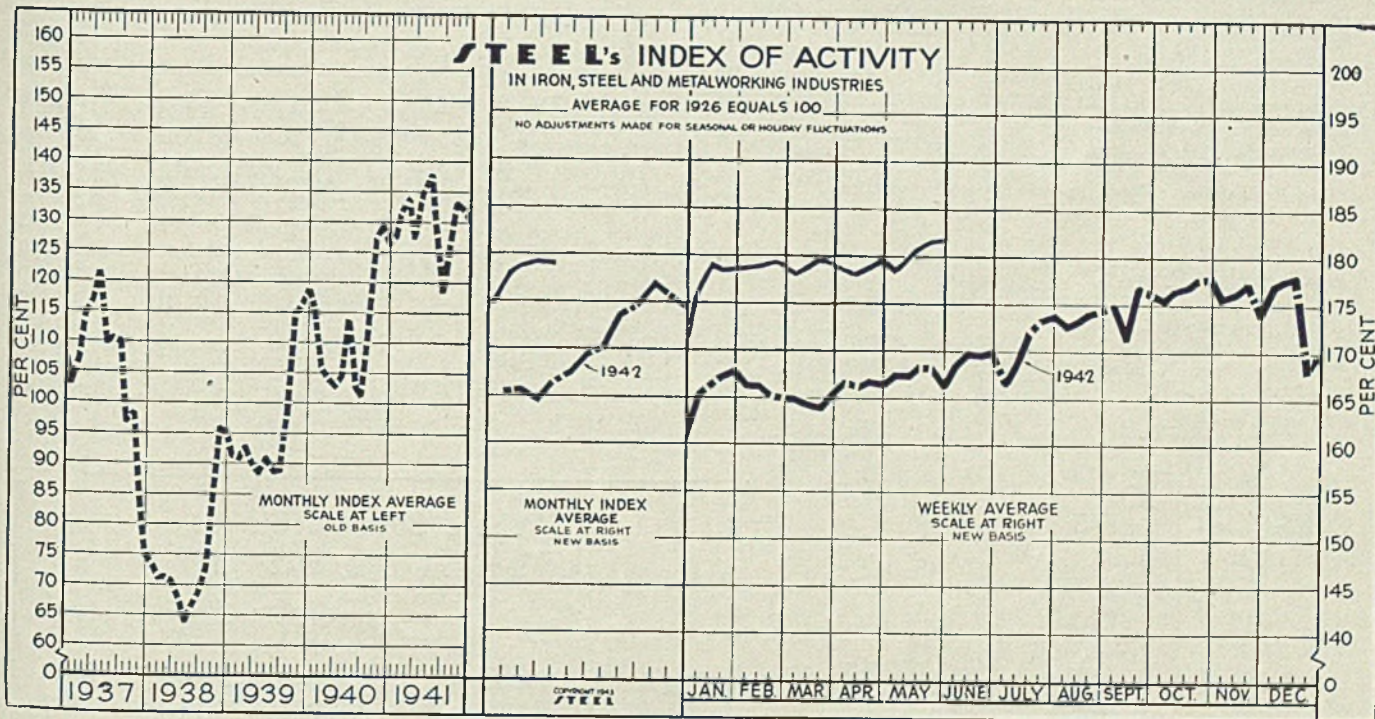
Although munitions output climbed higher in March, there was a 7 per cent deficiency in aggregate production for the quarter, indicating the average output for each succeeding quarter must be lifted to about 27 per cent of the projected 1943 total. This implies an average increase in rate of approximately 22 per cent quarterly.

Planning for improvement in the record, faced by seemingly insurmountable difficulties, is moving down the only avenues open—adaptation of machines to replace human hands and closer co-ordination promised by recently developed materials scheduling techniques. Need is seen for better distribution under CMP and for minimizing the frequency of changes in types of production among war plants.

Government officials predict this year's output of manufactured products will reach \$180 billion, double the 1938 volume. It is planned to hold production at this level into the postwar period by a program of reconverting plants and shifting materials allotments when military events permit.

Rise in war output naturally has been accompanied by a continued increase in war expenditures. From July 1940, through April, 1943, war spending amounted to \$94.9 billion. In the latter month \$7,290 million was disbursed, representing an annual rate of \$87.5 billion and 3 per cent more than in March.

Conspicuous among recent trends in the commercial field and closely related to war spending is the unprecedented



STEEL'S index of activity rose 0.3 points to 182.1 in the week ending May 29:

Week Ended	1943	1942	Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
May 29	182.1	166.2	Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.8
May 22	181.8	168.3	Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
May 15	181.1	168.4	March	179.0	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
May 8	179.1	167.4	April	178.8	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8
May 1	178.5	167.4	May	178.8	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
April 24	179.3	166.4	June	178.8	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4
April 17	178.8	166.7	July	178.8	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
April 10	178.8	166.2	Aug.	178.8	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
April 3	178.5	166.7	Sept.	178.8	174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Mar. 27	179.2	165.5	Oct.	178.8	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Mar. 20	179.6	163.9	Nov.	178.8	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
			Dec.	178.8	174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production

retail buying spree of the first four months of the year in cities with large war industries or Army camps. With the exception of stores in eastern areas, retail establishments in this period showed tremendous sales increases over a year ago, ranging from 47 and 48 per cent in the South and Midwest to 55 per cent in cities of the Southwest. This buying wave, plus sustained purchasing in the final 1942 quarter, has liquidated nearly \$1 billion worth of surplus retail inventories, according to Department of

Commerce analysts. In April dollar sales reached \$5,200 million, 13 per cent above March. Inventories probably will be further reduced to supply current needs.

Bank clearings have maintained a substantial margin of increase from month to month in daily averages since January, when daily average of transactions was \$1,334,170,000. On May 27, latest available date, the figure for last month was \$1,533,806,000, or 34.2 per cent above corresponding day and month last year.

## BUSINESS BAROMETER

### Financial Indicators

	April, 1943	March, 1943	April, 1942
30 Industrial Stocks*	\$134.13	\$131.15	\$97.79
20 Rail Stocks*	34.73	32.47	24.56
15 Utilities*	19.00	17.58	11.06
Average Price of all listed bonds (N.Y.S.E.)	\$98.69	\$98.24	\$95.63
Bank Clearings daily average (000 omitted)	\$1,505,859	\$1,398,759	\$1,108,132
Commercial Paper, interest rate (4-6 months)	0.67	0.67	0.56
Com'l. loans (000 omitted)†	\$10,414,000	\$9,456,000	\$11,337,000
Federal Reserve ratio (per cent)	75.8	77.7	90.4
Capital flotations (000 omitted)			
New Capital‡	\$56,900,000	\$11,300,000	\$79,100,000
Refunding‡	38,400,000	1,900,000	39,200,000
Federal gross debt (millions of dollars)	\$129,849	\$115,507	\$65,018
Railroad earnings†	\$129,647,038	\$106,132,776	\$66,486,021
Stock sales, New York Stock Exchange	33,553,559	36,997,243	7,589,297

\*Dow-Jones series. †March, February, March, respectively.  
‡Leading member banks Federal Reserve System, §Standard and Poor's.

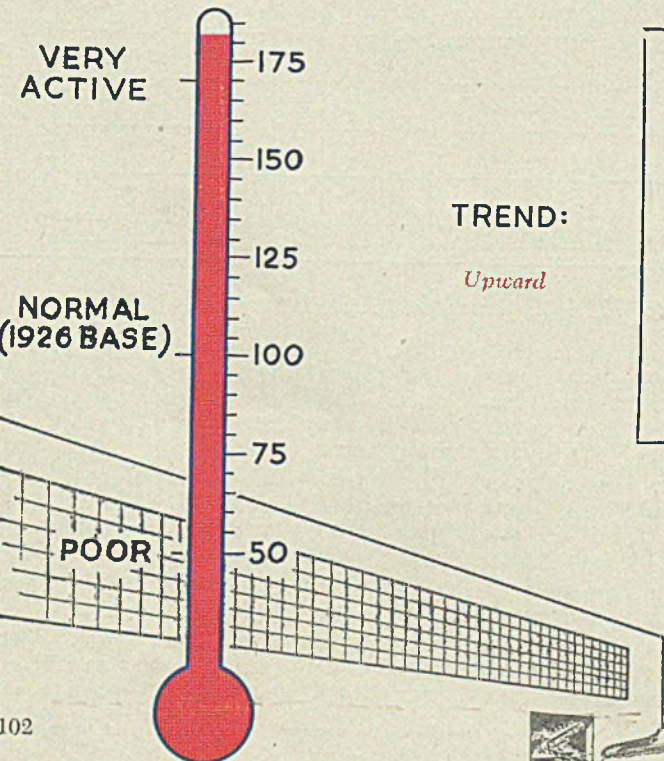
### Industrial Indicators

	April, 1943	March, 1943	April, 1942
Commerce Dept.'s Mfgs. Index†			
Orders	288	275	274
Shipments	249	255	199
Inventories	174.9	175.5	165.6
Industrial Production Index (Federal Reserve Board)	203°	202	173
Iron and Steel Scrap consumption (tons)†	4,787,000†	4,361,000	4,276,000
Gear Sales Index	240	334	378
Foundry equipment new order index	362.7	562.7	1089.3
Finished steel shipments (net tons)	1,630,828	1,772,397	1,758,894
Ingot output (average weekly; net tons)	1,718,917	1,731,419	1,659,975
Dodge bldg. awards in 37 states (\$ Valuation)	\$303,371,000	\$339,698,000	\$498,742,000
Fabricated structural steel shipments (Tons)	97,982	113,337	187,205
Coal output, tons	55,337,000	62,274,000	53,485,000
Coke Production (Daily Av.)			
Beehive†	24,129	23,991	22,258
By-Product†	175,065	175,009	168,581
Business failures; number†	410	422	1,048
Business failures; liabilities†	\$7,282,000	\$4,163,000	\$12,011,000
Cement production, bbls.†	11,392,000	10,293,000	12,733,000
Cotton consumption, bales	938,989	995,512	999,749
Freight Car Awards	1,000	0	2,125
Car loadings (weekly av.)	788,225	768,356	826,509

°Preliminary. †March, February, March, respectively. ‡Bureau of Mines figure.

### Commodity Prices

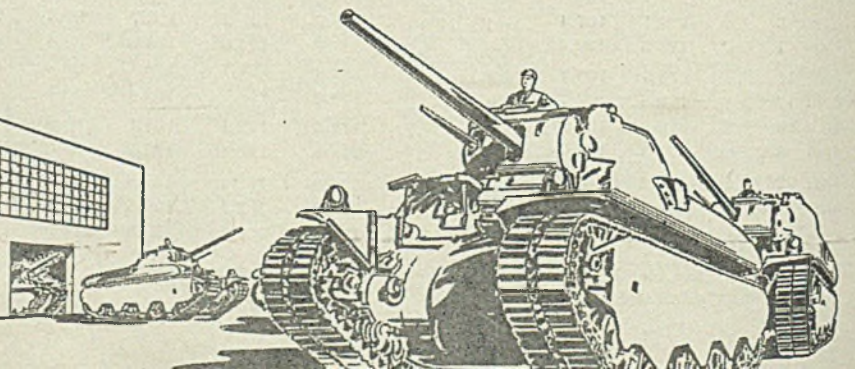
	April, 1943	March, 1943	April, 1942
STEEL's composite finished steel price average	\$56.73	\$56.73	\$56.73
U. S. Bureau of Labor's Index	103.5°	103.4	98.8
Wheat, cash (bushel)	\$1.645	\$1.69	\$1.22
Corn, cash (bushel)	\$1.235	\$1.15	\$0.998



### Where Business Stands

Monthly Averages, 1942 = 100

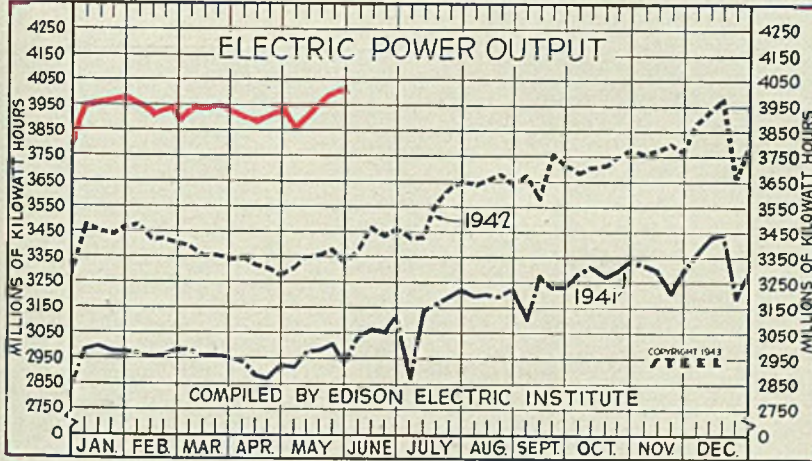
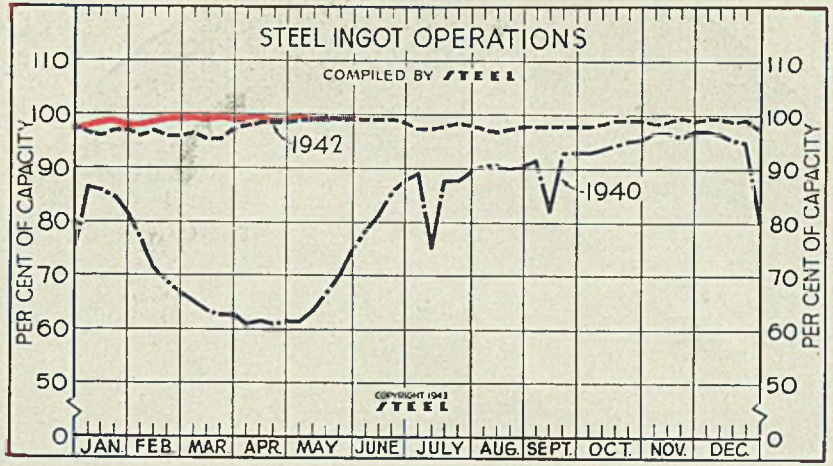
	April, 1943	March, 1943	April, 1942
Steel Ingot Production	104.7	104.9	100.5
Finished Steel Shipments	93.0	101.1	100.3
Bit. Coal Production	103.2	116.8	100.0
Freight Carloadings	96.0	93.6	100.7
Building Construction	44.1	49.4	72.5
Wholesale Prices	104.9	104.8	100.1





**Steel Ingot Operations**  
(Per Cent)

Week ended	1943	1942	1941	1940
May 29	99.0	99.0	99.0	78.5
May 22	99.0	99.0	100.0	75.0
May 15	98.5	99.5	99.5	70.0
May 8	98.5	99.0	97.5	66.5
May 1	99.5	99.0	95.0	63.5
April 24	99.0	98.5	96.0	61.5
April 17	99.0	98.5	98.0	61.5
April 10	99.5	98.5	98.0	61.0
April 3	99.5	98.0	98.0	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	63.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0



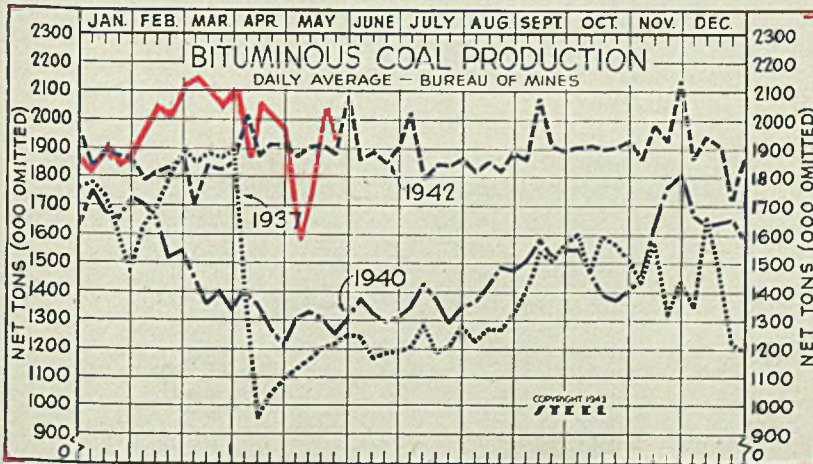
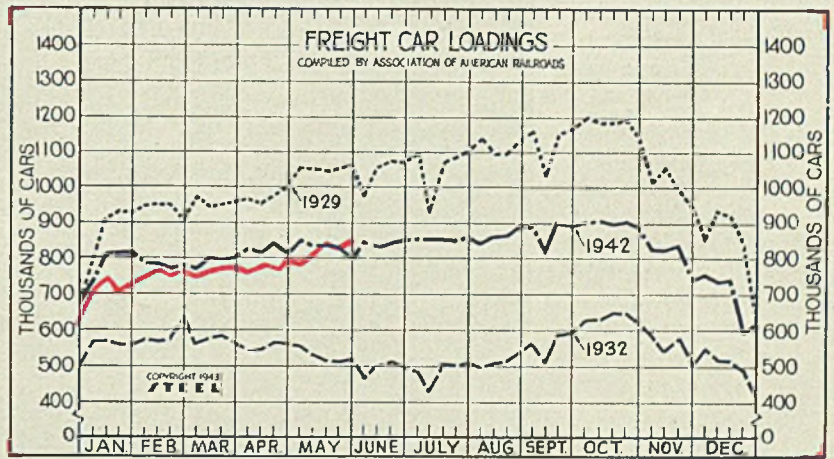
**Electric Power Output**  
(Million KW/H)

Week ended	1943	1942	1941	1940
May 29	3,994	3,323	2,730	2,332
May 22	3,993	3,380	2,838	2,419
May 15	3,960	3,357	2,800	2,422
May 8	3,904	3,351	2,792	2,387
May 1	3,867	3,305	2,734	2,386
April 24	3,925	3,273	2,750	2,398
April 17	3,917	3,308	2,702	2,422
April 10	3,882	3,321	2,721	2,418
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,523

**Freight Car Loadings**

Week ended	(1000 Cars)			
	1943	1942	1941	1940
May 29	852†	796	802	639
May 22	843	838	866	687
May 15	848	839	861	679
May 8	816	839	837	681
May 1	789	859	794	665
April 24	794	816	722	644
April 17	781	847	709	628
April 10	789	814	680	619
April 3	772	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	769	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634

†Preliminary.

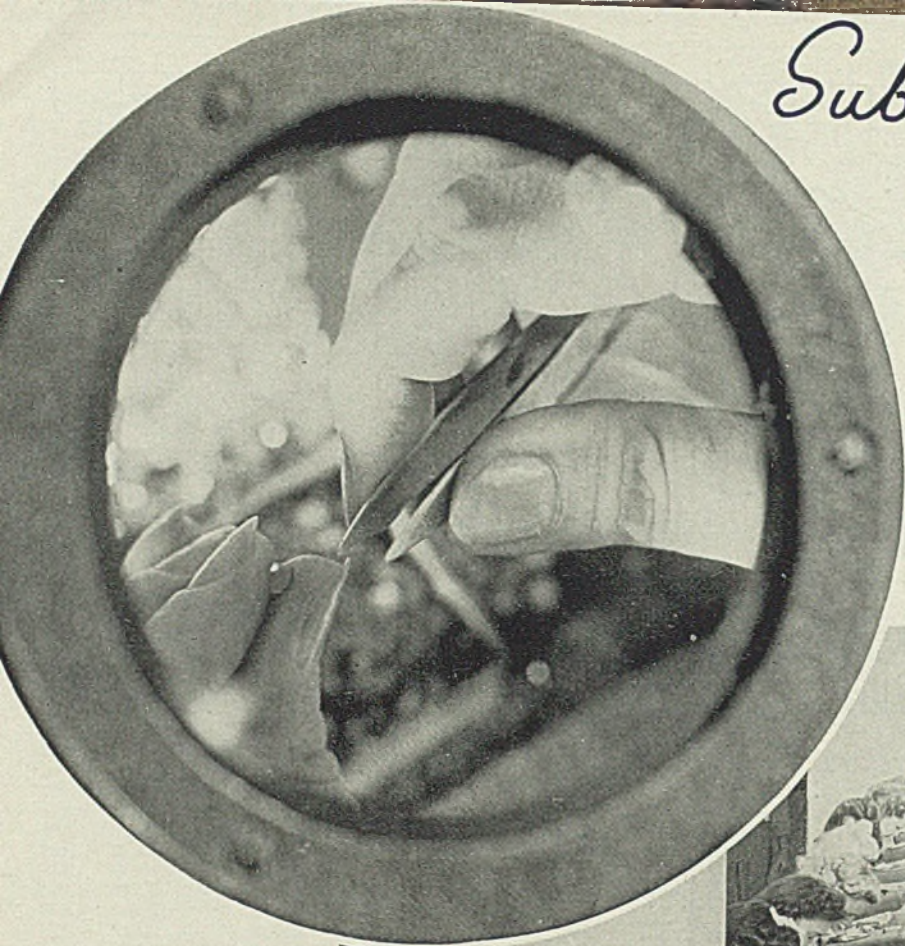


**Bituminous Coal Production**  
Daily Average

Week ended	Net Tons (000 omitted)			
	1943	1942	1941	1937
May 22	1,917†	1,881	1,745	1,223
May 15	2,025	1,913	1,693	1,203
May 8	1,700	1,903	1,567	1,163
May 1	1,584	1,877	867	1,126
April 24	1,963	1,916	267	1,092
April 17	2,017	1,919	233	1,041
April 10	2,067	1,875	200	953
April 3	1,858	2,019	665	1,381
Mar. 27	2,108	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,113	1,878	1,736	1,897

†Preliminary.

# Subcontractors Attain PRE PRE



Above—Closeup of what inspector sees through magnifier which permits detection of flaws invisible to the unaided eye

Right—Keen sight is a "must" for these women whose job it is to detect any possible defect in shell fuze parts—defects so tiny a magnifier is required for examination



Right—Here S. A. Ellingson, left, assistant chief inspector, and O. R. Swanson, chief inspector, Stewart-Warner Corp., examine a part sent in by a subcontractor

Opposite page—Row on row in seemingly never-ending lines, skillful women workers keep production moving in this fuze inspection department



# PRECISION

*... by well engineered program of setup and inspection inaugurated and followed through by the prime contractor*

IF YOU are a subcontractor on win-the-war production, whether large, medium size or small, it will pay you: (1) to set up every job carefully according to the specifications of your prime contractor; (2) to have his inspection department check on your setups and first runs; (3) to intensify your own setup inspection, floor inspection, and detail inspection of all parts produced on your machines; (4) to adopt the habit of frequent inspection of gages; and (5) to go to your prime contractor's inspection department early for consultation over any trouble you may have instead of doing so after pushing through a long run of parts.

If you are a prime contractor on war production, it will help toward victory and will pay you: (1) to provide your subcontractors not only with blueprints of specifications of parts and layouts of operations in good detail but also with special tools and with gages; (2) to help your subcontractors in their shops to set up machines properly for your jobs; (3) to inspect samples of their first runs promptly, if possible by sending your inspectors to their shops; (4) to assist subcontractors, patiently, to overcome mistakes; and above all (5) to have the appropriate sections of your own inspection department do thorough work on all parts you receive from subcontractors.

These two sets of pointers, one set for subcontractors and one set for prime contractors, have been driven home to the writer as an independent observer by study of experience at the Chicago headquarters plants of the Stewart-Warner Corp., one of the nation's pioneers in manufacture of precision parts for use in aircraft, tanks, shell and bomb fuzes, radio equipment, and other war products.

Stewart-Warner, manufacturer in peacetime of diversified automotive accessories, lubricating equipment and other industrial products, automobile heaters, electric refrigerators, radios and other consumer items, is now engaged 99.99 per cent in war production. Subcontracting expands its capacity and is extensive. Recently James S. Knowlson, chairman of the board and president, while on leave for 16 months as Director of Industry Operations and vice-chairman of the War Production Board, in an address before national and Illinois manufacturers urged them to go in strong for subcontracting on war work.

**Subcontractors, 110; Jobs, 300:** One day recently when the writer visited the headquarters plants of Stewart-Warner in Chicago, this company had parts coming in for inspection from 110 subcontractors, some large, some small, on 300 jobs. These were divided about as fol-

lows: Automatic screw machine parts, 35 per cent; Alemite parts, 35 per cent; hand screw machine parts for airplane motors, 10 per cent; parts for heaters for aircraft, 10 per cent; parts for radio equipment for the Army and the Navy, 10 per cent. On all of this an end use demand is for interchangeability of parts, wherever produced, by prime contractor or subcontractor. The imperative demand is for perfect fits, so that our fighting men can have faultless equipment. The importance of perfect interchangeability cannot be over emphasized.

Stewart-Warner has some of the largest batteries of automatic screw machines, also of hand screw and other machines, in Chicago. Moreover, it early converted its large "south plant" from a warehouse into a thoroughly equipped arsenal to produce fuzes. Nevertheless, this company is highly organized for subcontracting. It is specially qualified for that as a supplementary activity, since it has had long experience as a supplier to the automotive industry, and since some of its own war production is as a subcontractor.

For locating subcontractors and placing orders with them, the purchasing department of Stewart-Warner has a special subcontracting division. It comprises three men and three office girls. That unit works closely with the production department on subcontractors to be placed, materials, special tools, blueprint specifications and operation layouts to be supplied to the subcontractors.

**Subcontractors Assured Continued Work:** The purchasing department, with the co-operation of the production, inspection and legal departments has worked up and is using a special letter contract with subcontractors. It fosters a uniform flow of production from the subcontractors. Under its terms, and under informal arrangements also, subcontractors in many cases agree to keep their machines working exclusively on Stewart-Warner jobs. On the other hand, *that company agrees to keep them* (Please turn to Page 128)



# NE (National Emergency) ALLOY STEELS

Having used 85 heats of NE steels, the experience of Allis-Chalmers Mfg. Co. should prove a valuable guide to possible applications of many NE steels reported here

USING HARDENABILITY and chemistry tests as a basis for acceptability, the Allis-Chalmers Mfg. Co., has used to date approximately 85 heats of National Emergency steels in full or part. We, no doubt, like many others, were rather hesitant on full acceptance of the NE steels during their first appearance, but this has disappeared entirely with familiarity in use and classification during the past fifteen months.

By FREDERICK HORAK  
And  
EUGENE CHAMPLIN  
Metallurgists  
Allis-Chalmers Mfg. Co.  
Milwaukee

tile strength, yield point, elongation, reduction in area, impact and hardenability were used in the preliminary laboratory tests, acceptance as substitutes for the SAE steels on simple parts

was given early in the program. Dynamometer tests on more highly stressed shafts and gears were run on the same parts made of SAE steels. From these tests, and in certain cases, field tests, it has been demonstrated that the NE steels are entirely satisfactory substitutes where the substitution is based on physical properties comparable with the former satisfactory SAE steels.

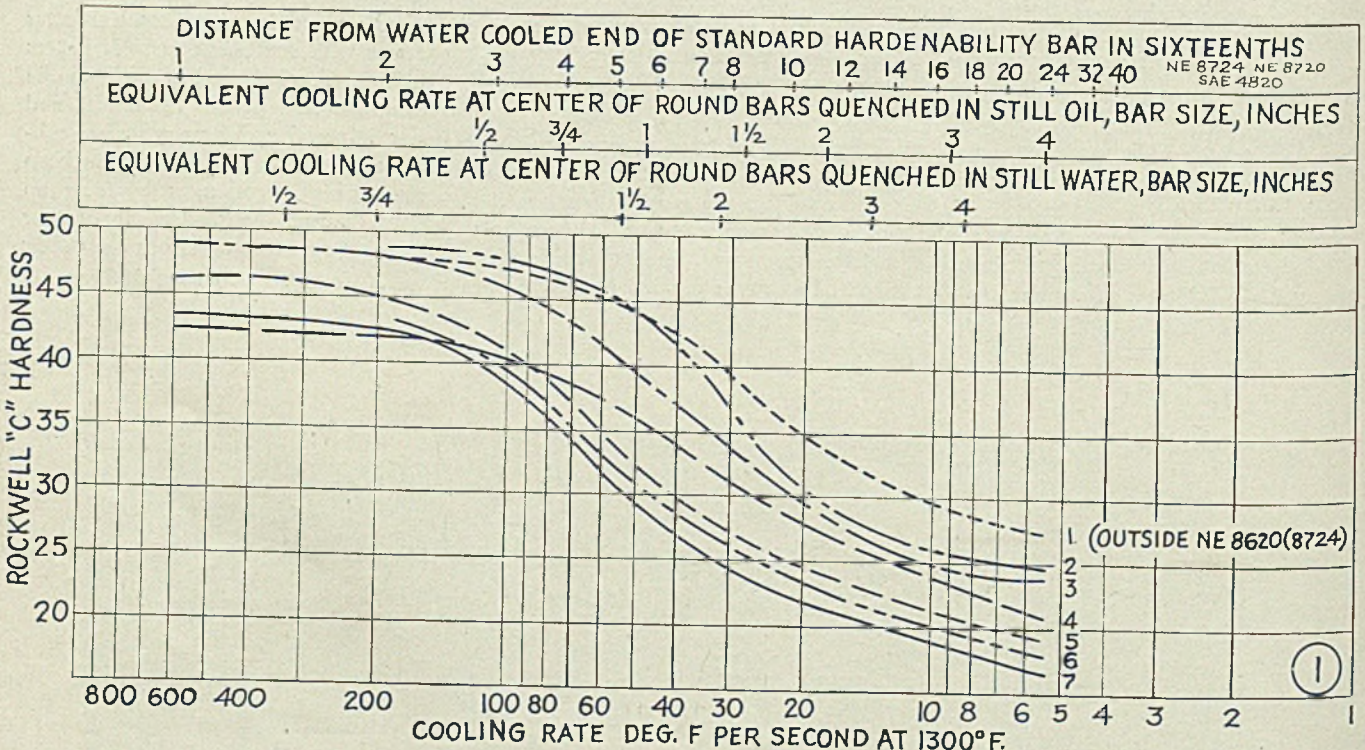
In a large changeover from many alloy steels to NE steels, some confusion and difficulties could be expected in shop procedures or processing. To date, complaints have been few and of minor importance, our major problem being one in bookkeeping when the same parts of SAE and NE steels were in the shops at the same time.

Testing programs are in process now and planned for greater consumption of the 9400 series, and this same series with an additive or "needling" treatment. Many favorable oral and published reports on additive treatments to NE steels made such tests highly desirable, specially where 9400 series steels do not meet

While the conventional tests of ten-

Fig. 1—End-quench hardenability tests: Curve 1, off heat of NE-8620 (NE-8724); Curve 2, AISI high for NE-8724; Curve 3, experimental heat of NE-8724; Curve 4, SAE-4820 from AISI data; Curve 5, production heat of NE-8724; Curve 6, AISI low for NE-8724; Curve 7, average for three production heats of NE-8720

Curve	Chemical Analyses					Grain	Quench Temp.
	C	Mn	Ni	Cr	Mo		
1	.23	.91	.62	.73	.27	8	1525
2	.28	.90	.68	.57	.27	3-4	1600
3	.26	.83	.63	.55	.30	7-8	1525
4	.19	.47	3.52	.25	.25	Fine	1550
5	.27	.81	.55	.53	.25	8	1525
6	.21	.68	.50	.36	.21	8	1550



the requirements for heavy duty parts.

Parts requiring carburizing have been made of NE-8620, 8720, 9420, 9422 and 8022. In the thorough hardening grades NE-8739, 8744, 8640, 8645, 8442, 9442 and 9445 have been specified for various applications including shafts, gears, studs and bolts.

Forgings made from 12 x 12-inch billets of NE-8442 steel and weighing from 110 to 750 pounds apiece have been made using the same procedures as with the approximate SAE-3140 originally specified.

NE-8630 has been tested and approved for blades made from 1/4-inch plate. Tenons are milled on both ends and then are hot riveted later in the procedure of fabrication. Another type of blade is drop forged using NE-8724 or 8620 as a substitute for SAE-2517. These blades are later coined for finish. Physical properties for these blades are approximately 115,000 pounds per square inch tensile strength, 85,000 pounds per square inch yield point, and 18 per cent elongation. NE-8724 steel has given better final properties than the former E-2517 steel.

The strengths of NE-8620 equal those of E-2517 but its ductility is slightly lower. Nozzle blocks formerly made

from SAE-4620 are now specified NE-8620. Considerable welding is done on this part and no difference has been noted in welding acceptability of this steel or any of the other NE steels where properly applied as substitutes. It may be also stated that, in general, the machinability of the NE steels used compares favorably with that of SAE steels.

With the advent of the NE steels it was natural that one of the major points of consideration was just how the new emergency steels would compare with the

For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41 and 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102; March 1, p. 94; March 8, p. 90; March 22, p. 78; March 29, p. 76; April 5, p. 116 and 118.

For reports from users of NE steels, see issues of Nov. 16, 1942, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100; March 8, p. 109; March 15, p. 96; March 29, p. 72; April 26, p. 84.

For latest revised list of NE ALLOY steels, see March 1, p. 98.

For list of NE CARBON steels, see March 8, p. 90.

For list of AMS (Aircraft Materials Specification) steels, see Sept. 7, 1942, p. 78.

For details of WD (War Department) steels and complete listing, see Feb. 8, 1943, p. 80.

For STEEL's latest *Handbook on the NE Steels* and the *NE Steel Selector*, address Readers' Service department, Penton building, Cleveland. Price \$1.00 per set.

Fig. 2—Case structure of NE-8724 after oil quenching from 1500 degrees Fahr. and drawing for 2 hours at 320 degrees Fahr. Shown at 750 diameters

Fig. 3—Case structure of NE-8724 after oil quenching from 1525 degrees Fahr. and drawing for 2 hours at 320 degrees Fahr. Shown at 750 diameters

Fig. 4—Case structure of NE-8724, same as Figs. 2 and 3 except for 1550 degree quench

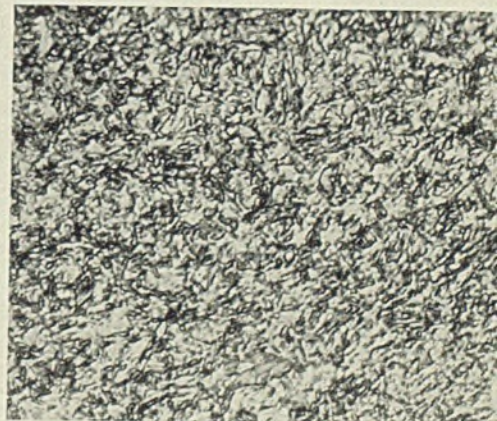
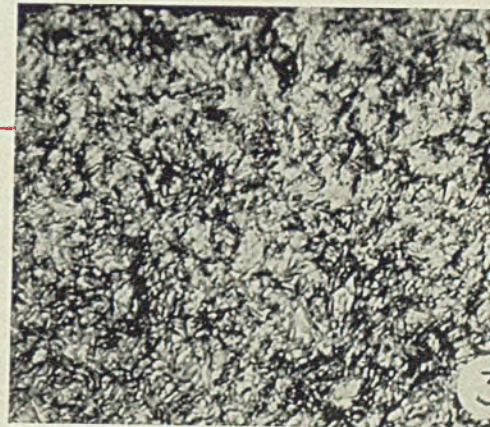
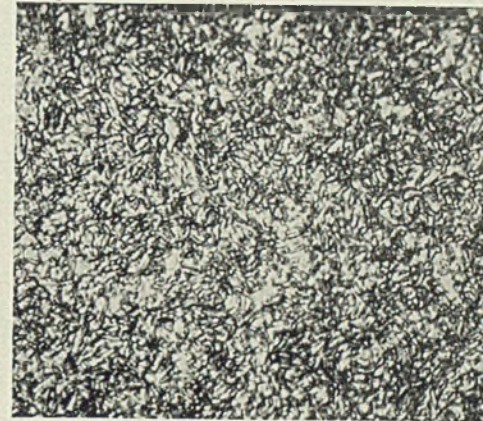


TABLE I—Chemical Analyses and Properties

	C	Mn	Ni	Cr	Mo	Grain Size
SAE-4820	.20	.40	3.39	.	.25	7-8
NE-8724	.26	.83	.63	.55	.30	7-8

Physical Properties

Grade	Size	Tensile Strength	Yield Point	% Elong.	% Red. Area	Keyhole Charpy	Breaking Temp.
SAE-4820	.550" Rd.	209,400	144,500*	13	49.5		
	1" Rd.	150,700	101,000*	18.5	48.5	21-23	75
Treated: Pseudo-carburized—1700° F.—8 hrs. Fcc. Cool							
Reheat 1500° F.—Oil quench—Draw 320° F.							

\*Yield Strength at 0.1% offset.

NE-8724	.550" Rd.	216,500	150,000†	14.5	50		
	1" Rd.	170,000	123,500†	14	50	21-24	75
Treated: Pseudo-carburized—1700° F.—8 hrs. Fcc. Cool							
Reheat 1525° F.—Oil quench—Draw 320° F.							

†Yield Point.

TABLE II—Chemical Analyses and Properties

	C	Mn	Ni	Cr	Mo	Grain Size
SAE-4620	.25	.57	1.84	.	.25	7-8
OFF HEAT NE-8620	.23	.91	.62	.73	.27	8

Physical Properties

Grade	Size	Tensile Strength	Yield Point	% Elong.	% Red. Area	Keyhole Charpy	Breaking Temp.
SAE-4620	.550" Rd.	133,000	100,000	15	57		
	1" Rd.	127,000	95,000	22	54	33	75
Off Heat	.550" Rd.	234,500	160,000	14.5	49		
	1" Rd.	175,000	111,000	14	47	27	75
						25	-20

Treated: Pseudo-carburized—1700° F.—8 hrs. Fcc. Cool  
Reheated 1525° F.—Oil quench—Draw 320° F.—2 hrs.

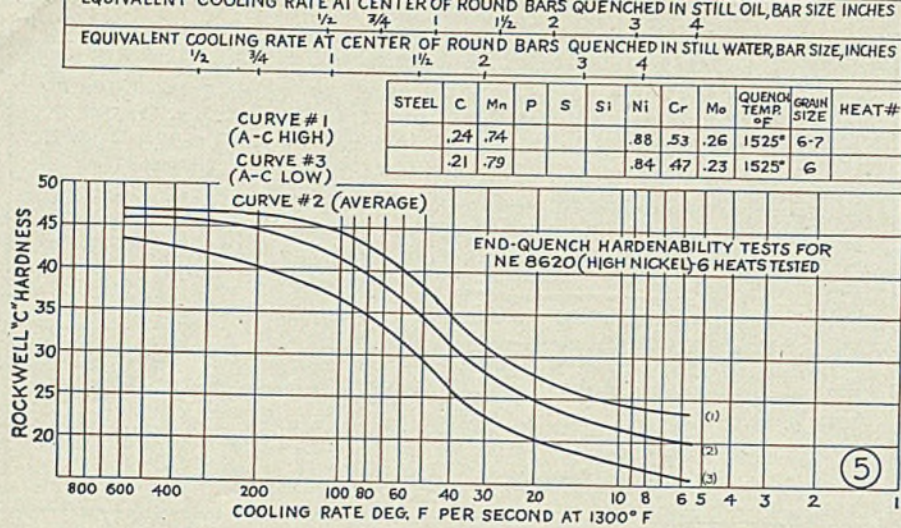


Fig. 5—End-quench hardenability tests of six heats of NE-8620 in which nickel was higher than usual: Curve 1, carbon and nickel maximum; Curve 2, average of tests; Curve 3, carbon and nickel minimum (A-C refers to Allis-Chalmers tests)

richer alloy steels which were commonly used for heavy duty gears or other so called critical parts. Our preliminary investigation of the NE steels concerned itself chiefly with both the physical and actual test characteristics of NE-8724 and NE-8620 to be substituted for the SAE grades 4820 and 4620 respectively.

Results of test work conducted on NE-8724 in conjunction with a production lot of SAE-4820 are shown in Table I.

All of the elements were on the high side of the range for this steel and the properties obtained compared favorably with the SAE-4820 steel. Heavy duty final drive gears were produced and given an accelerated dynamometer test in conjunction with regular production gears. The results of these tests showed that NE-8724 could be substituted for SAE-4820.

The Jominy end quench curve for the above NE steel is shown along with the tentative band for this grade published by the AISI in Fig. 1. Its hardenability, as would be expected, borders on the high side of the range, and compares favorably with the hardenability curve shown for a typical SAE-4820 steel at those distances from the quenched end which must be considered. The low of subsequent heats tested falls within the range and again comparison with the SAE-4820 indicates that generally core hardness would approximate those obtained from the SAE-4820 steel.

With the deletion of the NE-8724 grade, NE-8720 has been examined as a possible substitute for SAE-4820. The average hardenability curve obtained from three heats tested to date is also shown in Fig. 1. Indications are that it can be substituted for SAE-4820 if some core hardness can be sacrificed. To date

some applications of NE-8720 have been made with respect to the above.

Carburized 1-inch rounds from the production heat of NE-8724 were quenched from several temperatures to determine the effect on carbide solution of the case and core hardness. Hardness traverses showed only slight differences in core hardness and agreed with the expected hardness indicated by the Jominy curve.

Photomicrographs of the case structures for the temperatures tried indicate that 1525 degrees Fahr. is the minimum temperature for quenching on reheat. Considerable excess carbide is evident at 1500 degrees Fahr. (See Figs. 2, 3, 4).

The NE-8620 intended for comparison study with SAE-4620 was outside of the range and bordered on an NE-8724. The data obtained (Table II) are included to show effects of small increases in alloying elements within certain possible critical amounts. This is further illustrated if a comparison is made between physical properties of the NE-8724 steel of Table I and those shown in Table II.

The off-heat of NE-8620 in Table II was due to the small increase of harden-

ing elements to the high side of the range and slightly over this causes a very considerable increase of strength over the average AISI-4620. On 2 1/2-inch rounds, an increase of 100,000 pounds per square inch in tensile is exhibited with comparable ductility.

The hardenability for this off-heat of NE-8620 is shown in Fig. 1. On comparison, these curves would indicate that when alloying elements are within limits specified that hardenabilities are generally comparable. However, in cases where off-heats are encountered minor increases in alloying elements may serve to give considerably greater hardenability than expected.

Prior to the time that the nickel content of the NE steels was increased we encountered a number of NE-8620 heats in which the nickel content ranged from 0.84 to 0.88 per cent. Hardenability curves showing the effect of the higher nickel content are illustrated in Fig. 5. Hardenability ranges determined in our laboratory and those published by the AISI for regular NE-8620 steel are shown in Fig. 6. Consequently, it may be necessary to exercise certain precautions when applying off-heats for regular production even though the variation in alloying elements appears to be slightly higher (or lower) than specified.

With reference to the NE steel listed in Table II, it might be added that despite its off-analysis, transmission gears were produced from it and given a standard dynamometer test run. Results obtained were favorable.

(Continued Next Week)

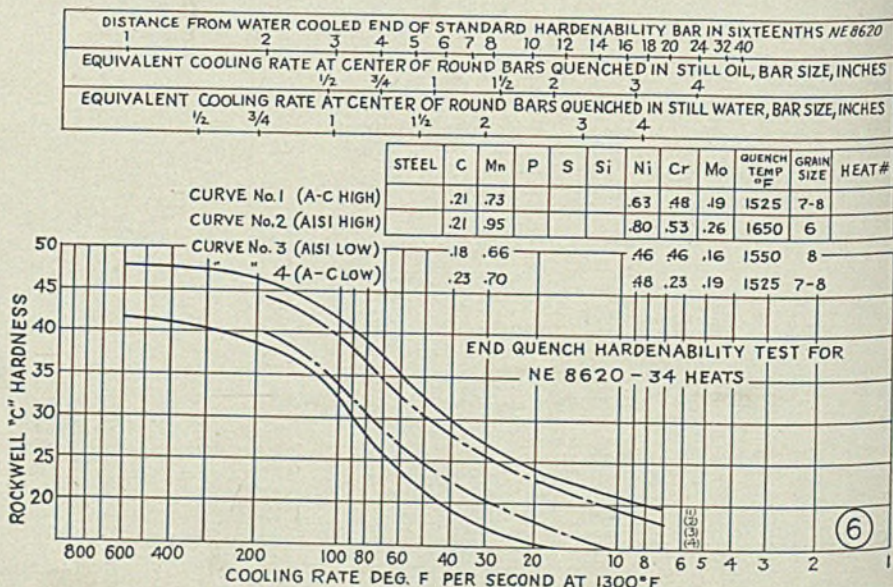
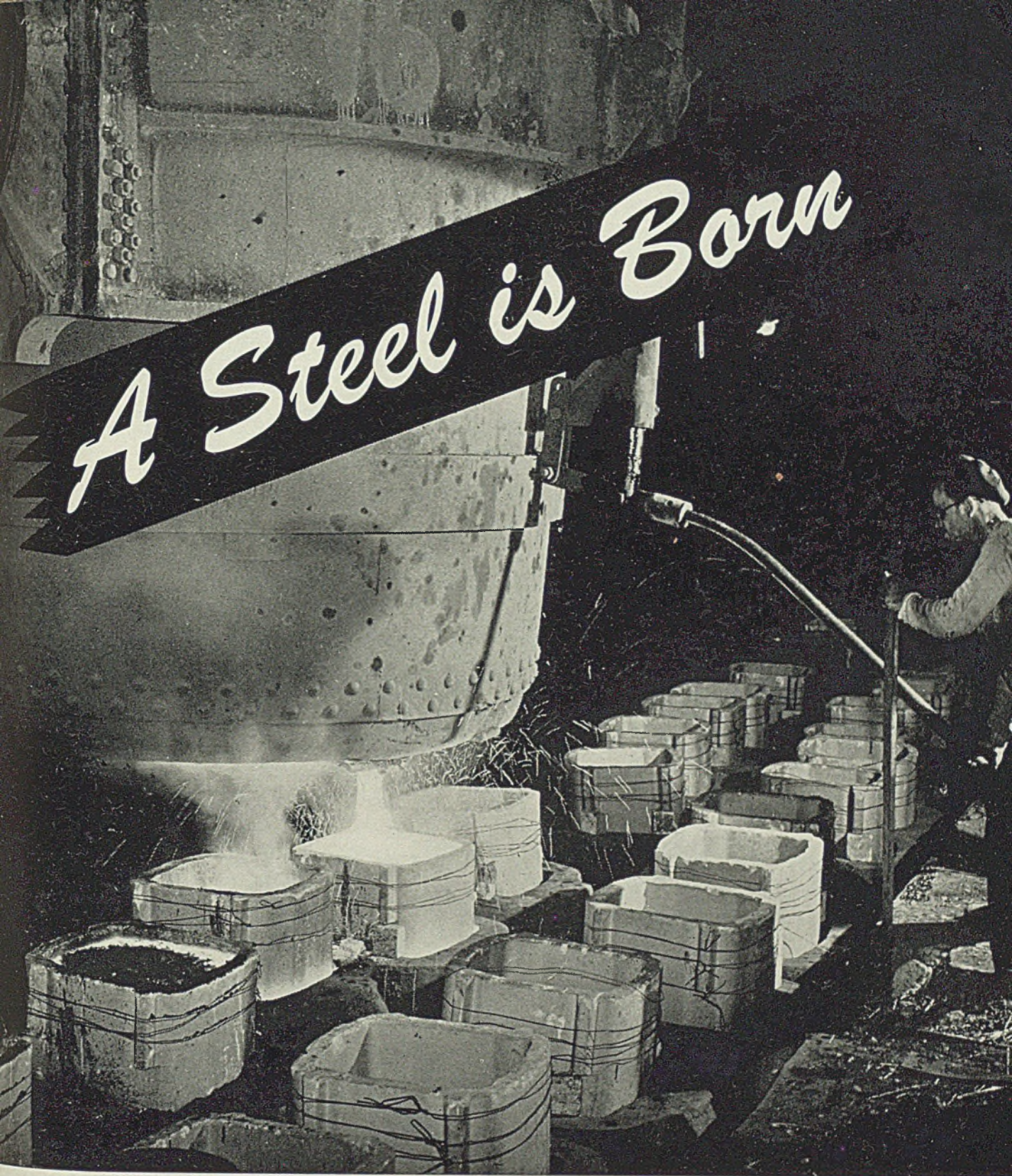


Fig. 6—Standard end-quench hardenability band for NE-8620—34 heats tested

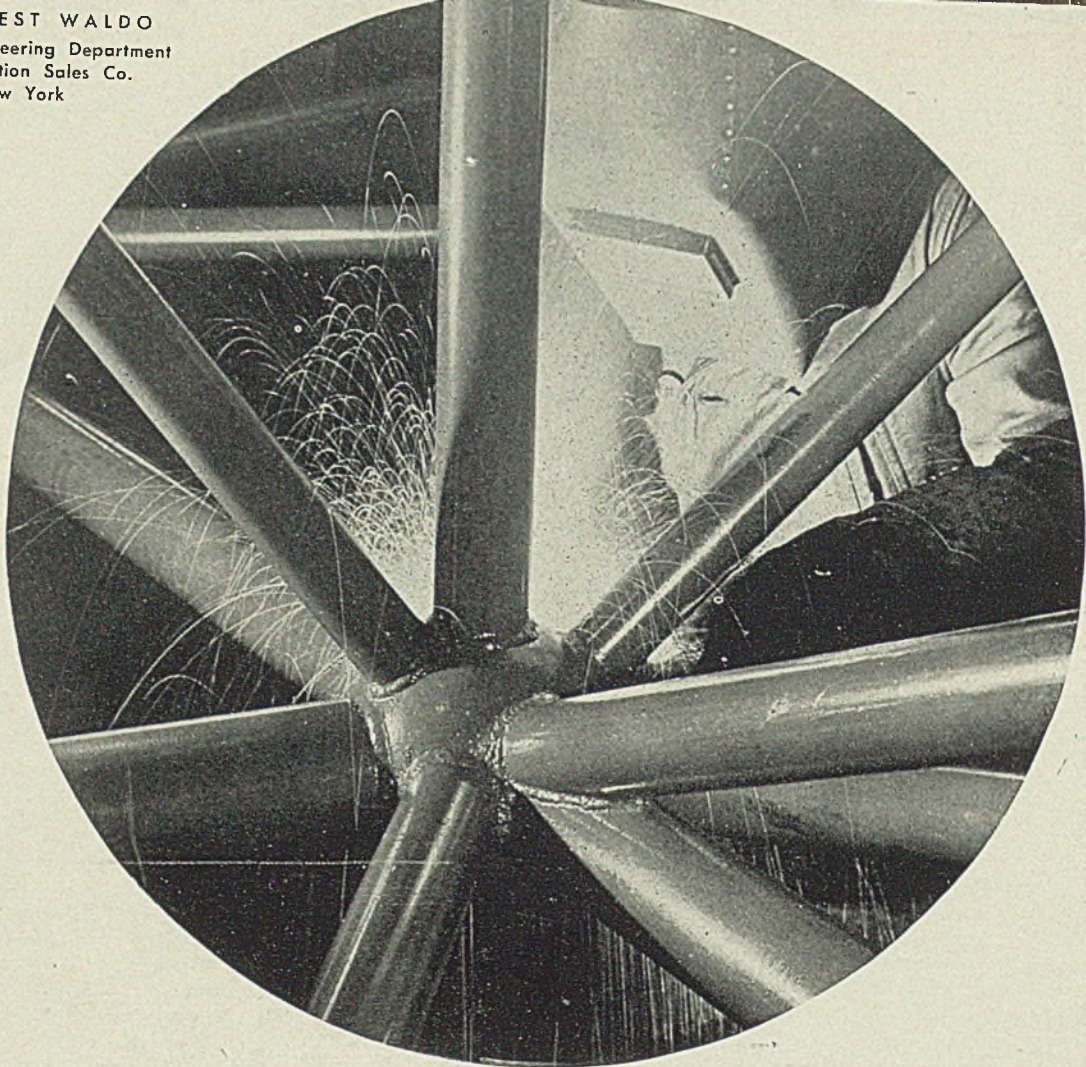


*A Steel is Born*

Pouring the first heat of a new "A.W." Alloy Steel is a moment to long remember. The promise of Victory and the vision of a better America are in every hot top ingot. Our first thought today is to produce the best steels possible in the greatest volume for ships, tanks, guns or the equipment which produces them. If you are engaged in war production and have an alloy steel problem, we will do our best to help you. Personal attention has been the keynote of "A.W." service since 1826.

# **ALAN WOOD STEEL COMPANY**

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## WELDING TUBULAR STRUCTURES

... with sphere type joints to simplify preparation of tube ends

STRUCTURES of steel tubing with spherical joints and employing welding throughout offer such important advantages in rigidity and weight economy that it is difficult to understand why this tubular design is still so infrequently used.

In the past, cost was an important factor, but today's steel shortage puts greater premium upon a pound of steel than upon a dollar in winning the war.

For structures requiring maximum rigidity with a practical minimum of weight the welded tube design is at once one of the simplest and at the same time one of the most conserving of steel.

There are, of course, particular types of structures which, because of their service function or for other reasons, bene-

fit most from this form of construction. Best known among these is perhaps the airplane fuselage, many of which utilize thin-walled steel tubing to resist the severe stresses of combat flight. In another category are the jigs upon which airplane wings or other mass-fabricated structures are assembled.

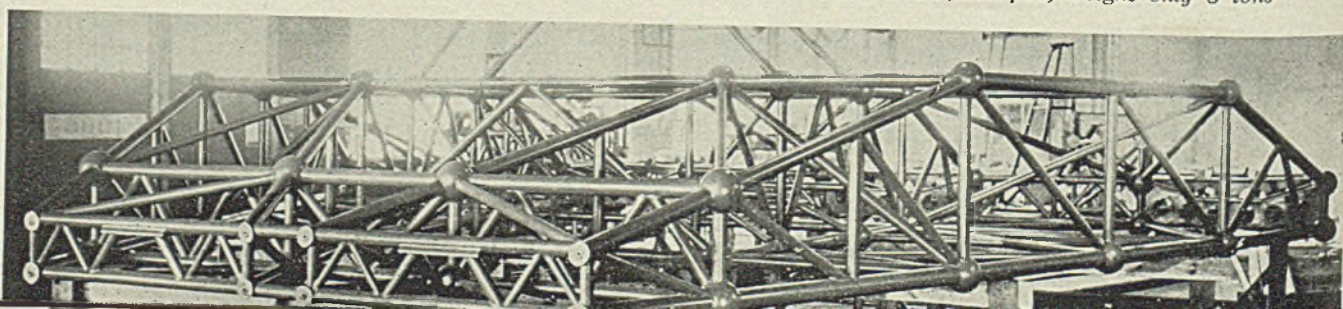
Joint designs differ, most joints being made by cutting the tube ends to fit the contour of adjacent members, with web

plates or other stiffeners frequently incorporated into the joint. However, the cutting of these end profiles sometimes becomes quite involved when the number of tubes meeting in a single cluster is large.

It is here that the sphere type of joint is advantageous, for it eliminates a great part of the necessity to cut involved intersections. Most tube ends may be cut off square, since the axis of the tube is di-

Fig. 1. (Above)—Ten-tube cluster joint with 7-inch diameter cast steel sphere. This joint has excellent structural properties and eliminates eccentricity between members

Fig. 2. (Below)—Welded tube construction of this ship towing carriage provides extreme rigidity with minimum weight. Spherical joints simplify construction work. Carriage has 28-foot span, weighs only 8 tons







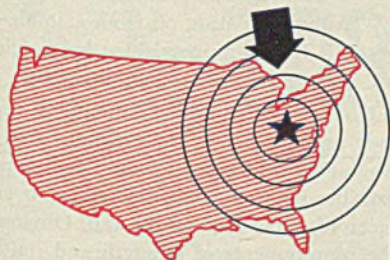
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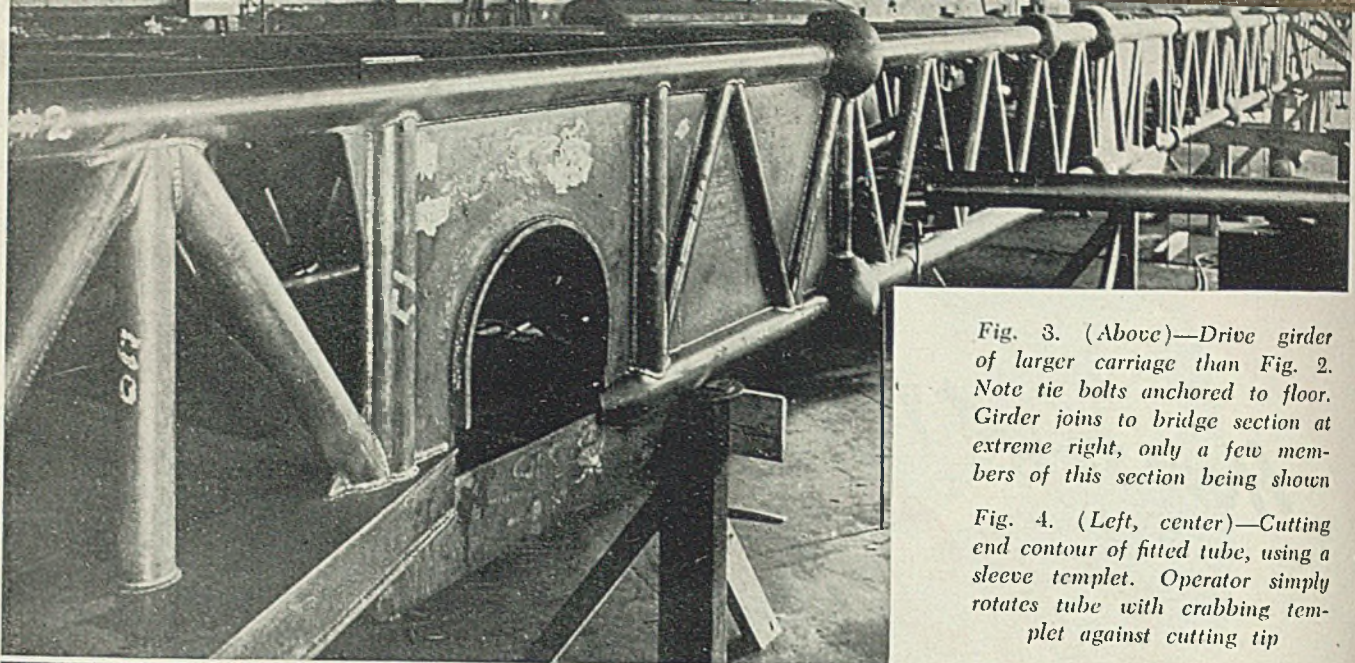


Fig. 3. (Above)—Drive girder of larger carriage than Fig. 2. Note tie bolts anchored to floor. Girder joins to bridge section at extreme right, only a few members of this section being shown

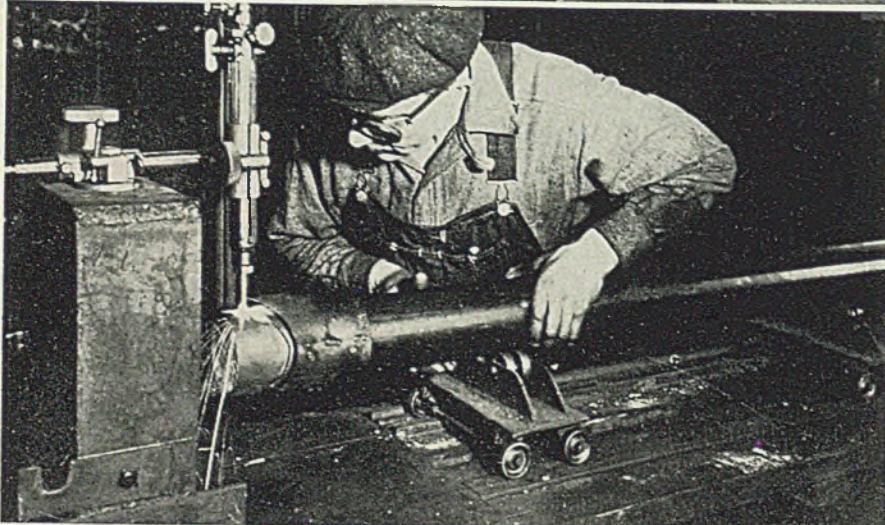


Fig. 4. (Left, center)—Cutting end contour of fitted tube, using a sleeve templet. Operator simply rotates tube with crabbing templet against cutting tip

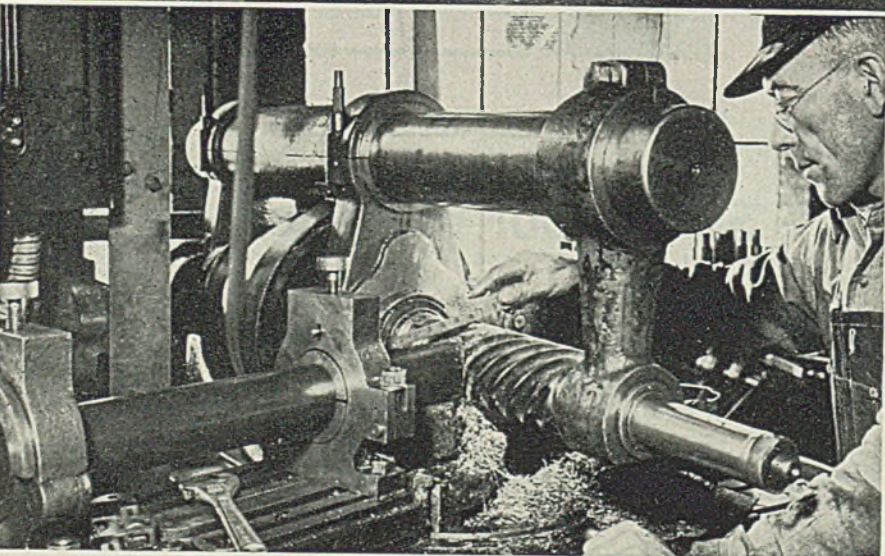


Fig. 5. (Lower left)—Profiles of fitted joints are milled to insure accurate fitup. Use of sphere joints permits most tube ends to be cut square, thus simplifying preparation of joints

ments for this service are extraordinarily rigid.

In use, the carriage is mounted on rails, spanning a half-mile-long testing basin, where it is driven at speeds up to 46 miles per hour while towing the small model ship. Instruments for measuring and recording the hydrodynamic characteristics of the model are mounted on the carriage.

An indication of the precision of the entire set-up is shown by the fact that the carriage rails are laid down to correspond exactly with the earth's curvature, are ground and polished, and oiled frequently to prevent oxidation. The four wheels, ground to within 0.0005-inch of true diameter, are powered individually by four hydraulic motors which are driven by circulating oil from a single oil pump. The pump is driven by an electric motor through reduction gears.

No super-streamlined automobile ever rode as smoothly as this towing carriage. Engineers riding on it would feel a perceptible jar if the machine rolled over a piece of paper laid on the rail. Obviously the requirements of strength and rigidity as well as dimensional precision of the welded structure are almost unconditional.

In building these carriages, once the design had been established, the two greatest essentials were the accurate cutting and lineup of each tube length, and the progressive elimination of distortion during welding. An ingenious method for cutting end contours on some of the tubes is shown in Fig. 4, where a perma-

(Please turn to Page 149)

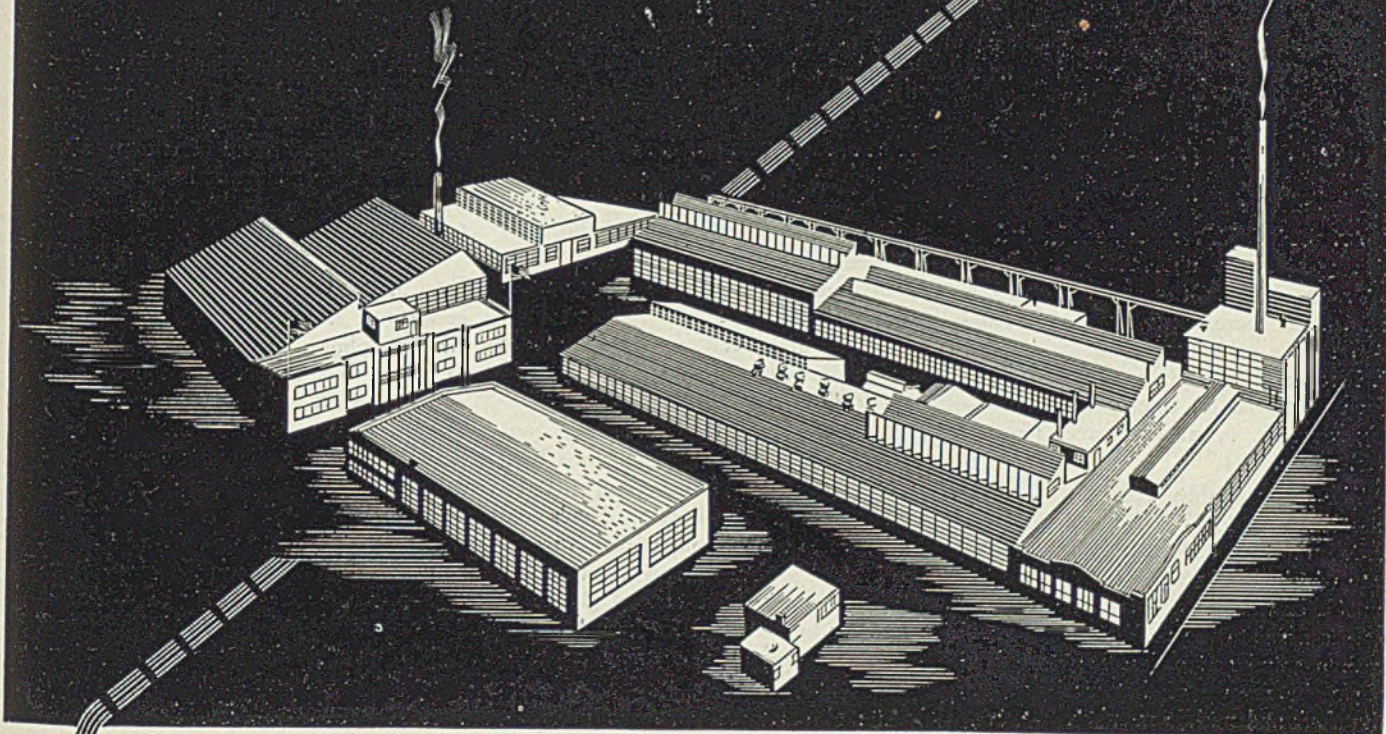
rectly in line with the center of the sphere, no matter what the angle of the tubes being joined. The square ends require less welding, and the whole joint is much simpler and more accessible for both welding and inspection than the customary fitted joints.

Two unusually compelling examples of

welded tubular structures employing spherical joints are the towing carriages illustrated in Figs. 2 and 3, fabricated by C. Frederick Wolfe Inc., Brooklyn. These carriages are for installation at the David Taylor model basin at Carderock, Md., where they will be used in the testing of ship models. Construction require-

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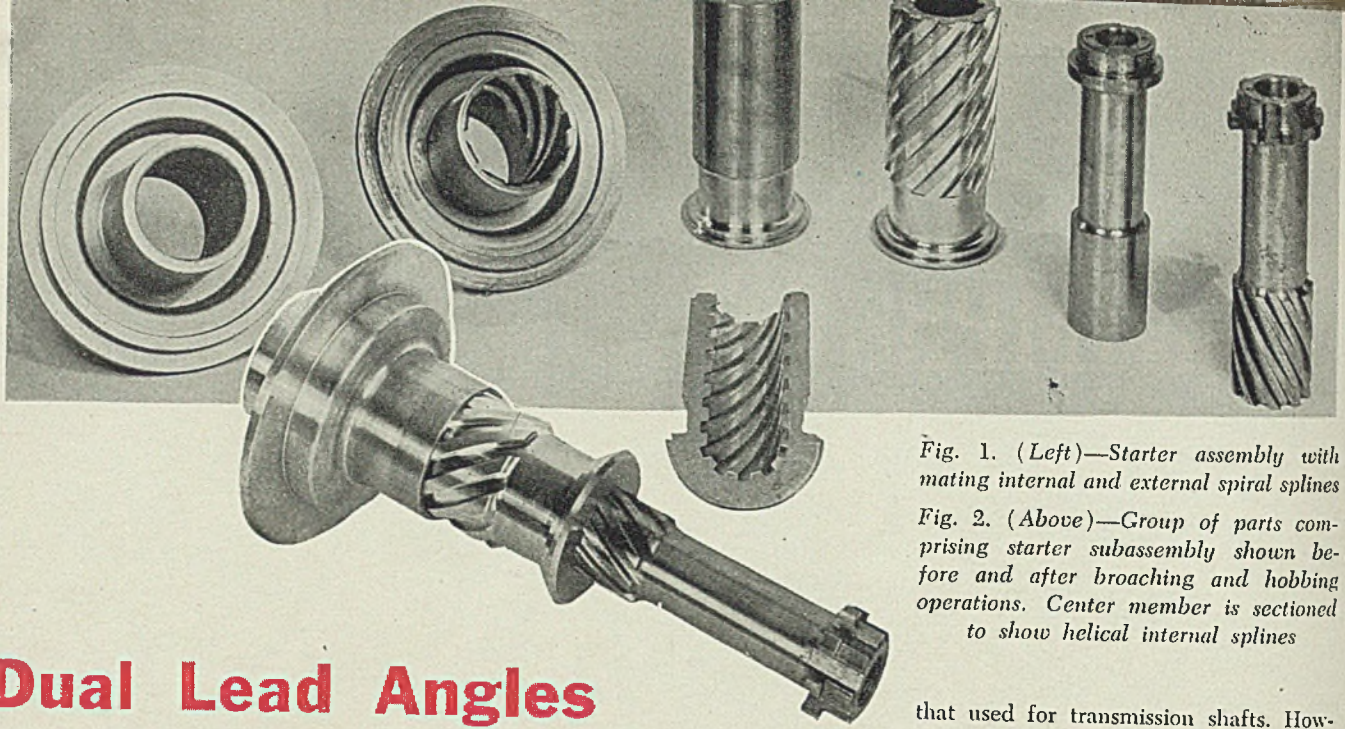


Fig. 1. (Left)—Starter assembly with mating internal and external spiral splines

Fig. 2. (Above)—Group of parts comprising starter subassembly shown before and after broaching and hobbing operations. Center member is sectioned to show helical internal splines

## Dual Lead Angles

... produced by broaching and hobbing

AN UNUSUAL example of production possibilities inherent in combining interlocking broaching and hobbing operations is represented by the combustion starter subassembly shown in Fig. 1. Mechanisms of this general type have been employed for some time for starting engines in racing cars, aircraft, yachts, etc.

The subassembly consists of three members—an inner shaft with a spiral spline on one end, a middle member into which the shaft is fitted, and on the outside of which a hub is mounted. The hub is fitted to the middle member also with a spiral spline, but having a lead angle the reverse of that used between the shaft and middle member.

When the inner shaft and outer hub are held against endwise movement and rotation of the hub is also prevented, movement of the middle member in and out of full engagement of the splines causes rotation of the inner shaft. Since the lead angles between the parts are reversed, the amount of rotation is approximately doubled over the amount that would be obtained if only one spiral spline were used in conjunction with a straight spline. The mechanism thus serves to convert straight-line motion into rotation.

To obtain freedom of longitudinal movement of the three mating parts for the entire length of travel, it is important that the specified helix angles of both internal and external splines be maintained accurately. The "tooth" form or contours and spacing of the splines also must be accurately reproduced, while close concentricity between

the inner and outer splines of the middle member is necessary. It was decided that broaching was the only practicable method of cutting the female splines to the required precision, while the male splines are cut with precision ground hobs to the close limits noted later.

The broaching operations are performed on Colonial horizontal broaching machines equipped with helical drive attachments and broach guide heads and lead bars to assure both conformance to the desired lead angle and concentricity, Fig. 3. In general, therefore, the setup is similar to that used for broaching the internal splines of automobile transmission gears.

The two externally splines parts are also produced on equipment similar to

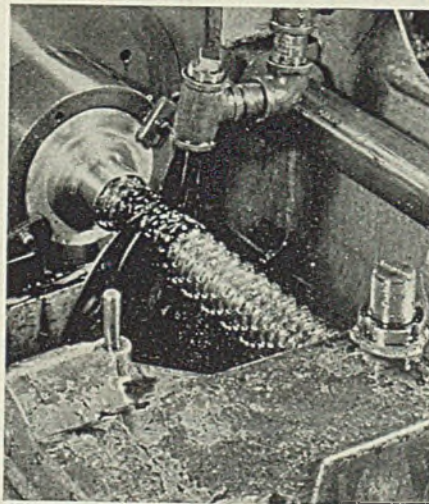


Fig. 3—Spiral broaching of internal splines with high helix angle

that used for transmission shafts. However, the greater length of the splines and the need for maintaining the helix angles on three instead of two parts (as in transmissions) increased the precision with which the operations must be performed.

The inner member or shaft is turned from molybdenum steel bar stock and consists of a hollow shaft on which a straight spline is cut on one end for attachment to a clutch. On the opposite end a helical spline with a counterclockwise twist is hobbled. The helix angle in the type shown is approximately 35 degrees, providing a lead equivalent to one revolution of the shaft for about 8 inches of travel. The length of this spline is 2 1/4 inches. Overall diameter of the spline is approximately 1 1/2 inches and overall length of the shaft is 6 1/4 inches. Limits on the external diameters of the finished spline must be within plus or minus 0.0025-inch.

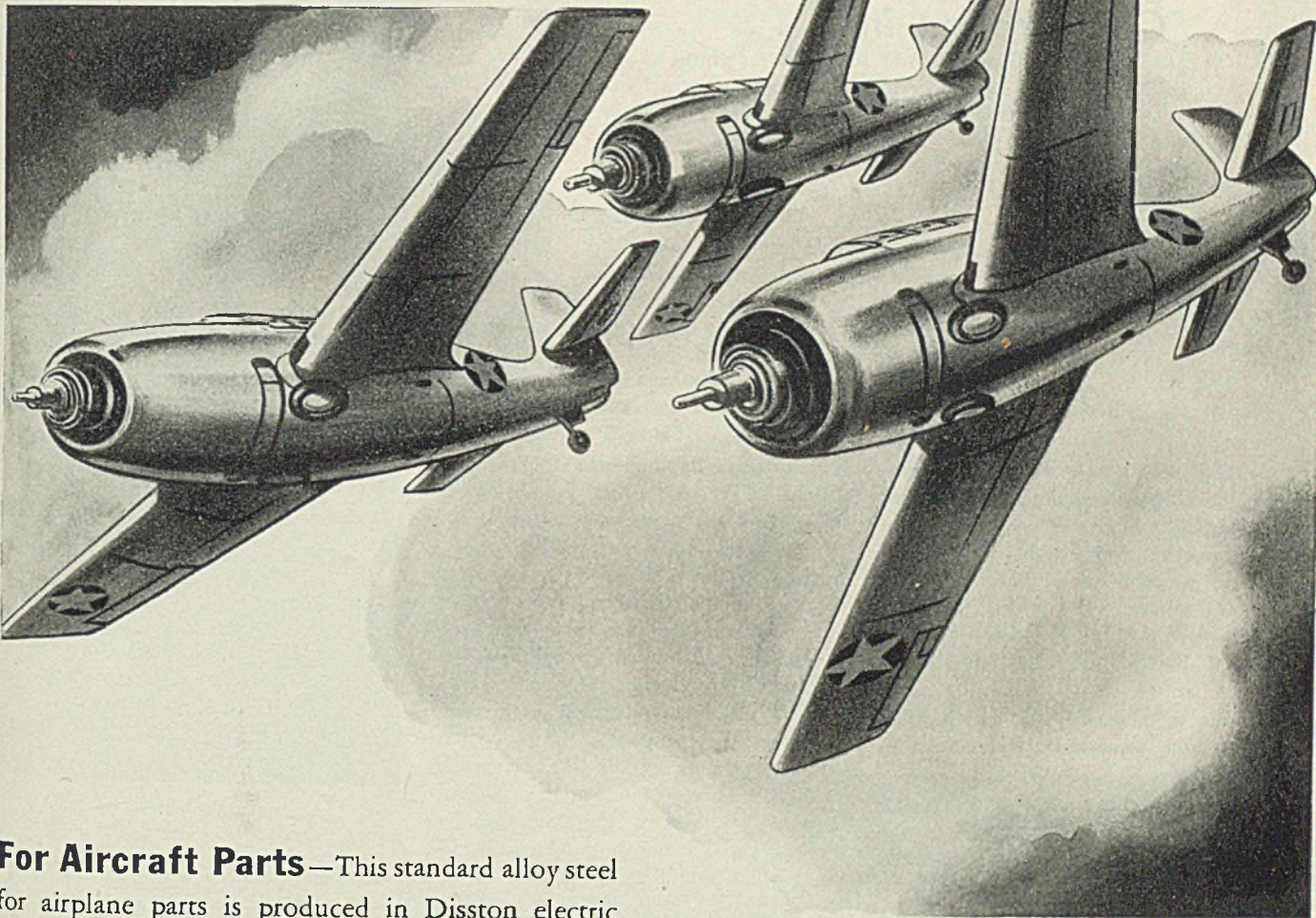
The middle member is produced from centrifugally cast high-tensile Ampeco bronze, tough to machine. The internal spline on this member is broached in two passes. Different broaches are used for each pass, a roughing broach and a shorter finishing broach, rather than performing both roughing and finishing in a single pass. Both broaches are guided, as mentioned previously. Thus a double assurance of accuracy is provided. At the same time the finishing broach can be made sufficiently long to provide for accurately finishing to specified size.

Broach cost is also reduced since wear on the roughing broach does not affect the finishing operation. In turn the amount of wear on the finishing broach is less since the amount of metal it removes is small. Limits on the internal diameter of this part are within plus

(Please turn to Page 150)

# FINE DISSTON STEELS

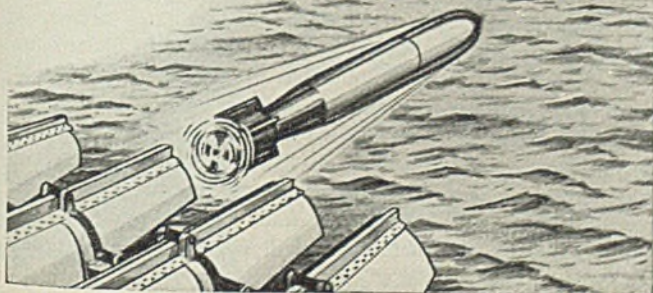
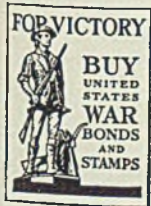
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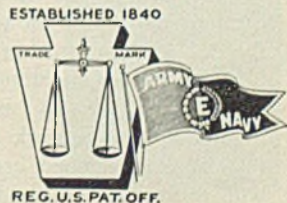
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## How To Enlist the Worker's Co-operation in . . . .

# Extra pay Plans

By JOHN W. ROBERTS  
Vice President  
Bedaux Co. Inc.  
New York

WHEN the wage stabilization program was first formulated, there was considerable doubt as to what the government's policy would be with regard to wage increases resulting from increased output per worker. These doubts were apparently resolved by the order of the National War Labor Board of October 14, 1942, permitting wage rises due to increased skill and productivity under piece-work and other incentive plans.

This order and the subsequent interpretations laid down the important principle that so long as basic wage scales are not disturbed and no rise in costs and prices result, *there is no legal obstacle to provide inducements to workers to step up output in the form of more pay for more work.*

### Incentive Plans Favored

Now President Roosevelt has affirmed this policy in his executive order of April 8 by specifically exempting wage increases under incentive plans from the general freeze order. This policy provides the basis for a substantial increase in labor productivity in war industries through co-operative action by management and labor.

In a previous article (STEEL, Nov. 30, 1942, p. 54), the writer outlined the elements of a sound wage policy for the steel industry, pointing out that a plan of incentive wage payment making earnings dependent on productivity can succeed in its objectives only if it enlists the full co-operation of the workers involved. Every executive knows examples of piece-work or bonus plans that were abandoned because they met with resistance from the workers. What

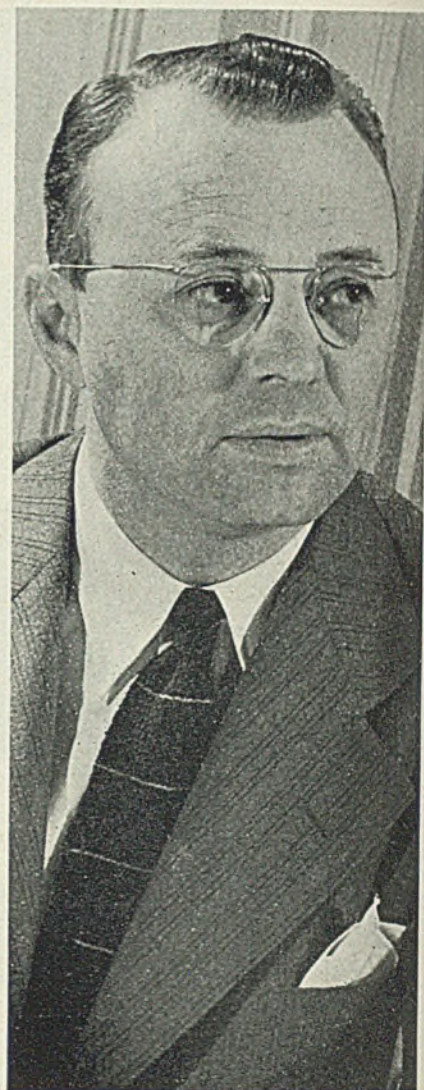
is not generally understood, however, is that in at least a fair proportion of these cases, the plans were either basically inequitable or incorrectly applied and maintained.

Some of the shortcomings of wage plans that aroused the resentment of workers—such as abusive rates of speed, unscientific production standards, cutting of rates and lack of guaranteed pay—were enumerated in the preceding article. And over and above these specific objections was the worker's general feeling of insecurity, the fear that by increasing production he might be working himself out of a job.

### Labor's Attitude Changes

Today we have an entirely different situation. Protected by the right of collective bargaining and by social legislation, there is no longer the same suspicion of "efficiency" programs. Workers have seen many examples of incentive wages plans that benefited them as well as the company. They have found out that to realize higher earnings it is not necessary to "speed up" operations but merely to work effectively and steadily. Furthermore, such opposition as existed before the war has largely disappeared in recent months—and particularly since the wage stabilization program has made increased skill and productivity almost the only way a worker can count on increased pay.

Despite this change in labor's attitude, there are still many factory managers who hesitate to introduce or extend incentive wage plans. This hesitancy may be based either on unwillingness to bring up the issue with workers at a time of boom production or on a feel-



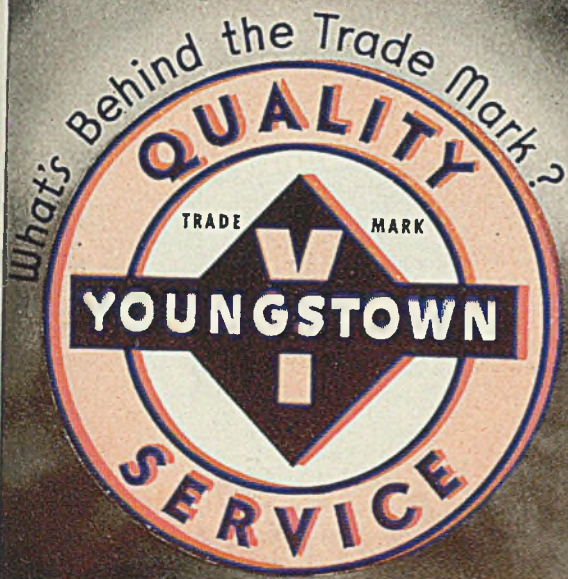
John W. Roberts

ing of complacency with results already being achieved.

Whatever the reason for it, such an attitude may be a distinct obstacle to maximum war output. With the limit of our available manpower and equipment resources being rapidly approached, we are coming to a stage where virtually the *only source of increased production will be the possibility of increasing the output of the individual worker.* And a carefully set up wage incentive plan is one of the best tools at management's command for doing this.

To insure the workers' willing acceptance of such a plan, the first prerequisite is that it be basically sound. No two wage plans will, of course, be alike in all details. The Bedaux organization has found, however, in an experience covering hundreds of plants, that the workers' co-operation is dependent on the presence of certain fundamental provisions — including a guaranteed minimum wage, assurance that wages will not be adjusted unless

(Please turn to Page 151)



## *Courage to Risk and Vision to Foresee . .*

The future prospects of The Youngstown Iron Sheet and Tube Company, which had grown from a \$600,000 vision in 1900 to a \$4,000,000 reality by 1905, were so favorable that arrangements for a loan of \$2,500,000 to finance additional expansion were justified. This move occurred five years from the date of the incorporation of the company.

These additional funds made possible the installation of two Bessemer converters, soaking pits, blooming mill, billet mill, sheet bar mill, skelp mill, plate mill, power plant and other necessary auxiliary equipment. It was in 1905, also, that the word "Iron" was deleted from the company name and this organization was known henceforth as The Youngstown Sheet and Tube Company.

The progress shown at the end of 1905 was an indication of the majestic proportions to which this company was to expand in the future. This experience in building from an unpretentious beginning to a position among the leaders in a great American industry is parallel to that of all the great industrial organizations in America today. It is a manifestation of one of America's greatest heritages -- the inalienable privilege of any individual or group of individuals to do as we have done -- or better.

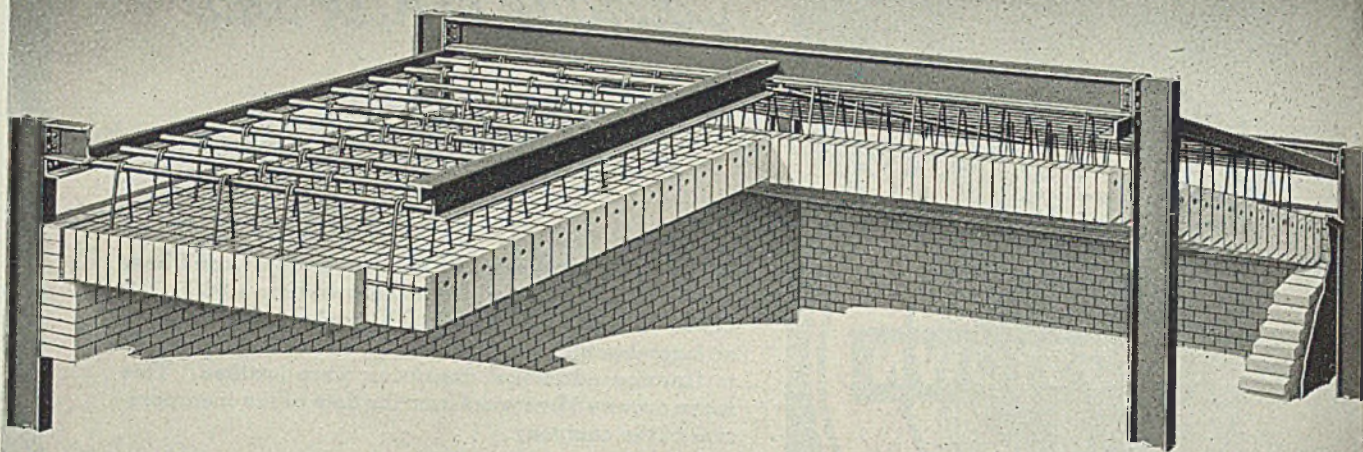
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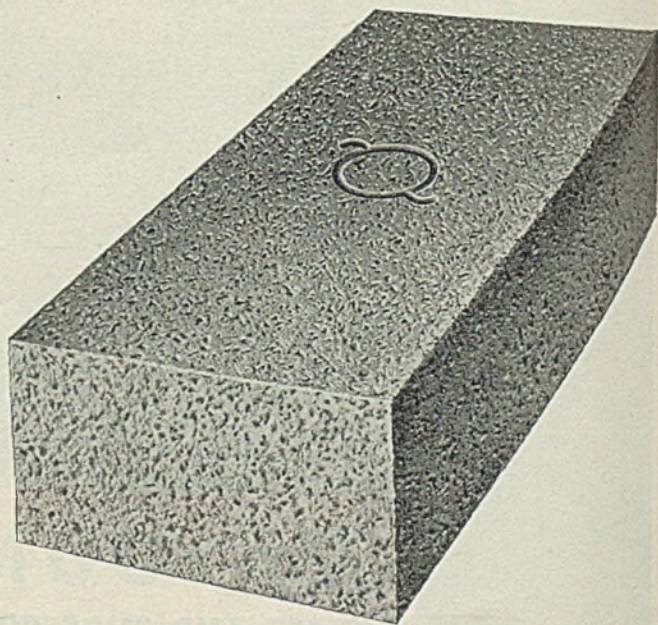
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# BABCOCK & WILCOX



# SINTERING-

## The Process

(Continued from Last Issue)

AN INDUSTRY can exist only so long as it serves a need.

Importance of the position which an industry, or a division of it, occupies in the general scheme of productive activities can change with developments in associated industries. Demand for the products of an industry will determine the development within the industry and a change in the position of the products in relation to associated operations can stimulate or retard development activities.

The change in the relative importance of bessemer and basic open-hearth steels and of beehive and by-product coke are examples in the iron and steel industry.

Because of the economic change which is taking place in the iron ore reserves of the United States and the need for

By CHARLES E. AGNEW

Consultant  
Blast Furnace & Sintering Plant Operations  
Cleveland

better operating control to meet more exacting specifications of the chemical composition of pig iron another major development appears to be in the making for the blast furnace industry. Beneficiation of natural ores by concentration and sintering seems destined to become an important part of our blast furnace industry. Directly or indirectly the development must affect every producing district. Ore deposits heretofore dormant probably will be developed. The relative importance of existing producing centers may change and new centers come into existence, such as the Pacific Coast and the Southwest. Many of the

accepted blast furnace operating practices are almost certain to change.

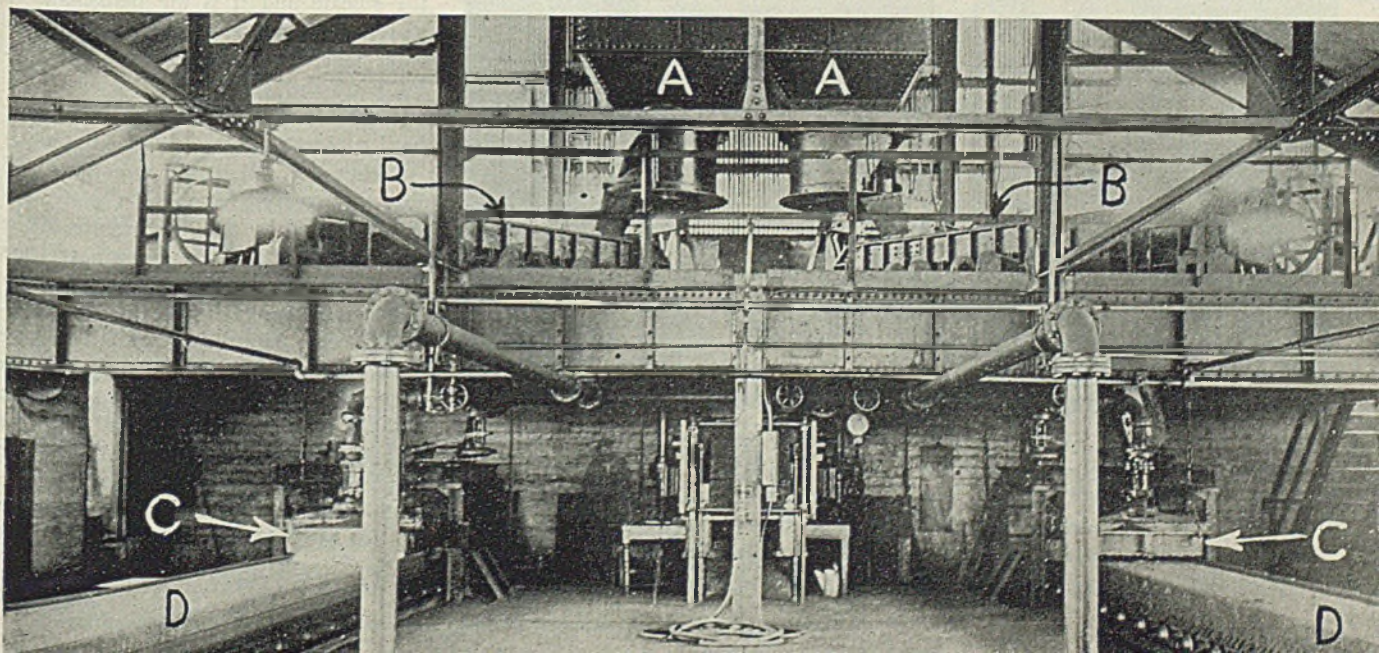
Because of the prominence of the subject in the minds of those who are facing the post-war problem of supplying their furnaces with iron-bearing materials which can be smelted economically some comments upon the sintering process and plant may be of interest. With the major part which sinter seems destined to play the need exists for new development in sintering equipment and this can be developed just as fast as qualified engineering thought and progressive management lend support. Every step in the advancement of the industrial arts has been possible only because someone had the vision to conceive and someone had the courage to construct.

An infant industry producing an en-

Table I—Data for Calculating Analysis of Sinter

	Mixture		SiO <sub>2</sub>		Al <sub>2</sub> O <sub>3</sub>		CaO		MgO		Fe		P		Mn		V.M.		Moist.		
	%	Lbs.	%	Lbs.	%	Lbs.	%	Lbs.	%	Lbs.	%	Lbs.	%	Lbs.	%	Lbs.	%	Lbs.	%	Lbs.	
Magnetic conc.	50	500	4	20	2.50	12.50	0.10	0.50	0.10	0.50	65	325	0.30	1.50	0.10	0.50	0.50	2.5	3	15	
Hematite ore	40	400	8	32	2.50	10.00	0.50	2.00	0.40	1.60	50	200	0.06	0.24	0.80	3.20	5.00	20.0	10	40	
Flue dust	10	100	10	10	3.50	3.50	0.80	0.80	0.40	0.40	42	42	0.08	0.08	0.40	0.40	9.00	9.0	10	10	
Total	100	1000	62			26.00		3.30		2.50		567		1.82		4.10		31.5		65	
Ignit. loss		96.5																			
Sinter wt.		903.5																			
Sinter anal. %			6.86		2.87		0.36		0.27		61.65		0.20		0.45						

Operating floor in early type sintering plant showing feed hoppers (A), pug mills (B), ignition burners (C) and sinter bed (D)



tirely new product must go through a development stage where much experimental research is necessary to establish the fundamental principles upon which to build the industry but when those principles are established the advance development is usually rapid. Advance development is one of refinement of accessories to serve the known fundamentals and the steps in development, while more numerous, are made with less experimenting and with greater certainty of success because a refinement is simply a correction of a known thing while research for fundamental principles delves into the unknown and the untried.

Sintering is not an infant industry, the fundamental principles are well established. The process was introduced into the ferrous industry about the turn of the present century to salvage blast furnace flue dust which was accumulating rapidly with the use of the soft fine ores. With improvements in furnace lines and in furnace practice less dust

was made and as the stock piles of dust were consumed the sintering of the current dust production became a minor part of most of our blast furnace operations. A result of this condition was the arresting, for many years, of development in refinements to sintering equipment because there was not the demand to create the incentive to improve. But present economic changes facing the blast furnace industry seem certain to force a new conception of the place sinter will occupy in the furnace operation and to provide the incentive for new development of accessories to serve the known sintering fundamentals.

With few exceptions the sintering plants built in the past to serve the ferrous industry were built primarily to sinter furnace flue dust only and the plant design was predicated on the thought that sintering was simply a means of salvaging a waste product and consequently of secondary importance to the blast furnace operation. The discussion of

the sintering process and plant is predicated upon the thought that in the immediate future sinter will become of the same primary importance to blast furnace operations of all districts as it is to the Eastern district where it is a major part of the furnace burdens.

Sintering is a simple process, simple in the sense that there is not anything difficult to understand about the operation; no intensive technical training or long apprenticeship is necessary to direct the operation. To sinter is to fuse, consequently the operation is first of all a thermal problem, the generation and application of heat to the materials to be sintered. In the presence of a fusing temperature chemical law rules that the acid and base elements must unite into a compound of elements. The chemical reactions which occur as a result of the fusing temperature determine the physical and chemical characteristics of the sinter but after ignition has taken place the operator does not have any control of the reactions. The observation of the effects of the sinter characteristics upon blast furnace operations using sinter has possibly contributed to some misunderstanding of the limitations of the sintering action.

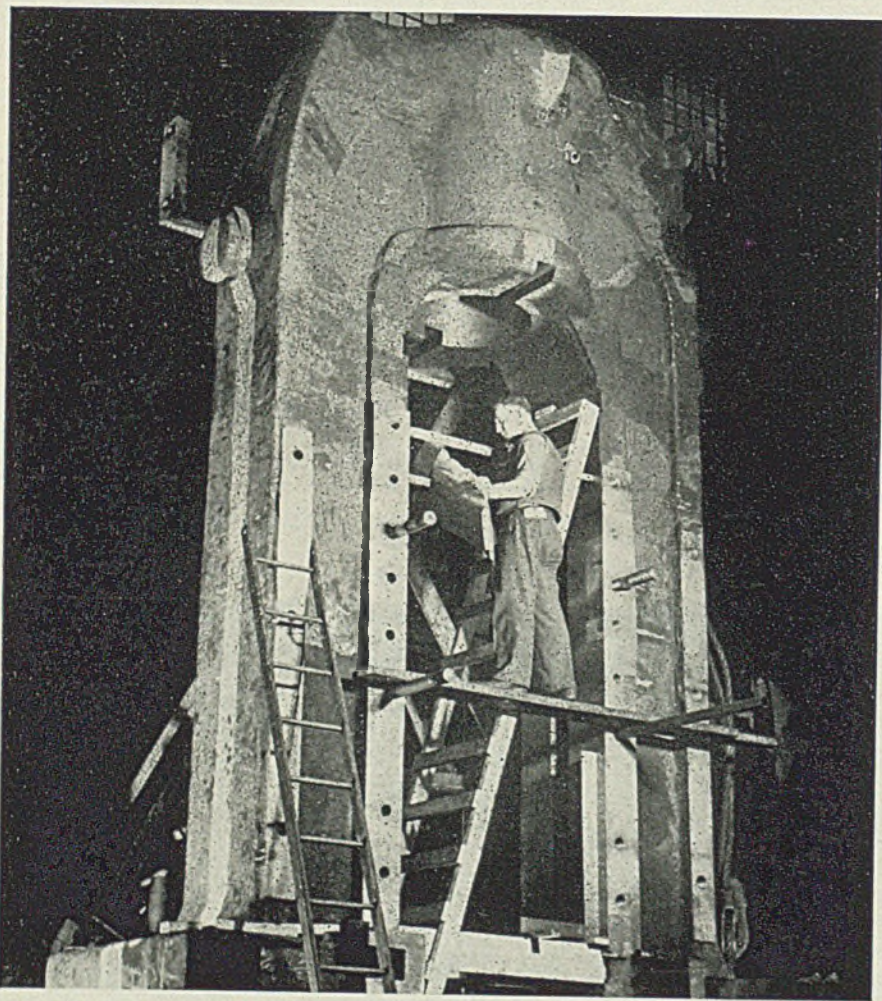
#### Mix Is Controlled

The only control which the operator can exercise over the chemical reactions of the sintering operation is in the selection and preparation of the components of the mix to be sintered. The chemical reactions of the fusion are the elimination of all moisture, all chemically bound volatile matter, and the fusing of the nonvolatile elements. The effect of the silicates formed during the sintering operation, upon the particle size of the sinter and the effect of that size upon the blast furnace operation using the sinter, was discussed in an earlier article of this series and need not be repeated other than to say that if truly sintered all the silica in the mix will be converted to the silicate and it is the percentage of and the molecular formation of the silicates which determine the natural friability of the sinter.

It is sometimes said in describing hard sinter that the sinter is "overburned". It is also sometimes said that the structural strength of sinter can be controlled by the temperature of the sintering fire and "underburning" the mix. The opinion is offered that both statements would be hard to substantiate under the microscope. To sinter is to fuse and if the chemical elements are present in the percentages and in the ratio of percentages which will form the structural strengthening iron silicates the production of hard sinter is inevitable—if the mix is entirely fused. Likewise

(Please turn to Page 154)

## GIANT HOUSING FOR KAISER



SOON TO BE rolling plates for Liberty ships in Henry J. Kaiser's steel plant in California, this 97-ton housing for a 3-high rolling mill is at present being machined at the East Pittsburgh Works of Westinghouse Electric & Mfg. Co. Space in which inspector is standing will hold roll bearings and hole at top will contain the screw down mechanism that puts pressure on the rolls

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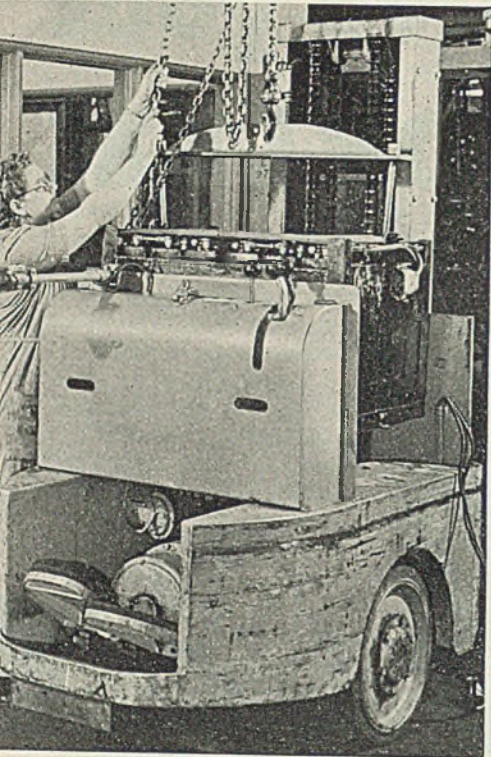
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*With mechanical handling aids, the women operators make battery changing a simple routine job. Charging department is a model of efficiency*

*Left below—Accurate teamwork of hands, eyes and feet is necessary in tiering but the women operators quickly become experts  
Right—Skid boxes are the usual handling unit through processing*

# G I R L T R U C K E R S

**. . . . are quick to learn, and take excellent care of equipment**

By **GEORGE E. STRINGFELLOW**  
*Division Manager*  
**Storage Battery Division**  
**Thomas A. Edison Inc.**  
**Orange, N. J.**

AT ONE of the new plants recently put into operation by the Allis-Chalmers Mfg. Co. for additional war production, the battery industrial trucks are operated by girls. Experience at this plant tends to show heavy industrial trucks lend themselves to operation by women with no difficulty.

Women have proved to be excellent operators, and the company's experience to date indicates that, as a class, their outstanding merit lies in the fact that they are extraordinarily careful.

The plant is new and is provided with first-class industrial floors, ample, regularly spaced aiseways, and clearly marked areas for placement of loads. Loading platforms are within the building. Thus the physical truck operating conditions are all that could be desired. The trucks, like the building, are new.

Nevertheless, it would be usual, even under such conditions, for the trucks to

begin showing the scratches and gouges left by failure to clear at turns or in the various unavoidable close quarters that daily create themselves in a busy plant. The fact that the trucks still have their original paint jobs, virtually unmarred, shows that they have been carefully handled. Likewise, the electrical department finds that maintenance work, especially on parts such as contactors, is relatively negligible.

The product of the new plant is a military secret, but it is permissible to say that its manufacture consists largely of metal working, and requires that a flow of relatively heavy parts be maintained through production to assembly. For this purpose, skid boxes have been adopted as handling units, similar in size and design to those which the company has found well adapted to similar work, in conjunction with elevating-platform trucks, in some of its other plants.

The skid boxes are of wood, with metal corners designed to rest upon one another for convenience in tiering in case a stop for storage is necessary. By tiering the skid loads, any surplus of parts that may accumulate between one process and another is readily accommodated nearby in space set aside for the purpose.

In addition to the movement of parts





## FRONT LINE PIPE LINES!



PORTABLE PIPE LINE TUBING

**H**ERE'S a new war use for WELDED STEEL TUBING that is helping United Nations troops put the blast on the Axis. It's a portable pipe line—made of easily-handled sections of steel tubing—which can be quickly assembled to deliver fuel to motorized equipment in the field from protected rear line bases. It's advantages are many. It permits great volumes of fuel to be sent over mountains, through swamps and forests—all kinds of terrain where ordinary methods of transport are slow, cumbersome and often dangerous. It's valuable, too, in the delivery of gasoline and oil supplies from ship to shore. In every use, it's much harder to put out of commission than a tank truck on land or floating barrels at sea.

This newest use for WELDED STEEL TUBING holds an important place among the many tubing products we are making for war uses. This

story of it illustrates the facilities we have and the constant search we are making for other tubing products we can build to aid the armed forces.

If you are in production on an item that presents a tubing or steel forging problem, maybe we can help. Phone, wire or write for information.



★ Complete Tube Stocks Maintained by ★  
 STANDARD TUBE SALES CORP., One Admiral Ave., Maspeth, L. I., N. Y.  
 LAPHAM-HICKEY COMPANY, 3333 West 47th Place, Chicago, Ill.  
 UNION HARDWARE & METAL CO., 411 East First Street, Los Angeles, Calif.

NOW MORE IMPORTANT THAN EVER BEFORE...

# Speed plus Safety!

You get both in a Macwhyte Atlas Braided Wire Rope Sling



## ADD THESE, too...

- Light-weight, flexible, easy to handle
- Positively NON-SPINNING
- Kink-Resistant
- Patented construction of LEFT- & -RIGHT LAY ropes
- Non-damaging to loads
- Store in small space
- No splices to wicker
- Terminate in natural loop-ends
- L-O-W final cost

Yes, this sling body is responsible for ALL these advantages.

See how the wire ropes are spirally woven? (See illustration below.) Notice how uniform the braided body is? Two endless wire ropes, one left-lay construction and one right-lay construction, are woven in a uniform spiral throughout the length of the sling. No other sling is made like this one. The result is a lifting element of unmatched strength and flexibility.

Today, Macwhyte Atlas Slings are safely speeding production of countless guns, tanks, engines, ship sections, and hundreds of equally vital war materials. They can help you, too. Write on your company letterhead for complete

story. Address Macwhyte Company, 2912 Fourteenth Avenue, Kenosha, Wisconsin.

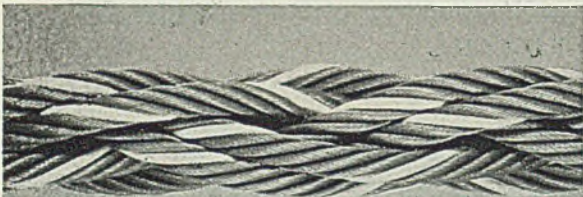
## CONSULT WITH US—SAVE TIME, DELAY

Time is vital. Help save yours by taking advantage of our sling experience. You know what work you want the slings to do; we can tell you, from years of experience, the sling design best suited for that job.

Before taking time to design the sling yourself, why not consult with our engineers? They can simplify the sling equipment needed, make every inch of steel give MAXIMUM service. That's what YOU want. That's what YOUR COUNTRY asks.

*Time and materials are vital. On sling problems, consult Macwhyte. Save both time and materials.*

NO. 665-S

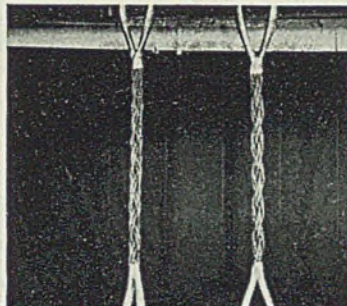


Left-Lay Ropes are woven in a right-hand (lay) spiral.

Right-Lay Ropes are woven in a left-hand (lay) spiral.

Thus we have a sling body made from opposite lay ropes which are woven in a direction contrary to the lay of the rope itself.

This is what makes Atlas Slings so flexible. This is what gives you Speed Plus Safety.



## S-P-E-E-D plus Safety MACWHYTE ATLAS Braided Wire Rope SLINGS

*"The sling with the perfectly balanced body"*

**MACWHYTE COMPANY**, 2912 Fourteenth Avenue, Kenosha, Wisconsin  
Manufacturers of wire rope to meet every need—Left-&-Right Lay Braided Slings—Aircraft Cable, Aircraft Tie-Rods, and "Safe-Lock" Swaged Terminals.  
Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle  
San Francisco. Distributors throughout the U. S. A.



through process, much of the receiving and shipping is done by the industrial trucks, the incoming materials being unitized in skid boxes at the carriers wherever practical. Many of the outgoing products are pushed into position in the carriers by truck.

The batteries are exchanged at intervals of 12 to 16 hours and, although an attendant is usually available for the purpose, the girls always exchange their own batteries. The charging station, al-

though smaller than in many of the company's other plants, is a model of efficiency. The charging bench and the area for a distance of approximately 3½ feet in front are covered by overhead traveling crane, making exact spotting of the truck unnecessary.

Standard automatic modified-constant-potential charging is employed with ampere-hour-meter control regulated by test fork. Direct-current charging is provided by a motor-generator set.

## Shear Testing Machine Tests Spot Welds

A small shear testing machine now is being used to make thorough tests of spot welds in the East Springfield, Mass., plant of Westinghouse Electric & Mfg. Co. It has four advantages it is reported. It aids in control of quality by giving a quantitative value of the strength of the weld; serves as a quick check on setup of welder; simple to operate and permits tests to be made by the operator or floor inspector.

Usual test of a spot weld is by "pulling a button," but this only tells if the material actually is welded, failing to give any indication of strength or soundness of weld.

With the shear test, an operator takes two standard test pieces, cleans the surfaces and makes the weld by overlapping the two pieces. The welded specimen is then clamped in the machine and a shear is applied. The force applied in pounds is shown by a gage on the machine, and a prepared chart shows minimum strength required, for various thicknesses and types of materials.

## Chains Could Offset Rope Shortage Institute Reveals

Although capacity for manufacturing welded chain is being taxed to the utmost to fill essential war demands, there does exist idle capacity for making weldless chain. This was the observation of the Chain Institute Inc., Chicago, after ending a recent study on the possibility of using weldless chains for manila ropes of which there now is an acute shortage.

According to the institute, this capacity has been partly idle for more than a year because steel was not available for weldless chain production.

Shortage of manila, it is revealed, will continue until recovery of the Philippine Islands which formerly supplied the United States with the base material, abaca fiber. On the other hand, plenty of iron ore at home assures users of all the steel chain needed.

In the study the institute included

breaking tests of weldless chains in comparison with manila rope, and prepared a table which brackets 10 ropes under 1 inch in diameter with the weldless chain that provides comparable strength for each.

For example: The smallest rope listed is 3/16-inch. Manila rope in this size, made to government specifications TR-60a, has a breaking test of 420 pounds, and wartime substitute fiber rope a breaking test of 336 pounds. Comparable weldless chains are Tenso type No. 3, with breaking test of 375 pounds, Lock-Link type, No. 4, with a test of 405 pounds, and Niagara type, No. 4, with a test of 420 pounds.

## Develops Ramming Mix For Basic Bottoms

A magnesite ramming mixture for the construction of open-hearth and electric furnace bottoms, known as H-W Magnamix and requiring only the addition of sufficient water to bring it to the proper consistency for ramming has been developed by Harbison-Walker Refractories Co., Pittsburgh. It contains approximately 80 per cent magnesia in the stable crystalline form, periclase, which has been established as the durable constituent of bottoms of dead-burned magnesite grains sintered into place.

No slag is added to the material, hence there is no dilution of the high homogeneous magnesia content of the finished bottom. Ramming can begin as soon as the brickwork of the sub-bottom, frontwalls, backwalls and roof are completed and can proceed simultaneously with the construction of ports and endwalls and repairs to regenerators.

Contours of the hearth and the working surface are established completely before any heat is applied. Furnace refractories are spared the severe treatment to which they are subjected in furnaces with bottoms of dead-burned magnesite grains sintered into place in successive layers. Complete open-hearth furnace bottoms have been installed with common labor at the rate of over 2 tons per hour with less than five man-hours per ton.

FOR SAFELY CLEANING  
YOUR FERROUS AND  
NON-FERROUS METALS

USE

## SPECIALIZED OAKITE DEGREASING MATERIALS

One prime reason why so many war plants are establishing new production records is that they KNOW what degreasing material to use on EACH different metal or alloy in preparing it for final finishing operations.

For example, aluminum and similar sensitive metals can be safely cleaned only with materials that do not etch or pit surfaces. Due to their susceptibility to tarnish or oxide formation, brass, bronze and copper require other materials. Cold rolled and other steels usually call for heavy-duty, high-speed materials, particularly where smut is to be removed.

### Wartime Service FREE!

To make sure that the materials used in your degreasing operations are correct from every standpoint, take advantage of the competent, personal help of our nearby Technical Service Representative. His successful experience and specialized knowledge of degreasing ferrous and non-ferrous metals will enable you to meet ALL your war production cleaning needs with complete satisfaction. Write today... no obligation, of course.

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Principal Cities of the United States and Canada

**OAKITE** *Buy Bonds for Victory*  
Specialized cleaning  
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

● AN ENTIRELY different method of applying coatings to articles has been developed within the past few years and has been very successful in largely overcoming two of the most serious handicaps of spray finishing. The process accomplishes these worthwhile purposes by causing a large saving in material waste and by contributing toward a more uniform film than can be achieved by any ordinary means.

**Fundamentals of the Process:** There are a number of similarities and a number of dissimilarities between this painting process and conventional electroplat-

points or fine wires. These are spaced from the piece and from each other in such a way as to produce the proper intensity and direction of impulse to the field established. It is essential that the aggregate ratio of surface area of the electrodes be extremely small when compared to the area of the article directly opposite the electrodes.

The general rule which has been established for practical applications is to use a series of No. 30 copper wires suspended vertically and spaced 10 to 12 inches from each other with the entire electrode structure 11 inches from the

what determined by the specific application, but in all cases where a high saving of material is desired, it is imperative that the axis of the spray be directed at an acute angle to the line of travel of the pieces on the conveyor. An angle of 15 degrees is normally used. This factor is highly important because of the wide variety of particle sizes produced from any spray gun that has been tested. It is obvious that a varying time will be required for the field to overcome their original inertia and direct them to the article being coated, since they vary in size and inertia at a given distance from the gun head.

In most cases, it is highly practical for the spray gun to remain in continuous operation. The pieces pass progressively through the field, each picking up its share of coating material. In cases where it is impossible to have an uninterrupted flow of articles through the coating zone, it is easily possible to use an electric eye or a timing relay for actuating a magnetic air valve which will in turn operate the guns.

**Wide Application:** The paint required for this

process is in no way different from that used in general finishing practices. This fact has been determined by very extensive tests, and it is known without question that the difference between materials considered highly insulating and those considered highly conductive is so slight as to be negligible. However, it is necessary that the solvents be adjusted so that the film remains open a little longer than normal usage.

This can be obtained by a number of rather simple changes in the present formula of dilution in the paint supply room. To illustrate very successful use has been made of 40 per cent E 3 and 60 per cent E 2 for diluting material which would be normally reduced with toluol or E 1. High boiling-point solvents may be used, such as 1 per cent of pine oil or a small percentage of butyl carbitol. The viscosity is reduced considerably below that in normal practice in order to secure the maximum in particle size and low velocity.

**Films Normal:** The film resulting from this application is in no way different from that achieved by other methods other than the fact that it can be expected to be much more uniform in thickness.

One of the most striking demonstra-  
(Please turn to Page 158)

*Development of a means of utilizing electrostatic fields to control path of spray particles in spray finishing is a unique achievement and an important one because it prevents overspray by attracting the spray particles to the work. It also makes possible the depositing of a uniform coat even on highly irregular objects, thus extending the advantages of spray finishing to objects which could not heretofore be finished by that method effectively.*

# Electrostatic spraying

- directs spray particles to work
- almost eliminates overspray
- evenly coats irregular objects

ing. In this method the grounded article being coated is surrounded by an electrostatic field designed to impart an electric charge on the sprayed particles in such a way as to cause the particles to be attracted to the piece being coated. The proper electric current is provided by a power pack, which is especially designed to produce a high voltage (of the order of 100,000 volts) and a very low amperage (not exceeding 10 milliamperes).

Direct current is essential. Fair results can be had with almost any rectified wave form. Tests have established the fact that a pulsating one half wave is satisfactory as any, and appreciably more efficient than some other wave forms. The volume of current used is negligible, in no case more than 4 or 5 milliamperes. It is important, however, that a sufficient amount of current be supplied to the electrodes, and this end can be accomplished on any installation by properly designing the "lead-in connections", carrying the current from the power pack to the electrodes to mitigate leakage.

The electrodes which surround the grounded article are in the form of sharp

piece. This has been found to be the most suitable set of conditions when working with 100,000 volts.

**Guns and Spraying:** The guns used are of a standard make, air operated automatic type, selected for their ability to atomize liquids sufficiently when using a relatively low air pressure. The conditions of the paint and air pressure vary considerably with the type of article being coated and the speed of production required. However, it can be said in general that most satisfactory results have been obtained when using about 10 pounds atomizing pressure and in the neighborhood of 1 pound of fluid pressure.

The fact that these pressures are not fixed should not imply that there are wide limitations upon these factors, but it is important to realize that as the flow of the liquid is varied to meet the requirements of a specific job, such factors as the fluid tip size, atomizing pressure and fluid pressure must also be varied in order to attain the greatest efficiency.

This might be more clearly understood by a realization of the importance of correlating the inertia of the paint particle with the intensity of the electric field through which it is moving.

The position of the spray guns is some-

From a paper presented by Harold Ransburg at the 30th annual convention of the American Electroplaters' Society and reproduced in *Metal Finishing*.

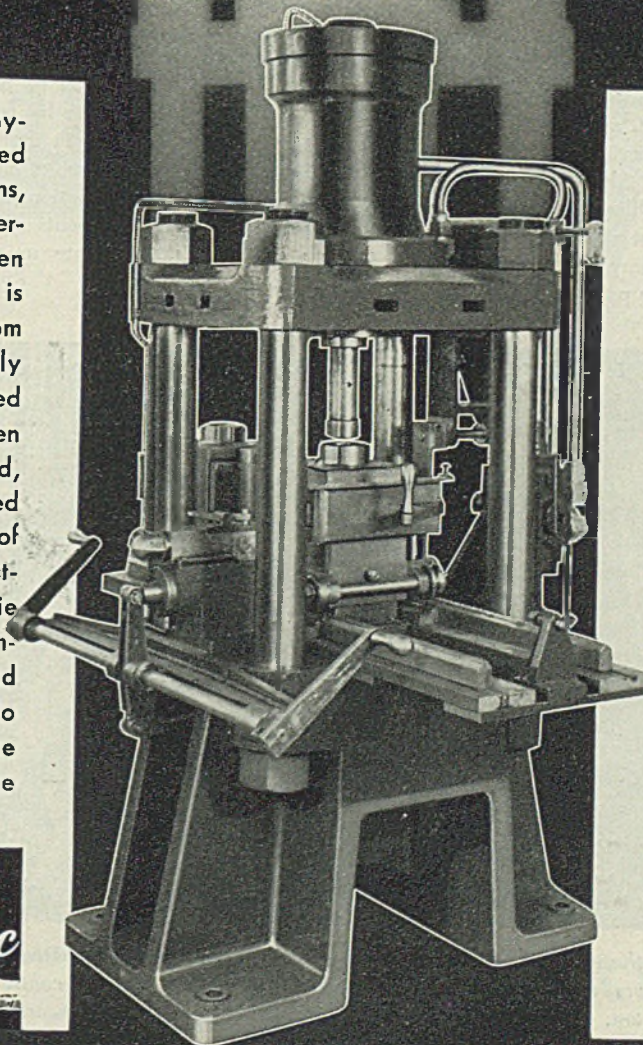


# ANNOUNCING MODEL "K" SERIES

# Hydraulic Presses



A new type of "Hy-Mac" hydraulic press that may be adapted to capacities up to 150 tons, (identified as a "K" Series) is operated by a separate motor driven power units. It is a press that is ordinarily manually controlled from a four-way valve—automatically cutting-off when the predetermined pressure or tonnage has been reached—ipm. of closing speed, power speed and opening speed as per specifications. The frame of the press is made up of heavy castings bolted together by steel tie rods with the power cylinder assembled vertically on the top and above a base platen 19" (right to left) x 13 $\frac{1}{4}$ " (front to rear) on the 75- and 100-ton presses. The



platen is 1" larger in each dimension on the lighter models and 1" or  $\frac{1}{2}$ " smaller on the larger ones because of 3" instead of 4" tie rods on the former, and 4 $\frac{1}{2}$ " or 5" tie rods on the heavier types. Maximum daylight—the length of stroke, diameter of cylinder are built to specification, the bore and stroke varying in ratio to the capacity required. The platen is 27" from the floor—height 75-ton press—overall is 82" (varying a few inches one way or other depending upon length of stroke)—without power unit, the press occupies a floor space of 25" x 50"—power unit may be adjacent to press or a remote installation.

K75 (Illustrated)—  
at 2000 lbs. per sq.  
in. cylinder—10" bore  
stroke—here our  
factory—set-up  
for making fixtures  
—the set-up pro-  
vided—two operators—  
arrangement.



**HYDRAULIC  
MACHINERY, INC.**

12825 FORD ROAD  
DEARBORN, MICHIGAN

**HYDRAULIC MACHINERY**

# Attaining Precision

(Continued from Page 105)

in work. The subcontractor whenever within 5 days of the end of a run notifies Stewart-Warner. That company then shoots another order to the subcontractor. This keeps him going, and going on "S-W" war work.

The inspection department of Stewart-Warner comes into the situation after the order is placed with the subcontractor. This department is large and highly organized. As the total force of plant employees has been more than doubled by the war demand, the inspection force has been increased more than six times over; in this inspection force about 1000 are young women.

**100 Per Cent Inspection:** Whereas in peacetime large reliance was placed on inspection at final assembly, now there is full inspection of parts at every stage, 10 per cent spot checking on minor dimensions, but 100 per cent on major and critical. Production departments, since they are charged with the time of the inspectors assigned to them, are given allowances for the cost of inspecting the parts from subcontractors.

Frank A. Ross, senior vice-president, who guided "S-W" war production also in the first World war, puts responsibility for perfect inspection up to those in charge of that work: O. R. Swanson, chief inspector, and S. A. Ellingson, assistant chief inspector, who supervise inspection of all fabricated parts; Alemitte, heater and instrument assemblies; and all receiving inspection, except radio, of which William Terry is in charge. Mr. Swanson, chief inspector for the past

5 years, formerly an experimental mechanic, and a tool and die maker before that, holds that all inspectors should not look for any pats on the back for the perfect production expected, but should count on "getting hell" for any defective parts that get by.

**No Gov't Inspection at Subcontractor's Shop:** All parts fabricated by subcontractors pass Stewart-Warner inspection first and then pass Ordnance inspection before being received by the government. There is no longer government inspection in the shops of Stewart-Warner subcontractors, except of radio equipment in some cases. The subcontractors' output shipped by Stewart-Warner, along with its own direct output, is regarded by the government as Stewart-Warner output.

"If after this war is over, even 20 years after, there are in a government warehouse some Stewart-Warner products for which parts were made by us or by our subcontractors, Stewart-Warner will be held responsible for them," said Mr. Swanson. "That will be so, even though Ordnance has inspected and accepted them. I wish all subcontractors would realize that fact. I wish they would cover their machines with inspection the way we do ours."

A Stewart-Warner subcontractor is required to submit samples of his production of each part to be run on his machines before going ahead with production. Up to 5 months ago the practice for subcontractors in the Chicago area was to have them rush these samples to Stewart-Warner by automobile, and that company, under the typical contract, was allowed 6 hours for giving the go-ahead signal. Out-of-town subcontractors still

send in samples and get release by wire or telephone.

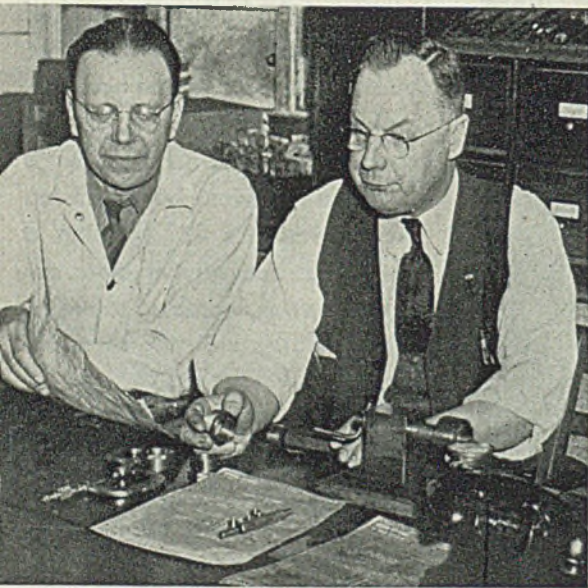
**"Roving" Inspector:** But the practice has been changed with regards to Chicago area subcontractors. Stewart-Warner now sends out a roving or traveling inspector to tell the subcontractor about troubles to look out for according to Stewart-Warner's own experience and to check on first runs. He also visits the subcontractors' shops from time to time during their runs.

This roving inspector, working under F. C. Dunning, supervising inspector of one of the largest sub-divisions of the Stewart-Warner inspection force, that for the automatic screw machine parts department, is H. Rohde, who has had 19 years' experience in inspection in the "S-W" plant. After each day's roving, this inspector makes a report, which goes not only to Mr. Dunning, but also to Messrs. Swanson and Ellingson and others concerned.

For example, a recent daily report on four subcontractors, showed that the work of two of them was coming through all right; that of another required checking for location of eight drilled holes in a Stewart-Warner department having larger gears; that of a fourth subcontractor, a stud for a tube to go into an aircraft heater, was coming with an incomplete thread.

**24 Inspection Sections:** Final inspection of parts delivered to Stewart-Warner by subcontractors takes place along with that of its own inspection sections. Out of more than two dozen inspection sections for as many production departments or groups of departments six devote much of their time to inspecting

(Please turn to Page 146)



Special gage setups such as those shown here are all checked carefully by inspectors when getting a subcontractor started in production. Harold Rohde, left, roving inspector, and F. Dunning, in charge of inspec-

tion, Automatic Parts Division, work closely with subcontractors

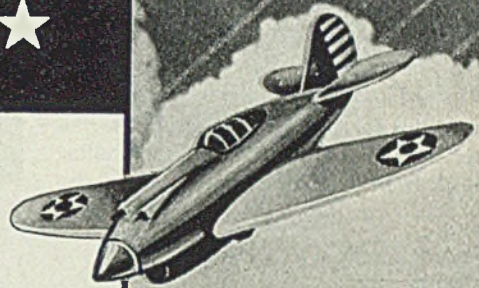
Right—Another of Stewart-Warner's 24 inspection sections, checking automatic parts

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Visit our plant now... is the invitation we'd like to extend executives who will have peacetime mechanical parts or complete assembly problems to solve...but we're working 24 hours daily on aircraft armament and can permit no visitors. You can visit our plant and feel our spirit by way of our 36-page brochure "Ingenuity." Write for it (using your business letterhead, please). We're sure you'll find in it one answer to your problem. Joseph J. Cheney, President.



# Spriesch

ESTABLISHED 1923

TOOL & MANUFACTURING CO., INC.  
22 HOWARD STREET • BUFFALO, NEW YORK

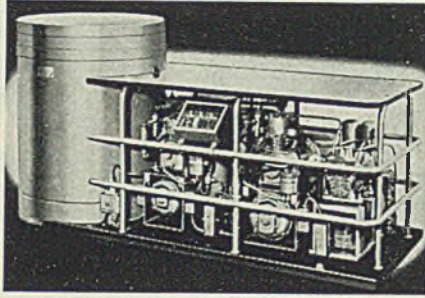
## Turning Rolls

Ransome Machinery Co., Dunellen, N. J., is now offering turning rolls for position-welding large cylindrical work such as drums, tanks and other pieces.

The set consists of a pair of motor-driven rolls controlled through a Reeves variable-speed unit, giving a range of speeds to meet requirements. Remote push-button control for forward or reverse rotation is furnished.

Means for changing the center-to-center distance of the rollers, for handling work from 2 to 14 feet in diameter also

1000 B.t.u.'s per hour when work is immersed in convection fluid. In the unit, the first compressor acts to extract heat



from the barrel and introduce it to the heat interchanger. The second in turn extracts the heat from the heat interchanger and dissipates it into the air. Because this high rate of heat removal can create oil charring, which would cause excessive wear on the compressors, a third compressor is used to cool the heads of the working compressors.

One of the most important applications of the unit is the shrinking of metal to permit assembly of sleeve bearings and ball or roller races otherwise requiring a press-fit by merely slipping them into position after chilling. Another equally important use is the treatment of steel to produce a uniformity of hardness with all stresses and strains relieved.

## Dust Collector

Bargar Sheet Metal Co., Cleveland, announces development of a new portable Safe-Aire dust collector designed to provide a simple, flexible and inexpensive dust-collection system for plants where dust control is needed. It can be used either to supplement larger, perma-

it is reported.

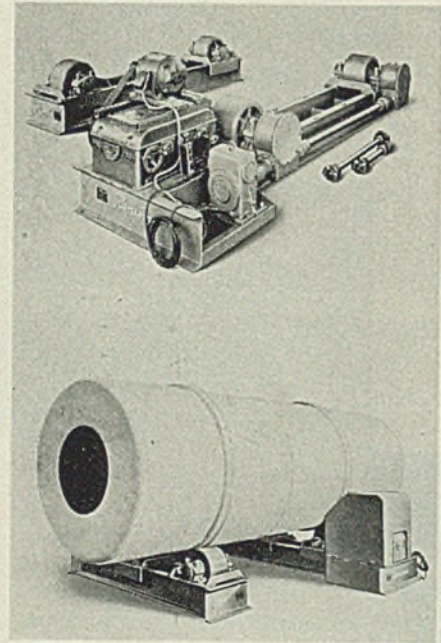
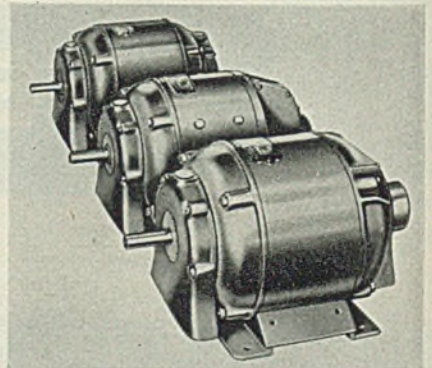
Basic use of the unit is to collect dust from a single grinder or other dust-making machine, separate the dust from the air, and blow the clean air directly back into the shop. It will normally handle dust from two 9-inch grinding wheels, whether they are mounted together or separately, and it can be attached to two separate machines.

Capacity of the collector is 600 cubic feet per minute. One of its most important advantages is that it does not exhaust any air from the shop, but returns it approximately 97 per cent clean and slightly warmer than before, it is said.

The unit is powered by a 1/8-horsepower motor running an 11g blower at 3400 revolutions per minute. The machine stands 37 inches high, is 27 inches wide and 13 inches deep. Installation is quick, involving no piping other than a short length required to attach the dust collector to the machine guard or hood.

## Electric Motors

Robbins & Myers Inc., Springfield, O., announces its new line of Uni-Shell electric motors reported to be the only com-



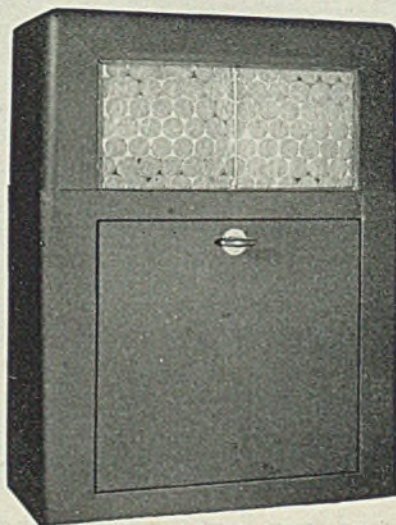
is provided. One or more sets of idler rolls may be used, depending on the length of the cylinder being welded. Also, units are available in capacities for handling loads up to 75 tons.

## Chilling Machine

Deepfreeze Division, Motor Products Corp., 2301 Davis street, North Chicago, Ill., announces a new improved cascade industrial chilling machine with a chilling capacity for high production metal chilling of any part where large quantities of heat must be removed quickly.

Among features recently added to increase its operating efficiency are a temperature controlling device for accurate control at any point from atmosphere to -120 degrees; a table top for convenience and safety; and a new system of three compressors and three motors which develop maximum thermal efficiency and eliminate necessity of water connections and drain facilities.

Employing the cascade principle of 2-stage refrigeration, this machine has the capacity at low temperatures to remove



ment dust-control systems, or to serve in place of such systems when necessary,

plete line in which all motor types in any one frame size are interchangeable.

The motors are built within cylindrical shells of steel. In any frame size, the shell dimensions, head fit, bolt circle holes, shaft size and conduit box mountings are identical for all motor types. This is true of polyphase-induction motors, capacitor-start induction motors, standard direct-current motors and generators, repulsion-induction motors, as well as other types.

Standard on all motors is the double-row-width ball bearing which has an exceptionally large grease reservoir, and complete seals on both sides held in place by removable snap rings.

Equally important improvements have been made on sleeve bearings for motors requiring them. Efficient, better insulating materials also are included in the units. Into smooth, clean slots, free

# Now, All-Position A.C. Welding with New Murex Type A Electrode



This new rod has been designed to meet the demand for an electrode that can be used with A.C. current and that will handle easily in the overhead and vertical as well as in the flat and horizontal positions. ¶ The new Murex Type A electrode meets these specifications superbly. It is fast winning friends for welding of high pressure mild steel piping, ships and structural steel work—and for other applications where an all-position electrode is desirable. ¶ According to many tests in laboratory and in the field, deposited weld metal is clean and smooth, without gas pockets or slag inclusions. Fusion and penetration are excellent. ¶ Murex Type A electrodes meet the requirements for Grade E-6011 electrodes under A.W.S.-A.S.T.M. specification A-233-42T; for Grade III, classes 1 and 2 under U.S. Navy Bureau of Ships Specification 46E3; and for Grades H1G, B1G, and E1G, American Bureau of Shipping. ¶ Type A is available in  $\frac{3}{32}$ " ,  $\frac{1}{8}$ " ,  $\frac{5}{32}$ " and  $\frac{3}{16}$ " sizes. Typical physical properties of the weld metal, stress-relieved, include yield points of 47,000 p.s.i. to 56,000 lbs. p.s.i., ultimate strengths of 60,000 to 68,000 lbs. p.s.i. and elongations of 27% to 32% in 2".

*Send for your copy of new Murex catalogue.*

## METAL & THERMIT CORPORATION



*Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.*



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# Anti-Aircraft

## Gun Mounts and Gun Barrels

are constructed  
with **STANDARD** forgings



Acid open-hearth steel, rigidly controlled through every phase of production at Standard, results in finished forgings with the high physical properties and high quality demanded in ordnance materiel for our armed forces. This control of quality also applies to all forgings by Standard being produced either directly or indirectly for the war effort.

It is one of the major reasons why Standard steel products bear the reputation for dependability throughout peace-time industry and transportation as well as that of war.



**STANDARD**  
**STEEL WORKS**

DIVISION OF  
THE BALDWIN LOCOMOTIVE WORKS  
P H I L A D E L P H I A

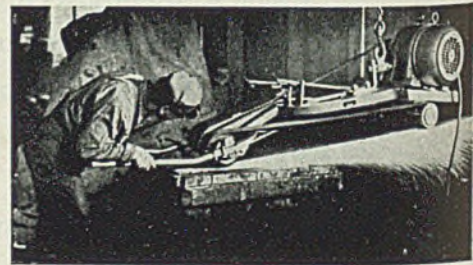
from burrs or sharp edges, two layers of the highest grade impregnated rag paper are placed to minimize the danger of a weak spot causing a breakdown to ground. The wire itself is coated with double-weight synthetic resin insulation for strength, toughness and flexibility. An added sheet of impregnated paper is placed between the coils in the slot, and an improved method is used for holding the end coils so that complete insulating paper protection can be provided between the phase groups in the winding.

Entire winding assembly is given successive cycles of pre-heating, dipping in special synthetic resin-base varnish, and baking. As a final protection, coils are thoroughly covered with moisture-resistant synthetic resin and tung oil sealer. Good bearing alignment and rotor construction in motors, together with precision balancing, prevents vibration that injures bearings and shortens their life. Three grades of rotor balance are available on all type motors: Static balance, commercial dynamic balance and special dynamic balance.

### Frame Grinder

Fox Grinders Inc., Pittsburgh, announces a new type swing frame grinder which uses an abrasive belt or a grinding wheel. It is said to have a high rate of metal removal.

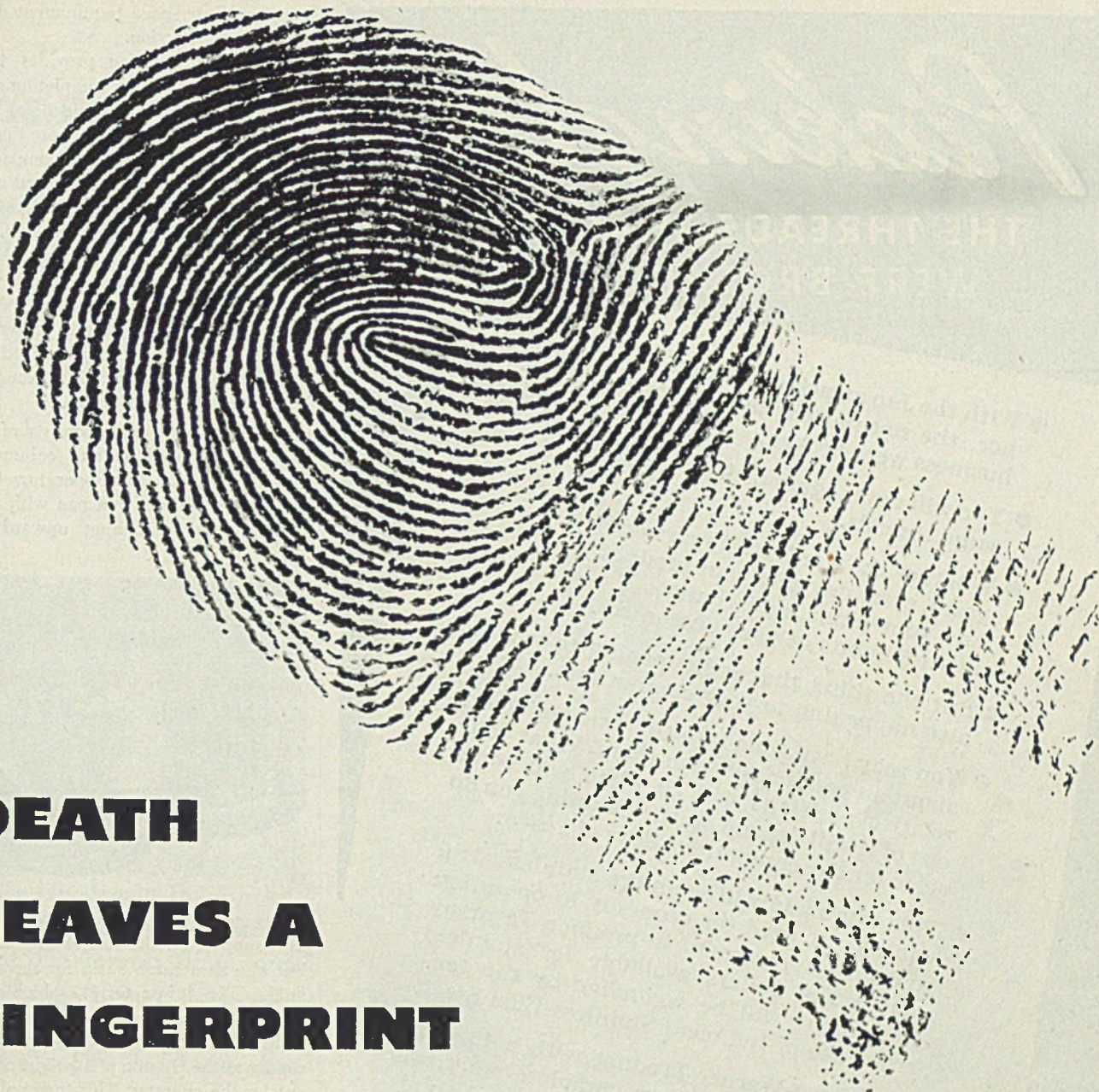
Easy to maneuver, the machine pro-



vides a fine finish in surfacing plates. It removes defects from tubes and merchant bars, and smooths weld seams. When in action, it allows the operator a clear view of the work at all times.

### Screw Machine

Machine Tools Division, C. I. Togstad Co., Kokomo, Ind., announces a new 12-spindle Verti-Matic vertical-type automatic hydraulically operated bar feed and chucking screw machine designed primarily for fast, accurate production of parts from round, square or hexagon bar stock. It also can be used for machining drawn steel parts of different shapes. Advantages claimed for the machine are faster production with less man power, simpler and faster set-up because of pre-tool set-up at the bench, and 50 per



# DEATH LEAVES A FINGERPRINT

Probably it was hot and humid in the assembly room... that day when warm, perspiring fingers accidentally touched a tiny, needle-pointed shaft. But the fingerprint remained... acid, corrosive...

A saboteur—this accidental fingerprint? Yes—for on a later day that tiny part, weakened by corrosion, may fail—in a submarine depth-gauge, an airplane altimeter, or in any of scores of delicate military

instruments. And just because of a fingerprint, a man may die.

\* \* \*

ANOTHER WAR JOB FOR AIR CONDITIONING. Where precision instruments are made, on which men's lives depend, air conditioning reduces perspiration... filters out dust... helps speed output.

And this is but one example of how General Electric air conditioning and industrial refrigeration may serve the

war effort. To meet the exacting requirements of these wartime applications, General Electric is producing equipment that is highly efficient... flexible... compact.

When peace comes, this improved air conditioning equipment — by General Electric—will be available to all.

*General Electric Co., Air Conditioning and Commercial Refrigeration Dept., Division 436, Bloomfield, N. J.*

*Air Conditioning by*  
**GENERAL  ELECTRIC**

# Picking Up

## THE THREADS THAT WERE BROKEN!

- With the Jap attack on Pearl Harbor, the normal threads of your business were broken.
- You will never again pick up those same threads.
- Whether the war lasts 2 years or 5 years, every day ages your product and your plant, and changes the buying habits of your customers.
- But the thing that is happening to you is also happening to your competitors.
- You may have gone into this war period on about an equal basis with them. What your relative positions will be when you come out of it will depend on the planning you do *now* for the competitive days of Peace.
- This war's end will see more stainless steel equipment used for economy in operation and for improvement in product. In many plants the dollars available for stainless equipment will be *stretched* by the generous use of IngAclad Stainless-Clad Steel.
- This Borg-Warner Product with a 10-year record of success gives complete stainless protection on the side that is used, and makes your stainless dollars go much further.

Prepare now to "pick up the threads that were broken"

**INGERSOLL STEEL & DISC DIVISION**  
**BORG-WARNER CORPORATION**

310 South Michigan Avenue

Chicago, Illinois

Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

Makers of

**INGACLAD**  
STAINLESS-CLAD STEEL

"A Borg-Warner Product"

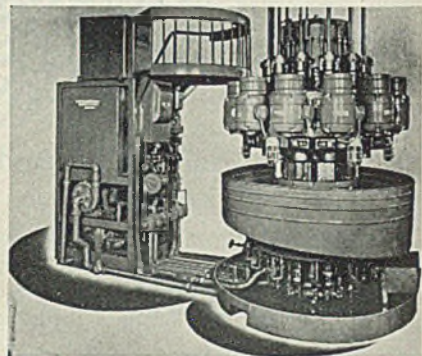
Conserving Vital Alloys for War and in Peace

Note: We Also Produce  
**INGERSOLL SOLID STAINLESS STEEL**

cent less floor space requirement due to vertical construction.

While the machine provides twelve different operations for completing a part, it also permits the employment of duplicate operations to produce more than one piece at the same time, the company reports. The machine is composed of two units—the machine proper and the control unit. Being vertical in design, there are no long lengths of bar stock to project horizontally from the machine. Mechanical contrivances used to feed the stock through the horizontal type of machine are eliminated, since feeding is handled entirely by gravity through the hollow spindle from above.

The machine proper consists of three main units; the base and column, the lower turret, and the upper turret. The base is a large cast iron pan with a supporting column running upward from



the center. The column serves not only as a support for the rest of the machine, but also as a catch basin for the cutting fluid. The lower turret, which houses the lower spindles with their respective drills, taps or cutting tools, is fastened rigidly to the column at a height convenient for the operator. This turret also carries the stock locator and the manifold supplying the cutting fluid.

The upper turret is also mounted on the column, but is not fixed radially. It is supported on two large Timken bearings, and is allowed to rotate around the column at desired intervals. The twelve spindles each revolve on Timken bearings, and each is driven separately by a 2-horsepower motor mounted on the outside diameter of the turret. The drive is by V-belts, and the motors are mounted on hinged brackets to provide belt adjustments.

Directly above the lower turret are the twelve horizontal cutting cylinders, with the various tools required for their respective operations. These cylinders are fastened rigidly to the column in a radial direction and in line with each spindle position. The speed at which the cylinders travel is accurately regulated by means of metering valves. Not only can the cutting speed be perfectly



**THIS DIE SINKER**

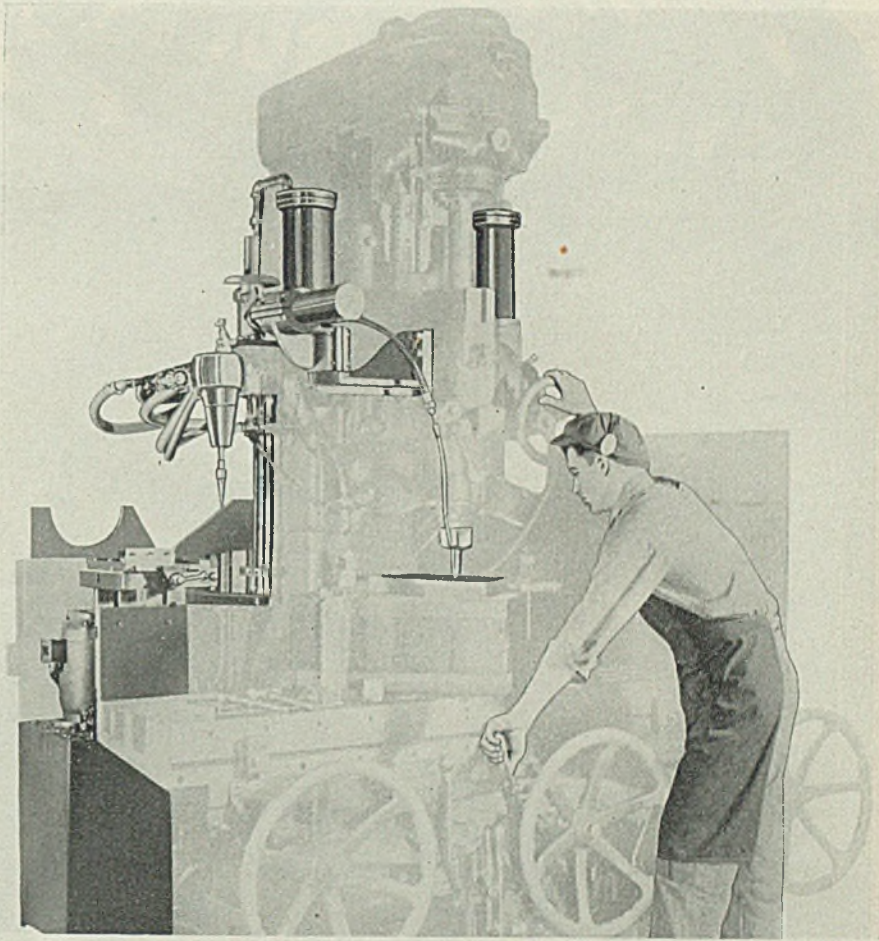
# *Turned to Turchan*

**FOR FASTER, MORE EFFICIENT PRODUCTION!**

**D**IE SINKING, one of the more difficult machining operations in any plant, is a comparatively simple task when the plant is equipped with a Turchan Follower.

Shown herewith is a Turchan Follower attached to a Reed-Prentice No. 5 mill. This Turchan equipped machine, located in one of the largest drop forge plants in the United States, is in almost constant use machining airplane engine crankcase dies.

One of the paramount virtues of Turchan equipment is simplicity of operation. This all hydraulic duplicator, attached quickly to any standard type lathe, planer, grinder, shaper or mill, is handled easily by any operator. The high degree of skill normally required for die sinking and other such operations is not necessary when



Turchan Followers are employed.

Turchan Followers, on the other hand, do not interfere with normal use of the machine. The one pictured here can be disengaged by removing two nuts. The operators of this equipment are saving

time, money and reject worries by

*Turning to Turchan* You, too, can *Turn to Turchan* and do likewise. Send for our new booklet today and let our engineers explain Turchan all hydraulic duplicating to you.

# **TURCHAN**

*Turn to Turchan*  
**FOLLOWER MACHINE CO.**

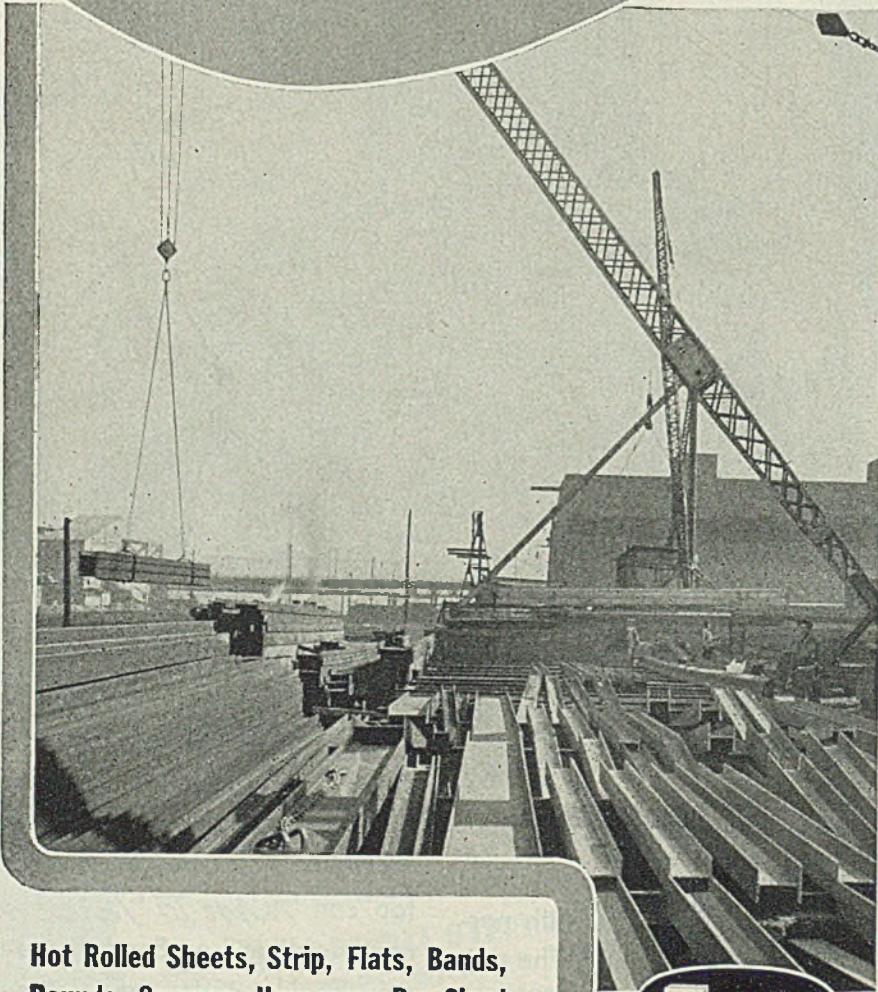
*Originators of Hydraulic Duplicating Attachments*

8255 Livernois Avenue

Detroit, Michigan

# LEVINSON

## Warehouse STEEL PRODUCTS



Hot Rolled Sheets, Strip, Flats, Bands, Rounds, Squares, Hexagons; Bar-Sized Angles, Channels, Zees, Tees; Structural Angles, Beams, Channels; Plates and Checker Plates; Reinforcing Bars; APS Protected Steel Roofing and Siding.



## LEVINSON STEEL SALES CO.

*Warehouse and Specialty Steel Products*

33 PRIDE STREET · PITTSBURGH, PA.

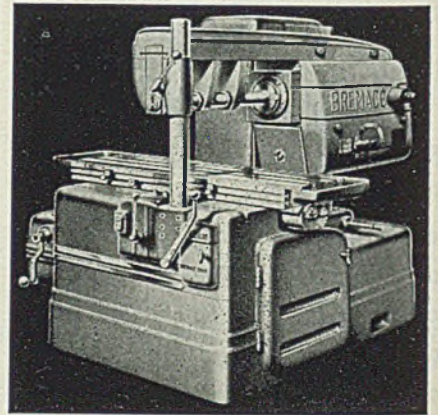
adjusted, but a cushioning effect is accomplished by the use of the hydraulic feed.

### Milling Machine

Bremacc Corp., Detroit, is introducing a new model No. 4 milling machine with twin lead screws capable of down cut milling (same direction as the feed) on a precision, high speed production basis. It uses two unsplined lead screws that are so connected in relation to each other that the effective bearing surface, or attack area, with the feed nut, is constantly in tension through the use of a synchronizer sleeve (pack-lash-eliminator) conventionally arranged outside the gear housing in the table.

A housing cast integral with the table, which carries all of the thrust loads, contributes to the sturdiness of this assembly. Accuracy of the plane of travel of the work table is provided for by two conventional dovetail ways.

The rear slide is mounted securely and is permanently fixed, while cross adjust-



ment of the front slide is accomplished by means of adjusting screws without removal of the table. The channeled table assures rapid disposal of cuttings, regardless of the accumulation on the table.

Coolant return is through a channel in the center at the rear of the table. Conducted over this circuitous channel, the coolant is delivered over a screen before it is returned to the reservoir. Table feeds range from 1/2 to 30 inches per minute arranged through semi-quick change of pick off gears. Rapid traverse has a standard table movement of 125 inches per minute. Both table feeds and rapid traverse can be operated manually or automatically in either direction. Automatic reversing and jump feeds also are available which permit the use of work fixtures on both ends of the table.

The table travel is free to function so long as the main motor is in operation, regardless of whether the cutter is rotat-

STEEL

ing or not. The operating lever, controlling the feed and rapid traverse cycles, is mounted directly in front of the operator in a vertical position. A floating gear drives the spindle. This drive gear is permanently anchored with its own precision annular bearings. The spindle is of extremely large diameter. A special feature can be incorporated in the machine whereby the spindle can be shifted to allow for cutter drag on face milling operations.

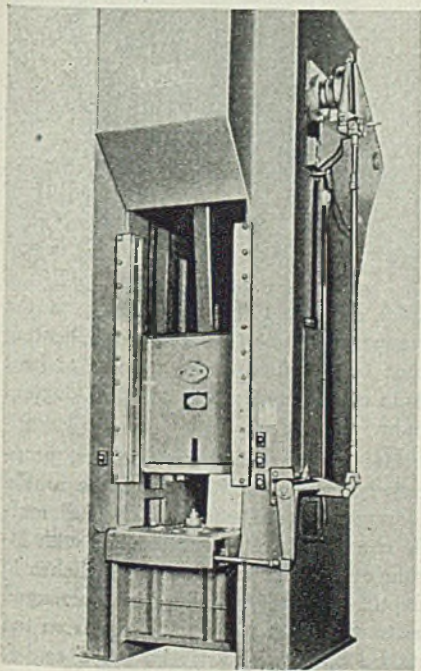
The elevating screw housing is mounted directly below the spindle housing, receiving its support from the main base. The elevating screw is carried in a bronze nut mounted in a ball bearing assembly and is worm gear driven having a drive shaft extending out to the right of the machine.

Large graduated dials are mounted on the extension shafts. Two speeds are included in the main gear box in connection with spindle speeds. All pick-off gears, both feed and speed, are splined and run in oil. Automatic lubrication is provided throughout the machine.

A heavy duty disk clutch is used in the main gear box and power is supplied by an individual 10-horsepower motor. Complete control equipment is mounted in an enclosed cover on the left hand side of the machine.

### Drawing Press

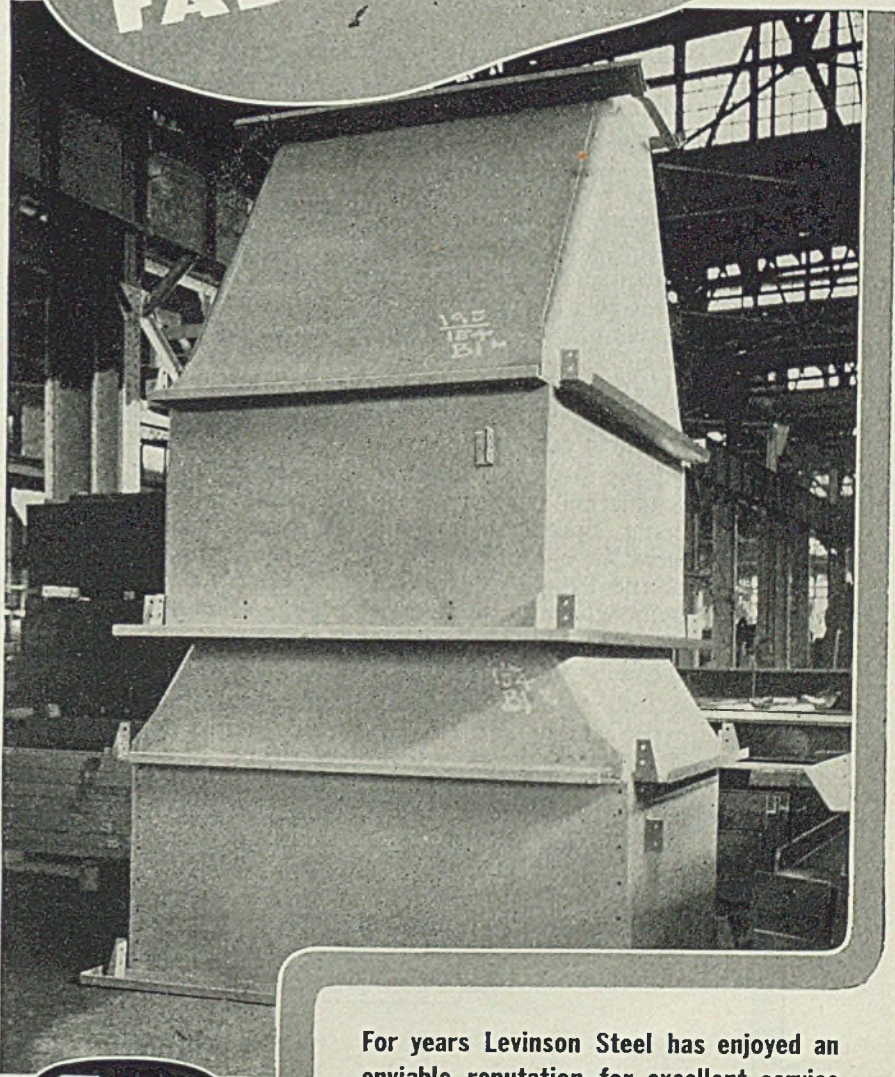
Verson Allsteel Press Co., Chicago, recently designed an eccentric type cartridge case drawing press which produces both brass and steel cases. It is built



for all stages of case fabrication, from preforming through drawing, heading, tapering, to piercing; and is available to make cases of all sizes up to 105 milli-

# LEVINSON

*Special* **STEEL**  
**FABRICATION**



For years Levinson Steel has enjoyed an enviable reputation for excellent service and workmanship in the fabrication of structural steel. Another important phase of Levinson Steel service is the fabrication of steel for heat-treating furnaces and for other special war production equipment.

## The LEVINSON STEEL Company

*Fabricators of Structural and Miscellaneous Steel*

33 PRIDE STREET · PITTSBURGH, PA.



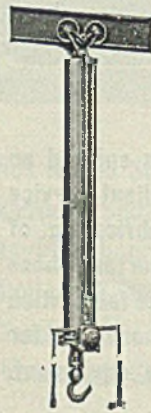
*Before*  
**"PEARL HARBOR"**  
 AND *After* **"TOKYO"**

CURTIS was actively engaged in *Defense Work* before "Pearl Harbor." Thereafter, a constantly increasing volume of *War Activities* was taken on until we are now devoting all of our productive efforts to War Work for our Government and essential War Industries. We expect to continue on this basis until America dictates the peace terms in Tokyo.

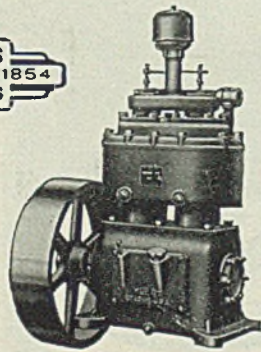
In World War I our engineering and designing ability and experience was recognized by the award to us of a contract for the manufacture of approximately two million (2,000,000) high explosive shell forgings. Our performance on this contract won for CURTIS the coveted Ordnance Department Flag, the emblem for "excellence," which flag is one of our treasured possessions.

Now in World War II our engineering ability and production facilities are again being called upon, first to design, then to produce some special equipment for one of the branches of the Armed Forces of the United States. This has progressed to the point where we are now tooling up, ordering in the material, and this *additional* productive activityMM becoming an accomplished fact.

Today's emergency is providing an even richer experience to add to that already accumulated in the 89 years during which CURTIS has been a successful and growing institution, and which will naturally be reflected in the products of the CURTIS organization after the war is won and when peacetime markets are again restored.



*Curtis Pendant  
Air Hoist  
and I-Beam  
Trolley*



*Curtis Model C Water-Cooled  
Compressors, 3 to 60 H. P.*



**CURTIS PNEUMATIC MACHINERY DIVISION**

*of Curtis Manufacturing Company*

1996 Kienlen Avenue, St. Louis, Missouri

meter.

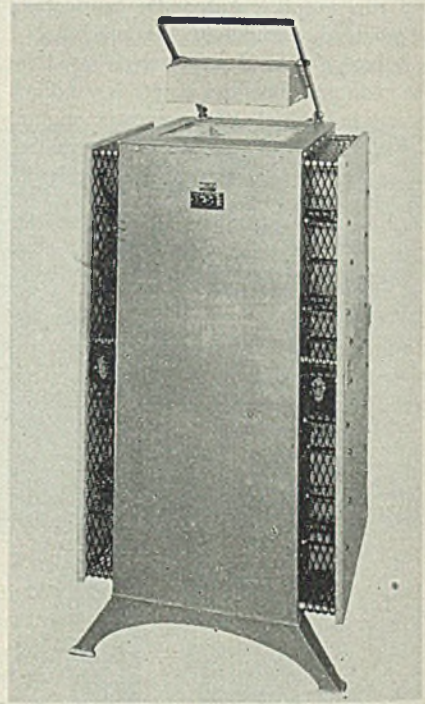
Equipped with a dial feed, it can make as many as 15 productive strokes per minute, it is reported. Dial is tied into the press circuit, and press cannot operate until dial is perfectly indexed.

Pneumatic clutch and brake unit of the press is controlled electrically by push buttons. Increased punch and die life is obtained by using extra long gibs, which confine the slide at all positions of the stroke.

**Hardening Furnace**

Sentry Co., Foxboro, Mass., is offering a new size 4B model YP electric vertical high speed steel hardening furnace. It is similar in general appearance as a former model but has greater capacity, both as to tool diameters and tool lengths.

Furnace shell is of steel with heavy top and bottom plates. Amply insulated, it will attain a top temperature of



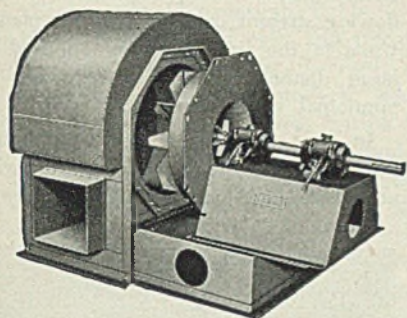
2500 degrees Fahr. According to the company, recent tests showed a heating time of 1 hour and 15 minutes to heat from room temperature to 2350 degrees Fahr.

Heating elements are Globars, properly spaced on both sides of the muffle to provide even heating. The full muffle chamber is of silicon carbide with inside dimensions of 6 x 6 x 40 inches in depth. The lift type floor is so arranged as to swing up and back away from the muffle opening, and is balanced so hot surface is not exposed to the operator. Terminals are spring mounted and designed for efficient air cooling. All electrical contacts are shielded and provided with safety guards. Tools up to 4 1/4-

inches diameter and up to 36 inches long can be accommodated by the unit.

## Industrial Fans

Mahr Mfg. Co., 1702 North Second street, Minneapolis, announces a new series of fans for work in temperatures up to 1500 degrees Fahr. One of the features of the series is that the rotor,



shaft, bearings and mounting of each unit can be pulled out as a unit for inspection or servicing.

Each fan is equipped with a 6-blade rotor and heavy duty bearings to insure performance under severest operating conditions. Ten sizes are being offered. These range from 800 to 40,000 cubic feet per minute.

## Triple-Duty Contactor

General Electric Co., Schenectady, N. Y., announces a new three-purpose contactor, known as the CR2791-Q100, to start, reverse and provide dynamic braking for direct-current split-field, series-wound aircraft motors. It is applicable to motors having full-load currents up to 10 amperes and locked rotor currents of 60 amperes at 12 or 24 volts, direct current.

Combining in one unit functions of several single-purpose relays, with their interconnections and mechanical interlocks, the new contactor is compact and light in weight. It has all moving parts statically and dynamically balanced, and can be mounted in any position on either a metallic or nonmetallic base. Also, it is corrosionproof, meeting 200-hour salt-spray tests. Other features include operation at rated currents in ambient temperatures ranging from 95 Cent. to minus 40 Cent and at altitudes up to 40,000 feet. It also will withstand 95 per cent humidity at 75 degrees Cent. on 48-hour tests, with immediate operation thereafter.

In addition, the balanced-armature construction assures that when the relay is in either the energized or de-energized state, the contacts will remain in their open or closed position even when subjected to mechanical frequencies of 5 to 55 cycles per second at 1/32-inch

## AMPCO CASE HISTORIES



## In Ordnance AMPCO Bronze Parts Give Added Strength

You must have strength in an anti-aircraft gun carriage — strength to resist the shock of recoil, the rough treatment imposed by rugged terrain, the strenuous service of combat conditions. The equipment must not fail.

The material for each part must be selected carefully to give the utmost in strength for this vital task of warding off death from the skies.

That's why Ampco bronzes have been selected by so many ordnance manufacturers, for critical parts where strength and wear-resistance are vitally important.

You find Ampco bronzes used in Army and Navy ordnance, in aircraft, in marine service — wherever there is need for an alloy that can "take it." For your war work, where bronzes meeting Government specifications are used, there is a grade to meet your requirements and to deliver results that are creditable to you.

Send for "Table of Bronze Specifications to Government Requirements" and data on Ampco Metal. Free on request. Write today.

## AMPCO METAL, INC.

DEPARTMENT 5-6

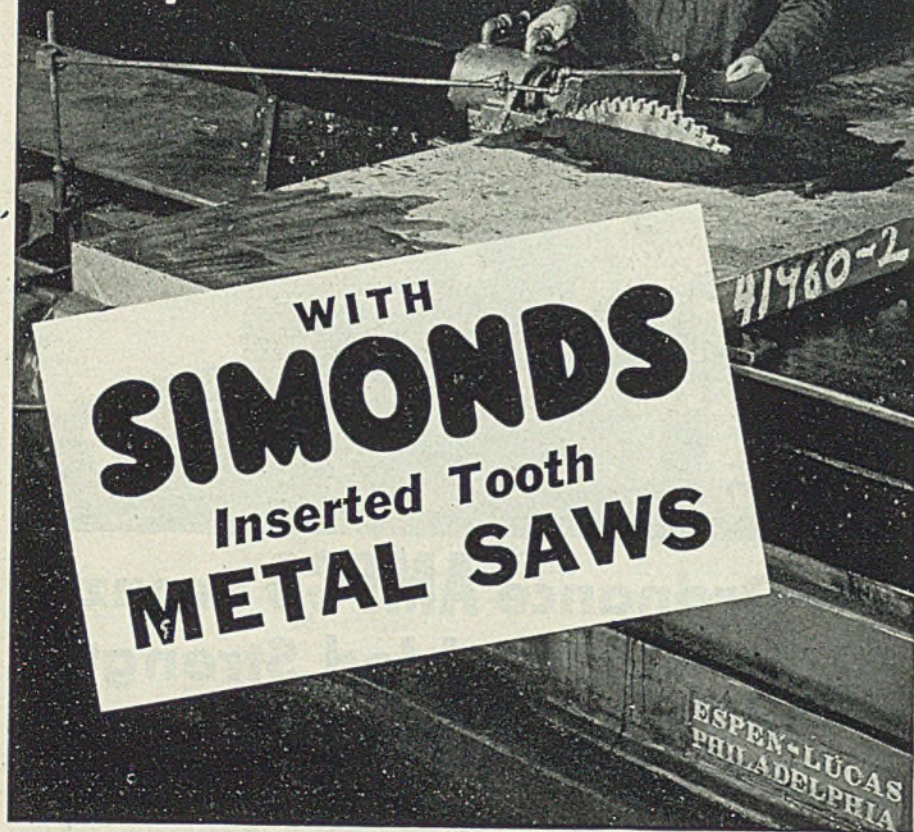
MILWAUKEE, WISCONSIN

# AMPCO METAL



THE METAL WITHOUT AN EQUAL

**Get Higher Speeds...  
Faster Feeds...  
Deeper Cuts**



High-speed steel teeth... with a wedge for every tooth... mean extra strength and sharply improved operating characteristics that in many cases have *doubled* metal-cutting production on billets, sheets, rods and rails. Alternating bevelled and square teeth split chips in 3 parts, and curved gullets clear them easily under heavy-

est loading. So chips can't weld, stick, or cause the saw to break. Teeth are readily sharpened in the plate... and quickly replaced, when worn out, by your own mechanics. These inserted Tooth Metal Saws are made under Simonds complete Quality-Control... and are under constant check in actual use in Simonds own factory. Prompt shipments on rated orders.

**Operating Handbook FREE to Users of Metal-Cutting Saws**

*Handy pocket book tells how to get utmost service and production from Simonds Inserted Tooth Saws. Free while they last. Write today.*

METAL CUTTING METHODS

**SIMONDS SAW AND STEEL CO.**

1350 Columbia Road, Boston; 228 First St., San Francisco; 520 First Ave., So., Seattle; 127 So. Green St., Chicago; 311 S. W. First Ave., Portland Ore.

**SIMONDS**  
Famous Family of Metal-Cutting Tools

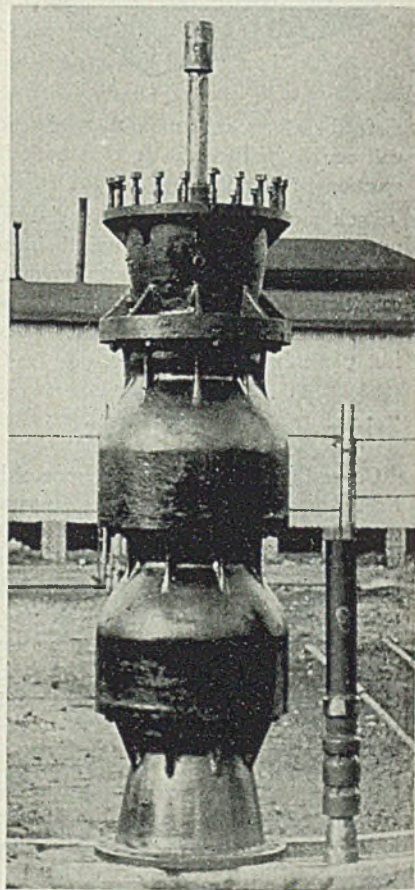
★ BOUGHT YOUR BONDS AND STAMPS THIS WEEK? ★

maximum amplitude applied in any direction, or when subjected to a linear acceleration of 10 times gravity in any direction.

**Turbine Pump Bowls**

Layne & Bowler Inc., Memphis, Tenn., recently developed a new line of high capacity vertical turbine pump bowls intended primarily for pumping water from flowing streams or lakes for war plants. Units in the line also may be used in large diameter wells for industrial or municipal water supplies.

In one order for a synthetic rubber plant, these units were equipped with new 2-stage 30-inch type SKHC bowls,



designed to deliver 11,000 gallons per minute against a total dynamic head of 169 feet. They also were driven by 500-horsepower, vertical hollow shaft motors. This new line includes designs for capacities up to 16,000 gallons per minute, and all bowls are true turbine type. Features incorporated make the new bowls especially desirable for pumping from rivers or streams where fluctuating water levels are encountered.

**Communication System**

Executone Inc., 415 Lexington avenue, New York, announces an improved communication system with a new annunciator selector which includes a

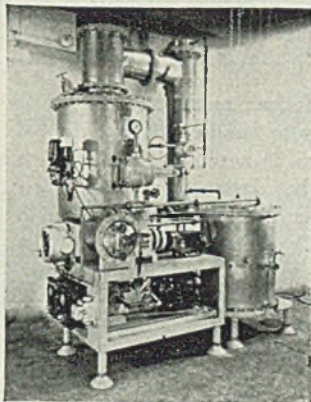
buzzer and name tabs which illuminate to identify incoming calls.

Built into a detachable base which can be replaced with larger selectors, the new unit enables the user to talk individually to up to eleven other remote stations in the system or page them all simultaneously. Likewise any other station in the system can signal and register its call on the master station's annunciator selector.

Each of the 11 name tabs lights up to identify the incoming calls and remains illuminated until each is received. A manual buzzer, which sounds to signal that another station is calling, can be cut off during conversations by flipping a toggle switch. This special selector unit also is provided with a tone signal controlled by a lever on the side of the cabinet. Latter can be transmitted selectively or simultaneously to all other stations in the system, serves as an alarm, dismissal signal, or method of calling other stations by tone instead of voice.

## Solvent Still

Brighton Copper Works, 2156 Cole-rain avenue, Cincinnati, is now offering a new automatic solvent still said to speed the reclaiming process of used solvents. It features a separate vacuum pump,



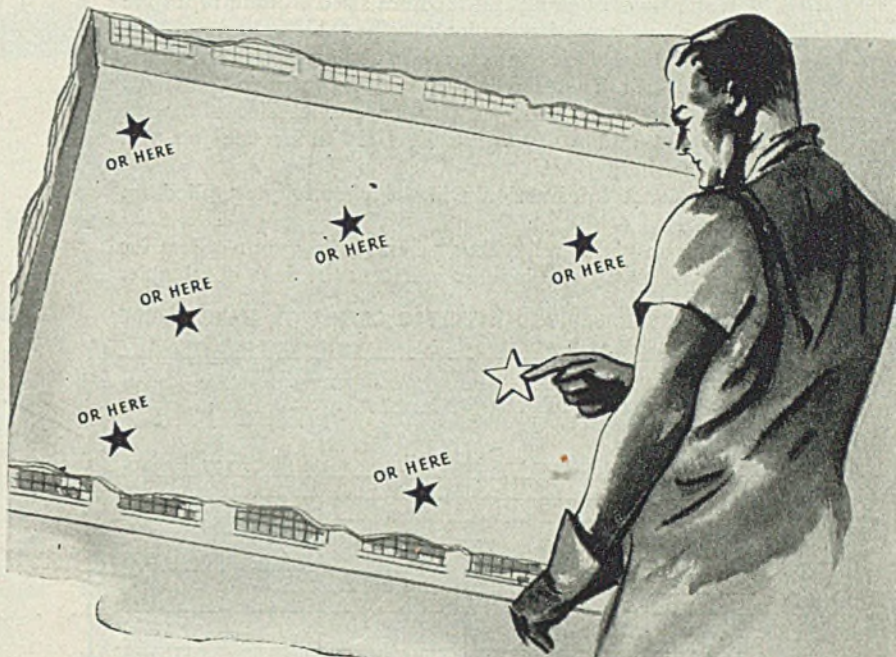
whose action reduces the boiling point, facilitating early distillation. Available in capacities to meet specific requirements, the unit is explosion-proof and is built entirely of monel.

## Boric Acid Fuse

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new boric acid fuse for outdoor power systems. Weather-protected, it interrupts the circuit to the faulted equipment, and isolates the fault from the feeders with a complete 180-degree air break.

In this fuse, known as the DBA-1, the blown fuse unit is dropped out of the circuit after the fault current is interrupted. Thus there is no possibility of burning contacts or arcing between fuse

# Move it over *Here*



**N**O extra time for re-handling here. A Shepard Niles Single-Beam Crane covers every square foot of the bay with vertical lifts. Side pulling and dragging of the load is eliminated. The crane covers the length of the bay, while the hoisting unit covers the width. Thus, fast, accurate and economical handling of materials is afforded through Single-Beam Cranes, where conditions do not require, nor clearances permit, installation of a Double-Beam Crane.

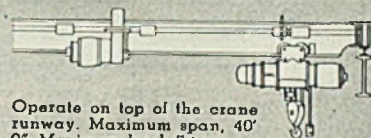
Available in over-running, inner-running or under-running construction—with push button, or pendent rope control. Handle all loads from  $\frac{1}{4}$  to 10 tons.

Call in our nearest representative. He will gladly cooperate with you in determining where important materials-handling economies can be made.

Write for  
Bulletin 130

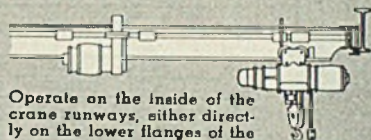


### OVER-RUNNING SINGLE-BEAM CRANES



Operate on top of the crane runway. Maximum span, 40' 0". Maximum load, 5 tons.

### INNER-RUNNING SINGLE-BEAM CRANES



Operate on the inside of the crane runways, either directly on the lower flanges of the runway beams, or on Shepard Track which has been clamped to the lower runway flanges. Maximum span, 40' 0". Maximum load, 5 tons.

### UNDER-RUNNING SINGLE-BEAM CRANES



Operate on bottom flange of runway to which Shepard Track has been clamped. Especially adapted to low head-room areas. Crane runway can be hung direct from roof trusses, eliminating supporting columns, saving vital materials, time and expense. Maximum span, 40' 0". Maximum load, 10 tons.

# Shepard Niles

## CRANE & HOIST CORPORATION

358 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

# HOW TO USE CHAIN FOR MANILA ROPE

● If shortages of small and medium sized Manila ropes are retarding your production look at the table below.

Select the size of rope you need which appears in the left-hand column. Then follow the line of figures to the right. You'll find it easy to pick out the correct size of **TENSO**, **LOCK LINK** and **NIAGARA** weldless chain for the job you have in mind.

Additional information will be cheerfully supplied on request.

Will you please remember, when placing your orders for chain, to supply the highest preference ratings obtainable.

## COMPARISONS VARIOUS WELDLESS CHAINS TO MANILA ROPE

MANILA ROPE				TENSO WELDLESS CHAIN			
Diameter (Inches)	Weight 100 ft. (Lbs.)	*Federal Spec. TR-601a (Lbs.)	*Ply-mouth Wartime (Lbs.)	Trade Size	Diameter (In.)	Weight 100 ft. (Lbs.)	Break Test (Lbs.)
3/16	1.37	420	336	No. 3	.08	5.75	375
1/4	1.71	550	440	No. 2	.0915	7.50	430
5/16	2.52	950	760	No. 1	.1055	10.00	785
3/8	3.45	1275	1020	No. 1/0 or No. 2/0	.1205	13.00	1000
7/16	5.15	1750	1400	No. 4/0	.162	23.00	1500
15/32	6.14	2250	1800	No. 5/0	.177	26.00	1850
1/2	7.36	2650	2120	No. 6/0 Spec.	.192	37.00	2105
9/16	10.20	3450	2760	No. 8/0	.2253	47.00	2850
5/8	13.10	4400	3520	No. 9/0	.2437	55.00	3355
3/4	16.40	5400	4320	No. 10/0	.2625	67.00	4525

MANILA ROPE				LOCK LINK WELDLESS CHAIN			
Diameter (Inches)	Weight 100 ft. (Lbs.)	*Federal Spec. TR-601a (Lbs.)	*Ply-mouth Wartime (Lbs.)	Trade Size	Diameter (In.)	Weight 100 ft. (Lbs.)	Break Test (Lbs.)
3/16	1.37	420	336	No. 4	.072	6.00	405
1/4	1.71	550	440	No. 3	.080	7.00	495
5/16	2.52	950	760	No. 1	.1055	13.00	940
3/8	3.45	1275	1020	No. 1/0	.1205	17.00	1055
7/16	5.15	1750	1400	No. 2/0	.135	22.00	1545
15/32	6.14	2250	1800	No. 4/0	.162	29.00	1915
1/2	7.36	2650	2120	No. 5/0	.177	34.00	2440
9/16	10.20	3450	2760	No. 6/0	.192	41.00	2940
5/8	13.10	4400	3520				
3/4	16.40	5400	4320				

MANILA ROPE				NIAGARA WELDLESS CHAIN			
Diameter (Inches)	Weight 100 ft. (Lbs.)	*Federal Spec. TR-601a (Lbs.)	*Ply-mouth Wartime (Lbs.)	Trade Size	Diameter (In.)	Weight 100 ft. (Lbs.)	Break Test (Lbs.)
3/16	1.37	420	336	No. 4	.072	4.75	420
1/4	1.71	550	440	No. 3	.080	5.75	505
5/16	2.52	950	760	No. 1/0	.1205	13.50	1130
3/8	3.45	1275	1020	No. 2/0	.135	17.00	1370
7/16	5.15	1750	1400	No. 3/0	.1483	20.25	1675
15/32	6.14	2250	1800	No. 4/0	.162	25.00	1845
1/2	7.36	2650	2120	No. 5/0	.177	30.00	2220
9/16	10.20	3450	2760	No. 7/0	.207	40.00	3100
5/8	13.10	4400	3520				
3/4	16.40	5400	4320				

\*Minimum Breaking Strength

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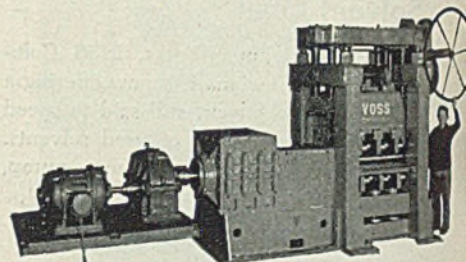
tube and clips, or of any carbonized fuse parts breaking down to produce leakage or a second fault.

Other features are the "de-ion" boric acid arc quenching action and the sleet-proof ejector mechanism for all-weather operation.

The new fuse is being offered in voltage ratings from 7.5 kilovolt through 69 kilovolt. It is applicable in utility and industrial high-voltage power systems for protecting power transformers, feeder-circuit sectionalizing, distribution transformers, high voltage capacitors, and potential transformers.

## Roller Leveler

Voss Machinery Co., 2882 West Liberty avenue, Pittsburgh, announces an improved roller leveler which now straightens armor plate. It handles 3/4-inch armor plate, in continuous sheets, and up to 1-inch in some other steels. The machine is of heavier construction



than former models. Much of the unit's ability to handle this work is said to be due to its new design. The leveler can also be designed and built for much heavier and wider plates, the company states.

## Sponge-Rubber Gasket

B. F. Goodrich Co., Akron, O., reports development of a new product—creation of a sponge-rubber gasket covered with a smooth coating of natural or Ameripol synthetic rubber by the extrusion process. It is now being used mainly in airplanes and tanks, but is expected to find wide use on refrigerators, automobiles and other products at a later date.

When covered with Ameripol, the new gasket withstands the destructive action of oils and greases and extremely low temperatures. It has a lower permanent set and is as soft and compresses as well as the older type.

In the new process of manufacturing the rubber, sponge rubber filler used is molded in slab form, slit into strips and fed through a special extruding machine to obtain the smooth covering which varies in thickness according to specifications. It is made in round, square



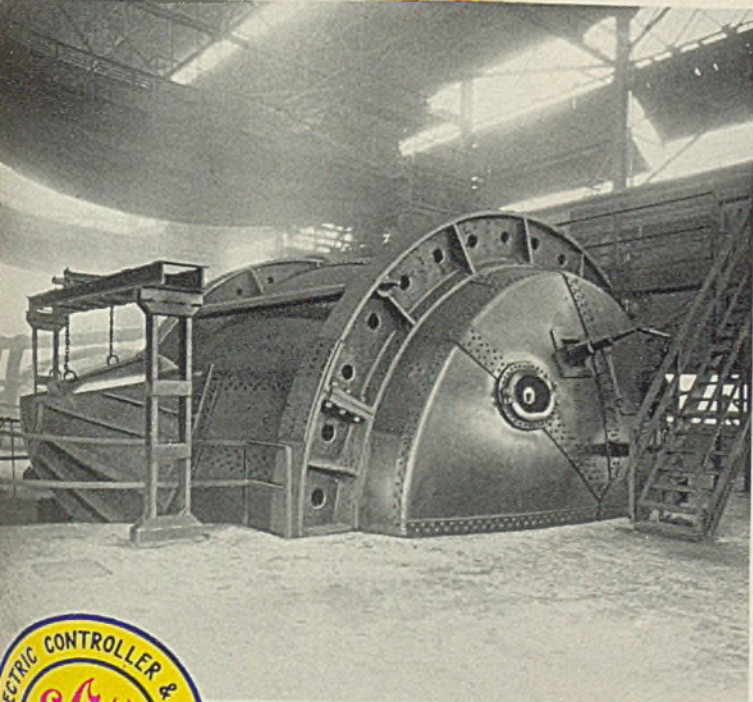
# 1250-TON HOT METAL MIXER

EQUIPPED

**FOR SAFETY** WITH

- 1** Dual electric motor drive for normal operation — either motor capable of operating mixer should one motor fail.
- 2** Air-motor for emergency, automatic return of mixer to safe position if power fails while pouring.

but only **TOTALLY SAFE** when **PROTECTED**  
by the **EC&M System of MIXER CONTROL**



**H**OT METAL MIXERS require the utmost protection against spillage. They are normally operated by two motors, connected through the gearing to tilt the mixer for pouring and to return it to the safe position. Motors are usually of a size sufficient to permit operation by one motor should the other motor fail. In addition, an air-motor is provided for automatically returning the mixer to the upright position should power fail while pouring.

For complete safety with this arrangement EC&M recommends and supplies 2 controllers, 2 brakes (both air and magnetically-released), 2 master switches with quickly detachable coupling and air-interlock panel. There is nothing safer than this EC&M method of control for the tilt motion of Hot Metal Mixers.

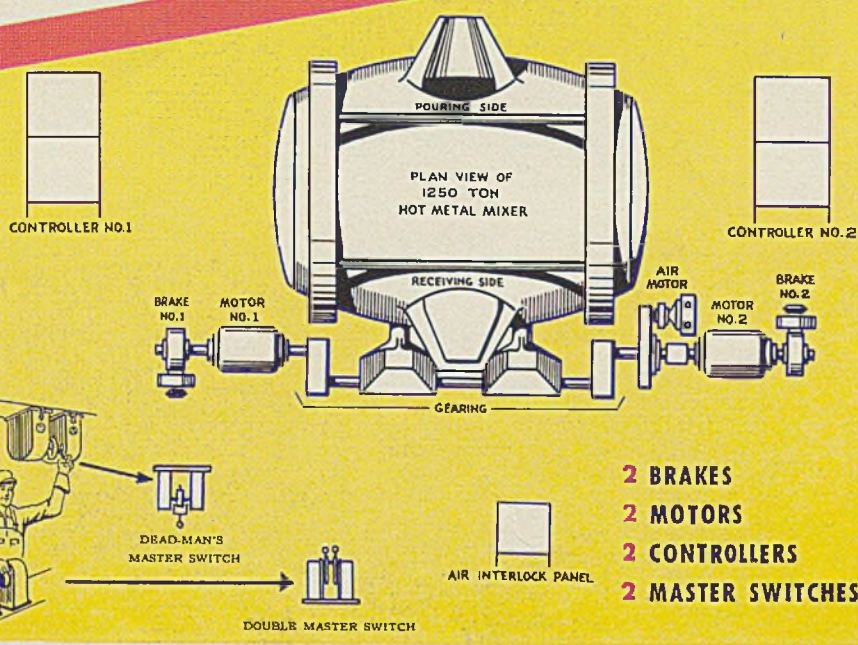
*For complete details, see other side  
of this page*



**THE ELECTRIC CONTROLLER & MFG. CO.,** Cleveland, OH

# This DUAL Electric DRIVE

made **100% SAFE**  
by EC&M CONTROL SYSTEM



- 2 BRAKES
- 2 MOTORS
- 2 CONTROLLERS
- 2 MASTER SWITCHES

THIS 2-motor drive with series-wound brakes is completely protected by the EC&M Method of Control. Each Brake is equipped with 2 separate windings for positive release of both brakes in an emergency should one motor or any part of one motor circuit become disabled.

No matter where the fault may occur—in the brake, the motor, the controller, or the wiring of either circuit—the other circuit maintains operation until the safe position of the mixer is reached and this is accomplished without any delay—no attention required by the operator—no time lost to operate knife, disconnect or transfer switches.

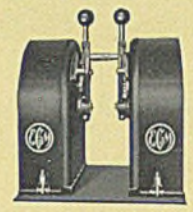
To insure that the mixer can be automatically returned by the air-motor if power fails, an EC&M Air-interlock panel is provided. This prevents tilting of the mixer by electric-motor drive unless sufficient air pressure is available to insure return by air, if necessary.

Besides eliminating the hazard of metal spillage, this EC&M Motor Control System for Hot Metal Mixer and Bessemer Converter Tilt Motions simplifies the controllers, the wiring between the motors and the control, and makes the installation not only lower in cost but easier to maintain. We invite you to discuss your requirements for these applications with us.

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EC&M Type WB Brake with 2 separate windings, one for each motor. Also arranged for air release.



EC&M Type NT Double Master Switch, mechanically connected by quickly-detachable coupling.



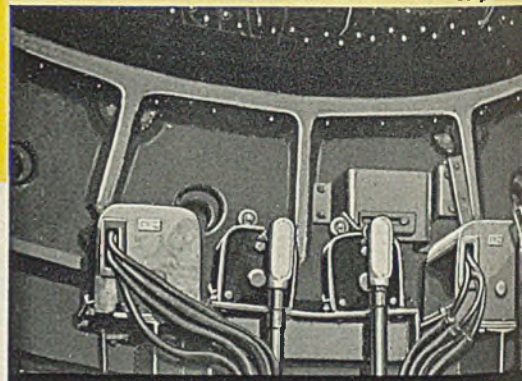
EC&M Gravity-return Dead-man's Master Switch.



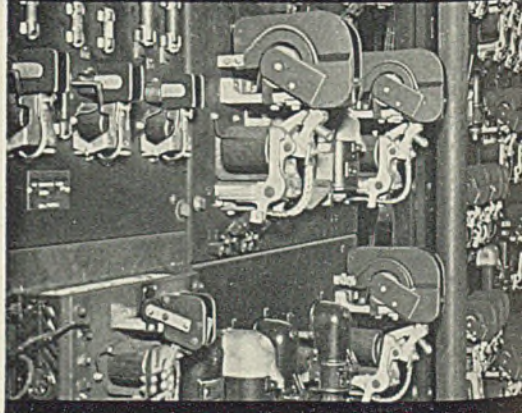
Typical EC&M Type CURRENT Controller for Hot Metal Mixer Of the Reversing-P Type, with Armature Slow-down on first



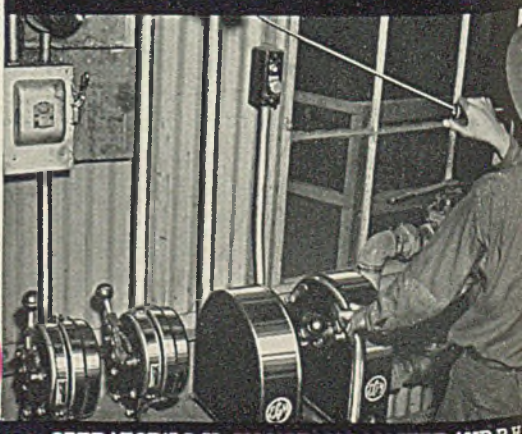
EC&M Power Circuit Limit Stop for final stop.



VIEW OF CONTROL CIRCUIT AND POWER CIRCUIT LIMIT SWITCHES ON UNDER SIDE OF MIXER



VIEW OF LINE-ARC CONTACTOR CONTROLLER



# EC&M CONTROL

and rectangular shapes, and is most practical at present in dimensions not smaller than 1/4-inch nor larger than 1 1/4 inches. Maximum production length is 12 feet, but the product can be spliced to any desired length with the connecting points barely detectable. It can also be produced, where necessary, with a lip for attachment.

### Type Holder

Jas. H. Matthews & Co., 3942 Forbes street, Pittsburgh, announces development of a new line of ring style holders designed for use in curved line marking of all types of parts from 1/4 to 6 inches in diameter. They are for use in high speed production stamping equipment, or in hand style units where marking of parts may be limited.

The holders are recommended for marking rounds, dials, bearings, tubing rims and special parts, whether the surface is recessed, concave or convex. Holders are custom built and engineered to fit the marking need. Spacing of characters, type capacity, in curved line or combined straight and curved line arrangement are provided to mark all types of products.

### Boiler Feed System

Johnson Corp., Three Rivers, Mich., reports it recently expanded its line of boiler feed systems to include a new larger size pumping unit, a standard coupled type pump, in addition to the close-coupled type originally offered.

The standard coupled pump is being offered for those installations where space is not at a premium. It permits the use of a standard type motor, which simplifies replacement.

The new pumping unit, like the original close-coupled type, employs the Johnson "pressure equalizing" principle of operation.

Instead of fighting against boiler pressure, the system admits this pressure to an equalizing chamber behind the pump during operating cycles, which leaves only the task of raising the returned condensate a few feet to the boiler water level.

This short cut, it is claimed, saves as much as 60 per cent in power pumping cost, and permits the use of a low speed, low pressure centrifugal pump.

Savings in fuel are obtained by venting the equalizing chamber of the pump unit to the condensate receiver. This makes it possible to maintain a slight controlled pressure on the returns. Condensate, consequently, can be returned to the boiler at far higher temperatures than is possible under atmospheric pressure or vacuum conditions.

# Consider BAKER TRUCKS FOR PROBLEMS LIKE THESE

**A**

**PROBLEM:** To increase productive capacity without enlarging plant.

**SOLUTION:** Addition of mezzanine floor and substituting Baker Crane Truck for overhead crane removed.



**B**

**PROBLEM:** To increase the efficiency of handling operations in a large chemical plant.

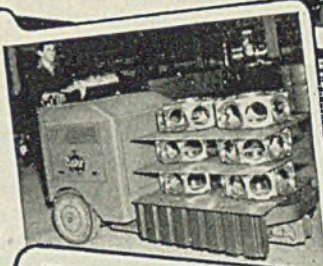
**SOLUTION:** A fleet of Baker Fork Trucks contributes materially to net profits by saving time and money in general handling, truck and car loading, and multiplying the value of storage space by high tiering.



**C**

**PROBLEM:** To speed aircraft production.

**SOLUTION:** Several large aircraft manufacturers use Baker Trucks for spotting fuselages, engines and propellers in position for assembly, for die handling and for many other vital operations.



**D**

**PROBLEM:** To cut handling costs for the world's largest domestic range manufacturer.

**SOLUTION:** A fleet of 8 Baker Trucks has cut handling costs upwards of 75%, besides speeding production and increasing plant capacity without adding to overhead.



**E**

**PROBLEM:** To speed changing of heavy dies and to provide more efficient die-handling generally.

**SOLUTION:** Baker Hy-Lift Truck with die-handling winch makes quick work of removing or placing dies in position, and simplifies storage of dies. Baker Crane Trucks store heavy dies in yards, releasing inside space.



If you have a similar problem, a Baker Material Handling engineer can help you to find the correct solution.

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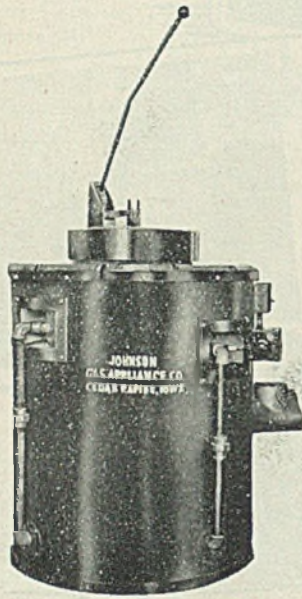
**Baker** INDUSTRIAL TRUCKS

2200-2-43

# TO EVERY MANUFACTURER Who Needs Furnaces

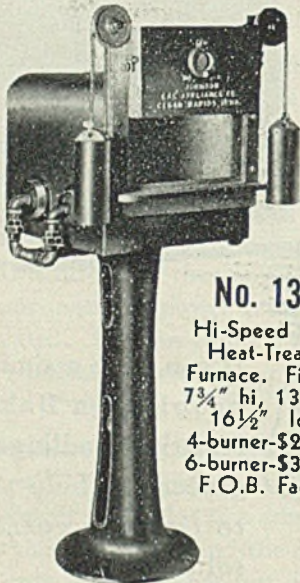
**JOHNSON**  
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**TWO  
WEEKS'  
DELIVERY**

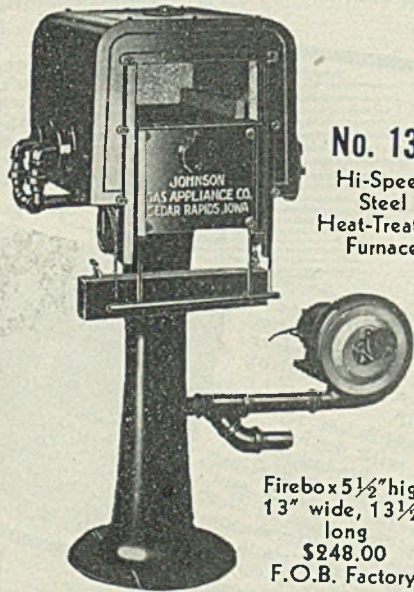


## No. 575 Pot-Hardening and Melting Furnace --- 8" Insulation

This Johnson Furnace offers you a new lid-lifting mechanism which raises lid and locks it in UP position. The heavy 8" insulation throughout assures maximum operating efficiency and economy. Burners, located near top of combustion chamber, insure longer pot life. Tangentially fired around pot, flame impingement is avoided. Vent is equipped with a damper to regulate flow of exhaust gases, and may easily be connected to duct to remove gases from building. Top ring constructed in 3 sections, to prevent cracking or distortion. Furnished complete with steel pot 14" dia. 20" deep, and large Johnson blower, \$375.00 F.O.B. factory.



**No. 130A**  
Hi-Speed Steel Heat-Treating Furnace. Firebox 7 $\frac{3}{4}$ " hi, 13" wide, 16 $\frac{1}{2}$ " long. 4-burner-\$295.00 6-burner-\$325.00 F.O.B. Factory



**No. 130**  
Hi-Speed Steel Heat-Treating Furnace

Firebox 5 $\frac{1}{2}$ " high 13" wide, 13 $\frac{1}{2}$ " long \$248.00 F.O.B. Factory

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## Attaining Precision

(Continued from Page 128)

parts from subcontractors. These are for the following: (1) automatic-screw machine parts; (2) hand screw machine parts; (3) Alemite parts for equipment for lubricating army tanks and trucks; (4) parts for use in airplanes; (5) receiving inspection for standard parts purchased for the fuze plant; and (6) fabricated parts for radios for the government.

The importance of thorough inspection of parts turned out by subcontractors was learned early by the Stewart-Warner chief inspector and assistants at Chicago "the hard way". This was in connection with the line of parts for Alemite lubricating equipment to be assembled at the Stewart-Warner plant in Indianapolis. On a worm gear and shaft, three subcontractors were involved—one blanked, a second hobbled, and after Stewart-Warner has hardened and ground the cylindrical diameters, a third ground the worm. At first subcontractor No. 3 was permitted to send the finished parts direct to Indianapolis. Then, when many were rejected there, the subcontractor blamed the "S-W" hardening. So it was provided that thereafter Stewart-Warner at Chicago would not rely on the subcontractor's inspection but would inspect all before sending them to Indianapolis.

"The Hard Way": The necessity of the prime contractor's inspection after every subcontractor's operations was further emphasized when subcontractor No. 1 was permitted to send 700 blanks direct to subcontractor No. 2 to expedite the job. That subcontractor, perhaps erroneously thinking that this would help to end the war sooner, sent blanks which Stewart-Warner had inspected and rejected. Consequently, No. 2's output did not pass.

"Setup" Inspector: For headquarters-plant inspection of its own production and that of subcontractors' production, Stewart-Warner has advanced practices. This is at all stages—in the work of setup inspectors, floor inspectors, and detail inspectors. The typical setup inspector, a man seasoned and expert, devotes his time wholly to the first samples of a part coming off from a machine, checking them according to the operation layout sheet and the blueprint involved, as prepared by the tool layout engineers. After a setup inspector tags a part as "O.K.", it is turned over to a floor inspector, with instructions on what to look out for.

"Floor" Inspector: Each floor inspector, checking as a rule on the output of 25 machines, is charged with seeing that parts from them are of the quality approved by the setup inspector. For detail inspectors at the benches, Stewart-Warner long has used girls, especially for

inspecting small parts where their delicate finger touch is an advantage. Recently, with qualified men floor inspectors away in the fighting services, this company has developed a considerable number of women floor inspectors. On the day when the writer visited "S-W's" inspection sections, 25 women floor inspectors were at work in them, and Mr. Ellingson, who interviews all prospective inspectors, had accepted 16 additional girls for training as floor inspectors.

Mr. Swanson said that the favorable results of training women for floor inspection were almost unbelievable. While not qualified for it where the heavy gages for checking on hand screw machine parts are involved, they are capable for this work on all parts where the need is merely for light-weight gages.

Two important points were brought out by an incident observed in the office of the supervising inspector for automatic screw machine parts. There seated at the desk of Mr. Dunning, the supervising inspector, was a youthful subcontractor who had run 10,000 pieces of a blank for a spiral drive gear for speedometers in tanks. The specifications called for this to be  $\frac{3}{8}$ -inch long with the hole  $\frac{7}{8}$ -inch in diameter. A double end gage loaned to the subcontractor for checking had been dropped and nicked, with the result that the hole was too large. Yet the piece required a dry fit on a shaft.

**"Bad" Gages Cause Trouble:** The subcontractor frankly admitted that the gage had been dropped. What to do? Mr. Dunning told him that Stewart-Warner would copperplate the oversize holes on 150 pieces, have them hobbled, hardened, assembled and checked. If the results were satisfactory, the rest of the 10,000 could be saved in the same way, but, of course, at the subcontractor's expense. The subcontractor said that was all right with him, and went away happily hopeful.

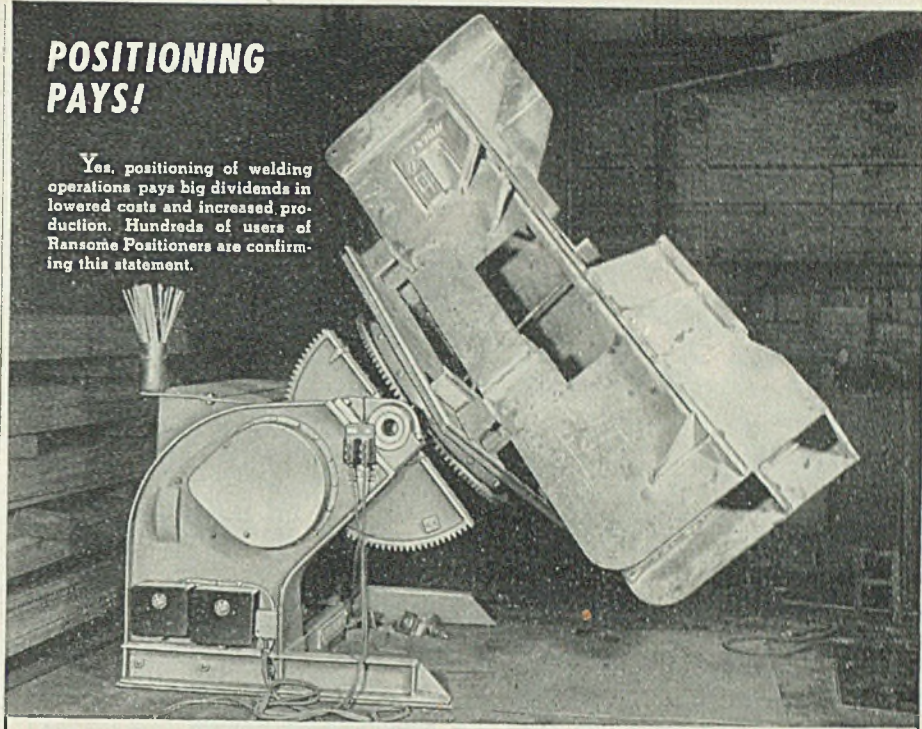
The two points? One is that inspection departments of prime contractors must exercise great patience and marked ingenuity in helping subcontractors. The second is that subcontractors must inspect gages frequently.

**Close Tolerances:** The tolerances required of subcontractors for Stewart-Warner can be indicated by quotations on "operations to be performed" from some of the production department directions to the subcontracting division of the purchasing department to let contracts. Copies of these go to the inspection department men concerned. Here, in part, are a few that are typical:

*Stud, amount 10,000:* "To be machined as per following instructions: Turn for 7/16-20 threads. Center, drill 0.166 diameter hole, form 7/16-20 threads. Re-center 0.025 @ 30 degrees. Cutoff. Ven-

## POSITIONING PAYS!

Yes, positioning of welding operations pays big dividends in lowered costs and increased production. Hundreds of users of Ransome Positioners are confirming this statement.



- Smoother, stronger, welds.
- Time savings up to 50%.
- Downhand position for all welds.
- Accident hazards reduced.
- Less crane service required.
- Big savings in floor space.
- Rod savings up to 7%.

Literature on request

### Ransome WELDING POSITIONERS

INDUSTRIAL DIVISION • RANSOME MACHINERY COMPANY • DUNELLEN, NEW JERSEY

## HOT-DIP GALVANIZING PRACTICE . . . BY W. H. SPOWERS JR.

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These electrodes produce a weld metal with the following qualities—EXTREME TOUGHNESS, MAXIMUM SHOCK RESISTANCE and LONG LIFE FOR CUTTING EDGES. They are the last word for repairing or building heavy duty forming dies, chisels, shear and chopping blades, concrete beaters, lathe and planer cutting tools, etc. Ordinary welding technique is all that's necessary for their application. AGILE SILVER SERIES electrodes put the "possible" in "impossible."

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dor to purchase material from us. Material to be paid for 30 days after delivery. S-W to loan special tools indicated by number on operation layout sheet. Vendor to furnish standard tools. Vendor to cover all S-W tools with fire and theft insurance while same are in his possession. Submit sample before going into production. Material specified: 0.500 + 0.004 — 0.004 square steel, S-W specification #1532. Weight per M 78— $\frac{1}{4}$ #."

*Flange, amount 2,800:* "Insert part in jaws. Face, countersink  $\frac{1}{32}$  x  $45^\circ$ . Bore. Ream 1.005. Turn part end for end and face other side. Drill (2) 0.281 holes. Wash in gasoline. Remove burr. Material specification: Cast aluminum, purchased by S-W. This is an addition to an original order. Vendor has S-W tools."

*Clutch, amount 22,000:* "Center, drill 0.157 diameter hole  $\frac{7}{16}$  deep. Feed stock to stop, form to 0.130 diameter for a distance of 0.625 from swaged end. Chamfer end  $\frac{1}{64}$  @  $90^\circ$ , cutoff. Wash in soda ash. Vendor to purchase material from us. Material to be paid for 30 days after delivery. S-W to loan special tools indicated by number on operation layout sheet. Vendor to furnish standard tools. Submit sample before going into production. Material specified:  $\frac{7}{32}$  round steel, S-W specifications #1532. Weight per M 15#. End use; auto pattern."

Virtually all subcontractors ask for more liberal limits on tolerances than are specified in initial orders Stewart-Warner places with them. When the company's engineers find that they have been over-conservative they give revised dimensions. For example, a small Chicago subcontractor, having special machinery for experimental work, was using it to turn out castings a majority of which were being rejected because certain of their dimensions were not those of the blueprint specifications. Its head wrote saying it would be good for the government, for "S-W" and for his company, if granted additional tolerances. But, such changes are exceptional.

**Merit Rewarded:** Some of the subcontractors, however, handle their work so thoroughly that they do not put any special demands on the patience of the Stewart-Warner inspection department. Two at least inspire enthusiasm. One, on receiving an order from Stewart-Warner, calls in all its people involved, lays out the blueprint of the part they are to make and the tools, talks over possible troubles. Then when the job goes on its machines, it inspects carefully with the result that the parts delivered to the prime contractor are found to be 100 per cent perfect. Another, making an engine part, is doing so well that although Stewart-Warner could again take

this job into its own plants, it is letting the subcontractor continue with further runs on it.

Figures of Stewart-Warner cost per 1000 of a piece and of the subcontractor's cost are given in the production department directions such as those quoted in part above. On the average the company finds that the cost of parts produced in the shops of subcontractors is higher than that of those produced in its own departments. But, nevertheless, this company is strong for subcontracting to spread war work among small business concerns, and to add the extra capacity for required volume on schedule.

"Quality" the Watchword: Chief Inspector Swanson, when asked for a word for inspectors for prime contractors on war work said: "Watch and work with the subcontractor. Try to get him to adopt our motto, 'Quality, not quantity, first.' Try to make him realize that every part he produces is just as important toward winning the war as a bullet."

### Tubular Structures

(Continued from Page 112)

Recently mounted machine cutting torch was used in conjunction with a sleeve templet. The templets were slipped over the tube end and crabbed against the torch tip while the operator slowly rotated the tubing on roller dollies. The cuts were made leaving 1/8-inch allowance for final milling to within 1/64-inch of the required length.

All primary intersections of tubes in the assembly are of the sphere type. These spheres are cast steel shells, internally strengthened by a diaphragm and webbing. Carbon content is 0.25 per cent or less for good weldability. For the smaller carriage shown in Fig. 2, measuring 28 feet between wheels, 7-inch spheres are used, with tubing of sizes ranging up to 3 1/2 inches diameter. The large carriage employs larger diameter spheres at principal joints. This truck offers the best example for description of the procedure used during welding to eliminate distortion. It is 60 feet long and weighs 6 tons, considerably less than would a comparable structure made of rolled shapes.

In the first stages of assembly, as in welding individual panels of the structure, the task of aligning members, skip welding and checking for fairness were simple enough. But as the structure began to assume size and shape, it was necessary to devise means for holding it in the manner of a welding jig.

To accomplish this a combination of supporting timbers and hold-down tie bolts was used, functioning in both the vertical and horizontal planes. As shown in Fig. 3, tie bolts anchored to the concrete floor at four points along the struc-

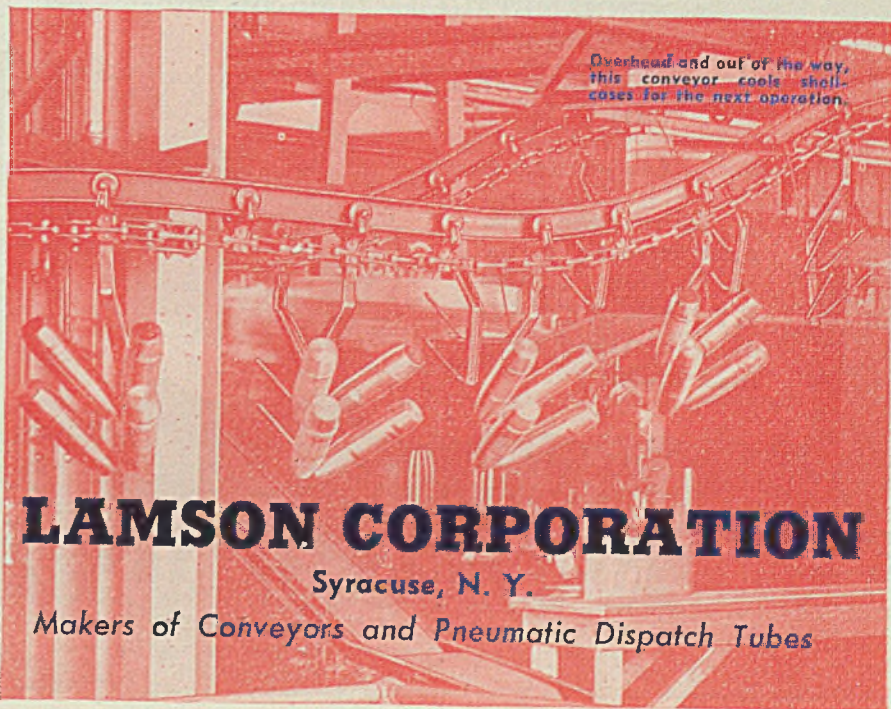


Lamson's V-Type gravity is made for moving shell-cases and projectiles.

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Write for new Wartime Conveyor Bulletin ST



Overhead and out of the way, this conveyor cools shell-cases for the next operation.

**LAMSON CORPORATION**  
Syracuse, N. Y.  
Makers of Conveyors and Pneumatic Dispatch Tubes

ture held the girder down against wooden supports. Similarly two long bolts, one at each end, anchored the structure to the wall of the building, operating against a timber compression member midway between.

To check the alignment of the assembly as welding progressed, a surveyor's level was employed. Periodically during welding, the tie bolts were loosened and a check sight made of the level, focusing on previously sighted "benchmarks" such as the upper surface of a horizontal tube. According to the degree of distortion indicated by these readings, a few shims would be inserted or removed between

the lower tube and the supporting timbers, and the tie bolts again clamped down. By this procedure, shrinkage was taken up progressively through judicious skipping of welds.

High quality of weld metal was secured by using electrodes conforming to requirements of AWS classification E6010 of specification A233-40T. The electrodes used were Airco No. 78E, for all-position welding with reverse polarity and a high deposition rate. Classification E6010 calls for a ductility of at least 22 per cent as welded, with a minimum tensile strength of 60,000 pounds per square inch, though for these towing carriages

high weld ductility is the more essential characteristic.

As finally welded the 60-foot girder showed a deviation of only 1/16-inch in the vertical plane. Similar near-perfect alignment was present horizontally, except that a camber of 3/4-inch was left in the sections where the bridge part of the carriage would be welded to the girder.

#### Welds Tested for Air Tightness

Each carriage is protected against corrosion within the tubes by filling the entire tube network with nitrogen. Prior to welding of joints, small holes were drilled wherever necessary in the spheres and in tube walls so that all trapped air spaces would be interconnecting. Welds were tested for air tightness by the soap bubble method. Air from the tube system was then evacuated and replaced with nitrogen which is sealed under 3 pounds pressure.

These welded tubular structures, while pleasing to the eye, illustrate even more the simplicity of such fabricated assemblies. The use of sphere members at joints is not essential, of course, but it does promote speed and accuracy of construction. The primary advantage gained by the welded tubular design lies in the weight-strength ratio, which is important not only in these carriages but in other applications where cost is subordinate to reduction of weight and conservation of metal.

#### Dual Lead Angles

*(Continued from Page 114)*

or minus 0.0015-inch and on the root diameter of the spline 0.002-inch. Overall length of the part is 5½ inches.

The outside of the middle member is hobbled to produce 10 splines, these having a clockwise helix of the same lead as the inner spline. Since this part is more than 5 inches long and the lead angle is about one turn in 8 inches, approximately 1¼ turns is provided by sliding the inner members out of engagement. It is throughout this movement that minimum friction must be maintained without excessive looseness of one part with another. Limits on the outside diameter of the external spline are plus or minus 0.0025-inch.

The outer part or hub, like the inner unit, is of forged molybdenum steel. Its internal spline which mates with the middle member is also broached as illustrated in Fig. 3.

The broaching machine for this operation is equipped with helical drive attachment and broach guide bars and head to assure correct lead, as for broaching the inner splines on the middle member. Two broaches are also used for this operation. The method of holding the

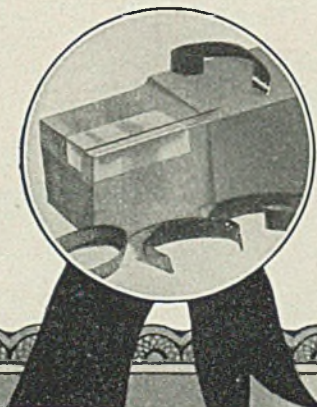
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outer member and the middle member is simple. Both members are placed in recessed cups centered in the face plate of the Colonial horizontal machine and are held by clamping dogs to prevent any movement during the broaching operations. Length of the spline is approximately 2 $\frac{3}{8}$  inches. Limits on the internal diameter are within plus or minus 0.0015-inch of the specified dimensions.

## Extra Pay Plans

(Continued from Page 116)

technological conditions change, and sufficient financial incentive to make extra skill and effort attractive.

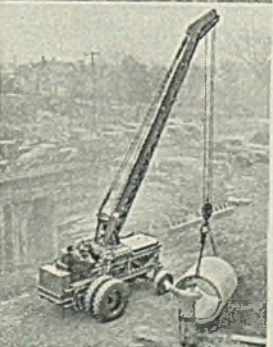
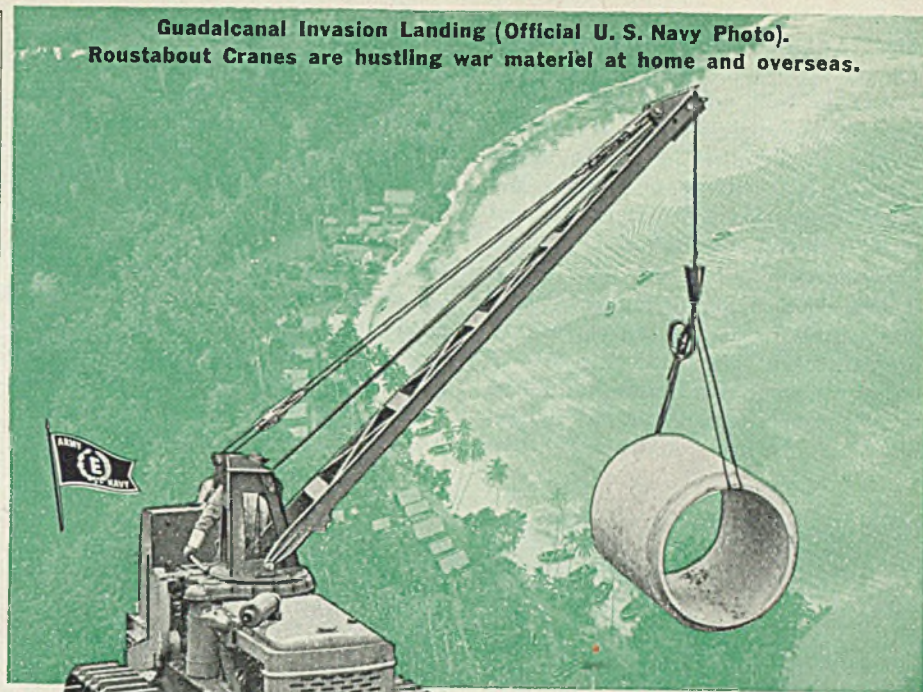
Once these basic requirements have been met, the job of getting the workers' understanding co-operation becomes relatively simple. The first step is to make sure that the plan is thoroughly understood by them. The plan should be set down in black and white in as simple language as possible and made freely available to any worker. Whether this should be done through bulletin boards or mimeographed instructions or printed pamphlets will depend on the circumstances in each individual case. In addition, this written presentation should be supplemented by careful explanations by foremen and supervisors. Close attention to these points at the outset will keep misunderstandings at a minimum later on.

### Men Help Set Up Standards

We have found it helpful in introducing wage incentive plans to have workers chosen from the men in the shop participate in the setting of production standards. Sometimes the men choose time-study representatives whose function it is to become familiar with all studies, take up complaints with regard to rates and standards as well as explain the plan and the wage calculations to the workers. Under this arrangement, the representatives retain their status as workers and as members of the union, where there is one. They usually keep their regular jobs but are paid at their average past earnings for all time spent on the adjustment of rate problems and disputes.

In order to prepare the worker-representatives for these duties, the management undertakes to put them through a course of training in the time-study department. A plan of selection sometimes used is to have the workers in each department nominate three or four men and then have the management choose one or two of the likeliest candidates for the training course. Three or four representatives can handle this

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function in a good-sized plant. We have found that an intelligent worker can master the basic principles and methods used in time-study work in about three weeks. In this time he can be taught to do a fair job of observation and checking of elements, occurrences and time, pace and effort ratings.

Getting worker-representatives to participate in time studies and to help adjust complaints has worked out well in practice. We have found it a rare occurrence for a worker chosen and trained in this manner to exhibit a lack of fairness and objectivity in making studies

and presenting his findings to the management and the men. The arrangement has almost invariably made for a better understanding of production problems by workers and consequently for increased mutual goodwill between management and employees.

It must be made clear, however, that such a plan is not a substitute for normal collective bargaining procedure, but rather a supplement to it. It is significant that a number of recent collective agreements in war industries have made specific provision for just such procedure as outlined here. Some leading unions

have even gone so far as to issue manuals explaining to their members the basic principles of time study and other phases of production control.

In some cases, however, the union may object to having one of its representatives perform what it may regard as exclusively a management function. In this event, the practice is often followed of selecting a few promising workers for regular jobs in the time-study or standards department. Care should be taken, however, to select workers who have the full confidence of the men, even though in their new capacity they are regarded as being part of the management apparatus. In practice there has been no difficulty in finding men with the basic qualifications for this work.

The experience of the Bedaux Co. indicates that after six months or a year, the men who have received this training frequently make good material for leaders, instructors and foremen. Sometimes the practice is followed of sending those workers who do not qualify for supervisory capacities back to jobs in the shop after a period of service in time-study work.

#### Gets Good Results

In any event, the combination in the standards department of men with considerable practical experience and men with thorough technical training has been found to produce excellent results. Each type of employe provides an element that the other lacks and the combination is such as to inspire the workers with confidence in both the fairness and the competence of the time-study operations. Once this feeling is established, a big step has been taken in getting the co-operation of the men.

Supervisors are largely relieved of the disagreeable task of "riding" the men to increase production (a task that is so common where men are paid on a day work basis), for with a plan of this kind, the foremen become instructors rather than drivers. They present facts, not opinions, and concentrate on the more constructive duties of watching the quality of the output and providing the necessary facilities and instruction to insure maximum production. This improves their position with the men and increases the workers' respect for the fairness and competence of the management. The results show up clearly in improved morale, reduced labor turnover and lower costs.

When these principles are followed, resistance to wage incentive plans on the part of the workers usually disappears. In fact, the main complaints come from those workers not covered by

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the plan, who feel they are being deprived of a chance to make extra earnings. It is therefore important to have the plan cover as many of the workers as possible—and this includes maintenance of employes as well as service men and group leaders.

Another occasional source of difficulty is failure to correct standards as conditions change. Sometimes, when jigs or fixtures are changed so as to make less effort required for the job, supervisors feel they will be gaining the goodwill of the men by leaving the production standard unchanged. Such a policy, however, operates in reverse. It creates unbalance which undermines the confidence of the men in the basic soundness of the entire program and weakens the position of the supervisor.

A sounder procedure is to make it clear at the outset that the management will take every reasonable opportunity and make every effort to improve methods of work so as to increase the output per worker, reduce costs and protect his security. So long as these changes are made in a careful and scientific manner fully safeguarding the interests of the workers involved, there should be no difficulty in getting the workers' acceptance.

#### Wage Incentives Work

It is sometimes said that in this time of national emergency, it is not necessary to hold out the prospect of increased financial reward in order to induce workers to put forth their best efforts—that the patriotic duty of everyone to produce to the utmost is sufficient incentive. Experience shows, however, that workers—as well as managers—will show better results when they have adequate financial incentive for doing so. This is no reflection on anyone's patriotism; it is simply stating a fact that has been proved on innumerable occasions in industrial operations.

All this, of course, does not preclude the possibility, and indeed the desirability, of using all other possible means of building employe morale in order to stimulate maximum productivity. Meetings, slogans, awards and other similar means are all valuable to a certain degree. But they cannot do away with the necessity of having a more tangible means of enlisting the worker's interest and co-operation and a solid foundation of fact on which to base improved operations.

With a wage incentive plan in operation, everyone is likely to be on his toes to effect further improvements. The workers put pressure on the management to supply materials, tools and instructions on time. The foremen, armed

with the accurate information provided by the work measurement program, can find out not only how much potential production is being lost but also where the leaks are occurring. The staff supervisors have a basis for accurately ascertaining costs and keeping them at a minimum.

Thus, the basic conditions are created that make it easy for the worker to produce more, and therefore to earn more. Under these circumstances, the worker quickly realizes the benefits to him of wage incentive plans and gives his willing co-operation.

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## Sintering—The Process

(Continued from Page 120)

if a mix is "underburned" there can be only a partial fusion or sintering action and part of the mix will not be sintered. For all practical purposes the result would be the same in the use of a partially burned sinter if some of the material was completely sintered and charged into the furnace with some of the raw unsintered mixture. Underburning would be more accurately described as a partial-sintering operation and the practice is applicable only to such mate-

rials which can also be used in the blast furnace burden in their natural state.

While the operator has little control of the actual sintering action there is a wide range in the control of material preparation. The number of components which can be mixed is limited only by the number of feed bins available. Materials of a wide range in chemical composition can be blended to a desired specification and with the chemical composition of the components known the chemical composition of the sinter from any mix can be predetermined by mathematical calculation. This phase of

the subject will be discussed later. The opportunity for blending materials is one of the principal advantages of the sintering operation. The only requirement for mixing two or more materials is a particle size range which will feed uniformly and which can be pugged into a homogeneous mass. In addition to averaging chemical composition blending offers the opportunity for improving the physical preparation of the bed of material on the sintering hearth. For example, magnetite concentrates being hard granular particles have little natural adhesiveness and with a bed of such material the entrainment of dust in the waste gas stream is apt to be excessive. An earthy material, such as a soft hematite ore, has great natural adhesiveness and dust entrainment in the waste gas stream will be small but resistance to gas passage is apt to be irregular because of localized packing. The mixing of two such materials is beneficial to both because of the averaging of the adhesive property.

When selecting materials to be sintered the expected advantages from the sintering should be considered. In the first article of this series (STEEL, Feb. 15) the opinion was given that the principal advantages of sinter to the blast furnace burden are, the freedom from volatile matter, the ability to absorb, conduct, and hold heat, plus a small uniformly graduated particle size range which makes possible the efficient recovery of heat. From this premise the only reason for sintering any material is to remove volatile matter and/or to prepare a material with an excessive percentage of fines to a better physical preparation for use in the blast furnace burden. Blast furnace flue dust, volatile bearing ores, and finely ground concentrates are examples of materials which are improved by sintering.

Reasonable structural strength with small particle size is of vital importance to the efficient recovery of the sinter values in the blast furnace operation. Every effort should be made to select materials which will produce a sinter with the natural friability so that it will withstand handling between the sintering plant and the furnace. A component with a high percentage of silica can be mixed with one low in silica in the proportions necessary to give an average silica content. This will control the structural strength of the sinter to give the desired friability. Likewise the molecular formation of the silicates can be partially controlled by mixing components which will supply the base elements, aluminum oxide, calcium oxide, magnesium oxide, and manganese oxide, in sufficient percentages to approach a balance with the total silica percentage and so hold to a desired minimum the

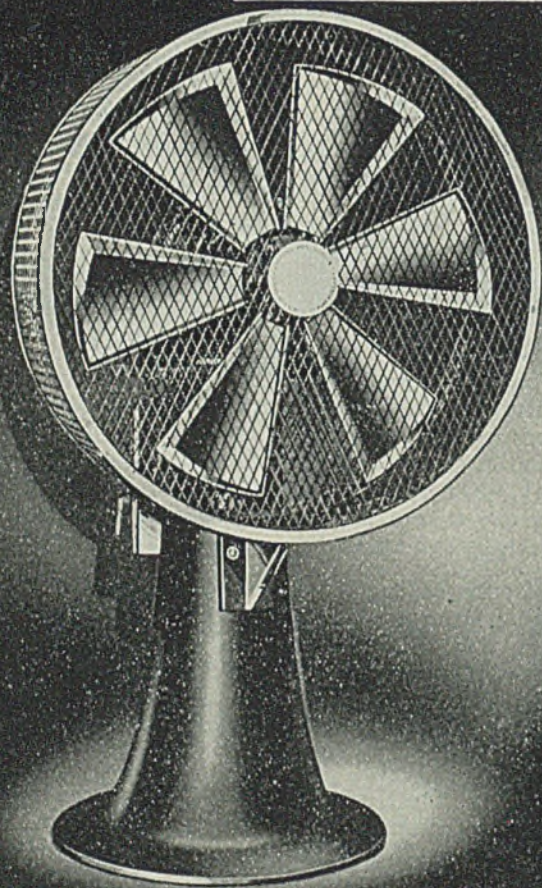
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percentage of iron in the silicate compounds formed. The structural strengthening effect of the iron silicate compounds increases as the percentage of iron in the compound increases and if there is not enough of the other base elements present in the mix to balance the silica percentage, the excess silica will satisfy itself with iron alone and the silicate Fayalite ( $\text{Fe}_2\text{SiO}_4$ ) will form. Fayalite has exceptional structural strengthening effect upon sinter and if present in large percentage natural friability is reduced to a minimum. If suitable materials are available a silica content of approximately 5 to 6 per cent (natural) balanced with base elements other than iron in the ratio of 1.5 to 1.0 is a good standard to approach. If the available materials do not permit a selection and the gangue elements are present in percentages which will produce a sinter of large particle size the preferred smaller size can be had by mechanical preparation.

Actual practice seems to indicate there is a limit to the benefits of having the base elements approach a balance with the silica percentage. Some iron silicates are necessary to give the desired structural strength to sinter. Use of lime in the mix to balance the silica and to produce a self-fluxing sinter has been tried at various times over a long period of years but so far the practice has not been developed successfully. A possible explanation of the various failures may be the form in which the lime is added to the mix. The following description of an actual operation is probably representative of other attempts to use lime in the sintering mix.

Lime used was in the form of limestone grit, in particle size minus  $\frac{1}{4}$ -inch to dust. In the grit, as in all limestone, the lime existed as calcium carbonate ( $\text{CaCO}_3$ ) and to be sintered two chemical reactions were necessary, first, the elimination of the carbon dioxide ( $\text{CO}_2$ ) from the carbonate, and second the fusing of the remaining calcium oxide ( $\text{CaO}$ ) with the other components of the mix. In the ferrous sintering operations the temperature necessary to sinter is confined to a thin zone of fusion approximately  $\frac{1}{4}$ -inch maximum depth.

The sintering fusion zone is comparable to the combustion zone of a field grass fire in that it feeds upon the combustible matter ahead of it and the rate of travel and the intensity of fire depends upon the volume of air delivered to the fire and to the compactness of the material through which the fire must pass. As the zone of fusion is drawn through the bed of materials on the sintering hearth the sintering action on the material in any plane of the bed must take place while the zone of fusion is passing through the given plane and if

the fusion is not complete the draft of colder air following the zone of fusion will lower the temperature rapidly and sintering action stops. With the sintering rate common to operations sintering ferrous materials there is apparently insufficient time to fully complete the two reactions of first calcining the limestone grit and then fusing the remaining calcium oxide ( $\text{CaO}$ ).

The term, fully complete, is used because in the actual operation being described approximately 5 per cent of calcium oxide was fused into the sinter but control of the operation proved to be too difficult to be practical. While the

percentage of grit fed into the mix could be controlled the percentage of calcined but unfused calcium oxide ( $\text{CaO}$ ) in the bed of material on the hearth was a variable percentage which so affected the percentage of calcium oxide in the return material that the percentage of calcium in the mix delivered to the hearth would become excessive and the sinter produced had little or no structural strength. The mix could be cleared of the excess calcium oxide by stopping the feed of grit which permitted the calcium oxide in the return material to be sintered but as soon as the feed of grit was resumed the same objectionable

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condition of excess percentage of calcium oxide in the mix would develop.

In the range of ferrous materials sintered the combined volatile matter usually is present in relatively small percentages but in limestone the combined volatile, carbon dioxide, (CO<sub>2</sub>), represents approximately 50 per cent of the total and apparently the release of this large volume of gas consumes too much of the time while the fusion zone is passing through a given plane of the material bed to permit the full sintering action. The advantage of a self-fluxing material is apparent to every blast fur-

nace operator and the control of lime in the sintering mix is one of the avenues open for development. If the lime fed into the mix existed as calcium oxide (CaO) it is probable that a self-fluxing sinter could be produced but the cost of burned lime seems to prohibit the use of it in a ferrous sintering operation. For several years a lime producing company in eastern Pennsylvania has produced a commercial product of double burned dolomite using a sintering machine, proving that lime can be sintered, but the sintering rate is much slower than with the ferrous materials and the

high temperature required causes a grate bar replacement cost which would be prohibitive to a ferrous operation.

Because of the limitations of the sintering action there is no chemical advantage gained from sintering a material which is free from volatile matter. It is common practice to mix roll scale with flue dust to improve the quality of the sinter. The high iron content of the roll scale averages up that of the flue dust and its physical characteristics serve to increase the permeability of the sintering bed to air. But since roll scale is already free from volatile matter there is no change chemically as a result of the sintering action. The same physical characteristics which roll scale imparts to the bed of material can be had equally as well from the use of good quality return material and the cost of handling the roll scale at the sintering plant is saved. Roll scale, having the same general characteristics as sinter, is an excellent blast furnace material itself and unless it has a small particle size, such as from a wire drawing operation, there does not seem to be any logical reason for sintering it.

Many of the magnetite concentrates are practically free from volatile matter and can be used successfully in the blast furnace burden in the concentrated form in any percentage below the critical percentage which would cause the burden to contain too large a percentage of fines for the most advantageous passage of the furnace gas. To correct the condition of excessive fines the concentrates are sintered to give the desired particle size range for blast furnace use.

Materials with a high natural moisture and combined volatile matter content will show a greater increase in percentage of nonvolatile elements than the low natural moisture and combined volatile matter materials. For example,

	Natural	% Moisture	% Vol. matter	% Iron
Magnetite concentrate	3.0	0.50	64.0	
Soft hematite ore	10.0	5.00	50.0	
Sintered				
Magnetite concentrate	...	...	...	67.35
Soft hematite ore	...	...	...	58.82

<sup>o</sup>Including 3.61%. <sup>†</sup>Including 17.64%.

Percentage of combined volatile matter in a material is an important factor in determining the cell structure of the sinter produced from the material. Moisture can be added at the pug mill in the amount necessary to serve the needs of the sintering operation and the elimination of the natural plus this added surface or absorbed moisture imparts the large cell structure common to all sinter. It is the release of the combined volatile matter which imparts the minute cell structure common only to sinter produced from high combined volatile matter materials. Minute cell structure is

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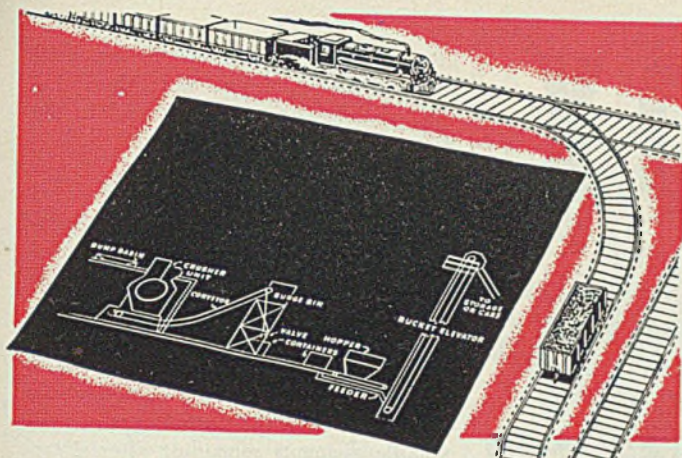
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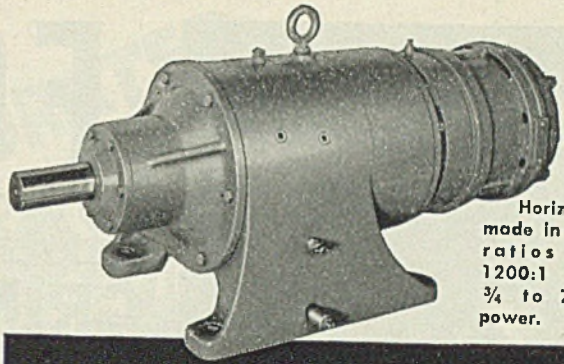
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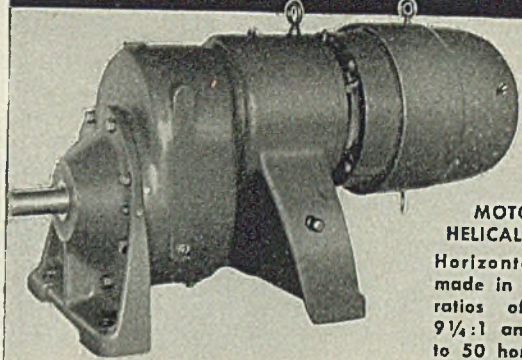
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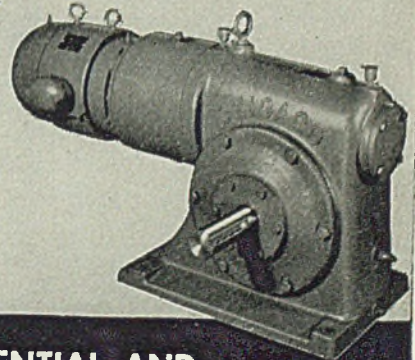
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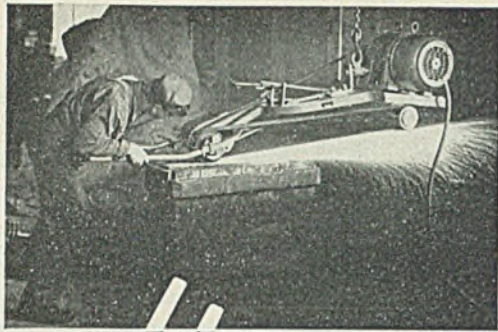


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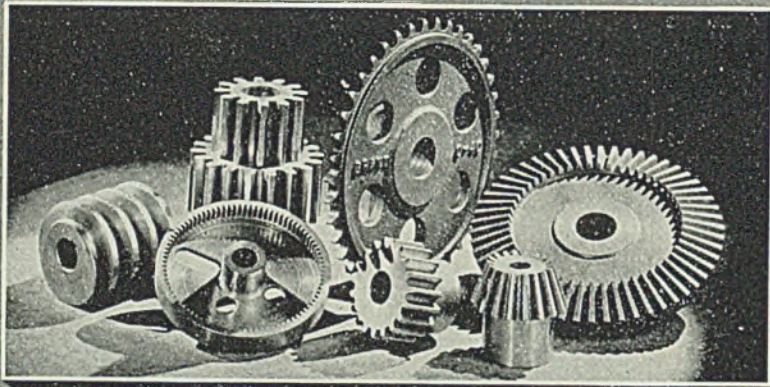
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an advantage because of the beneficial effect it has upon the heat absorption rate of the sinter when charged in the blast furnace.

#### How Calculation Is Made

The method of calculating the chemical analysis of a sinter from a mixture of materials is partially comparable to the calculation of a blast furnace burden in that the percentages of chemical elements are transposed into pounds. With the pounds of volatile and nonvolatile elements known the percentages of nonvolatile elements remaining after sintering are easily obtained. In the sample calculation the fuel (carbon) in the flue dust is considered as a volatile element and other fuel added and the return materials are ignored. For all practical purposes the effect upon the sinter analysis of the addition of the nonvolatile chemical elements of the fuel ash is negligible. Return material comes from the mix and, consequently, does not change the chemical composition of the sinter regardless of the percentage used.

The components of the calculation shown in Table I are representative of the wide range in material physical characteristics and chemical compositions which can be blended into a uniform product, enriched in iron, freed from all volatile matter, and given the ideal physical preparation for blast furnace use.

*(Continued in Next Issue)*

#### Electrostatic Spraying

*(Continued from Page 126)*

tions that has been designed is one where a grounded object is suspended about 2 feet before a spray gun, the operator spraying directly at it for a period of three seconds. Of course, the result is that the side of the piece directly facing the spray gun is well coated, and all of the paint spray which does not contact this narrow surface continues beyond the piece and is lost. Then the demonstrator replaces this object with an identical one, and with all other conditions the same he surrounds the piece with an electric field and repeats the operation.

The results in the case are rather startling, in that the observer can see a paint spray particle travel past the piece, change its original course of travel by 180 degrees and return to the back side of the piece being coated. This serves to illustrate the ability to completely coat a piece on top, bottom and all sides without changing its position. Though an interesting operation to observe, there are few production applications where it is practical to spray from one side only without rotating the



piece if both sides are to be coated.

**Not Limited to Conductive Materials:** This process is not limited to articles made of conductive material. It has been found that very efficient results can be produced on both wood and pottery. Over a million pottery flower-pots have been coated by this method, and it has been found that on this item it is possible to reduce paint consumption to one-fifth the amount required when spraying by hand.

Considerable evidence is available to encourage the belief that on items such as refrigerators it will be possible to reduce the paint consumption by 40 per cent. Production runs have been conducted with porcelain enamel on stove panels, and designers of the process are convinced that they can save 30 per cent of the material used on cover coat in the stove industry. The degree of savings possible is largely controlled by the shape and size of the piece being coated.

There are a few limitations to the use of this process which it would be well to note. As in electroplating, protruding edges and recessed sections are difficult or impossible to coat uniformly. This does not mean that the piece must be perfectly smooth, but rather it can be thought of as an obstacle toward getting the maximum in uniform film thickness. A considerable volume of repetitive production is necessary before it is practical to install the highly specialized equipment required for this method.

**Detearing Process:** Another process has proved highly beneficial to the application of liquid coatings by dipping. This process is designed to remove automatically and economically the "fatty edges" and excess material from the "drain-off" point of pieces that have been dipped. They know that this process will be of extreme importance where it is of interest to eliminate the "fatty edges" so prevalent on dipped pieces.

In applying it to production, the pieces are first dipped and allowed to drain until the flow of material has substantially ceased. This period of flow-down depends entirely upon the shape and size of the piece and the flowing characteristics of the coating material.

At this point it is passed over electrodes on which there is a high potential (in the neighborhood of 60,000 volts) between the electrodes and the grounded piece. The electrodes are flat sheets and designed to attract the excess material from the piece. The length of time required in the electric field will vary somewhat upon such factors as the radius of the section from which the point is being removed, the condition of the "fatty edges" at this period, and the intensity of the field at the "drain-off" point. When conditions are favorable a

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**Proof?**  
see page 25



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**MOTORS  
AND CONTROL**

few seconds are sufficient to remove a proper amount of excess material.

The power pack built to supply the proper current to the field will produce about 80,000 volts and is so designed that it cannot produce more than 5 milliamperes on the secondary.

This process will be most valuable where it makes possible the dipping of pieces that would have to be sprayed ordinarily. It makes possible a wider range in the formulation of dipping materials (such as using urea which normally would blister). The paint chemist can formulate without regard to "fatty edges" or "tears". In many cases this will make possible a shorter bake schedule. It will eliminate the costly and unsatisfactory practice of "cutting off" and patching the areas around "drain-off" points. In some cases it makes possible the use of faster solvents and more viscous coating material, so that a more nearly complete hiding may be obtained.

This process is limited to the use of materials which do not have a sufficient thermal plasticity to cause a reformation of "tears" or "fatty edges" during the bake. It is also necessary that the "drain-off" point be of relatively small radius in order to obtain a highly satisfactory appearance in the paint film at the point from which the excess was removed.

This process is not limited to materials normally considered conductive. Many pieces of pottery, wood, rubber, bakelite and glass have been processed, and the authors have applied insulating coatings, such as high dielectric varnishes, latex and wax, as well as the normal types of organic finishes.

## New Doall Ink Adheres To Ground Steel Surfaces

Quick drying and unmarred by abrasion or by cutting oils, a steel ink recently developed by Doall Co., Des Plaines, Ill., can be used for precise layout work on dies, templets and machine parts, to locate high spots in scraped machine ways, to check gear tooth contact and to determine the relation of mating surfaces, it is reported.

The deep blue color of the ink is said to adhere very readily to ground steel surfaces, yet it can be removed easily, when machining operations are done.

## Lists Stainless Steel Standard Type Numbers

In a 2-page steel products manual recently, American Iron and Steel Institute, 350 Fifth avenue, New York, provides a listing of stainless steel in table form. Standard type numbers and composition ranges corresponding thereto are included in the listing.



## When Hell Broke Loose In Tunis



Layne Wells and Pumps were in the thick of things when hell broke loose to crush the Axis troops in Tunis. Only the military authorities could tell of how they came through, but if they were not destroyed by the enemy—or our own terrific fire power, those sturdily built, tough and long lasting Wells and Pumps are still in there pitching—producing millions of gallons of water daily.

The Wells and Pumps in Tunis—and those throughout the African War Zone—Dakar, Algiers, Casablanca, Sousse, Kairouan, etc., were installed by Layne Engineers for peacetime duty, but they had the guts that made them give outstanding war-time service.

Whether for peace or war, Layne Well Water Systems and Pumps stand alone in skillful design, proven superior features, long life and highest efficiency. They are, according to the Layne slogan "Better Built for Better Service."

In the post-war era your Layne Wells and Pumps will be still higher in efficiency—longer in life and of further improved design. In the meantime, the Layne Organization is endeavoring to keep all industrial and municipal installations in repair and operating at peak efficiency. For literature, address, Layne & Bowler, Inc. General Offices, Memphis, Tenn.

**AFFILIATED COMPANIES:** Layne-Arkansas Co., Stuttgart, Ark. \* Layne-Atlantic Co., Norfolk, Va. \* Layne-Bowler New England Corp., Boston, Mass. \* Layne-Central Co., Memphis, Tenn. \* Layne-Northern Co., Mishawaka, Ind. \* Layne-Louisiana Co., Lake Charles, La. \* Louisiana Well Co., Monroe, La. \* Layne-New York Co., New York City \* Layne-Northwest Co., Milwaukee, Wis. \* Layne-Ohio Co., Columbus, Ohio \* Layne-Texas Co., Houston, Texas \* Layne-Western Co., Kansas City, Mo. \* Layne-Western Co. of Minnesota, Minneapolis, Minn. \* International Water Supply Ltd., London, Ontario, Canada.

# LAYNE

## WELL WATER SYSTEMS DEEP WELL PUMPS

*Builders of Well Water Systems  
for Every Municipal and Industrial Need*

**STEEL**

## ASTM Committee Approves 14 New Specifications

Several actions involving approval of new regular and emergency specifications and emergency alternate provisions by its committee E-10 are reported by the American Society for Testing Materials, Philadelphia. Since March 20, according to the society, 14 new specifications were approved of which three are emergency and 11 regular specifications.

The following list includes the specifications approved.

### New Specifications and Tests

#### Tentative Specifications for:

- Heat-Treated Carbon-Steel Bolting Material (A 261 - 43 T).
- Air-Setting Refractory Mortars (Wet Type) for Boiler Furnace and Incinerator Service (C 178 - 43 T).
- Cellulose Acetate Molding Compounds (D 706 - 43 T).
- Cellulose Acetate Butyrate Molding Compounds (D 707 - 43 T).
- Rigid Sheets Made from Vinyl Chloride-Acetate Resins (D 708 - 43 T).
- Laminated Thermosetting Materials (D 709 - 43 T).

#### Tentative Methods of:

- Test for Sieve Analysis and Water Contents of Refractory Materials (C 92 - 43 T).
- Test for Combined Drying and Firing Shrinkage of Fireclay Plastic Refractories (C 179 - 43 T).
- Panel Test for Resistance to Thermal and Structural Spalling of Fireclay Plastic Refractories (C 180 - 43 T).
- Workability Index of Fireclay Plastic Refractories (C 181 - 43 T).
- Test for Thermal Conductivity of Insulating Refractories (C 182 - 43 T).

### Emergency Specifications

#### Emergency Specifications for:

- Special Quality Aluminum Base Alloy Die Castings (ES - 29).
- Chloroprene Sheath Compound for Electrical Insulated Cords and Cables (ES - 28).
- Chloroprene Sheath Compound for Electrical Insulated Cords and Cables Where Extreme Abrasion Resistance is Not Required (ES - 30).

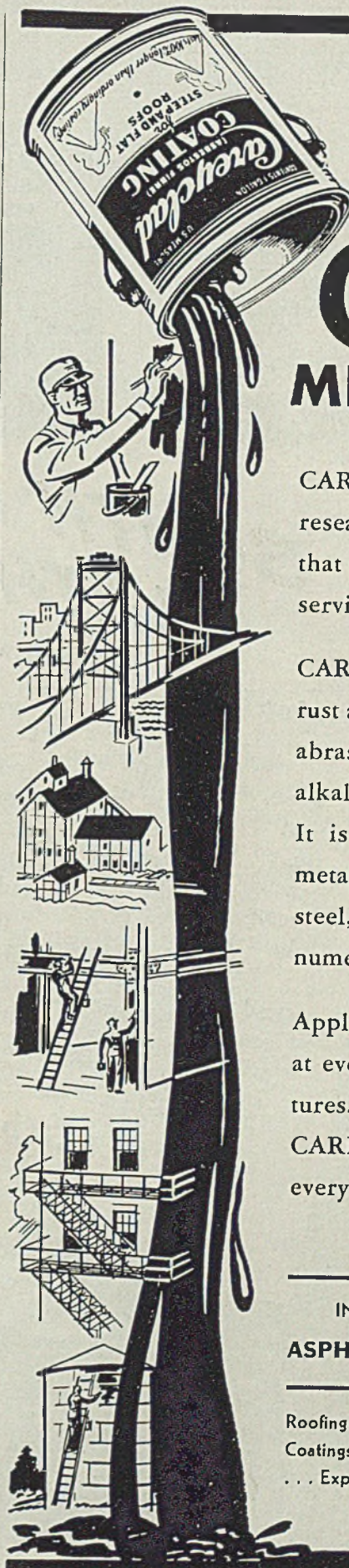
### Emergency Alternate Provisions

#### Emergency Alternate Provisions in:

- Standard Specifications for Electric-Fusion-Welded Steel Pipe (Sizes 8 in. to but not including 30 in.) (A 139 - 42) (EA - A 139a).
- Standard Specifications for Alloy Steel Castings for Structural Purposes (A 148 - 36) (EA - A 148a).
- Standard Specifications for Aluminum-Base Alloy Die Castings (B 85 - 42) (EA - B 85a).
- Tentative Specifications for Rubber Sheath Compound for Electrical Insulated Cords and Cables (D 532 - 39 T) (EA - D 532a).

## New Compound Helps Extend Tool Life

A new compound or lubricant for metal cutting tools said to extend tool life between 50 to 60 per cent is announced by Leonard Smith Inc., 2515 Independence road, Cleveland. It can be used in connection with broaching, tapping, drilling, reaming, thread chasing, stamping and hobbing operations.



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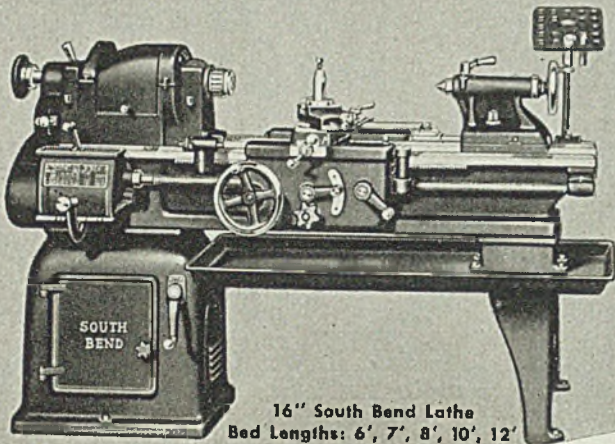
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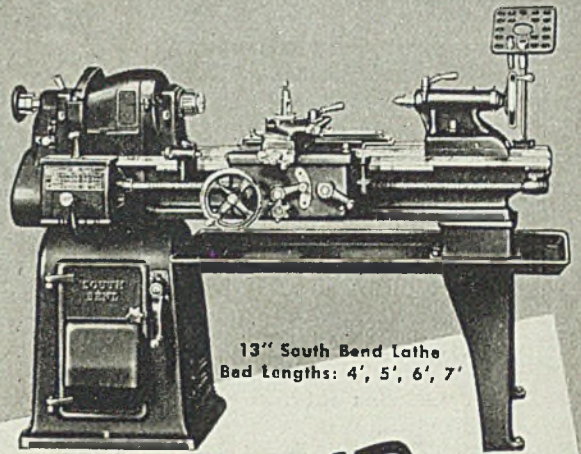
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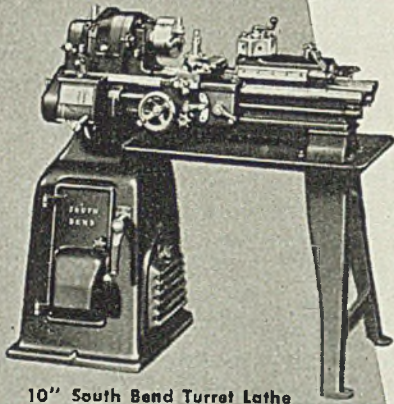
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16" South Bend Lathe  
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13" South Bend Lathe  
Bed Lengths: 4', 5', 6', 7'



10" South Bend Turret Lathe



9" South Bend Lathe  
Bed Lengths: 3', 3½', 4', 4½'



10" South Bend Lathe  
Bed Lengths: 3', 3½', 4', 4½'

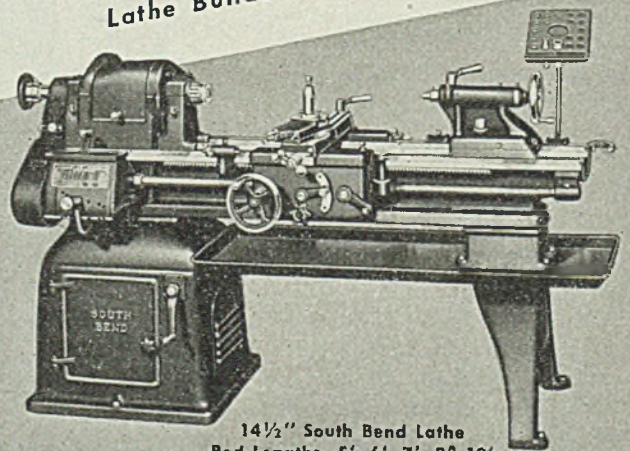
# SOUTH BEND LATHES

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Time, material, and manpower can be saved for vital work if you use the right lathe for every job. The matching of the job and the lathe has never been more important than it is today — in no other way can maximum production be obtained. Remember that versatility and precision are important in a toolroom lathe. For manufacturing operations, a lathe must also have plenty of power, speed, and stamina.

South Bend Engine Lathes are made in 9", 10", 13", 14½", and 16" swings, with bed lengths from 3' to 12'. The Toolroom Lathes are made in 10", 13", 14½", and 16" swings, with bed lengths from 3' to 8'. The Turret Lathes are made in 9" and 10" swings, with 3½' bed lengths. These lathes are described in Catalog 100C which will be sent upon request.

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14½" South Bend Lathe  
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## War Strategy Reflected In Changed Steel Needs

*Adjustments follow shifts dictated by victorious campaigns. . .  
Smoother distribution achieved under CMP. . . Blast furnaces  
to feel first impact of coal interruption*

VARIOUS changes in war strategy are being reflected in the steel industry, causing uncertainty in various departments as adjustments are made, though all-over demand is not affected and no additional steel is being released for civilian use.

A case in point is found in the severely curtailed landing mat program. As a result some producers of hot-rolled sheets who were booked solidly through third quarter and beyond have been able in the past few days to accept some tonnage for July delivery. Caps caused by cancellation of landing mat steel have been filled promptly in most cases and in general it is difficult to get sheets on current orders before September for hot-rolled and stainless grades and before August for cold-rolled.

Some foundries in the East have received substantial cancellations of castings for Liberty engines, following changes in the ship program from Liberty ships to the larger and faster Victory vessels. This has caused some change in need for pig iron, though supply is not beyond demand. Pig iron distribution is being made smoothly under the allocation plan and all users are receiving their requirements. Blast furnaces are likely to be the first to feel the effects of the coal mining suspension and coke supply will have to be conserved. This may result in stacks being blown out now for repairs that might have been delayed until later.

War Production Board warns steel producers that those accepting orders under CMP, where sizes and quantities are not specified, are doing so illegally and are inviting trouble as a result. It has been reported that some orders for extended delivery have been accepted thus incomplete and the warning is to save later difficulties.

The plate situation is well in hand under the perfected system developed by WPB and supplies are well matched to requirements. Some orders now are being placed well into next year for long-range programs but at the same time some capacity is available for August rolling and succeeding months. Plate buying is being done in a more leisurely manner under the strict control of CMP.

Repairs to open hearths last week took a number of units out of service and caused the rate of steel production to decline  $\frac{1}{2}$ -point to  $98\frac{1}{2}$  per cent. Cincinnati made the most important gain as furnaces were returned to service after repair, rising 10 points to 94 per cent. St. Louis gained  $4\frac{1}{2}$  points to  $91\frac{1}{2}$  per cent, Wheeling 1 point to

### DEMAND

*War needs change rapidly.*

### PRODUCTION

*Down  $\frac{1}{2}$  point to  $98\frac{1}{2}$  per cent.*

### PRICES

*Slight adjustments in scrap.*

94 and New England 5 points to 95. Pittsburgh slipped  $\frac{1}{2}$ -point to  $98\frac{1}{2}$  per cent, Cleveland  $\frac{1}{2}$ -point to  $95\frac{1}{2}$ , Buffalo  $2\frac{1}{2}$  points to 90 and Detroit 14 points to 80. Rates were unchanged as follows: Chicago, 97; eastern Pennsylvania, 95; Youngstown, 97; Birmingham, 100.

While scrap supply is such that all melters have sufficient for current needs, the margin of safety is relatively thin and many melters are working with much less surplus than normal. Flood conditions have limited collection and transportation in many sections and reserves have been drawn on to make up the lack of current supplies.

American Iron and Steel Institute reports April production of finished steel for sale at 5,564,981 net tons and for four months at 22,196,829 tons. At this rate for the remainder of the year the 1943 output would be 66,540,487 tons. Plate production in April was 1,070,060 tons, which was at the rate of 141.5 per cent of rated plate capacity.

How severely restrictions on steel construction have affected fabricators is shown by statistics of the American Institute of Steel Construction. Bookings by fabricators in the first four months this year were 198,471 net tons, compared with 974,347 tons in the corresponding period last year. Bookings in April were 56,050 tons and shipments were 97,982 tons.

Iron ore shipments in May totaled 10,974,672 gross tons, the Lake Superior Iron Ore Association reports, and the season total reached 12,929,467 tons May 31. This is 8,397,575 tons less than was loaded to the same date in 1942. In May, 1942, loadings of 12,677,356 tons almost equaled this year's season total.

Office of Price Administration has issued amendment No. 12 to revised price schedule No. 4, making minor changes in methods of pricing various scrap grades, establishing provisions covering weights, adding several grades, establishing a new floor for No. 1 heavy melting steel and designating new remote points to which preparations in transit apply. The springboard limitation for remote scrap is increased to \$7 per ton from \$5. The amendment is effective from May 29.

Average composite prices of steel and iron products are unchanged at ceilings prescribed by Office of Price Administration. Finished steel composite is \$56.73, semi-finished steel \$36, steelmaking pig iron \$23.05 and steel-making scrap \$19.17.

# COMPOSITE MARKET AVERAGES

	June 5	May 29	May 22	One Month Ago Apr., 1943	Three Months Ago Feb., 1943	One Year Ago May, 1942	Five Years Ago May, 1938
Finished Steel	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	11.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

## COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Current Week				Pig Iron	One Year Ago			
	June 5, 1943	April, 1943	Feb., 1943	May, 1942		June 5, 1943	April, 1943	Feb., 1943	May, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c	Bessemer, del. Pittsburgh	\$25.19	\$25.19	\$25.19	\$25.19
Steel bars, Chicago	2.15	2.15	2.15	2.15	Basic, Valley	23.50	23.50	23.50	23.50
Steel bars, Philadelphia	2.47	2.49	2.49	2.49	Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.39
Shapes, Pittsburgh	2.10	2.10	2.10	2.10	No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
Shapes, Philadelphia	2.15	2.22	2.22	2.22	No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Shapes, Chicago	2.10	2.10	2.10	2.10	Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Plates, Pittsburgh	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.00
Plates, Philadelphia	2.15	2.15	2.15	2.15	No. 2X, del. Phila. (differ. av.)	26.215	26.265	26.265	26.265
Plates, Chicago	2.10	2.10	2.10	2.10	Malleable, Valley	24.00	24.00	24.00	24.00
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10	Malleable, Chicago	24.00	24.00	24.00	24.00
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05	Lake Sup., charcoal, del. Chicago	31.34	31.54	31.54	31.54
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50	Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10	Ferromanganese, del. Pittsburgh	140.33	140.65	140.65	140.65
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05	<b>Scrap</b>				
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50	Heavy melting steel, Pittsburgh	\$20.00	\$20.00	\$20.00	\$20.00
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60	Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Tin plate, per base box, Pittsburgh	\$5.00	\$5.00	\$5.00	\$5.00	Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55	Rails for rolling, Chicago	22.25	22.25	22.25	22.25
<b>Semifinished Material</b>					No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Sheet bars, Pittsburgh, Chicago	\$34.00	\$34.00	\$34.00	\$34.00	<b>Coke</b>				
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00	Connellsville, furnace, ovens	\$6.50	\$6.50	\$6.40	\$6.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00	Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Wire rods, No. 5 to 3/8-inch, Pitts.	2.00	2.00	2.00	2.00	Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

### STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

#### Semifinished Steel

Gross ton basis except wire rods, skelp.  
**Carbon Steel Ingots:** F.o.b. mill base, rerolling qual., stand. analysis, \$31.00.  
 (Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at \$33 gross ton, f.o.b. mill.)  
**Alloy Steel Ingots:** Pittsburgh, uncropped, \$45.00.  
**Rerolling Billets, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$34.00; Detroit, del. \$36.25; Duluth (bil.) \$36.00.  
 (Andrews Steel Co., carbon slabs \$41; Continental Steel Corp., billets \$34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. \$41, Sterling, Ill.; Laclede Steel Co. \$34, Alton or Madison, Ill.; Wheeling Steel Corp. \$36 base, billets for lend-lease, \$34, Portsmouth, O., on slabs on WPB directives.)  
**Forging Quality Billets:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$40.00; Detroit, del. \$42.25; Duluth, \$42.00.  
 (Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points.)  
**Open Hearth Shell Steel:** Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., \$52.00; 12-18 in., \$54.00; 18 in. and over, \$56.00.  
**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$54.00.  
**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$34. (Wheeling Steel Corp. \$37 on lend-lease sheet bars, \$38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, \$39, f.o.b. mill.)  
**Skelp:** Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.  
**Wire Rods:** Pittsburgh, Chicago, Cleveland, Birmingham, No. 5-9/32 in., inclusive, per 100 lbs., \$2.00.  
 Do., over 9/32-47/64-in., incl., \$2.15. Worcester add \$0.10; Galveston, \$0.27. Pacific Coast \$0.50 on water shipment.

#### Bars

**Hot-Rolled Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)  
**Rail Steel Bars:** Same prices as for hot-rolled carbon bars except base is 5 tons.  
 (Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)  
**Hot-Rolled Alloy Bars:** Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.  
 (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300.....	\$0.10	4100 (.15-.25 Mo)	0.55
2300.....	1.70	(.20-.30 Mo)	0.60
2500.....	2.55		1.70
3000.....	0.50	4600.....	1.20
3100.....	0.70	4800.....	2.15
3200.....	1.35	5100.....	0.35
3400.....	3.20	5130 or 5152....	0.45
4000.....	0.45-0.55	6120 or 6152....	0.95
		6145 or 6150....	1.20

\*Add 0.25 for acid open-hearth; 0.50 electric.  
**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.  
**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.  
**Turned, Ground Shafting:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

**Reinforcing Bars (New Billet):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.  
**Reinforcing Bars (Rail Steel):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.  
 (Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)  
**Iron Bars:** Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.  
**Sheets, Strip**  
**Hot-Rolled Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.  
 (Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)  
**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.  
**Galvanized Sheets, No. 24:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.  
 (Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)  
**Corrugated Galv. Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.  
**Culvert Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.  
**Enameling Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

Table with 3 columns: Pittsburgh, Pacific, Granite City. Rows include Field grade, Armature, Electrical, Motor, Dynamo, Transformer, #72, #58, #52.

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.78c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; 26-50 Carb., 2.80c; 51-75 Carb., 4.30c; 76-100 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, \$5.00; Granite City \$5.10. Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box \$4.50.

Tin Mill Black Plate. Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c. Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box \$4.30; Granite City \$4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. \$12.00; 15-lb. \$14.00; 20-lb. \$15.00; 25-lb. \$16.00; 30-lb. \$17.25; 40-lb. \$19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c. (Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill, Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Gulf ports, 2.47c; Pacific ports, 2.75c. (Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add \$2 for Worcester): Bright basic, bessemer wire 2.60c Galvanized wire 2.60c Spring wire 3.20c

Wire Products to the Trade: Standard and Cement-coated wire nails, polished and staples, 100-lb. keg \$2.55 Annealed fence wire, 100 lb. 3.05 Galvanized fence wire, 100 lb. 3.40 Woven fence, 12 1/2 gage and lighter, per base column .67 Do., 11 gage and heavier .70 Barbed wire, 80-rod spool, col. .70 Twisted barbless wire, col. .70 Single loop bale ties, col. .59 Fence posts, carloads, col. .69 Cut nails, Pittsburgh, carloads \$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about \$200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Table with 6 columns: In., Blk., Galv., In., Blk., Galv. Rows include 1/4, 1/2, 3/4, 1, 1-3/4, 2.

Lap Weld table with 6 columns: In., Blk., Galv., In., Blk., Galv. Rows include 2, 2 1/2-3, 3 1/2-6, 7-8, 9-10, 11-12.

Roller Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

Table with 6 columns: O. D., Sizes, B.W.G., Hot Rolled, Cold Drawn, Steel, Iron. Rows include 1, 1 1/4, 1 1/2, 2, 2 1/4, 2 1/2, 3, 3 1/4, 4, 4 1/2, 5, 6.

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, \$40.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, \$40.00. Relaying rails, 35 lbs. and over, f.o.b. rail-road and basing points, \$28-\$30. Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

\*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c. High Speed Tool Steels:

Table with 6 columns: Tung., Chr., Van., Moly., Platts. base, per lb. Rows include 18.00, 1.5, 5.50, 5.50.

Stainless Steels

Base, Cents per lb.—f.o.b., Pittsburgh

CHROMIUM NICKEL STEEL table with 6 columns: Type, Bars, Plates, Sheets, Strip, Strip. Rows include 302, 303, 304, 308, 309, 310, 312, \*316, †321, †347, 431.

STRAIGHT CHROMIUM STEEL

Table with 6 columns: Type, Bars, Plates, Sheets, Strip, Strip. Rows include 403, \*410, 416, †420, 430, †430F, 440A, 442, 443, 446, 501, 502.

STAINLESS CLAD STEEL (20%)

Table with 2 columns: Type, Price. Row includes 304 at \$118.00 per 100.

\*With 2-3% moly. †With titanium. ‡With columbium. \*†Plus machining agent. ‡‡High carbon. ††Free machining. ‡‡‡Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941. Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of

the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. Governing basing point is basing point nearest the consumer providing the lowest delivered price. Emergency basing point is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate \$2.80 per 100 lbs.; terne plate \$2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carrage and Machine table with 2 columns: Description, Price. Rows include 1/2 x 6 and smaller, Do., 1/2 and 5/8 x 6-in. and shorter, Do., 3/4 to 1 x 6-in. and shorter, 1 1/2 and larger, All diameters, over 6-in. long, Tire bolts, Step bolts, Plow bolts.

Stove Bolts In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts table with 4 columns: Description, U.S.S., S.A.E. Rows include 3/8-inch and less, 1/2-1-inch, 1 1/4-1 3/4-inch, 1 3/4 and larger, Hexagon Cap Screws, Square Head Set Screws.

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham table with 2 columns: Description, Price. Rows include Structural, 3/8-inch and under, Wrought washers, Philadelphia, to jobbers and large nut, bolt manufacturers i.e.l.

Metallurgical Coke

Price Per Net Ton Beehive Ovens table with 2 columns: Location, Price. Rows include Connellsville, furnace, Connellsville, foundry, Connellsville prem. fdry., New River, foundry, Wise county, foundry, Wise county, furnace, By-Product Foundry, Kearny, N. J.,ovens, Chicago, outside delivered, Chicago, delivered, Terre Haute, delivered, Milwaukee,ovens, New England, delivered, St. Louis, delivered, Birmingham,ovens, Indianapolis, delivered, Cincinnati, delivered, Cleveland, delivered, Buffalo, delivered, Detroit, delivered, Philadelphia, delivered.

\*Operators of hand-drawn ovens using trucked coal may charge \$7.00, effective Feb. 3, 1943. †\$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha table with 2 columns: Description, Price. Rows include Pure and 90% benzol, Toluol, two degree, Solvent naphtha, Industrial xylol, Phenol (car lots, returnable drums), Do., less than car lots, Do. tank cars, Eastern Plants, per lb., Naphthalene flakes, balls, bbls., to jobbers, Sulphate of ammonia.





WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

Table listing steel prices by city and type: Hot rolled bars, Structural shapes (Plates, Floor plates), Hot rolled sheets, Hot rolled bands, Hot rolled hoops, Galvanized flat sheets, Cold rolled sheets, Cold finished bars, Cold-rolled strip, AISI hot bars 2000 series, AISI hot bars 8100 series.

\*Basing point cities, with quotations representing mill prices, plus warehouse spread. NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendments Nos. 10 and 14 to Revised Price Schedule No. 49.

BASE QUANTITIES

1-400 to 1999 pounds; 2-400 to 14,999 pounds; 3-any quantity; 4-300 to 1999 pounds; 5-400 to 3999 pounds; 6-300 to 1999 pounds; 7-400 to 39,999 pounds; 8-under 2000 pounds; 9-under 4000 pounds; 10-400 to 1499 pounds; 11-one bundle to 39,999 pounds; 12-150 to 2249 pounds; 13-150 to 1499 pounds; 14-three to 24 bundles; 15-450 to 1499 pounds; 16-one bundle to 1499 pounds; 17-one to nine bundles; 18-one to six bundles; 19-100 to 749 pounds; 20-300 to 1999 pounds; 21-1500 to 39,999 pounds; 22-1500 to 1999 pounds; 23-1000 to 39,999 pounds; 24-400 to 1499 pounds; 25-1000 to 1999 pounds; 26-under 25 bundles. Cold-rolled strip, 500 pounds and over, base.

Table listing prices for Ores and Manganese Ore. Ores include Lake Superior Iron Ore (Gross ton, 51 1/2% Lower Lake Ports), Old range/bessemer/nonbessemer iron ore, Eastern Local Ore (Cents, unit, del. E. Pa.), Foreign Ore (Cents per unit, c.i.f. Atlantic ports), Tungsten Ore (Chinese wolframite, short ton unit, duty paid), and Chrome Ore (Equivalent OPA schedules). Manganese Ore lists various sources like Chilean, Indian, South African, Cuban, Philippine, Domestic, and Molybdenum.

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Table for National Emergency Steels showing chemical composition limits (Carbon, Mn, Si, Cr, Ni, Mo) and prices for basic open-hearth and electric furnace steel. Includes details for Tungsten Ore and Chrome Ore.

Extras are in addition to a base price of 2.70c. per pound on finished products and \$54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

# MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

## PRICES FOR OTHER THAN RAILROAD SCRAP

	ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES										
	Low Phos. Grades		Bar		Heavy Structural, Plate		Foundry Steel		Alloy-Free		
	Billet, Bloom, Forge Crops	Crops and smaller; Punched Plate	3 ft. and less	1 ft. and less	2 ft. and less	1 ft. and less	2 ft. and less	1 ft. and less	Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackentridge, Butler, Johnstown, Midland, Messers, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	\$25.00	\$22.50	\$21.50	\$22.00	\$22.50	\$21.50	\$22.00	\$22.50	\$18.00	\$19.50	\$21.00
Claymont, Contesville, Harrisburg, Conshohocken, Phoenixville	23.75	21.25	20.25	21.25	21.25	20.25	20.25	20.25	16.75	18.25	19.75
Bethlehem	23.75	21.25	20.25	20.75	20.75	19.75	19.75	20.75	16.75	18.25	19.75
Buffalo	23.75	21.25	20.25	20.75	20.75	19.75	19.75	20.75	16.75	18.25	19.75
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	24.25	21.75	20.75	21.25	21.25	20.75	21.25	21.25	17.25	18.75	20.25
Detroit	24.25	21.75	20.75	21.25	21.25	20.75	21.25	21.25	17.25	18.75	20.25
Toledo	22.85	20.35	19.35	19.85	19.85	18.85	19.35	19.35	15.50	17.00	18.50
Chicago	23.75	21.25	20.25	20.75	20.75	19.75	20.25	20.25	16.75	18.25	19.75
Kokomo	23.75	21.25	20.25	20.75	20.75	19.75	20.25	20.25	16.75	18.25	19.75
Duluth	23.00	20.50	19.50	20.00	20.00	19.00	19.50	20.00	15.50	17.00	18.50
St. Louis	22.50	20.00	19.00	19.50	19.50	18.50	19.00	19.50	15.00	16.50	18.00
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburgh, Calif.	22.00	19.50	18.50	19.00	19.00	18.00	18.50	19.00	14.50	16.00	17.50
Minneapolis, Colo.	21.50	19.00	18.00	18.50	18.50	17.50	18.00	18.50	14.00	15.50	17.00
Seattle	19.50	17.00	16.00	16.50	16.50	15.50	16.00	16.50	12.50	14.00	15.50

Ill. San Francisco includes South San Francisco, Niles and Oakland, Calif. Chicago includes Gary, Ind. Claymont, Del., includes Chester, Pa.

**Inferior Grades:** Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

**Commissions:** No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

**Maximum Shipping Point Price:** Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, \$1 at Great Lakes ports, \$1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, \$6.65 per ton. Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on cartload rate for rail shipment, minimum \$1.00 per ton.

**Maximum Delivered Prices:** Determined by adding established transportation charges to shipping point price, not to exceed by more than \$1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to VPB allocations, to winter shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under VPB allocations may exceed prices at nearest basing point by more than \$1, if most economical transportation is used.

**Unprepared Scrap:** Above prices are for prepared scrap. Maximum prices for unprepared scrap are \$3.50 less; (material from Nos. 1, 2 and 3 bundles made is \$4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

## RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails		Rails for Rolling	18 in. and under
		Scrap Rails	2 ft. and under		
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton, Philadelphia, Wilmington, Sparrows Point	\$21.00	\$22.00	\$24.25	\$23.50	\$24.50
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	19.75	20.75	23.00	22.25	23.25
Chicago	20.50	21.50	23.75	23.00	24.00
Buffalo	19.75	20.75	23.00	22.25	23.25
Detroit	20.25	21.25	23.50	22.75	23.75
Kokomo	18.85	19.85	22.10	21.85	22.35
Duluth	19.25	20.25	22.50	22.25	22.75
Kansas City, Mo.	20.00	20.00	22.25	22.00	22.50
St. Louis	17.00	18.00	20.25	20.00	20.50
Birmingham	18.50	19.50	21.50	21.25	22.00
Los Angeles, San Francisco	18.00	19.00	21.75	21.50	22.00
Seattle	18.00	19.00	21.25	21.00	21.50
	15.50	16.50	18.75	18.00	19.00

## CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A		Group B		Group C	
	18 lb. & Under	Over 18 lb.	18 lb. & Under	Over 18 lb.	18 lb. & Under	Over 18 lb.
No. 1 Cupola Cast	\$18.00	\$19.00	\$19.00	\$20.00	\$20.00	\$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	19.00	20.00	20.00	20.00
Clean Auto Cast	18.00	19.00	19.00	20.00	20.00	20.00
Stove Plate	18.00	19.00	19.00	20.00	20.00	20.00
Unstripped Motor Blocks	15.50	16.50	16.50	17.50	17.50	17.50
Heavy Breakable Cast	15.50	16.50	16.50	17.50	17.50	17.50
Charging Box Size Cast	17.00	18.00	18.00	19.00	19.00	19.00
Miscellaneous Malleable	17.00	18.00	18.00	19.00	19.00	19.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico. Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

\*Open C includes states not named in groups A and B, plus Kansas City, Kans.-Mo. Group C includes grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet No. 1 chem. borings, 1 per cent oil, \$1 under, No. 2 bundles and No. 1 busheling No. 1 heavy melting steel, No. 1 heavy melting, cast steel, \$2.50 over, No. 2 busheling, \$2.50 under No. 1 cover only No. 2 busheling, springs, truncheons, \$1 over No. 1 heavy melting. Toledo open-hearth grades A basing point including the switching district of the city named. The Pittsburgh basing point includes the switching districts of Fessenden, Homestead, McKeesport, Pa.; Cincinnati includes Newport, Ky.; St. Louis basing point includes Bowling Green, East St. Louis and Madison, Texas and Florida.

# NONFERROUS METAL PRICES

**Copper:** Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1¼c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

**Brass Ingot:** Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-3-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; Nc. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

**Zinc:** Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

**Lead:** Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

**Primary Aluminum:** 99% pillus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ¼c 2000-9999 lbs.; 1c less than 2000 lbs.

**Secondary Aluminum:** All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

**Magnesium:** Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

**Tin:** Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1¼c 1000-2239, 2¼c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Stralts), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c; Grade E, below 99%, 51.00c.

**Antimony:** American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

**Nickel:** Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

**Mercury:** Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Ore., Wash., Idaho, Nev., Ariz. \$191; produced in Texas, Ark. \$193. Foreign, produced in Mexico, duty paid, \$193.

**Arsenic:** Prime, white, 99%, carlots, 4.00c lb.

**Beryllium-Copper:** 3.75-4.25% Be., \$15 lb. contained Be.

**Cadmium:** Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

**Cobalt:** 97-99%, \$2.11 lb.; 100 lbs. or more on contract, \$150 lb.

**Indium:** 99.5%, \$10 per troy ounce.

**Gold:** U. S. Treasury, \$35 per ounce.

**Silver:** Open market, N. Y. 44.75c per ounce.

**Platinum:** \$36 per ounce.

**Iridium:** \$165 per troy ounce.

**Palladium:** \$24 per troy ounce.

## Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

**Sheet:** Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

**Rods:** Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

**Seamless Tubing:** Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

**Extruded Shapes:** Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

**Angles and Channels:** Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

**Copper Wire:** Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weather-proof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

**Aluminum Sheets and Circles:** 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

**Lead Products:** Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

**Zinc Products:** Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

## Plating Materials

**Chromic Acid:** 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

**Copper Anodes:** Base 2000-5000 lbs., del.; oval 17.62c; unrimmed 18.12c; electro-deposited 17.37c.

**Copper Carbonate:** 52-54% metallic cu; 250 lb. barrels 20.50c.

**Copper Cyanide:** 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

**Sodium Cyanide:** 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

**Nickel Anodes:** 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

**Nickel Chloride:** 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

**Tin Anodes:** 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

**Tin Crystals:** 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

**Sodium Stannate:** 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

**Zinc Cyanide:** 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

## Scrap Metals

**Brass Mill Allowances:** Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¼c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	8.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

**Other than Brass Mill Scrap:** prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¼c for shipment of 60,000 lbs. of one group and ¼c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

**Aluminum Scrap:** Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c

**Lead Scrap:** Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

**Zinc Scrap:** New clippings, old zinc 7.25c f.o.b. point of shipment; add ¼-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 1000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

**Nickel, Monel Scrap:** Prices f.o.b. point of shipment; add ¼c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

**Nickel:** 98% or more nickel and not over ¼% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

**Cupro-nickel:** 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

**Monel:** No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Most leading sheet producers now appear virtually booked up for third quarter on hot-rolled sheets and report an increasingly tight situation in cold-rolled sheets. Little, if any, cold-rolled capacity is available for July and not much for August. Some mills are sold out through September. However, cold-rolled sheets for delivery in that month are still fairly free. Galvanized sheets can be had without difficulty for shipment in August and September, government limitation on the use of this product accounting for the relative easiness.

Numerous allotment numbers have only just been issued by the Maritime

Commission for third quarter, including tonnage for July shipment. Much shopping apparently will be necessary by holders of these allotment numbers if they are able to obtain tonnage for July.

Sheet demand in the New York area has been brisk for almost a month. Much of current demand is now for fourth quarter shipments. One eastern producer of hot-rolled is now practically out of the market for the remainder of the year. Some first quarter buying also is reported.

Most sheet demand in New England is from warehouses and shipyards, lighter gages lagging somewhat with distributors. Ships require a slightly heavier volume per unit because of special equipment and accessories. Substantial vol-

ume of this is fabricated by subcontractors. Miscellaneous requirements shift with the flow of war contracts, punctuated here and there by a sizable order, but for the most part are moderately more active. With a good part of sheet capacity taken up for plates, drums, containers and other specific large-tonnage needs, the remainder is filling for third quarter with more August-September deliveries included in current coverage on both hot and cold-rolled.

Apollo Steel Co., Apollo, Pa., has been authorized to quote 3.75c per pound on galvanized, the second non-integrated mill to be given price relief on sheets within a month.

Production schedules by some fabricators of landing mats have been reduced 25 per cent. Narrow cold-rolled strip capacity has been generally filled for third quarter delivery, notably on high carbon, and consumers, late in some instances with allotment certificates, are shopping to place tonnage for delivery late that quarter. More orders for fourth quarter are appearing. Production quotas on both hot and cold-rolled are filled, with some sellers reluctant to take on too much forward volume, although if CMP data is validated there is little choice.

**Bars . . .**

Bar Prices, Page 164

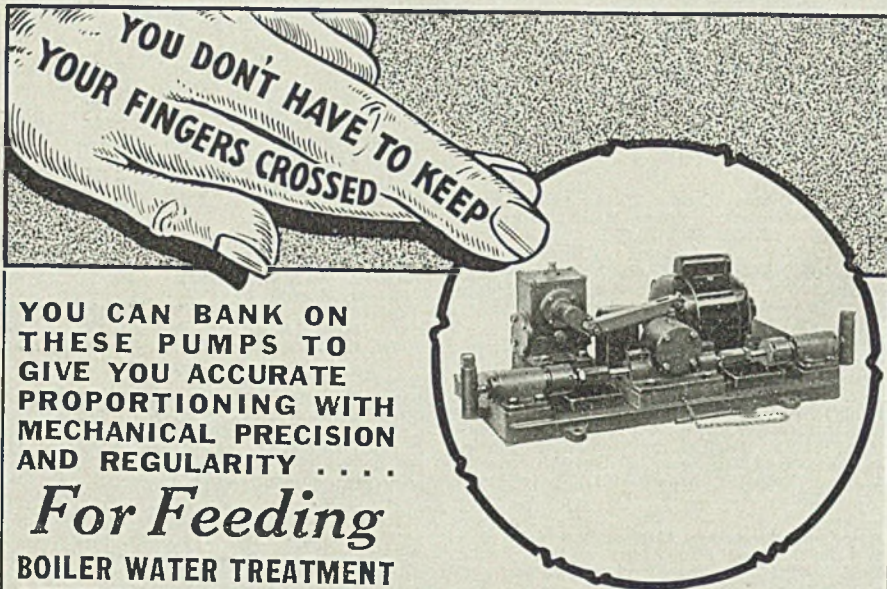
While bar demand reflects the cut-back on certain types of ordnance, including tanks, gun mounts and some descriptions of shells, mill backlogs continue to expand. In some quarters it is expected the ordnance department will come out with a new program about the first of July, which will accelerate bar buying considerably. The precise nature of this program, however, has not been revealed.

At present, a little tonnage of hot carbon bars can still be picked up for shipment in July and August, but not really much before September, and some producers are now out of the market on even that position. This is especially true with respect to large rounds and flats, with practically no tonnage in these large specifications available during third quarter. Some sellers have little of the larger sizes to offer before late November.

It is practically impossible to obtain cold-drawn or alloy bars for delivery in third quarter. Where special heat treatment is required, consumers find some producers covered to the end of the year and in certain instances well beyond.

Not all bar mill capacity is steadily employed because of the lack of sufficient semifinished steel for rolling; diversions to plates create limitations for bars with some producers. Bessemer deliveries continue somewhat ahead of open-hearth and electric furnace stock. Demand for tool steel is heavy.

Manufacturers of cutting tools, operating at capacity, have orders extending for many months with no indications of a recession in demand. Additional contracts have been placed with tool shops, outstanding awards by navy procurement going to Winter Bros. Co., Wrentham, Mass.; Union Twist Drill Co., Athol, Mass.; National Twist Drill & Tool Co., Detroit; and others producing taps, reamers, drills, cutters and dies. The decline in orders for new machine tools has no effect on steel requirements



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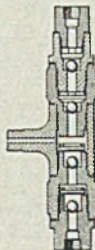
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**BOILER WATER TREATMENT  
GENERAL PROCESSING,  
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Type "U" single Unit 2 feed motor driven assembly. Handles 1.02 to 31.20 g. p.h. at pressures ranging from 190 to 4800 p.s.i.

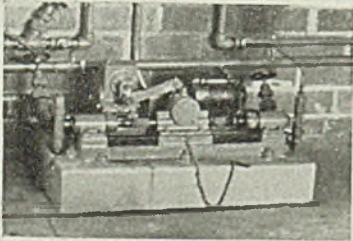
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*Positive PROPORTIONING PUMPS*  
**WITH POSITIVE ACTING CHECK VALVES**

**8 TYPES**  
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Ball Type Vertical Composite Check Valve, with both suction and discharge in the same body.

These pumps are used for continuous fluid processing or laboratory work, utilizing the time-proven single plunger principle and built strong and rugged, yet with infinite precision. The mechanism is extremely simple, to function perfectly over long periods of time with a minimum of care and attention. The control is easy and certain, and once set for the required amount of material, will continue to operate with consistent accuracy and regularity to maintain the desired proportions within tolerances of  $\pm 1\frac{1}{2}\%$ . No under-dosage, and no waste from over-dosage. In successful use throughout industry on all kinds of feeding and injecting jobs. Catalog P-41 on request.



Typical installation of "U" Type 2 feed pump injecting chemicals in an industrial process.

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**2434 NELSON STREET, CHICAGO**

**PROPORTIONING PUMPS • AIR & WATER VALVES • CHEMICAL VALVES  
MARINE VALVES • FORCED-FEED LUBRICATORS • DOWMETAL CASTINGS**

for small metal cutting tools, demand emanating from machines now in operation. Strong demand for forging steel continues with two large shops increasing facilities substantially in Ohio and Illinois through DPC.

### Plates . . .

Plate Prices, Page 165

Locomotive demand has stimulated plate buying in the East. In addition to some recent domestic orders, including 25 heavy switch engines for the Bessemer & Lake Erie, a substantial number of locomotives for the war department have been placed, for which plates have been purchased for shipment over the remainder of the year. Relatively little new car steel is being placed at the moment for domestic lines. Several hundred tons, however, have been booked for railroads in Mexico, with deliveries beginning in August.

Certain eastern plate mills, which as recently as a week ago, still had capacity available for July rolling have now received directives from the Navy and Maritime Commission which insure a full schedule for that month.

A sizable tonnage of plates is moving to Russia for oil refinery construction. Some plate tonnage for Egypt, originally scheduled for shipment in June and July, will be cancelled, according to present indications.

Demand for floor plates is unabated; direct shipments cover more volume than usual and warehouse stocks are maintained with difficulty. Distributor stocks are low and tonnage moves out promptly as received. Ships take most floor plate in the East. Some mills are offering jobbers stock lists of accumulated run of mine plate ends, but the latter are slower to take them at full prices. Shearing to size and uncertainty as to meeting requirements with this material has resulted in some refusing to accept them against quotas.

### Pipe . . .

Pipe Prices, Page 165

Oil country tubular goods business is gradually becoming rejuvenated, with a heavy increase in demand for drill pipe and casing and a better flow of orders carrying validations from this source. There is little new business in line pipe, but standard pipe is active up to the limit of the directive.

Jobber stocks of both black and galvanized pipe are far below normal and practically all sellers expect a rapid increase in demand for standard pipe for use in maintenance and repair operations in war plants. Already some orders of this character have been coming in from the newly built war plants.

Heavier inquiry for boiler tubes is reflected in the withdrawal of two locomotive works from tank production and resumption of locomotive building. All seamless tubular products, including boiler tubes, are tight, with deliveries far extended, generally into late third or early fourth quarter. For boiler tubes, as well as pipe and other tubing, electric welded material is replacing seamless where possible. Cold drawers absorb most hot seamless while the aircraft industry accounts for much tubing tonnage. Small sizes, two-inch and under, which have been withheld from warehouses, may be eased by a new order under consideration. Demand for

merchant steel pipe for industrial uses holds well, in fact pipe buying is active, considering the lack of building.

### Wire . . .

Wire Prices, Page 165

Orders and shipments of wire products are in better balance, representing a slight decline following placing of substantial forward tonnage under CMP. For the most part this applies to specialties. Mills have limited capacity on most active high carbon products for third quarter delivery but heavy sizes of common basic wire can be shipped by one eastern producer in about four weeks.

Decline in demand for heavy welded

fabric has released rods to some extent. Rods are somewhat easier with nonintegrated mills, but at the expense of finishing departments of producers. High carbon round spring wire capacity is taken for third quarter and some specialties are covered into first quarter next year. Rope mills, sold heavily ahead, require large tonnages of wire and are well supplied with a minimum of cross hauling, although at the expense of some trade relationships. Ratio of rope using galvanized wire is high and galvanizing equipment is taxed. For the moment buying of high carbon galvanized wire is slower, regarded as a temporary condition. Slow return of spools to producers is a hampering factor.

Demand for brush wire and valve

## NO. 34-30 MEXICAN GRAPHITE

for CARBON RECOVERY

### WHEN FEEDING SCRAP

● No. 34-30 Mexican Graphite receives re-newed acclaim from open-hearth superintendents throughout the land, engaging in basic practice. Difficult scrap charges, resultant of both scarcity and uncertainty of materials, call for this pure graphite product as an ideal source of carbon . . . Used under the lime, it feeds carbon steadily into the metal, providing a good boil that helps to release lime and cleans up the hearth quickly. No. 34-30 Mexican Graphite contains no phosphorous or sulphur and gives a carbon recovery of over 60% efficiency. With this product you will experience no foaming or gassy reaction, and its high density enables it to occupy a minimum of hearth space . . . Let this superior carburizer carry you through the "duration" and you will endorse its use for post-war build-up!

THE UNITED STATES GRAPHITE CO.

SAGINAW, MICHIGAN

U. S. A.

spring material is active. Rods for the latter are tight, with open hearths experiencing difficulty in heats to meet exacting specifications. Much of this type of material formerly was drawn from Swedish rods. While requirements for the aircraft industry are heavy, production appears better balanced with demand. Galvanized material is being specified for more aircraft uses.

Producers of coated welding wire have heavy orders with mills for bare wire through and beyond third quarter. While capacity for both bare and coated rods has been greatly increased, demand continues above estimates. While rods are slightly easier in small sizes, heavier rods are tight.

## Tin Plate . . .

Tin Plate Prices, Page 165

Orders being received by tin mills indicate that demand will be about equal to the projected volume of about one and a quarter million tons of plate for last half. The situation is still unsettled, however, and mills are discouraging long term commitments on tin plate as far as possible. Buyers are quite willing to place commitments not only for the balance of this year but also for early 1944 shipments, but because the situation is so questionable, mills are not inclined to take very seriously commitments that far in advance. The schedule remains on a month-to-

month basis and could be easily upset by unusual shifts in the market, such as heavy influx of important lend-lease tonnage or something of the kind, and the metallic tin situation is not static enough to prevent the possibility of a change in government policy in that direction. Part of this latter situation is contingent on the production performance of electrolytic lines now being installed. If orders for electrolytic plate do not keep these lines running to full capacity, it is entirely possible that some orders for dipped plate may be transferred to electrolytic in order to conserve tin.

## Rails, Cars . . .

Track Material Prices, Page 165

Domestic freight car awards of 370 in May brought the total for the first five months up to 9135 cars, against 23,005 in the corresponding period of 1942, 61,996 in the same period of 1941 and 8698 in the first five months of 1940. Further comparisons follow:

	1943	1942	1941	1940
Jan. . . . .	7,415	4,253	15,169	360
Feb. . . . .	350	11,725	5,508	1,147
March . . . .	0	4,080	8,074	3,104
April . . . . .	1,000	2,125	14,645	2,077
May . . . . .	370	822	18,630	2,010
5 mos. . . . .	9,135	23,005	61,996	8,698
June . . . . .		0	32,749	7,475
July . . . . .		1,025	6,459	5,846
Aug. . . . .		0	2,668	7,525
Sept. . . . .		1,863	4,470	9,735
Oct. . . . .		0	2,499	12,195
Nov. . . . .		0	2,222	8,234
Dec. . . . .		135	8,406	7,181
Total . . . . .		26,028	121,499	66,889

Due to continued governmental restrictions, car buying is far less than would otherwise be the case. Actual inquiry for the past week has been negligible.

Locomotive buying is featured by the placing of 25 heavy switch engines by the Pittsburgh & Lake Erie with the American Locomotive Co., New York.

## Structural Shapes . . .

Structural Shape Prices, Page 165

Structural shapes continue easy and in spite of limitation on mill quotas most producers can offer shipment early in July, so restricted is structural demand. Fabricating shops rely principally on miscellaneous shop subassembly work for such limited operations as they are able to develop.


Bookings of fabricated structural steel for April were 56,050 net tons, 73 per cent greater than in March, according to reports to the American Institute of Steel Construction. Bookings for the first four months this year aggregated 198,471 tons, compared with 974,347 tons in the corresponding months last year. Shipments in April were 97,982 tons, against 113,337 tons in March. In four months shipments were 450,303 tons, 40 per cent less than the 710,816 tons sent forward in the same period in 1942. Backlog of tonnage available for future fabrication was 385,294 tons, as of April 30.

## Pig Iron . . .

Pig Iron Prices, Page 166

The primary question in pig iron markets is the coal strike and its effect on coke supplies. Unquestionably blast furnace schedules will be cut down, beginning immediately, in order to keep

# how to use economical direct fired heating where coal is the available fuel

 *heating* industrial plants by means of direct fired warm air heaters fired with gas or oil has long been an accepted, economical practice. Now coal fired models are available for automatic bin or hopper feed stokers, hard or soft coal, in capacities of 1,000,000 to 4,000,000 B.t.u. per hour output.

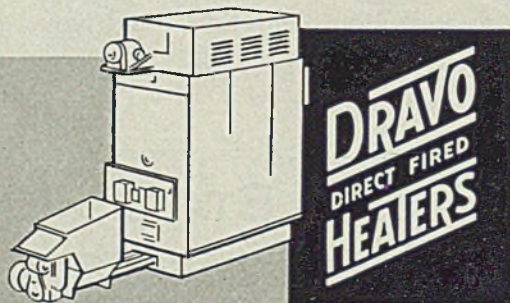
War-time savings—in critical metals—labor hours of installation and maintenance—in fuel and its transportation are so important as to demand thorough investigation.

Those considering conversion to coal heat or new building to be heated with coal are welcome to copies of Dravo booklets 505 and 506.

## DRAVO CORPORATION

Dravo Building

Pittsburgh, Pa.



stacks in operation as long as possible, using reduced volume of coke. There is a possibility that some stacks which have been scheduled for repairs for some time may be taken off now to increase coke stocks for the other stacks and also seize the opportunity to make needed repairs.

There are half-dozen stacks in the Pittsburgh district waiting for a propitious moment to go off for repairs, and this may be it. At least one of these stacks, the No. 4 Aliquippa of Jones & Laughlin Steel Corp., went down June 1 for repairs.

Mystic Iron Works, Everett, Mass., has filed a request with the OPA asking an increase in the base price of \$1 a ton retroactive to May 20. The petition points to heavier costs at the Everett furnace which since April 20, 1942, has been allowed \$1 premium, \$26 base, for No. 2 foundry. Application for a further differential is under consideration by OPA. June deliveries to New England consumers will be slightly lower, following the trend in recent months. The decline is gradual, centered mostly in gray iron foundry needs with demand for basic and malleable well maintained. A Buffalo district furnace, normally supplying part of the district needs, will be back in operation around June 15. Supplies from the Buffalo area during repairs to two furnaces are filled mostly from reserves, which are lower as production resumes. One is now shipping current production.

**Scrap . . .**

Scrap Prices, Page 168

As a result of flood conditions St. Louis scrap consumers lost approximately one week's supply from their reserves but material is now moving in and this loss probably will be made up. Damage to highways by high water is slowing movement into yards and preparation is hampered by water and shortage of labor.

In a dull market in the Cincinnati district some foundries are calling for No. 1 machinery cast and heavy melting steel, particularly short rails. Steel mills have comfortable stocks and most foundries are not seeking further accumulations. Only a moderate upturn has been noted in arrivals of country scrap.

First arrival by lake at Buffalo was a cargo of 5000 tons from the upper lakes, which aided in meeting a somewhat stringent situation. Consumers there, relying in large measure on scrap shipments by lake, fear some of their usual supply may be allocated elsewhere. Borings, turnings and light scrap are in large supply but heavier grades are scarce.

Scrap supply in New England continues out of balance; light plant scrap tonnage is ample, piling up at some points, while heavy open-hearth material is limited. Tonnage of the latter is readily absorbed either by direct purchase or allocation and reserves are built up at a less active rate. Unprepared melting steel is not reaching dealers' yards in satisfactory volume. Demand for shipyard scrap is active, also short shoveling steel. Alloy turnings, when properly segregated find a market, but while producers are making progress in segregation, consumers are skeptical of much of this material moved through dealers unless the source is known. Blast furnaces are taking some turnings, also

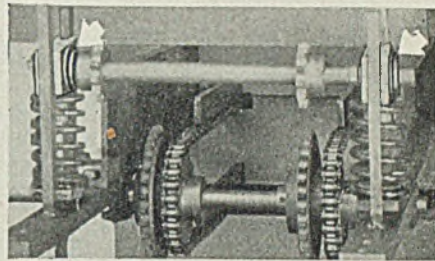
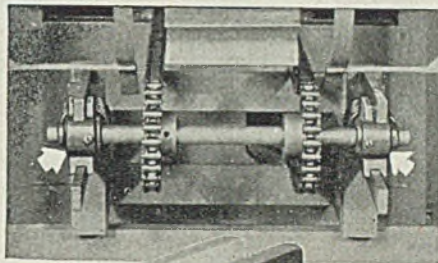
short stove plate, but distribution of turnings and other light plant material is spotty. Foundry scrap is in the doldrums; most melters have substantial inventories, some are melting less.

**Equipment . . .**

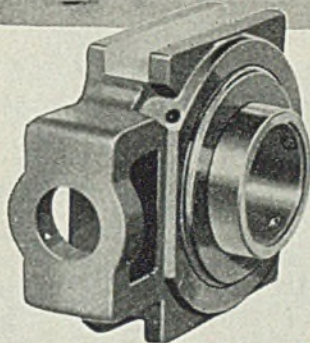
Boston—While large orders have been placed for tooling of an aircraft propeller plant in Ohio, new buying of machine tools declines, requirements for the aircraft industry excepted. Even for aircraft, with the placing of recent orders, the end is in sight for mass plant tooling. At least 60 machine tools for the propeller plant have been placed in the Worcester district; shops with orders

for this unit and an engine plant in the east, have instructions to schedule these machines ahead of everything, notably for the engine plant.

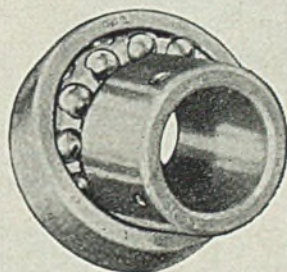
Recent talk of cutbacks and curtailment in new facilities, have adversely influenced new buying, but the decline for the most part follows the natural course of events following the heavy demand for machines in the last two years. During a mechanized war with constant changes in the theaters of operations, the machine tool industry is not likely to become entirely static. One of the largest shops, tentatively designated for contracts for war production other than machine tools, has been given lend-lease orders for regular lines.



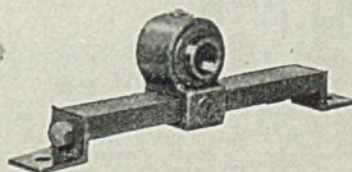
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## Nonferrous Metals . . .

Nonferrous Prices Page 169

New York—Copper producers are taking forward orders more freely which is in line with prewar practice. Consumer allocation certificates will apply more generally against forward commitments each month. No change in price ceilings is expected, minimizing the risk. Until recently producers have taken orders only for the ensuing month.

At times, however, several sellers have had copper after covering all certificates and the change in selling policy by some in taking forward contracts fills any temporary gaps. While most all domestic metal has been taken under alloca-

tions for June, some foreign replacements will go into warehouse for MRC reserves, filling spots opened by withdrawals. June over-all deliveries are not materially changed in tonnage, but mills and foundries with heavier scrap supplies asked for and got less.

However, some consumers with substantial scrap inventories require some new copper to adjust melts to meet difficult specifications. More battlefield scrap is going to brass mills and in at least one instance this was a factor in a mill taking about one-third of its usual copper tonnage this month. While there are indications larger scrap tonnages may slightly ease the pressure for copper, technical problems arising from uncer-

tain scrap means new copper will be required in most instances. While the reserve stockpile may increase slightly this month, for the most part replacements will exceed former withdrawals but slightly.

Contracts for 1,000,000 pounds, hydraulic ingot bronze for the navy have been divided among five producers. Heavier volume of brass scrap reaching mills is also further easing high grade zinc while prime western is as tight as ever. Zinc is more active with allocations completed, June tonnage about equalling recent months. Reserves of slab zinc are substantial. Floods caused less production loss in the Tri-state area than first expected. Requirements for steel galvanizing are up slightly. Substantial tonnages of high grade zinc have been accumulated by some producers and portions of the stock may be offered the MRC.

## Iron Ore . . .

Iron Ore Prices, Page 167

Transportation of iron ore on the Great Lakes is 39.38 per cent below that of last year to June 1, according to the Lake Superior Iron Ore Association, Cleveland. Cumulative tonnage to that date this year is 12,929,489 gross tons, compared with 21,327,064 tons to June 1, 1942, a drop of 8,397,575 tons. Cargoes loaded in May totaled 10,974,672 tons, a decrease of 1,702,684 tons, 13.43 per cent, from the same month last year.

Details of May loadings are as follows:

	May, 1943	May, 1942
Escanaba	722,720	982,458
Marquette	489,941	762,432
Ashland	865,067	916,196
Superior	3,964,712	4,502,289
Duluth	2,534,067	3,168,622
Two Harbors	2,442,483	2,290,875

Total, U. S.	10,918,990	12,622,872
Michipicoten	55,682	54,484

Grand total	10,974,672	12,677,356
Decrease from year ago,	1,702,684.	

Cumulative loadings to June 1 are as follows:

	To June 1, 1943	To June 1, 1942
Escanaba	1,302,905	1,753,749
Marquette	533,065	1,463,006
Ashland	961,270	1,734,725
Superior	4,376,783	7,422,430
Duluth	2,903,313	5,030,188
Two Harbors	2,796,471	3,800,558

Total, U. S.	12,873,807	21,204,656
Michipicoten	55,682	122,408

Grand total	12,929,489	21,327,064
Decrease from year ago,	8,397,575.	

## Nonferrous Foundry Group Seeks Price Order Change

Members of the Nonferrous Foundry Society and nearly four hundred other producers of nonferrous castings who are subject to OPA's revised price schedule No. 125 are being polled by mail for additional information, opinions and recommendations by the Washington Contacts committee of the Society in furtherance of the committee's efforts for modifications in this regulation.

Committee members are: E. W.

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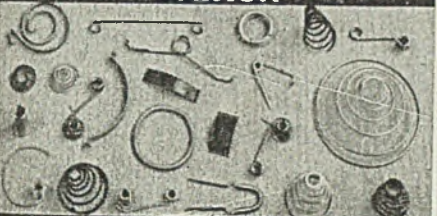
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**EXTENSION**



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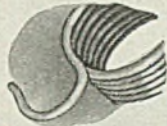


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Torsion spring with special hook end.



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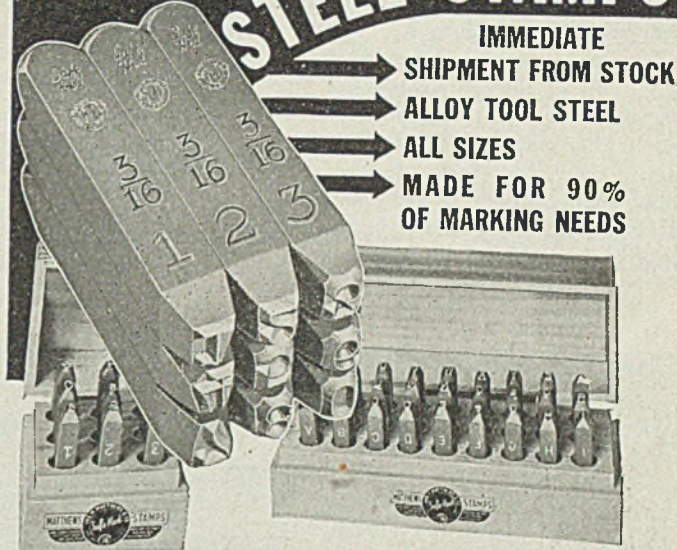
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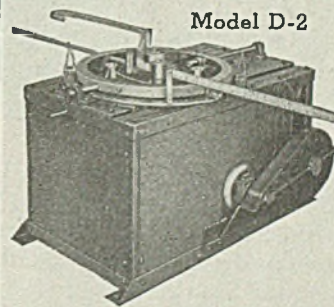
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The committee is pressing the industry's request for elimination of the "across the board" price reduction to persons or on classes of castings where metal cost had not declined by full amount of the 1½ and 3-cent reductions. It also reiterates its conviction that business volume of nonferrous

jobbing foundries still is declining. The committee has asked that members of the industry subject to the regulation be accorded same exemption on small orders that is accorded to small operators who are doing less than \$50,000 of business annually.

**Canada . . .**

Toronto, Ont.—New business is developing on an expanding scale in the Canadian steel markets and mills are accepting orders almost to the end of this year. Under the new war production program retooling is underway or planned for a number of war equipment plants,

especially those that have been turning out guns and shells and it is stated that the change from defensive to offensive weapons will result in production of at least three new types of guns in Canadian plants. The change already is swinging workers from one war plant to another, but it is stated that by the end of October those plants now laying off workers will resume operations on new products with staffs well in excess of anything they have used in the past. The change in production also will be reflected in revised analysis for certain lines of alloy steels, and it is stated that specifications for new types now are being prepared and large tonnage orders are pending for delivery during fourth quarter. Already there has been slowing in demand for special alloy steels under the program which calls for reduced output of Bren guns and other types of equipment that have been given special attention.

Persistent flow of new orders for ship plate features the market and producers report commitments extending through the better part of fourth quarter, with practically no capacity available for third quarter. In addition to the heavy call on shipbuilding account, heavier tonnages now are being made available to rolling stock builders and large orders have been closed recently for locomotive building. A number of plate orders appeared in the market during the week from boiler makers, ranging from 100 to 300 tons, which are in addition to the regular government placements.

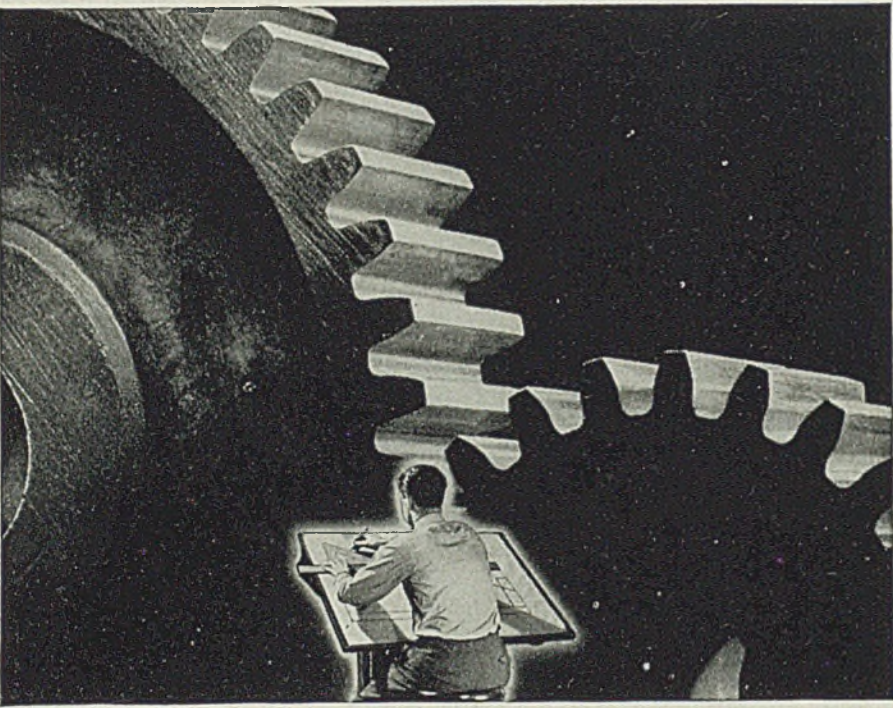
While mills are accepting additional tonnages for sheets, delivery dates on new orders are uncertain. On both black and galvanized sheets backlogs extent into fourth quarter although some supply still is available in the latter part of September. Sheet orders developed more action during the week with placements by some consumers exceeding 150 tons. While most of the new business is on war production account, it is stated that civilian buying also is increasing, although deliveries to the latter consumers are only against approval by the steel controller.

Demand for structural shapes is confined to small lots, but fabricators and producers report heavy demand on smaller sizes for shipbuilding. Production and demand for heavy sections have almost entirely disappeared and mills are confining output to a diversified group of small items.

Little change is reported in the iron and steel scrap market. Receipts are holding well up to the average of the past two months as far as steel grades are concerned and dealers are still adding to yard stocks. Deliveries to mills are said to be about equal to demands, but there has not been sufficient improvement in offerings to enable large consumers to start rebuilding inventories.

**Steel in Europe . . .**

London — (By Radio) — Output of semifinished steel in Great Britain is expanding and meets needs of rollers engaged on war contracts. Scarcity is developing in hematite pig iron as foundries increase activities. Engineering castings and heavy structurals are in better supply and the situation is easier. Scrap supply is steady and meets requirements.



*Lest they loom too large later,* start your plans now for the period which will follow the winning of this war. . . . Winning is the paramount task now. It is but the first step to Victory —which will be achieved and maintained only by an industrial transition, quickly stabilized to provide the profits needed to pay for the rehabilitation of a war-torn world population.

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PRECISION MEASURING EQUIPMENT

# OPA Establishes "Floor" of \$14 For No. 1 Heavy Melting Steel

ADJUSTMENTS in pricing requirements to changing conditions in iron and steel scrap field have been made by Office of Price Administration in schedule No. 4 as revised May 29.

The principal changes include: establishment of provisions covering weights to govern pricing of scrap shipments, addition of new listed grades, establishment of a "floor" of \$14 per gross ton

for No. 1 heavy melting steel, and the designation of new "remote" points to which preparation in transit privileges will apply.

**Weights to Govern.** Weights that are to govern the computation of maximum prices are specified. The general rule is established that settlement for all scrap shall be made on the basis of weights at the point of delivery. In rail shipments,

however, if weights at the shipping point have been determined, no adjustment need be made for differences of 500 lbs. or less per car between shipping point weights and weights at the point of delivery. If the difference exceeds 500 lbs. per car, adjustment must be made for the full shortage in the car. For vessel shipments, weights at the dock prior to vessel movement, rather than weights at the point of delivery, are to govern. Exceptions are made for shipments of scrap by the Navy and Metals Reserve Co.

**\$14 Floor.** The \$13 per gross ton "floor" for No. 1 heavy melting steel with established differentials for other listed grades of steel scrap has been increased to \$14 per gross ton. The change in the "floor" price eliminates the \$1 per gross ton differential that certain Gulf Coast ports had over adjacent areas.

**New Listed Grades.** Pit scrap, ladle scrap, salamander scrap, skulls, skimmings, and iron and steel scrap reclaimed from slag dumps, are priced according to the percentage of iron content; if the material contains 85% or more iron, it takes a differential of \$2 per gross ton under No. 1 heavy melting steel; a differential of \$4 per gross ton applies to an iron content of 75 to 85%, and \$8 per gross ton to an iron content under 75%. Mill scale is priced at \$8 per gross ton below No. 1 heavy melting steel. Mill cinder and grindings receive a maximum shipping point price of \$4 per gross ton at all shipping points in the United States. Heretofore these grades were priced in accordance with the base period experience of each seller, and were not uniform.

## "Remote" Area Enlarged

**"Remote" Scrap.** The amendment designates the State of Arkansas as "remote," and all non-remote shipping points in Nebraska and Kansas are made "remote." By this designation, certain preparation-in-transit privileges may apply to scrap shipped from these areas. In addition, several modifications are made in provisions applying to purchases of remote scrap. The springboard limitation for "remote" scrap has been increased to \$7 from \$5 per gross ton. Filing of bills of lading and sworn statements for the "remote" scrap moving within the "remote" springboard limitation, are no longer required, nor is the filing of bills of lading required on "remote" scrap delivering over the \$7 "remote" springboard limitation and approved by OPA. Prior approval by OPA is still required for any consumer wishing to purchase "remote" scrap that will deliver over the \$7 "remote" springboard.

**Basing Points, Claymont and Chicago.** The Amendment redefines the territorial limits of the Claymont and Chicago basing points. The Claymont basing point now includes the switching district of

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### BROSIUS MANIPULATORS and CHARGERS

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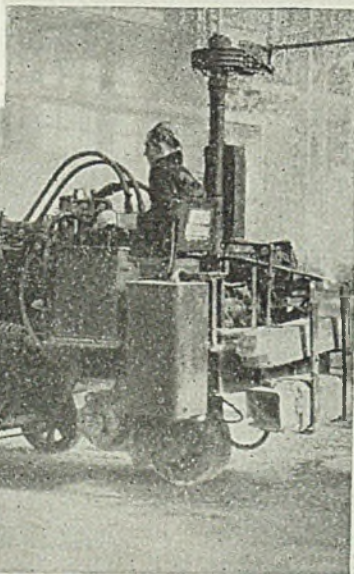
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By

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**DESCRIBES** sequence of operations in sheet-making from manufacture of steel to finished sheet, with especial reference to production of high grade sheets for automobile bodies; influence of various methods upon quality of product and causes and prevention of defects are given attention; description follows current practice and is devoid of unnecessary technicalities.

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**Crushing of Turnings in Transit.** Preparation-in-transit privilege is extended to machine shop turnings or other grades of long turnings shipped in rail carload lots and crushed in transit. The maximum preparation fee allowable is \$2 per gross ton.

**Scrap for Use in Copper Precipitation.** Detinned or tin-coated scrap sold for use in copper precipitation has been exempted from the Schedule. However, black or galvanized sheet scrap shredded

and sold for copper precipitation use is still covered by the Schedule. It is priced at \$1.50 per gross ton over the price of No. 1 heavy melting steel, and is free of any springboard limitation. These changes were instituted after consultation with the Copper Division of the War Production Board.

**Briquetted Alloy Free Turnings.** The special springboard limitation for alloy free turnings and certain other electric furnace grades produced in industrial plants in Michigan and delivered to consumers in or nearest the New York, Buffalo, Pittsburgh, Brackenridge or Mid-

land, Pa. basing points has been extended to briquetted alloy free turnings.

**Billing of Freight Tax.** Requirements that the 3 per cent property transportation tax be shown as a separate item on the invoice are removed.

**Initial Sales of Unlisted Grades.** Requirement for filing reports on initial sales of inferior unlisted grades of scrap has been eliminated.

**Suspension of 6 Per Cent Freight Increase.** Effective May 15, the Interstate Commerce Commission suspended the 6 per cent increase in freight rates which became effective in March, 1942. Certain language has been deleted which previously indicated the method of handling the freight increase whenever it was incurred in moving scrap from the shipping point to the point of delivery.

**Electric Furnace Grades.** Electric furnace premiums may now apply to electric furnace grades sold for use in smelting of nonferrous metals. This permits smelters to pay the same price that electric furnace acid open hearth and foundry consumers may pay for selected grades of steel scrap.

## Die Casters' Profits Seen Eliminated Under New Order

Profits of most die casters will be eliminated under terms of OPA's price schedule No. 377, effective as of May 1, according to Anton F. Waltz, president, American Die Casting Institute Inc. and Advance Pressure Castings Inc., Brooklyn, N. Y., in an explanatory article on the price regulation.

Studies by an industry committee indicates "that the proposed price cuts in the regulation might force half of the industry into the red and that 90 per cent of the die casters might have to apply for exemption or modification of the order," Mr. Waltz said.

"As a result of all the work done by the industry and its committee in order to correct the mistaken conception as to profits, the regulation calls for a . . . reduction . . . which the industry may not be able to afford on top of absorbing all the increased costs which the regulation requires. OPA showed its good intentions by modifying the proposed cut to a compromise basis requested by the industry to make the test less onerous.

"The executives of the government who conceived this new order say they are determined that it shall not jeopardize production nor cause a die caster to operate in the red, all criteria considered. Because of this assurance of fundamental justice in its application, during the test period, the die casting industry will do its best to live up to the letter and spirit of the regulation."

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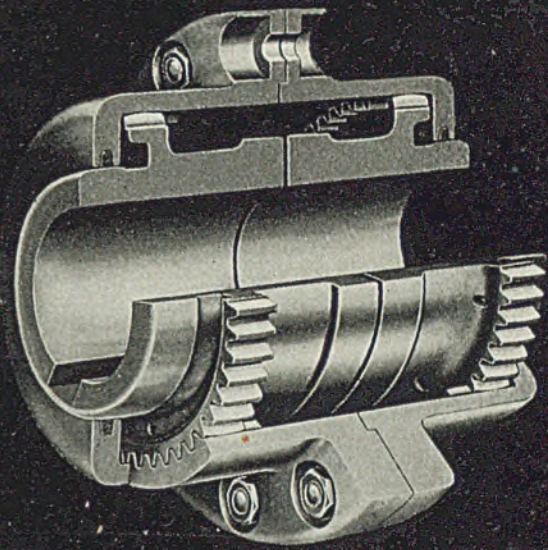
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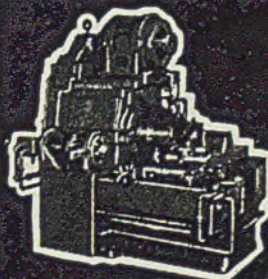
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Plant Expansion, Construction and Enterprise, Government Inquiries,  
Sub-Contract Opportunities, Contracts Placed and Pending

## SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

**Philadelphia Office. Contract Distribution Branch. Production Division, WPB, Broad Street Station building reports the following subcontract opportunities:**

**Buescher-21-1:** A Pennsylvania concern requires 3258 disc nuts, three types. Dimensions, O.D. 1¼-inch to 1¾-inch, length ¾ to 1 inch. Equipment, automatic or hand screw machine, 1¼ to 1¾-inch spindle. Tolerance, plus or minus .003. Material, B-1112 or X1112 steel, which will be furnished.

**Buescher-21-2:** A Pennsylvania concern requires 3258 disc nuts, four types. Dimensions, O.D. 1¼ to 2¼ inches, length ¾ to 1½-inch. Equipment, automatic or hand screw machines, spindle 1¼ to 2¾-inch. Tolerance, plus or minus .003. Material, 303 stainless steel, which is furnished.

**Buescher-21-3:** A Pennsylvania concern requires forging facilities for 16,000 locomotive connecting rods. Equipment required, 12,000 to 16,000-pound drop forge hammers. Deliveries 200 to 300 pieces per month, starting in November. Overall dimensions, 43 inches long, 13 inches wide and 5 inches thick. Weight, 195 pounds each. Material, 4140 steel allocated CMP. Priority, AA-1. Dies not furnished.

**Buescher-21-4:** A Pennsylvania concern requires 3258 valve stems, 12 types. Dimensions, length 8¼ to 15¾ inches, diameter 1¼ to 1¾-inch, threads 5 R.H. and 6 R.H. std. Acme threads per inch. Equipment required, turret lathe 1½-inch spindle, No. 1 milling machine. Tolerance, No. 3 thread fit, turned diameters plus or minus .003. Material 303 stainless steel, free machining, which will be furnished.

**Buescher-21-6:** A Pennsylvania concern requires 3258 gland nuts, three types. Dimensions, 2 to 2 9/16-inch hex stock. Width 1¼ to 1¾-inch. Threads 1½ to 2 inches, 12 N.C.3. Equipment required, automatic or hand screw machines. Tolerance, plus or minus .003. Material, SAE B1111 or 1112 steel, which will be furnished.

### Steel Hours Ruling Held Confusing by Committee

(Concluded from Page 72)

That difficulty will be multiplied if, indeed, the task is not made impossible by the delays and restrictions that will result from the War Manpower Commission's instructions.

"In fact, it is the committee's considered opinion that this regulation will have the effect of setting up a vast unworkable bureaucracy which must inevitably seriously interfere with steel production. Its operation is bound to

result in confusion, delays, and failures of operating schedules to the point that the industry's war effort will be imperiled.

"Because of the WPB's responsibility for maintaining maximum production of steel in the interests of the war program, your advisory committee feels an obligation to submit further detailed suggestions as soon as it is possible to analyze the regulation. If adopted, these suggestions should result in regulations for the proper application of the 48-hour week in the steel industry. They will have but one objective—maintenance of capacity production of steel and full utilization of manpower."

### WPB Intensifies Search for Red Metal Scrap

Scrap and salvage operators have been asked to assume greater responsibility in assisting the Scrap Processors Branch in locating and expediting the movement of copper, brass and bronze scrap from trade sources holding small accumulations. Although representatives of the Scrap Processors Branch supervise all dealer activities and are endeavoring to assure the 60-day "turn-over" provided for in order M-9-b, a more aggressive policy must be assumed by large dealers in flushing these grades of scrap from their dormant status into production channels, says Paul C. Cabot, director, WPB Salvage Division.

### STRUCTURAL SHAPES . . .

#### SHAPE CONTRACTS PLACED

4000 tons, wind tunnel, Moffat field, California, for War Department, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

275 tons, bridge, Eddystone, Pa., to Belmont Iron Works, Eddystone; Cayuga Construction Co., New York, general contractor.

### REINFORCING BARS . . .

#### REINFORCING STEEL PLACED

6000 tons, floating drydocks to be built in Delaware, divided between Bethlehem Steel Co. and Republic Steel Corp.; V. P. Lofus,

Charlotte, N. C., contractor; previously reported in error to another supplier.

560 tons, expansion, Northern ordnance plant, operated by Northern Pump Co., Fridley, Minn., to Truscon Steel Co., Youngstown, O.

300 tons, addition, U. S. Veterans' hospital, St. Cloud, Minn., to Truscon Steel Co., Youngstown, O., Hagstrom Construction Co., St. Paul, contractor; bids April 20.

180 tons, Detroit industrial highway, Detroit, to Bethlehem Steel Co., Bethlehem, Pa.; L. A. Davison, contractor.

137 tons, grade separations, Chicago—72 tons at Pulaski and Keller roads, and 65 tons at Cicero and Keller roads, for Illinois state highway division, to Concrete Steel Co., Chicago; Michael J. McDermott & Co., Chicago, contractor; bids March 19.

### REINFORCING STEEL PENDING

390 tons, modification center, airplane plant, Ft. Crook, Neb.; general contract to Peter Kiewit Sons Co., Omaha, Neb.

### RAILS, CARS . . .

#### LOCOMOTIVES PLACED

Pittsburgh & Lake Erie, 25 heavy switch engines, to American Locomotive Co., New York.

## CONSTRUCTION AND ENTERPRISE

### OHIO

**ALLIANCE, O.**—Alliance Radio Corp. is being incorporated to manufacture and develop electronic, electric and radio devices. Ian Bruce Hart, 403 First National bank building, Stewart O. McHenry and Kathryn Fellows are incorporators, the former being agent.

**BOWLING GREEN, O.**—Grieder Machine Tool & Die Co., Bowling Green, has awarded contract for a one-story 100 x 300-foot brick and steel factory building to E. J. Benes & Co., Terminal Tower, Cleveland.

**CLEVELAND**—Fisher Cleveland Aircraft division plant No. 2 of General Motors Corp., Fisher building, Detroit, has let contract for plant improvements to F. S. Tillman, Seymour, Ind., federally financed, to cost about \$150,000.

**CLEVELAND**—Hodell Chain Co., 3924 Cooper avenue, will build a chain forging shop 50 x 120 feet. Fred G. Hodell is president-treasurer.

**CLEVELAND**—Lakeside Steel Improvement Co., C. W. Derhammer, president and general manager, is having plans prepared for a 50 x 200-foot crane runway for five-ton crane, at 5418 Lakeside avenue.

**ELYRIA, O.**—Elyria Properties Corp. has been incorporated to manufacture machinery and mechanical appliances by D. B. Gordon, A. W. Thomas and A. J. Koehler. Ernest N. Birch, Elyria, is statutory agent.

**ELYRIA, O.**—Gilkison Mfg. Co., Abbe road, will rebuild its plant recently burned, it is

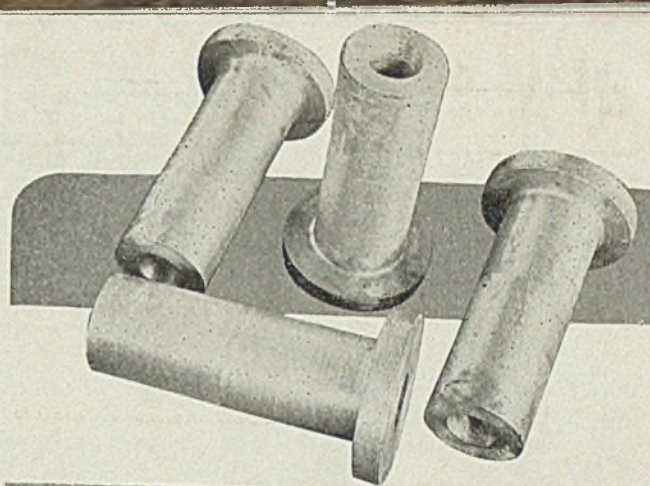


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announced by G. C. Gilkison, president. New plant will be one story, planned so additions can be made later.

## MASSACHUSETTS

LEOMINSTER, MASS.—Standard Tool Co., 75 Water street, will let contracts soon for a three-story 42 x 54-foot reinforced concrete plant addition to cost about \$40,000. S. W. Haynes & Associates, 336 Main street, Fitchburg, Mass., are architects.

## CONNECTICUT

BRIDGEPORT, CONN.—General Electric Co., Boston avenue and Bond street, has let contract to Harry Maring Jr. Inc., 536 Lindley street, for a factory building costing about \$54,000. M. Sword, care owner, is engineer.

## RHODE ISLAND

PROVIDENCE, R. I.—United States engineer, 819 Industrial Trust building, has let contract for a submarine watermain for the water system of Newport Co. to Elliott & Watrous, Crest avenue, Riverside, estimated to cost under \$50,000.

## NEW YORK

FALCONER, N. Y.—Jamestown Sterling Corp., Allen street, has let contract for one-story brick and concrete plant extension to Olson Construction Co., 311 Lincoln street, estimated to cost about \$40,000. Former contract has been rescinded.

JAMESTOWN, N. Y.—Crescent Tool Co., Foote avenue and Harrison street, will take bids soon through Beck & Tinkham, archi-

ects, Bailey building, for a plant addition to cost about \$40,000.

## NEW JERSEY

NEWARK, N. J.—New Jersey Galvanizing & Tinning Works, foot of Pacific street, has plans by V. Strombach, 1243 Springfield avenue, Irvington, N. J., for a one-story 77 x 165-foot manufacturing building to cost about \$100,000.

## PENNSYLVANIA

GREENSBORO, PA.—Duquesne Light Co., 435 Sixth avenue, Pittsburgh, will take bids soon on a one-story 40 x 130-foot brick machine shop.

## MICHIGAN

ADRIAN, MICH.—Plans are being drawn by Finbeiner, Pettis & Strout, engineers, 725 Nicholas building, Toledo, O., for a water filtration and pumping plant at Adrian, estimated to cost about \$200,000. Plans will be completed early in July.

DETROIT—Clair Ditchy, architect, 333 State street, is preparing plans and specifications for plant at 10340 Oakland boulevard for Diamond Specialty Power Corp.

DETROIT—Progressive Tool & Cutter Co., Dime building, has been incorporated with \$1000 capital to render engineering service. John Yonco, 231 South LaSalle street, Chicago, is agent.

GRAND RAPIDS, MICH.—Jenkins Tool Co., 1217 Monroe avenue, N.W., has been incorporated with \$25,000 preferred and \$25,000 common capital by Frances Borden, 1217 Monroe avenue.

GRAND RAPIDS, MICH.—Fruehauf Trailer Co. has awarded contract to Osterink Construction Co., 1502 Grandville avenue S.W., for addition to factory at 719 Century avenue, to cost about \$10,000.

KALAMAZOO, MICH.—Kalamazoo Plating Works, Willard and Colley streets, has been incorporated with \$100,000 common and \$150,000 preferred capital stock, by Albert J. Nook, company representative, and associates.

LANSING, MICH.—Motor Wheel Corp., 1500 North Larch street, has let contract to Reniger Construction Co., 127 North Cedar street, for a second story addition to its plant, at estimated cost of \$12,000.

MELVINDALE, MICH.—Melvindale Machine Products Inc., 2521 Oakwood boulevard, has been incorporated with \$5000 capital to manufacture machine products, by Gerald G. Goldsmith, 15123 University street, Allen Park, Mich.

## ALABAMA

BESSEMER, ALA.—Fruehauf, Harry R. Fruehauf, Detroit, has leased three acres for trailer assembly plant and will remodel plant building thereon, formerly occupied by U. S. Heater Co., at Eighth avenue and Twenty-fifth street.

## GEORGIA

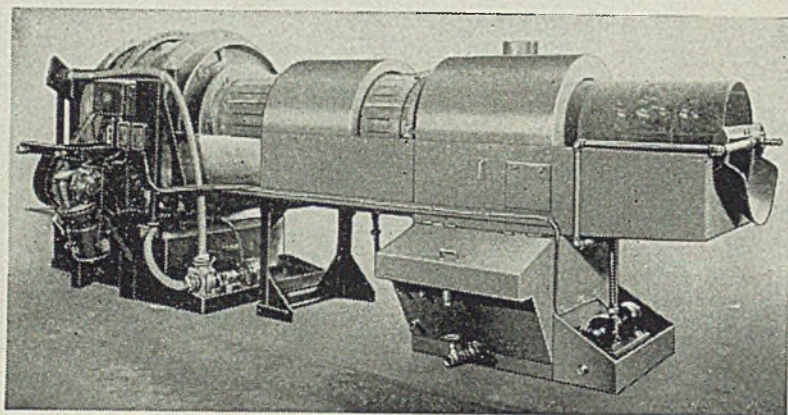
LA GRANGE, GA.—Plantation Pipe Lines, Healey building, Atlanta, Ga., is taking bids for a \$25,000 pumping station.

## MISSOURI

KANSAS CITY, MO.—Prier Brass Mfg. Co., Fifteenth street and Blue River, is building plant addition to allow rearrangement of foundry department and new pattern storage vault.

ST. LOUIS—McDonnell Aircraft Corp. has closed contract with Defense Plant Corp. to provide additional facilities for a plant in Missouri costing \$116,000.

Photograph shows the pickler with drum with rubber vulcanized inside and out. Or, with molybdenum bearing stainless steel.



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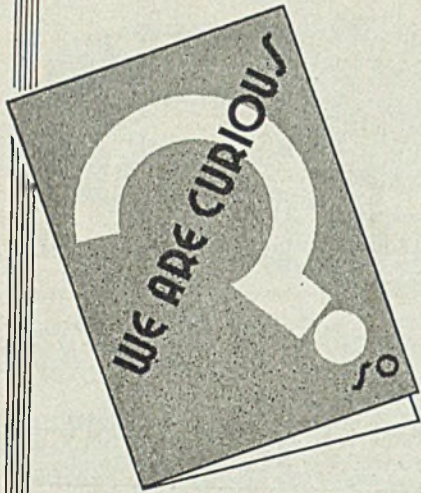
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## TEXAS

BEAUMONT, TEX.—Chemical Construction Co., engineers, 7621 Wallisville road, Houston, Tex., is taking bids on an acid and sulphur products plant for the Southern Acid & Sulphur Co., Port Arthur road, Port Arthur, Tex.

PASADENA, TEX.—City, care mayor, is planning postwar construction of a tunnel under Houston ship channel. Plans are being prepared by Garrett Engineering Co., 3504 Audubon street, Houston, Tex.

## IOWA

DIKE, IOWA—Farmers' Co-operative Elevator is having plans prepared for a soybean processing plant to cost about \$40,000, including equipment.

MUSCATINE, IOWA—Muscatine Processing Corp., S. C. Stern, president, is having plans prepared for a soybean plant to cost about \$200,000.

SIOUX CITY, IOWA—Sioux Soya Co., A. Sanford, president, Eleventh and Clark streets, has let contract for a soybean processing plant to W. A. Klinger Co., Sioux City, at estimated cost of about \$150,000, including equipment.

## WYOMING

LARAMIE, WYO.—War Production Board has recommended that Monolith Portland Midwest Co., Laramie, be authorized to build an alumina plant in that city at cost of \$4,000,000.

## IDAHO

KELLOGG, IDAHO—Bunker Hill & Sullivan Smelting Co., Kellogg, has started construction of a zinc fuming plant to cost about \$1,250,000.

## CALIFORNIA

BEVERLY HILLS, CALIF.—Aircraft Engineering Inc. has let contract for a factory building at 335 North Foothill boulevard, to cost about \$16,000.

BURBANK, CALIF.—Aircraft Accessories Corp. has let contract for a factory building at 106 West Olive avenue, to cost about \$10,000.

BURBANK, CALIF.—Pacific Airmotive Corp., 2627 Hollywood way, is erecting a test building at 4301 West Empire boulevard, costing about \$10,000.

LOS ANGELES—Rapeco Machine & Tool Co. will build a machine shop 36 x 100 feet, costing about \$6500 at 5742 Bandera street.

LOS ANGELES—Perfection Machine Co. has been formed by Ludwig Karlein and associates to conduct business at 3063 Los Feliz boulevard.

LOS ANGELES—Aircraft Tool Sales Co. has been formed by George Newman to conduct business at 3715 Santa Fe avenue.

SANTA BARBARA, CALIF.—Allied Metal Corp. has been incorporated with 2000 shares no par value by Harold S. Nix, 201 South Chapel street, Alhambra, Calif.; Lou Osborne, 55 Oak road and Ralph C. Raddus, 15 West Carrillo street, Santa Barbara. Representative is Robertson, Schramm & Raddue, 15 West Carrillo street.

## CANADA

TORONTO, ONT.—DeHavilland Aircraft of Canada Ltd., Sheppard avenue, North York township, has given general contract to A. W. Robertson Ltd., 57 Bloor street West, for construction of new plant addition to cost with equipment about \$1,000,000. David Shepherd, 57 Bloor street West, consulting engineer.

MONTREAL, QUE.—Canadian Pacific Railway Co., Windsor Station, has given general contract to Anglin-Norcross, Quebec, Ltd., 892 Sherbrooke street West, for addition to locomotive works and other extensions to the Angus shops at cost of approximately \$50,000.

SACKVILLE, N. B. — Enterprise Foundry Co. Ltd., Enterprise street, has given general contract to Rhodes Curry Ltd., 35 Lansdowne avenue, Amherst, for construction of new steel shop to cost with equipment about \$65,000, to replace plant recently destroyed by fire.

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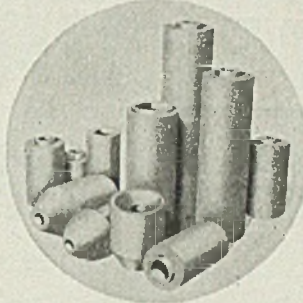
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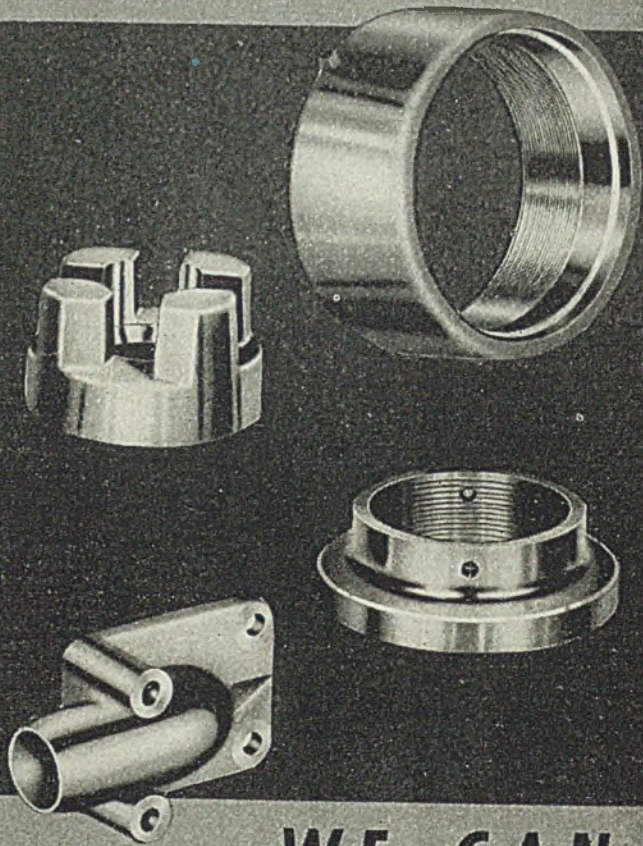
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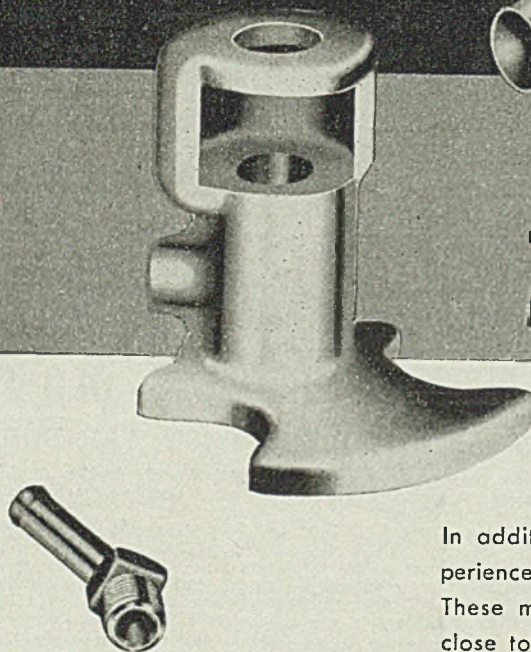
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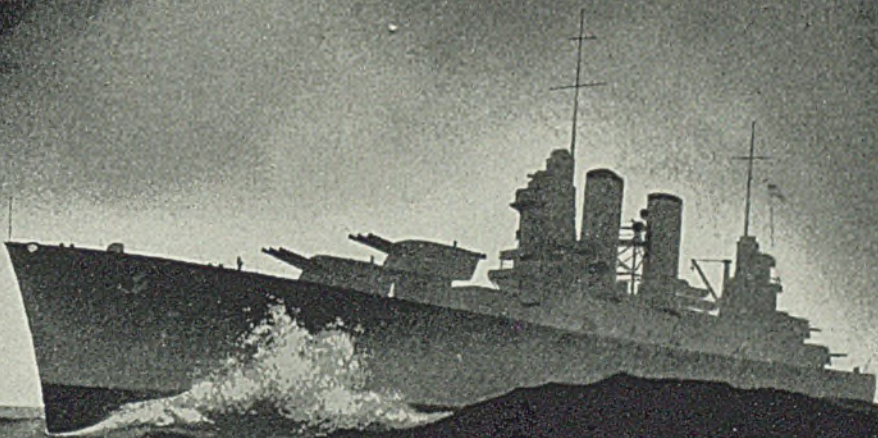
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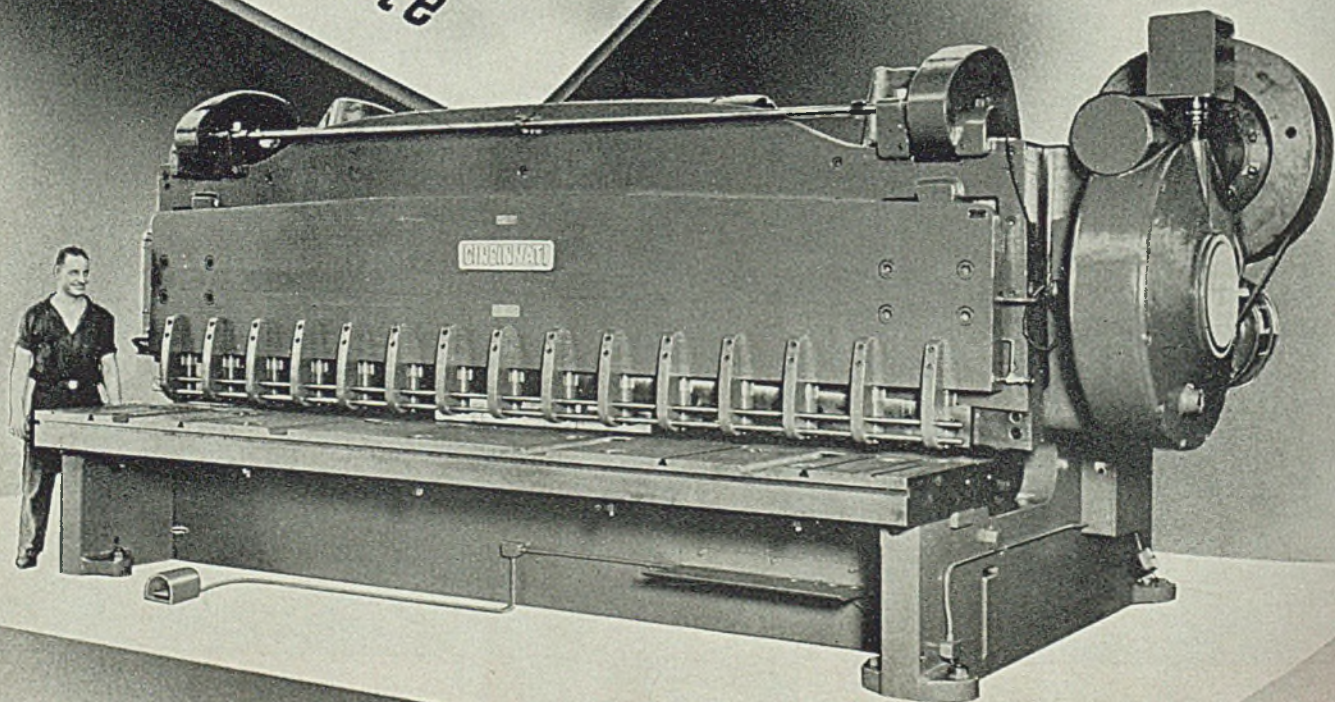
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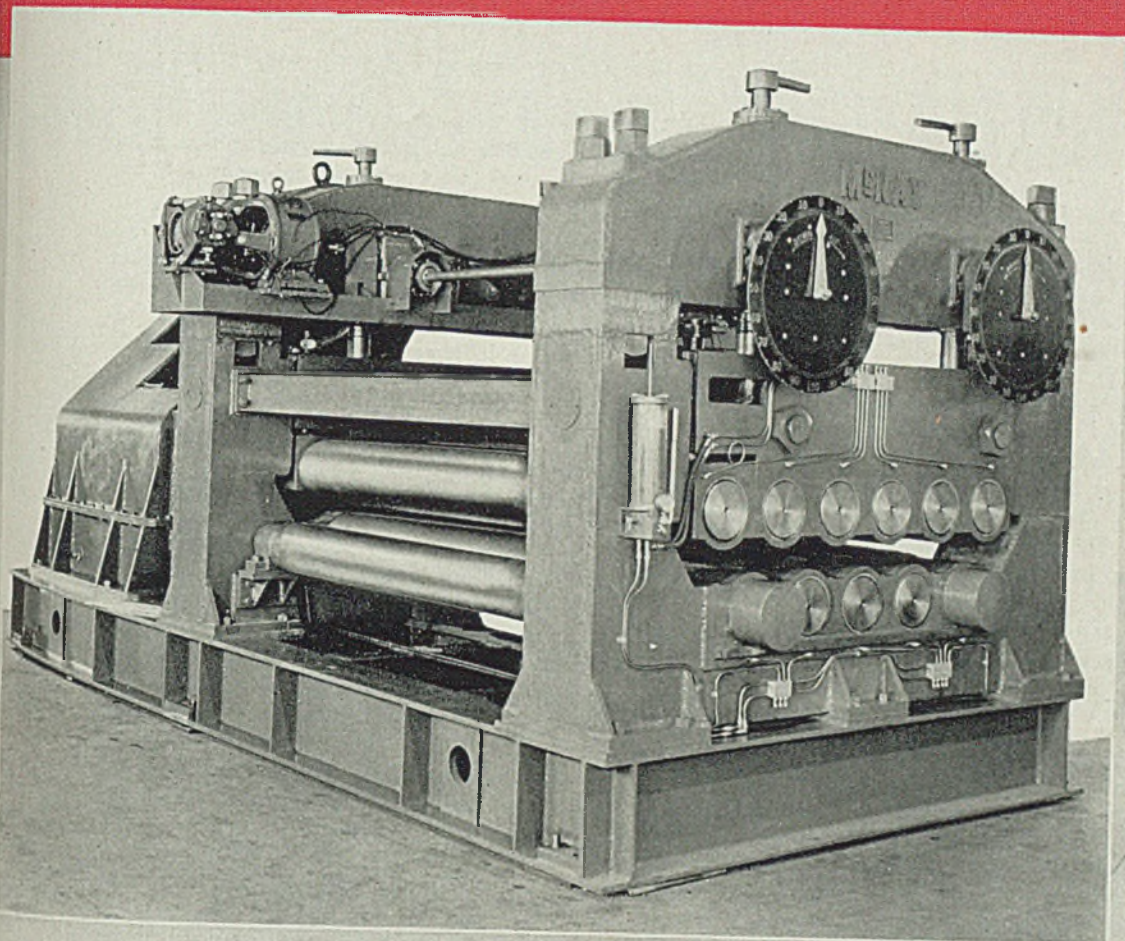


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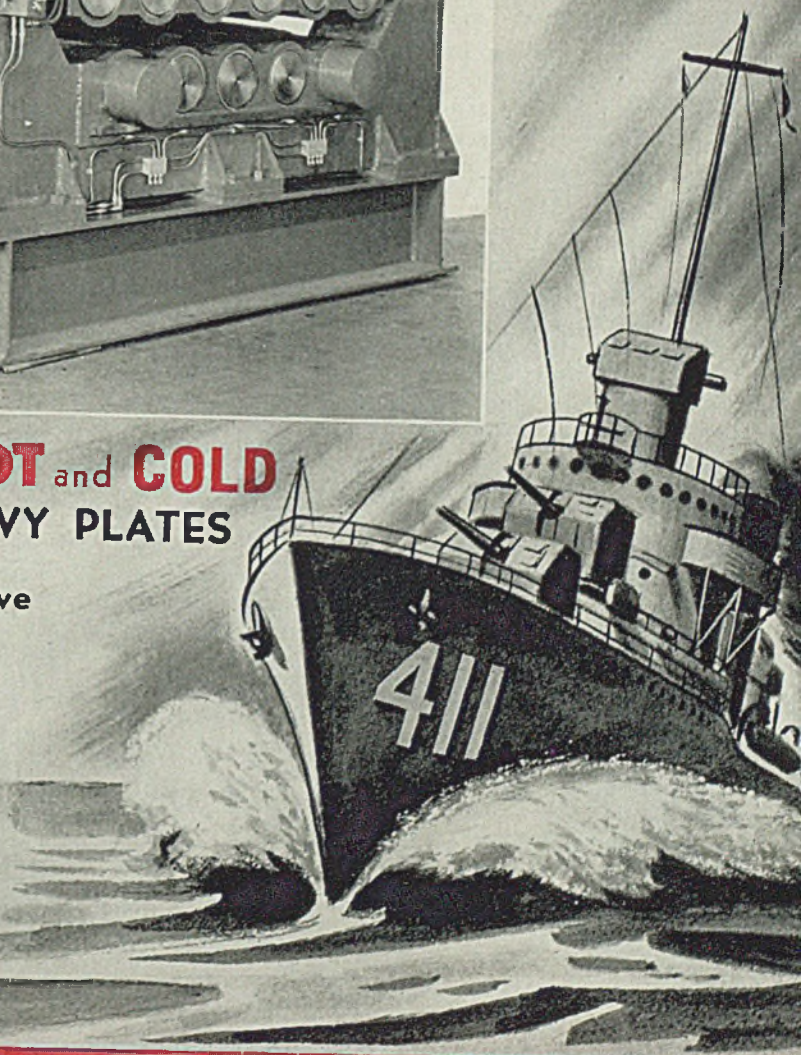
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# BEHIND THE SCENES

## Advice to the Victory Gardener

■ "Rain, rain—go away" has become the theme song of every metalworking victory gardener in this, the Cleveland area, at least. And from what little information seeps through the wartime weather bureau censorship we're not alone in our plaintive chant. But whether you are an old and experienced gardener who already is bragging about the peas you had last night for dinner or one of the rank amateurs like ourselves we believe you'll get some real help and advice from Doctor Horatio K. Bunbottom's Garden Column which we are snitching from the May issue of the American Foundry Equipment Co.'s *Parade*. It follows:

### Selecting the Site

■ "The first step in establishing a garden is the selection of the site. This, preferably, should be just beyond the reach of your sprinkling hose, as it is considered quite fashionable to use buckets to carry water out to your dying plants. Besides that, the water slopping down your pants' leg has a definite cooling effect which will be much appreciated on hot summer days.

"Once the site has been determined, a simple soil test should be made. This test consists of picking up a clod of dirt, smelling it, and then crumbling it between your fingers. This will create the impression that you are a soil expert, and it also dirties your shirt front which gives you an honest, down-to-earth appearance.

### Acquiring the Tools

■ "Obtaining a full assortment of tools is the next step. This is best done by borrowing from the neighbors; although, under very unusual circumstances, actual purchasing from the local hardware store is permissible. One of the most important of all tools is the hoe, so be sure to get one with a sturdy handle. You will find it of great value in helping to assume the Tired Gardener Stance which will awe both your family and close neighbors.

"The successful gardener also makes judicious use of fertilizer, of which there are two general types—one coming from bags and the other from nags. You will find that a great many people will insist the bag type is just as nutritive as the Old Original, but it is suggested you get the opinion of any well informed sparrow on this.

### Preparing the Soil

■ "The soil should next be prepared and the most popular way is to hire some farmer to do the plowing. The farmer and plow method gives him a chance to show his skill in driving horses. When he shouts "Gee", that is the signal for the horses to swing to the right and trample down your wife's begonia bush. "Haw" means just the opposite . . . (The begonia bush tramples down the horses?)

### When To Plant

■ "When to plant, probably, will be your biggest problem. Late frosts get the early vegetables and early

frosts get the late ones. It is well to remember that certain things should be planted on certain days. Potatoes, for instance, should be in the ground by St. Patrick's Day. Of course, if you aren't going to raise potatoes, it doesn't matter what day you don't plant them on.

### . . . And How

■ "The majority of garden vegetables are grown from seed, and there are various ways of planting. One expert advocates wrapping each seed in lead so the weight will cause the seed to sink in the ground and thus plant itself. This method is not generally recommended, for it is one sure-fire way to get lead in your plants.

"Radishes are a very popular item. Why, no one seems to know. They are pictured on the seed packet as being colorful scarlet globes tipped by small green leaves. Actually the average home-grown radish resembles spinach with large green leaves and an edible portion more like a toothpick.

### Vitamin Content Important

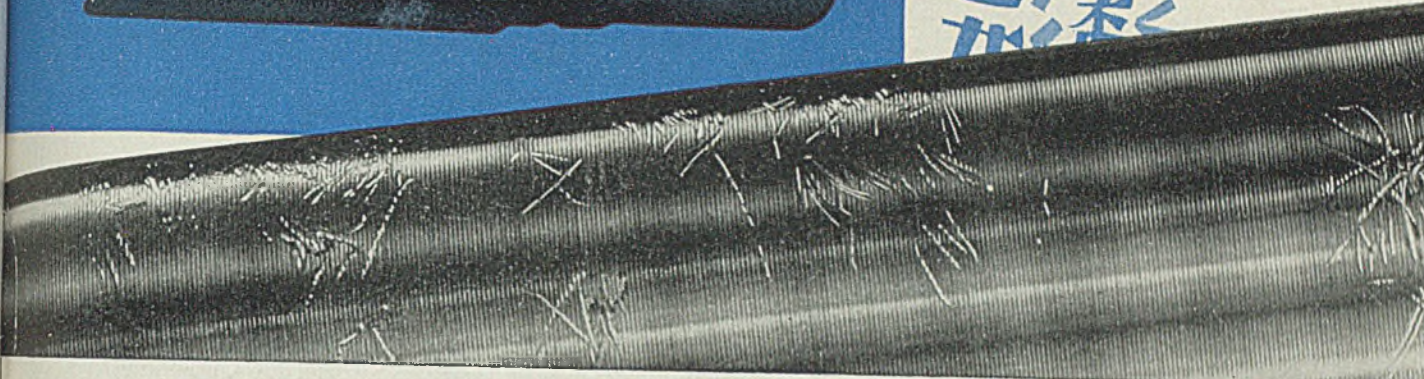
■ "Tomatoes are also a popular vegetable. They are generally grown from plants purchased from commercial growers. The plants usually seem sickly and puny and don't look as if they will survive. Don't let them fool you—they are, and they won't.

"Vegetables generally are famous for their vitamin content, some having more than others. Parsnips, turnips and spinach are notoriously rich in vitamin content; while the things you like, such as strawberries, and corn-on-the-cob, are sadly lacking. This often tempts the amateur gardener to try developing new species which incorporate the good points of several types. We warn that this does not pay. We knew of one man who, after years of experimentation, succeeded in growing strawberries that tasted like spinach. He wrote the Department of Agriculture and told them but instead of complimenting him they told him it wasn't worth much unless he could develop a spinach that tasted like strawberries. This particular friend gave up the whole idea and put in a miniature golf course instead."

### How To Get to Heaven

■ We all know the plight of association secretaries and can therefore appreciate this complaining obit written by the Secretary of the Purchasing Agents Association of Birmingham, Ala., as he retired from office at their last convention:

The Secretary stood at the pearly gate  
His face was worn and old.  
He merely asked the man at the gate  
For admission to the fold.  
What did you do down there? St. Peter asked  
To gain admission here?  
Oh, I used to be a Secretary,  
Down there for many a year.  
The pearly gate swung wide open sharp  
As St. Peter tapped the bell.  
Come in, Old Top, and take your harp,  
You have had enough of hell!



# ...*Any* "JAPANESE WRITING" In Your Shop?

"CHINESE WRITING", shopmen used to call it—a humorous, vivid description of the marks, gouges, and scratches on a work piece, caused by an inaccurate machine, improper tool setting or careless workmanship.

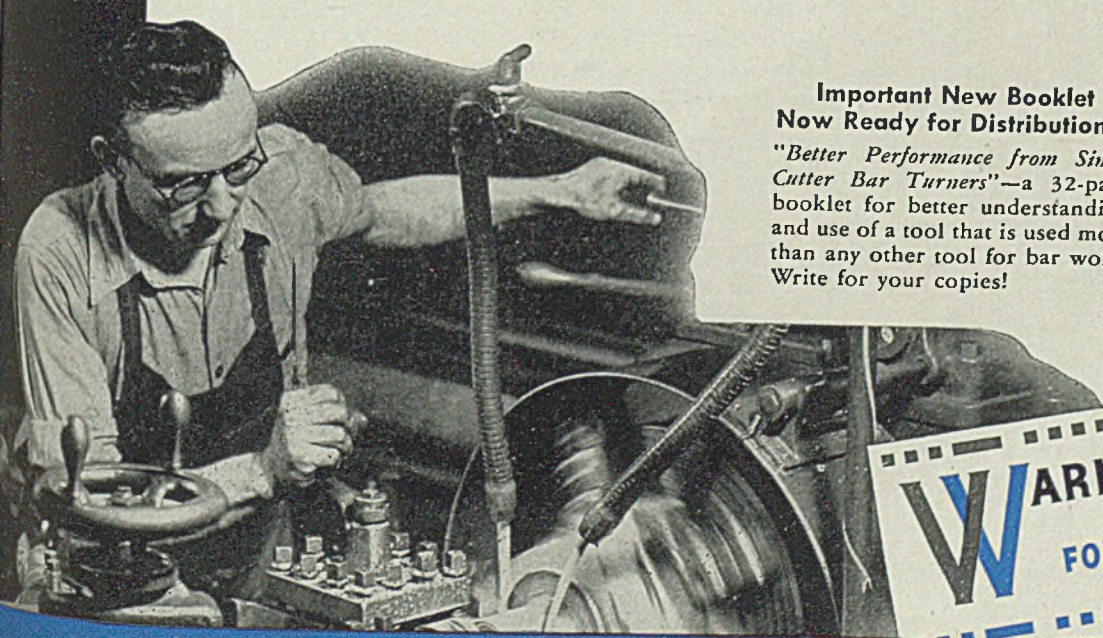
But today "Japanese writing" is the new and more appropriate term for these shop errors because every scrapped piece, or time lost in unnecessary grinding and refinishing operations, hurts America and helps Japan.

A number of things can cause "Japanese writing" in turret lathe turning operations—inaccuracies because of worn parts, improperly ground cutters, incorrect type of tool, wrong tool positioning, too heavy a cut or too fast a speed.

*And these factors can be licked*—probably very easily. A Warner & Swasey field engineer can help you do it by on-the-spot diagnosis. Also available to turret lathe departments are the Turret Lathe Operator's Manual, Turret Lathe Rebuilding Booklet, Tool Catalog, Bar Turner Booklet, Cutter Grinding Educational Motion Picture, Feed and Speed Calculator—and to your operators, "Blue Chips", a shop bulletin written especially for turret lathe operators that brings valuable, practical information, tips, short-cuts, etc.

**If you have trouble with "Japanese writing" or any other work spoilage that slows production from your turret lathes, perhaps we can help—write Warner & Swasey, Cleveland, Ohio.**

**Important New Booklet  
Now Ready for Distribution—**  
"Better Performance from Single Cutter Bar Turners"—a 32-page booklet for better understanding and use of a tool that is used more than any other tool for bar work. Write for your copies!

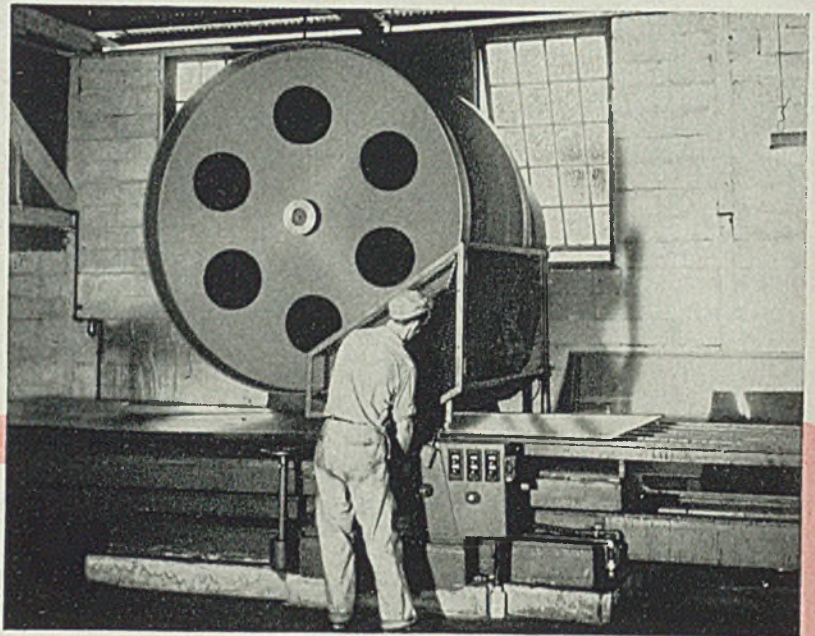


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TRADE NAME	TYPE	ANALYSIS		
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HI-Gloss	302	C-.08/.20%	Cr.-17.50/20.00%	Ni-8.00/10.00%
HI-Gloss	304	C-.08 max.	Cr.-18.00/20.00%	Ni-8.00/10.00%
HI-Gloss*	303	C-.20 max.	Cr.-17.50/20.00%	Ni-8.00/10.00%
HI-Gloss-MO	316	C-.10 max.	Cr.-16.00/18.00%	SE. .15/.35%
HI-Gloss-Ca	347	C-.10 max.	Cr.-17.00/20.00%	Ni. 10.00/14.00 Mo 2.00/3.00 Ni. 8.00/12.00 Ca-10xC
<b>CHROMIUM STAINLESS IRONS AND STEELS</b>				
Duro-Gloss C-1	410	C .15% max.	Cr. 10.00/14.00%	
Sta-Gloss-A	420	C .35%	Cr. 12.00/14.00%	
Sta-Gloss-B	440	C .60%	Cr. 14.00/16.00%	
Duro-C-3ss*	416	C .15% max.	Cr. 12.00/14.00%	S-.15/.35%
Duro-Gloss	430	C .12 max.	Cr. 14.00/18.00%	

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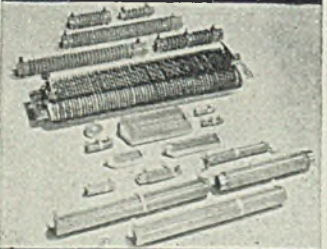
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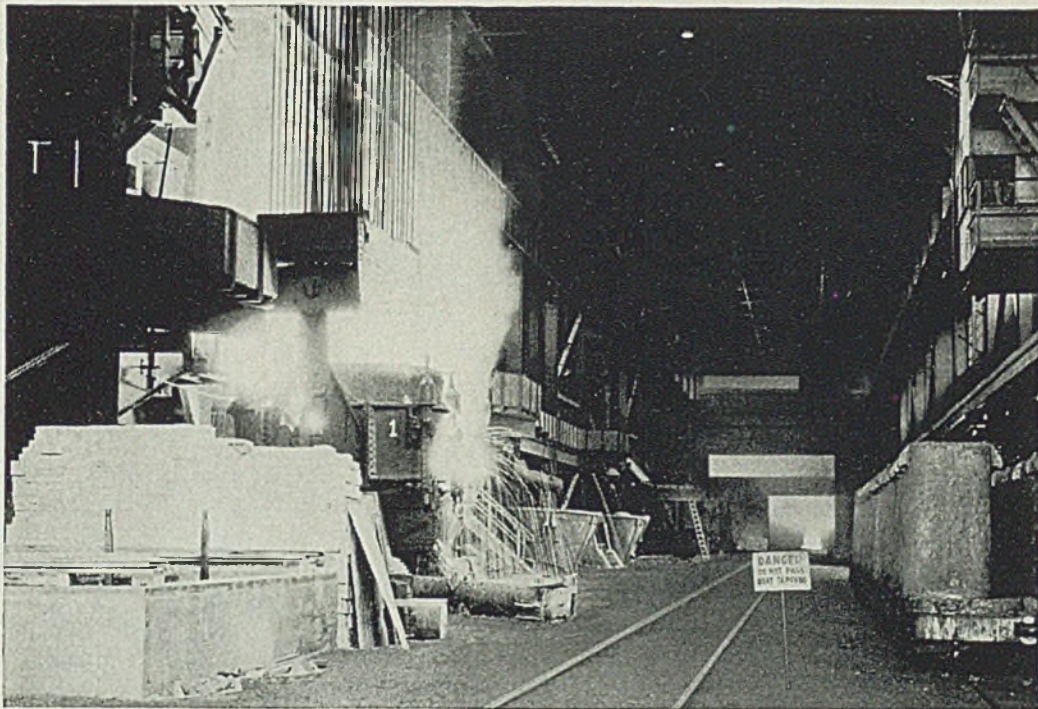
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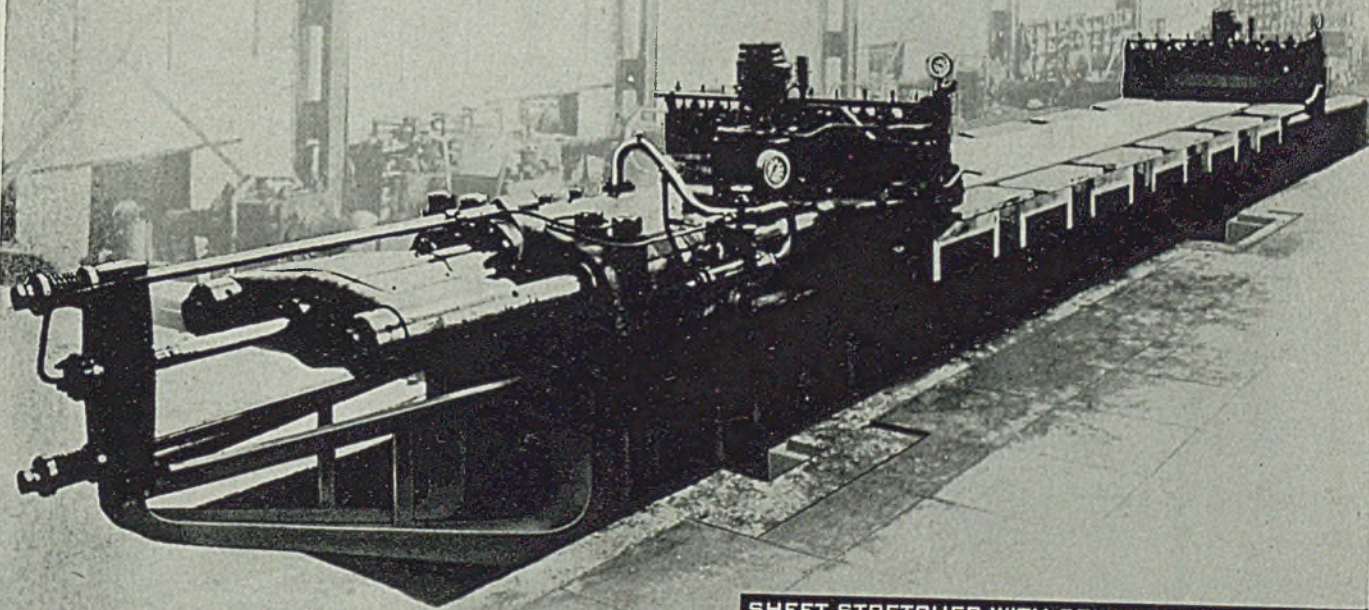


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**OUR HYDRAULIC STRETCHERS ARE  
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SHEETS, SHAPES AND SECTIONS.**



**SHEET STRETCHER WITH SELF-ADJUSTING JAWS**

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**DUST** and **DIRT**, the most destructive saboteurs that ever attack a bearing, can be effectively excluded by the use of Chicago Rawhide "Perfect" oil seals. At the same time these seals prevent the leakage of lubricant. Thus they constitute the best available insurance of long serviceable bearing life.



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# Announcing the New Ampac '200'

Today the big swing is to alternating current welding . . . and here it is at its newest and finest in Allis-Chalmers' new Ampac "200". Note how much more the new Ampac gives you in savings, faster work, better welds!

Compare 4 leading types of Transformer Welder in their Use of 11 Important Features . . .

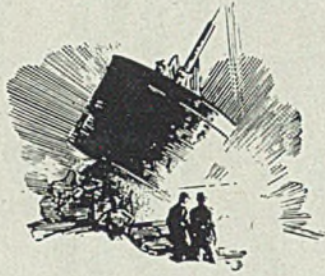
IMPORTANT FEATURES	HOW THEY BENEFIT YOU	AMPAC "200" (Integrated moving core type)	WELDER "B" (Moving coil type)	WELDER "C" (Moving core type)	WELDER "D" (Shunt type, moving core)
1 No arc blow to slow down welding.	Steady arc makes sound, uniform welds. You can weld in corners and grooves easily. Production is speeded.	YES	YES	YES	YES
2 Low striking voltage at high amperage.	Saves power for you. No need for high voltage at high currents. Raises power factor — cuts power input.	YES (65 volts)	NO (75 volts)	NO (75 volts)	NO (75 volts)
3 High striking voltage at low amperage.	Strikes arc fast. Gives you high, yet safe voltage necessary. Makes a-c welding easy at low currents.	YES (78 volts)	NO (72 volts)	NO (75 volts)	NO (75 volts)
4 Takes less than 300 sq. in. floor space.	Small size saves valuable space on crowded shop floors . . . makes it easier for you to move and handle the unit.	YES (281 sq. in.)	NO (361 sq. in.)	NO (398 sq. in.)	YES (288 sq. in.)
5 Contains less than 5 wearing parts.	Cuts maintenance to simple lubrication twice a year. Less chance for wear means longer service, lower upkeep.	YES (4 parts)	NO (8 or more)	NO (6 or more)	NO (8 or more)
6 Low original cost (no rotating element).	Simpler construction of a-c welder cuts purchase price to around 65% of what you would pay for a d-c welder!	YES	YES	YES	YES
7 Wide welding range of over 200 amperes.	You can weld thin sheets . . . yet have capacity for heavy plates, too. You can use rods from 1/16" to 1/4" in size!	YES (220 amp)	YES (215 amp)	NO (195 amp)	NO (195 amp)
8 Reconnectable for 220-440 & 208 v., 60 cycle.	Gives you full capacity at low voltages where lines are long and isolated. Can be used on any standard a-c voltage!	YES	NO (220 or 440)	NO (220-440 only)	NO (220-440 only)
9 Over 85% efficiency at normal loads.	You enjoy full benefits of a-c welding: lower power loss, high power factor, lower operating costs!	YES	NO	YES	YES
10 All settings within six control turns.	Saves welding time. Welder can make simple adjustment from high to low amperage current quickly and easily.	YES (6 turns)	NO (50 turns)	NO (30 turns)	NO
11 Movement of variable part 2" or less.	Cuts wear and maintenance to a minimum. Reduces hum and vibration. Contributes to trouble-free operation.	YES (1 inch)	NO (9 inches)	NO (6 inches)	YES

Only Ampac gives you all 11 . . . TOTALS

11 Ampac "200"      3 Welder "B"      3 Welder "C"      5 Welder "D"

**ALLIS-CHALMERS**  **AMPAC "200"**

WRITE ALLIS-CHALMERS, MILWAUKEE, WIS., FOR COMPLETE INFORMATION



## STAINLESS STEEL

**S**TAINLESS steel is playing an important role in Allied war production. Our aircraft, warships and motorized units utilize this strategic material. Production of chemicals, explosives and synthetic rubber is facilitated by use of stainless steel equipment. In many other fields, where high tensile strength and resistance to heat or corrosion are demanded, stainless steel is specified.

As America's largest and only exclusive producer of stainless steel, Rustless is filling a substantial portion of these wartime needs. Rustless is doing more. Through use of its unique process, Rustless is conserving America's limited resources of chromium and electrolytic nickel. This is important, because the stainless steel industry is the largest consumer of low-carbon ferrochrome and electrolytic nickel, both of which are among the most critical of strategic materials.

The Rustless Process is based on the use of sub-grade chrome ore and stainless steel scrap, of which there are adequate supplies in this country. More than 65% of the nickel used by Rustless is obtained from scrap, while only 3% of its chromium comes from low-carbon ferrochrome. Thus Rustless is not only meeting wartime demands, but through its conservation efforts is also assisting greatly in meeting the critical supply problem of these two metals.

These advantages of the Rustless Process will be of equal benefit in meeting a greatly expanded use of stainless steel after the war. When that time comes, Rustless will be ready with a fund of new technical knowledge and specialized experience to devote to the problems of peace.

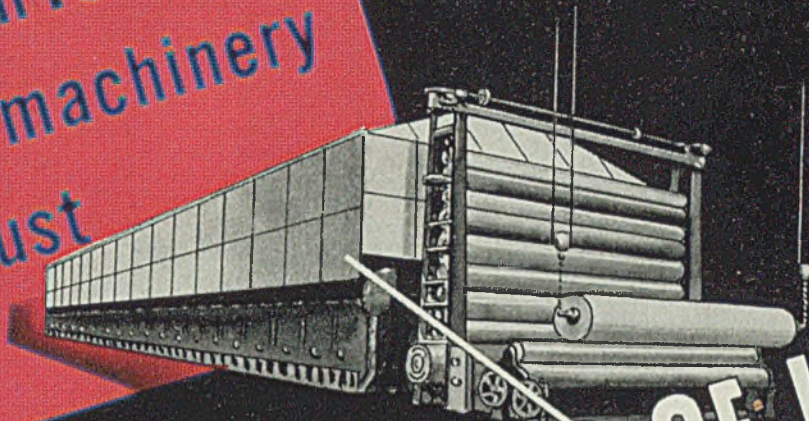
RUSTLESS IRON AND STEEL CORPORATION, BALTIMORE, MD.

**R U S T L E S S**  
CORROSION AND HEAT-RESISTING  
STAINLESS STEELS

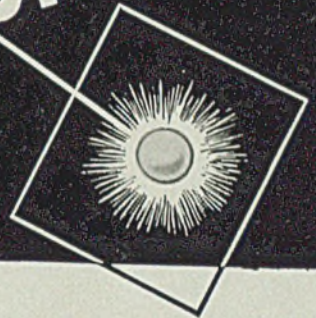




When 100 tons  
of machinery  
must



**FOLLOW A FLICKER OF LIGHT**



## It's another job for the AMPLIDYNE

A sheet of paper varies a ten-thousandth in thickness and a giant paper machine instantly changes its pace—

A strip of steel speeds by at 25 miles an hour and a flying shear jumps into action to cut 33-ft lengths with an accuracy of 0.1 per cent.

In industry after industry, small electrical signals such as the power output of photo and other electronic tubes are working "miracles" in the control of processes and product quality—with the aid of G-E AMPLIDYNES.

Within less than 1/10th of a second, the amplidyne can magnify a 1-watt signal from vacuum tubes, pilot generator, or other source into a powerful 10,000-watt working output. Thus it can assume the duties of heavy-current contactors, and eliminate many other conventional control devices.

The amplidyne will not change characteristics or get out of adjustment. Yet it is immediately adjustable to meet changed production requirements. Similar to conventional m-g sets, it is sturdy, long-lived, presents no unusual maintenance problems.

The versatile amplidyne is finding wide and dramatic use in automatic control of voltage and current, speed and acceleration, torque and tension, thickness and width, color register—even in finger-tip positioning of massive machinery. New uses for it appear almost daily wherever an electrical signal can express the need for a change in an electrical operation.

A G-E application engineer will gladly suggest how the amplidyne fits in with your plans for present and postwar production improvements. Call on him through our local office. *General Electric, Schenectady, N. Y.*

### THE STORY OF THE G-E AMPLIDYNE

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The operations of making Eagle Music Wire are exercised with extreme care. To maintain a bright, clean surface, the finished wire is handled with gloves to prevent perspiration marks which lead to rust and finally to surface pitting.

Specify Eagle Music Wire for superlative quality.

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# WASHBURN

CLEAN UNIFORM BILLETS-STRIP-RECTANGULAR, ROUND, FLAT RODS  
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

# COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" Headquarters for BRASS, BRONZE and COPPER

## Hot Forged Parts Display Superior Strength, Ductility

The hot forging process for the fabrication of non-ferrous parts has won increasing favor in recent years because of the superior physical properties resulting in the finished part. Compared with castings, hot forgings have greater strength, ductility, and impact resistance. They are generally tougher also, because of their freedom from the porosity found in many castings. The forging process tends to close up any voids which existed in the original cast billet, and the combined heating and working refines the grain structure, thus producing a tougher product.

Another feature in the growing popularity of hot forging has been the introduction of copper alloys characterized by exceptionally high mechanical strength in the hot forged conditions. Most of the copper alloys acquire their strength largely as a result of cold working. In such an alloy as Duronze III, however, the high mechanical strength is an inherent property rather than an artificially produced one. Duronze III is therefore particularly adaptable to the production of unusually strong parts by the hot forging process.

### Memos on Brass—No. 39

Brass is one of the most useful of engineering materials because its physical properties can be varied over a wide range to meet the requirements of specific applications. These variations in properties can be effected by changing the copper-zinc ratio, by the addition of small quantities of other elements, or by mechanical means.

## Annealing Step Important in Fabrication of Brass Goods

### Selection of Correct Equipment Essential in Attaining Satisfactory Results and Maximum Economy of Operation

Use of the correct annealing equipment is a factor of primary importance in the fabrication of many types of brass goods. Each job usually presents an individual problem, and because of the many types of equipment available, and the considerations that influence their selection, fabricators frequently find it advantageous to consult the skilled technicians in Bridgeport's laboratories.

Up-to-date annealing furnaces, selected with a view to the job in hand, will be found, in the long run, to be more economical than the continued use of outmoded or inadequate equipment. Correctly selected equipment will pay for itself in reduced costs of operation and in the higher quality of product.

#### Factors Influencing Selection

Annealing equipment is not necessarily complex. Where requirements are small, a relatively simple type of manually operated furnace will usually suffice, provided it is equipped with a pyrometer for indicating the annealing temperature. The recording type of pyrometer is to be preferred, since it provides a record of the temperature of the annealing cycle.

Where annealing requirements are more extensive, the use of automatically controlled equipment is desirable. The most modern types of furnaces include equipment for performing a number of other operations besides the actual annealing.

#### Cleaning and Pickling

It should be kept in mind that work to

be annealed should be free from drawing and lubricating solutions. Such work can be readily cleaned after annealing and pickling. On the other hand, work that is greasy before annealing will remain dirty and spotted after annealing and pickling.

For this reason, modern conveyor type furnace equipment is provided with a pre-cleaning chamber which removes the drawing lubricant before the work enters the furnace proper. To conserve handling time and floor space, such furnaces are also equipped with quenching, acid pickling, washing, and drying chambers at the exit end. Equipment of this type is particularly well adapted for the manufacture of long runs of the same type of part, such as brass small arms and artillery ammunition.

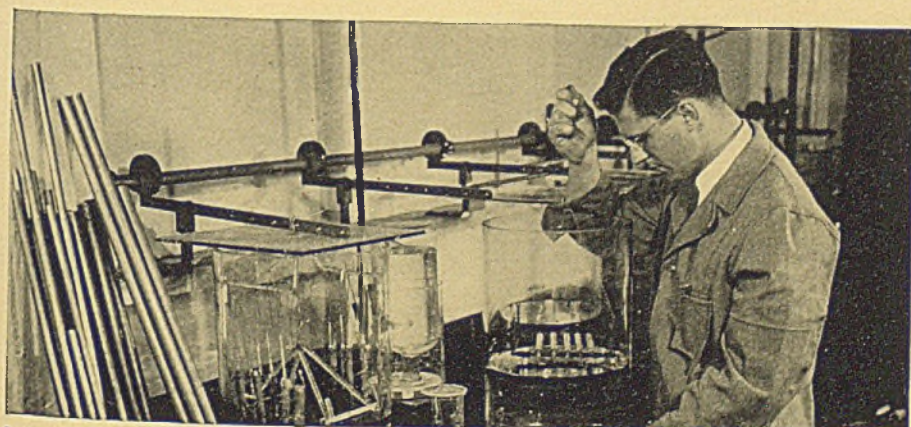
#### Method of Firing

Small manually operated furnaces are generally gas-fired. Larger equipment may be gas- or oil-fired with automatic temperature controls. Electrically heated furnaces are also used in some localities. Whatever the source of heat, the work is brought up to the required temperature, and in the process becomes discolored through oxidation. This discoloration must be removed by cleaning with dilute sulphuric acid.

Bright annealing furnaces are also available for annealing copper, gilding metal, and commercial bronze without scaling. Here a controlled reducing atmosphere surrounds the metal during the annealing operation, and provision is made for cooling the metal down to room temperature without allowing it to become oxidized.

Local annealing, such as is required for softening the mouth of a brass cartridge case, is generally done by partly immersing the article to be annealed in a molten salt bath. For a stress relief heat treatment (to remove internal stresses resulting from cold working operations) finished cartridge cases

(Continued on Page 2, Column 2)



Laboratory tests on the corrosion resistance of copper alloys are constantly carried on at Bridgeport, supplementing field studies as a guide to the development of new and improved alloys to meet modern service requirements.



# COPPER ALLOY BULLETIN

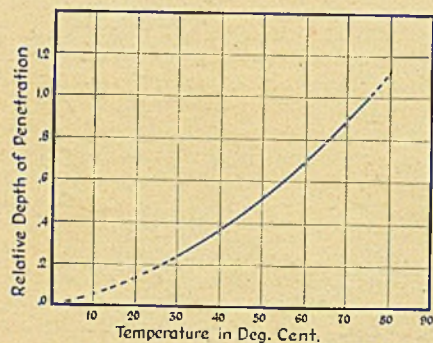
## CAUSES OF CORROSION

This article, dealing with the influence of temperature, is the eighth of a series of discussions by C. L. Bulow, research chemist at Bridgeport Brass Company.

### INFLUENCE OF TEMPERATURE

Before discussing the influence of water compositions upon the corrosion rate of metals, it will be well to recall that heat accelerates practically all of the reactions involved. Qualitatively, it may be said that a temperature rise of the corroding solution of about 20° C. will double the rate of corrosion. The effect of temperature is not always so pronounced, but in some cases it is even more so.

The change in corrosion rate with temperature generally depends on the nature of the corroding medium. The accompanying curve shows the relationship in the case of brass in a 3% NaCl solution.



Effect of temperature on rate of corrosion of brass in 3% NaCl solution

The influence of temperatures is one of the reasons that many power plant engineers keep a record of incoming and outgoing cooling waters in condenser installations, because it is recognized that a unit operating at too high a temperature may fail prematurely. The higher temperatures of cooling waters during the summer is also one of the factors contributing to more rapid summer corrosion.

Instances have been reported in which new condenser tubes installed during the winter season have given longer service than tubes installed in summer. This difference in performance occurs because of the type of protective film which forms. The corrosive film which forms on a metal in cold water is generally thinner and more continuous than one which forms in warm water. In warm and hot water the sus-

## Bulletin Index for 1942 Now Available

A complete index of all articles which appeared in the COPPER ALLOY BULLETIN during 1942 is now ready for distribution to readers. The index is thoroughly cross-referenced to facilitate its use, and includes a complete listing of all items which appeared in the New Developments column.

Copies of the index may be obtained free of charge by writing Bridgeport Brass Company on your company letterhead.

## Annealing Equipment

(Continued from Page 1, Column 3)

are also completely immersed in molten salt. Stress relief heat treatments can also be carried out in special continuous recirculating gas-fired furnaces.

It will be seen that the correct selection of furnace equipment depends on many factors: operations involved, length of production runs, continuous or intermittent use, composition of alloys. Bridgeport metallurgists will aid fabricators in weighing all of these factors.

### Preventing Hot Breaks

"Hot breaks" in brass—intercrystalline cracks resulting from a combination of heat and stress—can be prevented by observing simple precautions. A detailed explanation of the causes and prevention of hot breaks was given in the January, 1941, issue of the COPPER ALLOY BULLETIN, copies of which may be obtained from Bridgeport.

ceptibility toward pitting generally increases substantially. As a result of pitting, the useful life of a condenser tube may be considerably shorter than that indicated by the over-all corrosion rate, as evaluated by loss in weight or in tensile strength.

On the other hand, an increase in temperature may lead to the precipitation of calcium carbonate and other types of scales on the metal surface. These scales, when continuous, often confer considerable protection on the underlying metal. This scale formation is due to the decrease in solubility of certain minerals in the water with increase in temperature.

## NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A thread milling machine is described as especially suitable for threading operations on the nose of 75 mm. shells. It is equipped with an air-operated chuck of capacity up to 3 inches in diameter, and all driving elements, electrical controls, and coolant system are enclosed in a rugged structure. (No. 450)

A new connector is designed to serve as a substitute for soldered and taped joints in electrical wiring, according to the manufacturer. Connectors are said to use no rubber, tin, or lead, and to provide a satisfactory joint both electrically and mechanically. It is said that the insulation on the connector will not puncture at 10,000 volts. (No. 451)

A vernier height gage is made in three sizes of 12, 18, and 24 inches and is available in metric as well as in English measure. It is said to be designed particularly for use in jig and fixture making and for general layout and inspection work. It is described as a valuable adjunct to gage blocks in angular measurements and other operations where a high degree of accuracy is necessary. (No. 452)

Hole saws of fine-tooth design, said to be suitable for working on non-ferrous sheet, are made in a range of sizes from 3/8 to 4 inches. Sizes are in steps of 1/32 inch up to 2 inches, then 1/16 inch up to 3 inches, and 1/8 inch up to the maximum of 4 inches. (No. 453)

A forming machine is reported to be capable of rolling edge forms on both sides of a flat sheet in a single pass. Assembly is available to specification as to sheet width. One model will handle thicknesses to 22 gage, another to 16 gage. A variety of edge forms can be produced, and the manufacturer is prepared to furnish the proper rolls for a specific job. (No. 454)

A new polishing lathe is provided with a clearance hole through the entire machine. This feature, according to the manufacturer, permits polishing a portion of a long piece of work up to the maximum capacity of the lathe. Work can be loaded and unloaded while the spindle is in rotation, and a switch and mechanical brake control are provided to facilitate handling of work which can be loaded better when the spindle is stationary. (No. 455)

Metal hammers for machine shop and assembly line work are being produced with light or heavy heads. Construction consists of a cast bronze head with a hickory handle. Weight of heads ranges from 5 ounces to 8 pounds. (No. 456)

## PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

**SHEETS, ROLLS, STRIPS**—Brass, bronze, copper, Duronze, for stamping, deep drawing, forming and spinning.

**CONDENSER, HEAT EXCHANGER, SUGAR TUBES**—For steam surface condensers, heat exchangers, oil refineries, and process industries.

**PHONO-ELECTRIC\* ALLOYS**—High-strength bronze trolley, messenger wire and cable.

**WELDING ROD**—For repairing cast iron and steel, fabricating silicon bronze tanks.

**LEDRITE\* ROD**—For making automatic screw machine products.

**COPPER WATER TUBE**—For plumbing, heating, underground piping.

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**BRASS, BRONZE, DURONZE WIRE**—For cap and machine screws, wood screws, rivets, bolts, nuts.

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**BRASS AND COPPER PIPE**—"Plumrite" for plumbing, underground and industrial services.



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# BRASS

\*Trade-name.

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# Sturtevant Systems

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## AND EQUIPMENT

ENGINEERED FOR PRECISION-VENTILATING, HEATING, AIR CONDITIONING, DRYING,  
DUST AND FUME CONTROL, PNEUMATIC CONVEYING, MECHANICAL DRAFT

# get life imprisonment in 194<sup>V</sup>

Under the lash of all-out production, Industry has learned many new reasons for keeping a close watch on Dust—and its treacherous ally, Fumes. Utilizing the most advanced development of Sturtevant Air Research and Engineering, industry has been able, through effective air control, to boost output, pare down operating costs, and improve product quality—to a degree never before thought possible.

Take the manufacture of aircraft engines, for example. Destructive dust from buffing and grinding operations must be whisked away as soon as it leaves the wheels. But there's an extra twist that Sturtevant Air Engineering gives this job. Instead of carrying off and wasting the conditioned room air, it's whirled through dust separators, purified and returned to the room with all its valuable heat intact. Savings at the coal pile run as high as \$8,000 a year.

In giant booths where motorized equipment is spray painted, you'll find another Sturtevant dividend. Controlling the toxic fumes that spurt from spray guns was not enough. All air entering the room is now purged of dust or anything else that could impinge on freshly painted surfaces. Repainting was minimized and the production line went into high gear.

Processing metals at Victory-speed and efficiency calls for still another touch of Sturtevant genius. Acid fumes, destructive enough to eat through steel beams and keep labor turnover as high as 50% are now precision-controlled. Absenteeism is down to normal, costly equipment safeguarded and production quotas reach a new high.

And there are hundreds of new products, such as the miracle of making artificial wool from cow's milk, born with an inherent fume control problem that Sturtevant had to lick before production could be achieved.

Remember, all these advantages of dust and fume control—that are helping turn out better war goods, faster and more efficiently—will be equally important when industry returns to competing for postwar markets. Without "air at work," no plant can expect to compete on an equal footing.

**ENGINEERED AIR will make a difference.**

Yes, air that is engineered to serve efficiently—not only in dust and fume control but in all phases of industrial air conditioning, heating, ventilating, drying, pneumatic conveying, and mechanical draft—will make the difference between profit and loss in many a plant. And with new war-won knowledge, backed by experience as the pioneer in air-handling, Sturtevant will be in a position to find the most efficient and economical solution to your problems.

B. F. STURTEVANT COMPANY

Hyde Park, Boston, Mass.

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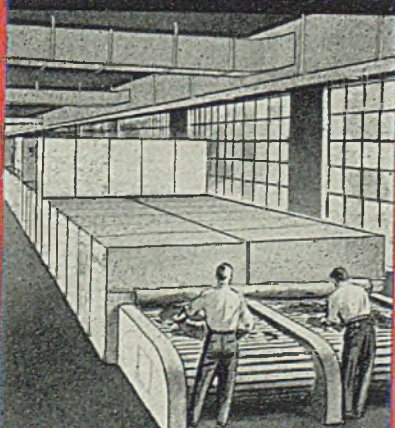
**STURTEVANT—FOUNDER OF THE  
AIR HANDLING INDUSTRY**



**AIR CONDITIONING**



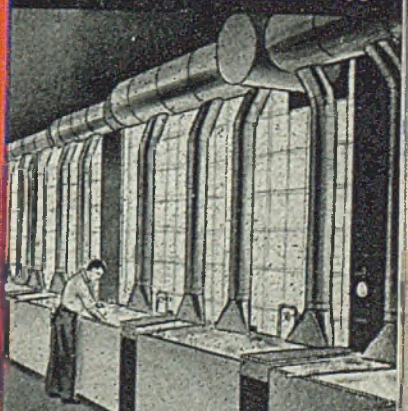
**DRYING AND HEATING**



**VENTILATING**



**DUST AND FUME CONTROL**



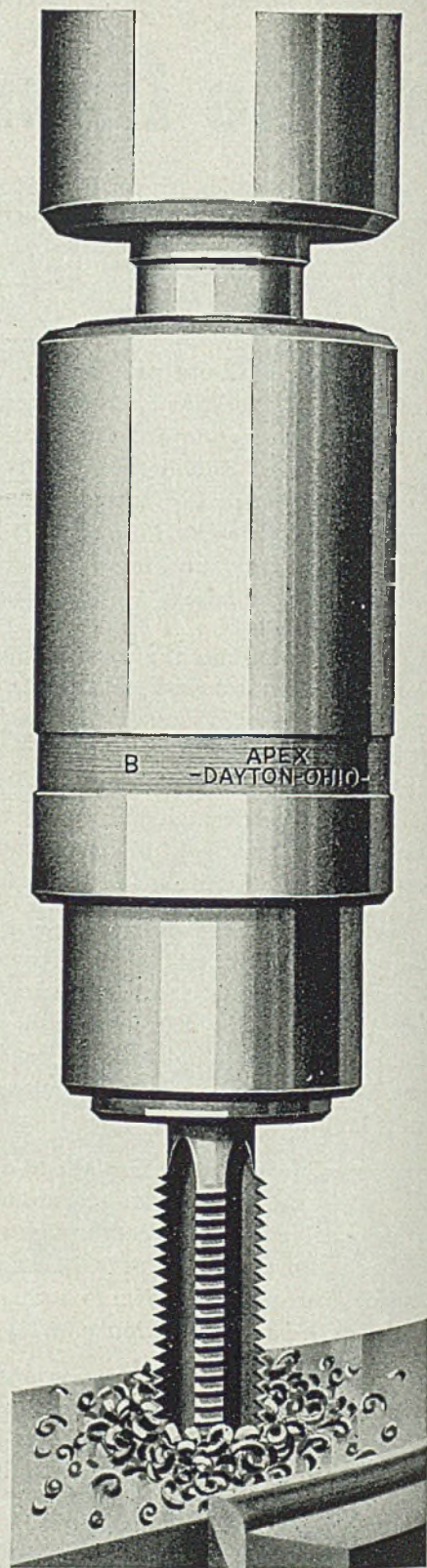
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and radials  
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with Apex Safety Friction  
Tapping Chucks

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In every detail, Apex safety friction chucks are *right*. Made of finest material for the job, precision built throughout. Easy to adjust, and once adjusted, maintain proper tension over long periods. End thrust set up by tapping or pressure exerted by the operator does not affect friction setting. Friction disc element can be replaced quickly and at low cost when necessary. Used for tapping thru and

bottom holes, drilling, reaming, stud setting, nut setting, spot facing, counterboring . . . wherever tool is apt to break. Shanks supplied for all requirements. Tap capacities up to 3". Considering today's conditions, reasonably good deliveries are obtainable.

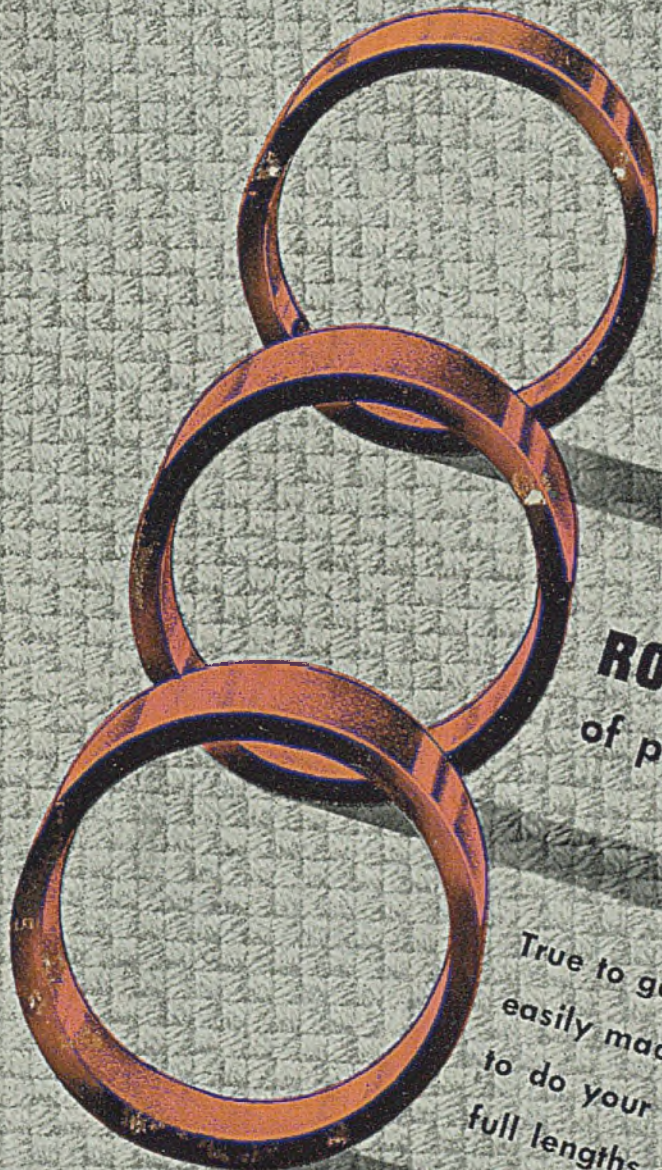
**How to save time** on orders: Make sure you give type and tool numbers. If non-standard tools are called for, make a drawing or sketch, or give complete specifications. This will insure prompt handling of your order and prevent possible delay for lack of information. Write for complete catalog of Apex Production Tools.



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Manufacturers of friction chucks, quick change chucks, positive drive chucks, vertical float tapping chucks, semi and full floating tool holders, stud setters, screw drivers, power bits, universal joints, plain and universal joint socket wrenches.





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ROTATING SHELL BANDS**  
of pure copper or gilding metal  
in all sizes

True to government specifications. Can be easily machined and finished. If you wish to do your own cutting, we can give you full lengths of seamless tubing.

**LEWIN MATHES**



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from 1 1/2 ounces

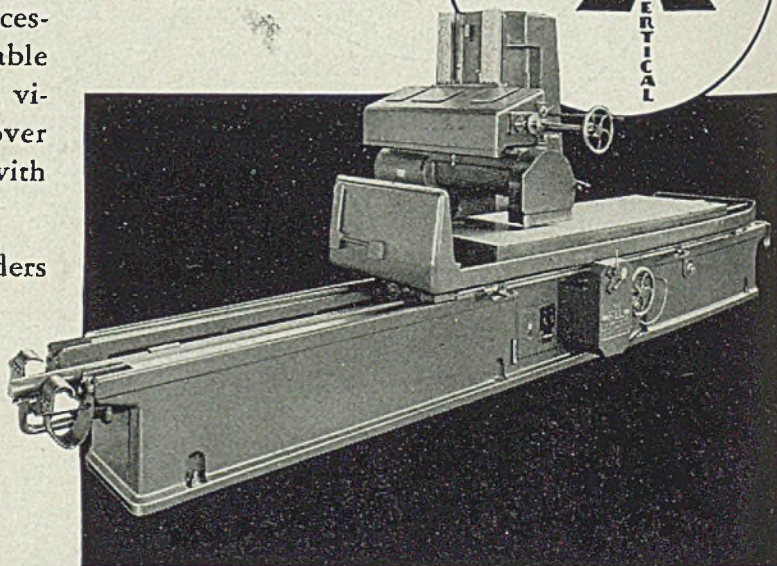
to 3 1/2 tons

**The HILL "Open Side" Horizontal Spindle Surface Grinder will produce a finished surface on a small key or a large casting to exacting tolerances**

Here is a Heavy Duty, Hydraulic, Precision, Surface Grinder that demonstrates amazing versatility and accuracy in finishing flat or irregular surfaces such as machine tool ways, dies, links, plates, die blocks, guide bars, cams, etc.

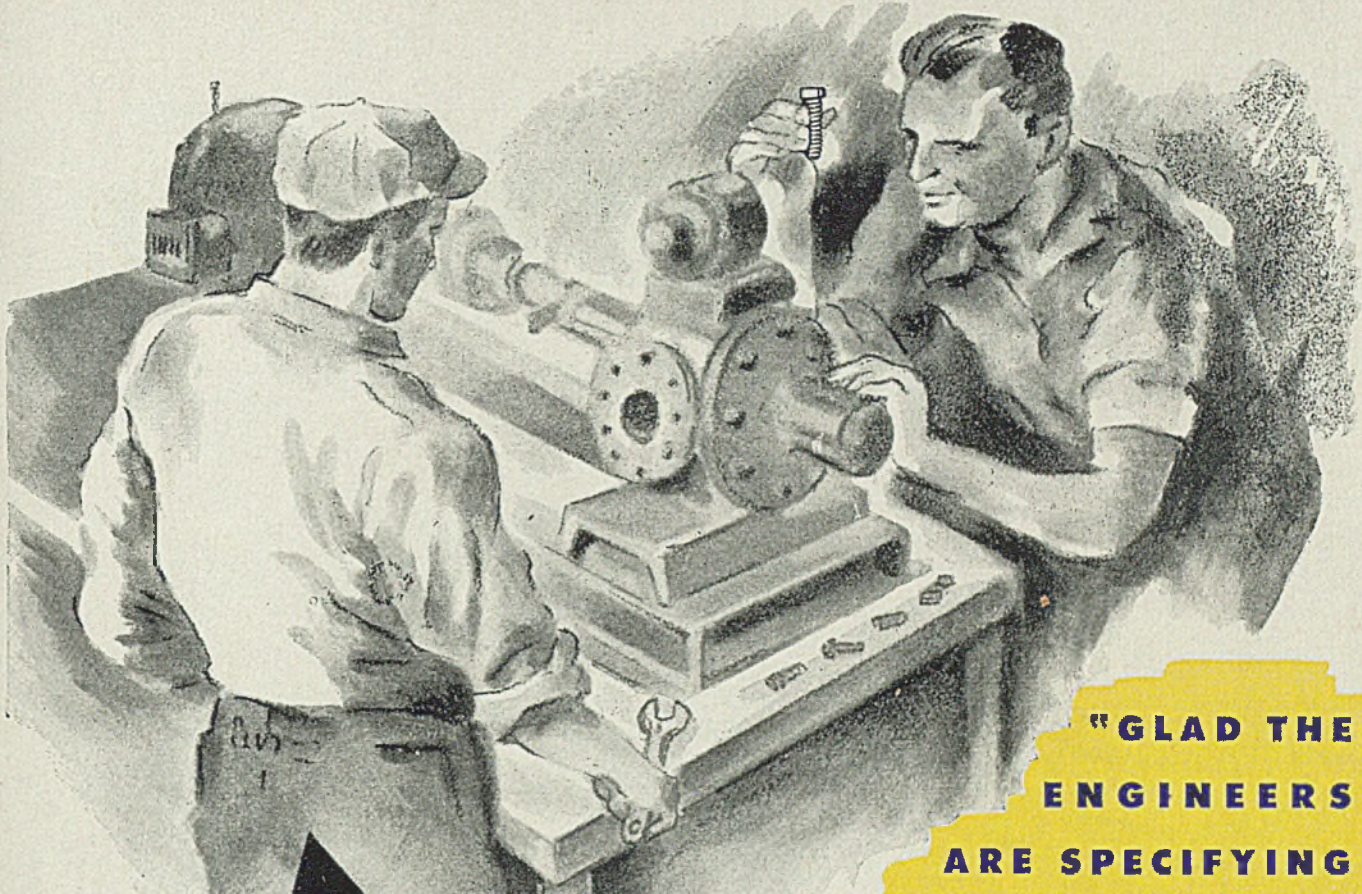
"Open Side" design affords maximum accessibility to the work—Fully hydraulic table and cross feeds insure smooth, positive, vibrationless operation. Proven savings over previous methods run as high as 90% with corresponding increases in production.

HILL "Open Side" Hydraulic Surface Grinders are built in both Horizontal Spindle and Vertical Spindle design and in varying table sizes to accommodate all classes of work within the scope of this type of machine. Bulletin HV-3 gives complete details.



*The* **HILL ACME Co.**

**6400 BREAKWATER AVE • CLEVELAND, OHIO**



**"GLAD THE  
ENGINEERS  
ARE SPECIFYING  
HARPER BOLTS**

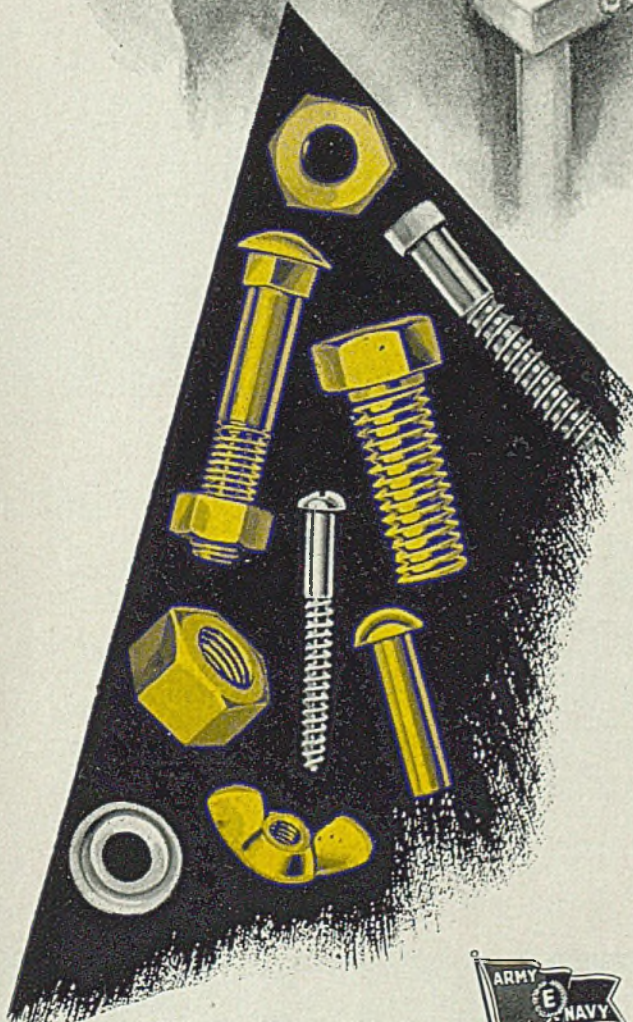
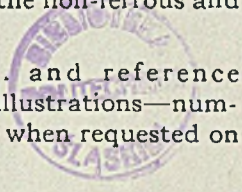
"Harper Bolts don't rust. They're tough and they'll make this pump last a lot longer."

Yes . . . the non-ferrous and stainless fastenings made by Harper are adding extra toughness and extra service-life to vital parts of ships, tanks, jeeps, planes and other war equipment. Also in hundreds of war production jobs they are preventing failures of vital equipment and keeping production rolling. They have high tensile strength; they resist rust, corrosion, many acids and alkalis and other tough conditions.

**4320 STOCK ITEMS . . .** of bolts, nuts, screws, washers, rivets and accessories in the non-ferrous and stainless alloys.

**WRITE FOR CATALOG . . .** and reference book—80 pages—4 colors—193 illustrations—numerous tables and other data. Free when requested on a company letterhead.

**The H. M. HARPER COMPANY**  
2646 Fletcher Street, Chicago  
EASTERN BRANCH: 45 West Broadway, New York City  
*Offices in Principal Cities*



**HARPER Chicago**  
**EVERLASTING FASTENINGS**

**BRASS • BRONZE • COPPER • EVERDUR • MONEL • STAINLESS**

# VITAMINS B2

## FOR STEEL

TITANIUM ALLOY MANUFACTURING COMPANY announces the production of two Boron-containing alloys for imparting deep hardenability to steels and for the conservation of other elements less available today than in other years.

It is necessary to introduce only minute amounts of Boron in fine-grained forging steels in order to obtain surprisingly intense hardenability, good ductility and superior toughness, as well as high strength (after hardening and drawing at low temperatures, such as 450° or 600° F.)

To realize these highly desirable qualities, only a few pounds of "BORTAM" (a complex alloy) are needed per ton of steel. (Note: "Bortam" is restricted to war production applications only.)

An exceedingly economical alloy to use in steel to produce deep hardenability, as well as other superior physical properties, is "CARBORTAM" (a less complex high-carbon alloy containing Boron and the well-known nitrogen stabilizer, Titanium.)

### ANALYSIS

"BORTAM"	
Ti . . . . .	16-18%
Al . . . . .	13-15%
Mn . . . . .	22-24%
Si . . . . .	20-25%
C . . . . .	Less than 1%
B . . . . .	1.5-2.0%

"CARBORTAM"	
Ti . . . . .	16-17%
Si . . . . .	2.50-3.00%
C . . . . .	6.5-7.5%
B . . . . .	1-1.25%

FOR FURTHER PARTICULARS FOR APPLICATIONS  
TO MEET YOUR SPECIFIC PROBLEMS, WRITE TO:

**TITANIUM**  
ALLOY MANUFACTURING COMPANY



**GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.**  
**EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY**

Representatives for the Pacific Coast . . . . . BALFOUR, GUTHRIE & CO., San Francisco, Los Angeles, Portland, Seattle, Tacoma  
Representatives for Canada . . . . . RAILWAY & POWER ENG. CORP., Ltd., Toronto, Montreal, Hamilton, Winnipeg, Vancouver, Sydney  
Representatives for Europe . . . . . T. ROWLANDS & CO., Ltd., 23-27 Broomhall St., Sheffield, England

He's Getting Ready to Speed

# PRODUCTION



Position of correct length Veelos V-belt before drive is turned.

**D**O what he's doing... install Veelos... the proved and practical V-belt... and you'll gain the advantages of a *peak* production drive. Construction of the Veelos link provides quick, easy tension adjustment to end slippage... keeps machinery running at full speed and productivity. Install Veelos and make the most of your machines and manpower.

**FREE!** COMPLETE, NEW  
VEELOS PRODUCTION MANUAL!



This free manual—"Drive Production Higher with Veelos V-Belt"—gives complete instructions on use, length table, engineering data, detailed description of Veelos link construction. Shows how to measure, couple, uncouple any size of Veelos. Write today for your copy of this valuable reference.

## IMPORTANT INSTALLATION DIRECTIONS

Sizes  $\frac{3}{4}$ ", A, B and C Veelos V-belts must be 1" per foot short of pitch length.

Sizes D and E Veelos V-belts must be  $\frac{3}{4}$ " per foot short of pitch length.

Measure one belt on floor or bench from end rivet to first empty hole. Make up all other strands with the same number of segments.

1. After correct length has been determined, place belt in nearest groove of small sheave.

2. Place belt in nearest groove of

large sheave as far as it will go to point A in illustration.

3. With SMALL sizes hold belt with hand at point A and turn drive until belt is in groove all around. With LARGE sizes hold belt with "C" clamp or rope; put cloth pad between belt and sheave rim.

4. Turn drive until belt is in groove all around. (Caution: Always turn drive manually. If necessary, a bar can be used for leverage.)

5. Work belt across to inside grooves by turning drive. Repeat until grooves are filled.

Veelos is made in all standard sizes ( $\frac{3}{8}$ ", A, B, C, D, E)  
... fits all standard V-belt grooves

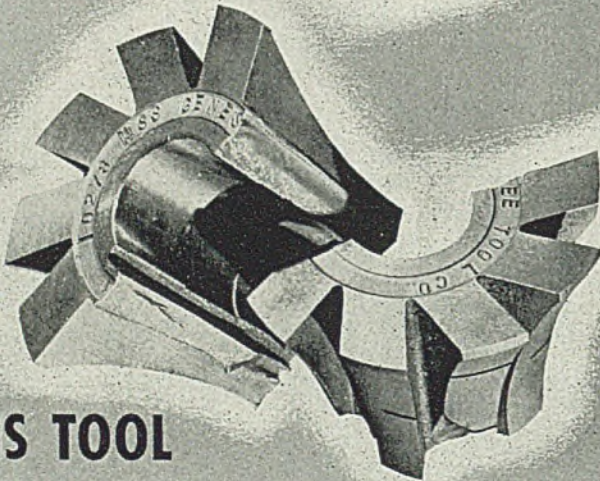
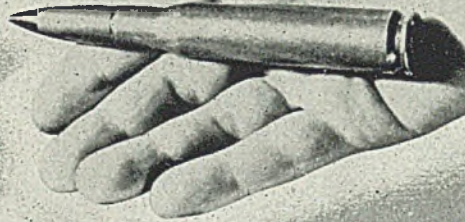
**VEELOS**  
THE LINK  
**V-BELT**

ADJUSTABLE TO ANY LENGTH  
ADAPTABLE TO ANY DRIVE

MANHEIM MANUFACTURING & BELTING CO.  
MANHEIM, PENNSYLVANIA

**THIS BULLET CAN STOP A**

**ZERO!**



**THIS TOOL  
COULD HAVE MADE ENOUGH  
EQUIPMENT TO STOP *A HUNDRED ZEROS!***

**THERE IS ONLY *SO MUCH*  
TOOL STEEL AVAILABLE!**

No. 3 in a series of 2 $\frac{1}{3}$  by 3 $\frac{1}{2}$  foot posters in color, designed to help reduce tool breakage through worker education, made available to users of **"TOMAHAWK"** tools, without charge.

*For complete information  
wire or write*

**GENESEE TOOL COMPANY**  
FENTON, MICHIGAN



*new*  
LEAD-COATED SHEET



HAS MANY  
*Virtues*

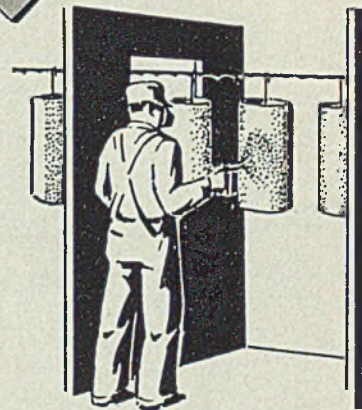


IT HAS  
*Greater*  
RUST-RESISTANCE

Lead does not corrode or weather away through galvanic action when in contact with steel. Properly applied, a lead coating for steel sheets affords longer-lived protection against rusting or corrosion of the base metal.

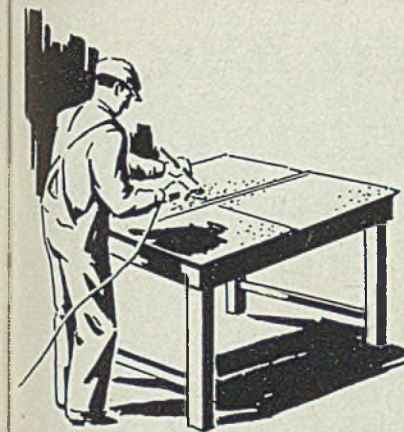
IT  
*Takes*  
PAINT

The new lead coating provides an ideal painting surface. LEAD-SEALED sheets TAKE and HOLD paint and synthetic enamels without preparatory treatment. This saves both time and cost in manufacturing operations.



IT  
SOLDERS  
*Easily*

Continental LEAD-SEALED solders fast and easily, and without the use of flux or acid. Less solder is required. Being both simpler and easier than soldering zinc-coated sheets, there is a worthwhile saving in time and effort.



IT'S  
*More*  
WORKABLE

Softer, more ductile, LEAD-SEALED sheets possess a high degree of workability. The coating serves as an effective lubricant for dies. It withstands severe forming operations without flaking or peeling.



Already this new sheet has demonstrated superior properties for such uses as: truck and trailer bodies, fire doors, heating and ventilating equipment, chemical containers, gasoline cans, tanks and a score of other products. In many industries, Continental LEAD-SEALED has replaced more critical materials and actually cut costs. LEAD-SEALED offers advan-

tages for many kinds of products. It cannot and is not intended to replace galvanized or long terne sheets for all purposes. The better acquainted users have become with LEAD-SEALED, the better they like it for specific uses for which it is intended. Perhaps this new sheet is your answer to a better product. Write, explain your problems, ask for a sample.

CONTINENTAL STEEL CORPORATION • KOKOMO, INDIANA



**SUPERIOR**

CONTINENTAL STEEL CORPORATION

FLYING FORTRESSES  
 LIBERATORS  
 HELL DIVERS  
 AIRACOBRAS  
 LIGHTNINGS  
 MUSTANGS  
 CORSAIRS



HERE COMES YOUR OXYGEN

## Another Battle Front Oxygen Producing Plant

ANOTHER, another in the steady stream of Independent Mobile Oxygen Generators is on its way to our fighting forces... *somewhere* on the world Battle Fronts... supplying oxygen to our "hi-flying" air squadrons who could not leave the ground without their oxygen tanks filled. • • Independent... *first* to produce these Mobile Oxygen Generators—First Too in actual service—You'll find Independent Engineering Company *first*—after Victory—to supply you with equipment for producing industrial gases for peace-time pursuits.

Independent Engineering Co.—Pioneer designers and producers of Mobile Oxygen and Hydrogen generating plants for the armed forces... builders of Oxygen, Hydrogen and Acetylene plants —manufacturers of industrial gas cylinders and cylinder handling equipment.

# Independent Engineering Co.



105 WEST SECOND STREET — O'FALLON, ILLINOIS



**SHENANGO-PENN**

# Centrifugal Castings

**... an improved process for many products**

**B**ECAUSE it is an extremely flexible process, the use of centrifugal castings has multiplied many times under wartime production demands.

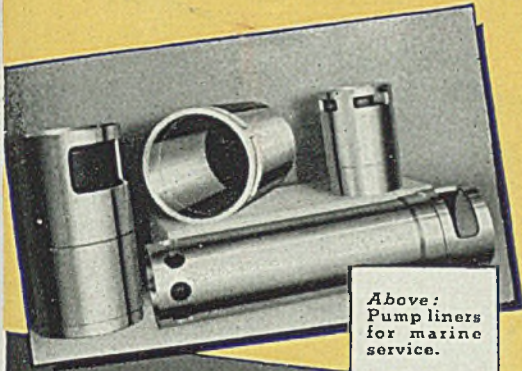
Wherever wheels turn, or corrosion or wearing problems exist, Shenango-Penn castings can probably be used. In marine service and the aviation industry, for example, parts formerly forged, are now cast centrifugally, and in many cases are giving better service.

Shenango-Penn castings have unusual advantages in strength and purity, and actually save production time because less machining is required on the finished product. Why not send for a copy of our new Bulletin No. 143 which describes the Shenango-Penn process and products, and gives a complete table of alloys available?

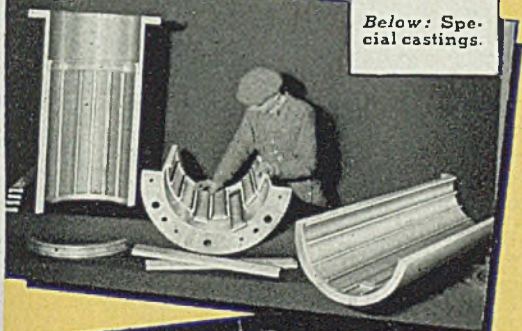
## **SHENANGO-PENN MOLD COMPANY**

411 WEST THIRD STREET, DOVER, OHIO

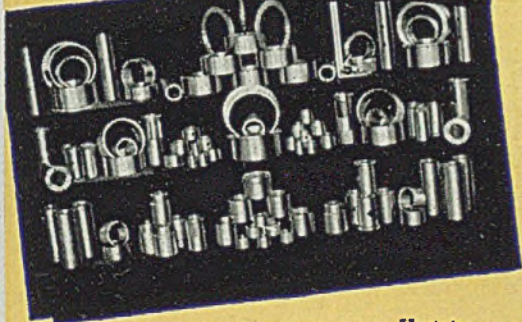
*Executive Offices: Pittsburgh, Pa.*



Above: Pump liners for marine service.



Below: Special castings.



Variety of maintenance parts



# SHENANGO - PENN



**ALL BRONZES · MONEL  
METAL · ALLOY IRONS**

**THIS VALUABLE  
CHART IS  
FREE  
SEND FOR YOUR  
COPY TODAY**

**RECOMMENDED KANTLINK SPRING WASHERS FOR USE WITH**

SCREW AND BOLT SIZE	STANDARD TOLERANCES FOR ACTUAL INSIDE DIAM. OF WASHER		WRENCH HEAD BOLTS, NUTS AND SCREWS		CAP SCREWS		SLOTTED HEAD SCREWS		MACHINE SCREWS		NUTS FOR MACHINE SCREWS AND STOVE BOLTS		SOCKET HEAD CAP SCREWS		SCREW AND BOLT SIZE
	Max.	Min.	SECTION Width and Thickness	Theoretical Weight Per 1000 (Pounds)	HEXAGON HEAD SERIES G	COLLAR HEAD SERIES H	BUTTON HEAD SERIES I	FILLISTER HEAD AND HEXAGON SOCKET SERIES J	ROUND HEAD SERIES K	FILLISTER HEAD SERIES L	SECTION Width and Thickness	Theoretical Weight Per 1000 (Pounds)	SECTION Width and Thickness	Theoretical Weight Per 1000 (Pounds)	
#2	.086	.098	.088												
#3	.093	.111	.101												
#4	.112	.124	.114												
#5	.125	.138	.127												
#6	.138	.151	.140												
#8	.164	.178	.166												
#10	.190	.206	.192												
#12	.216	.235	.218												
1/4	.250	.269	.254	3.81	1/2 x 3/16	2.80	3/32 x 3/16	1.79	3/32 x 3/16	1.08	1/2 x 3/16	1.08	1/2 x 3/16	1.08	1/2 x 3/16
5/16	.313	.334	.317	6.10	5/16 x 3/16	4.43	3/32 x 3/8	2.84	1/2 x 3/8	1.30	5/16 x 3/8	1.30	5/16 x 3/8	1.30	5/16 x 3/8
3/8	.375	.400	.380	10.40	3/8 x 3/16	6.92	1/2 x 3/8	3.21	3/8 x 3/8	1.79	3/8 x 3/8	1.79	3/8 x 3/8	1.79	3/8 x 3/8
7/16	.438	.467	.443	14.40	7/16 x 3/16	10.18	3/8 x 3/8	4.71	7/16 x 3/8	2.11	7/16 x 3/8	2.11	7/16 x 3/8	2.11	7/16 x 3/8
1/2	.500	.533	.506	22.86	1/2 x 3/16	17.29	7/16 x 3/8	7.81	1/2 x 3/8	3.21	1/2 x 3/8	3.21	1/2 x 3/8	3.21	1/2 x 3/8

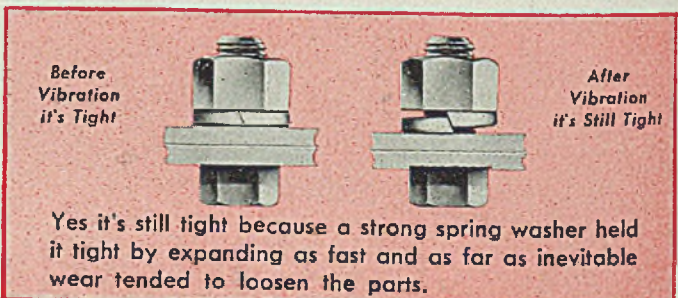
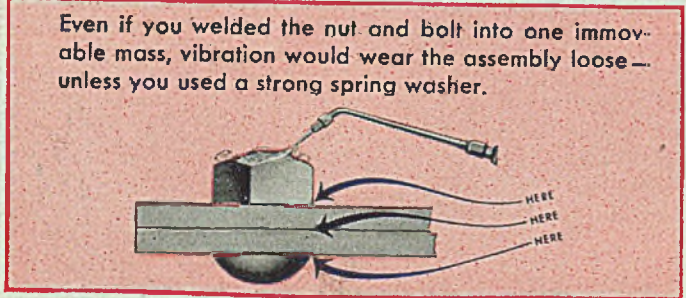


**IT SHOWS THE CORRECT SIZE OF SPRING WASHER TO USE WITH AMERICAN STANDARDS OF BOLTS, NUTS AND SCREWS.**

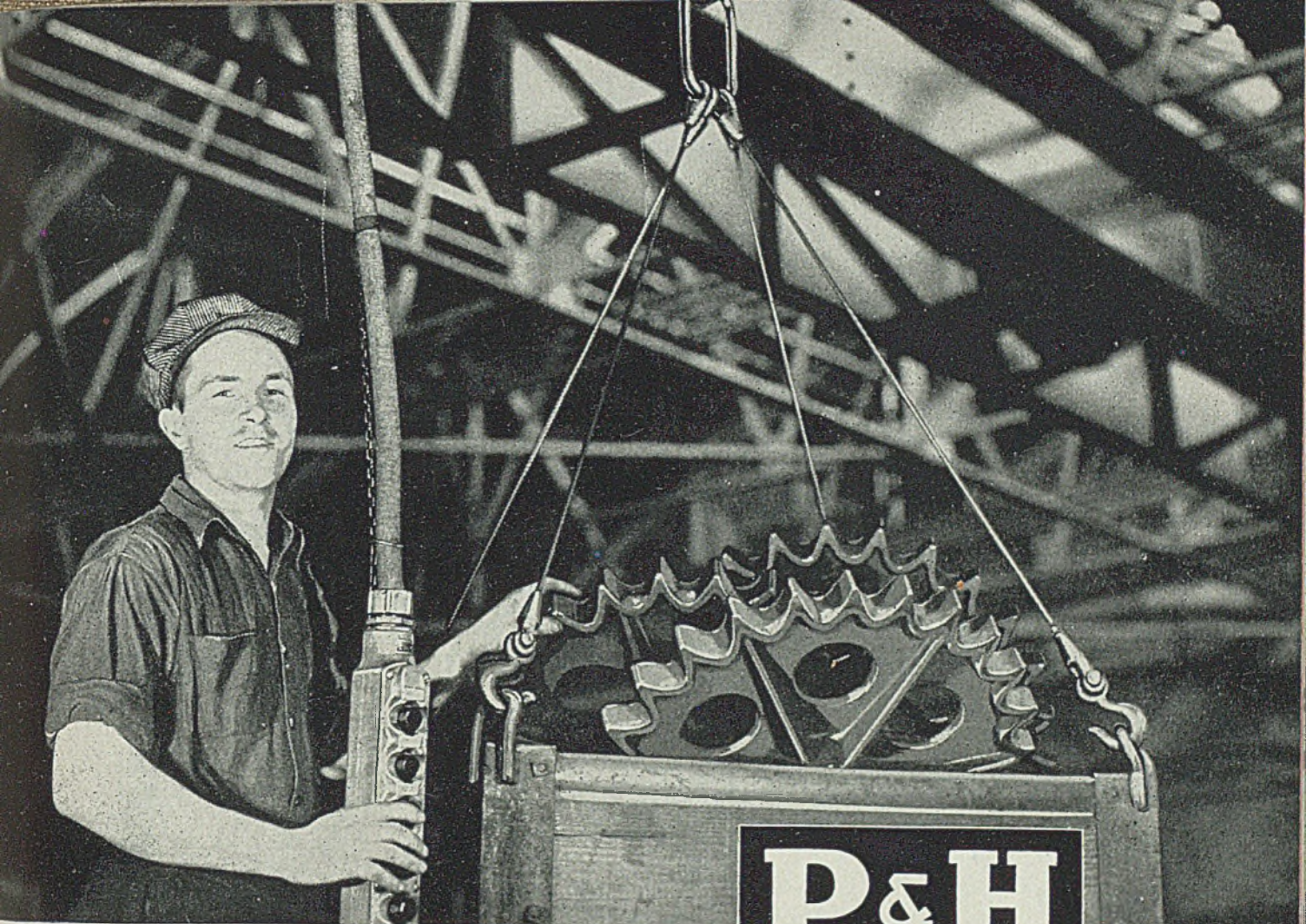
**T**hese tables deserve most careful consideration. They result from many years experience and research in cooperation with the testing staffs of industrial con-

cerns and the mechanical engineering laboratory of one of America's largest universities. Please write on your letter-head for a free copy.

A strong spring washer is essential on practically every bolted assembly. But for greatest economy, efficiency and for safety — you should use the correct size as shown on this chart.



**There is no substitute as economical. No fixed nut nor any short-range multi-toothed washer can possibly equal the great holding power of a long-range live spring — a big helical spring such as Kantlink. Write today to**  
**THE NATIONAL LOCK WASHER COMPANY, Newark, N. J., U. S. A.**



# SPEAKING OF TEAMWORK

*"We've teamed up for peak production. I press buttons and the P&H Trav-Lift moves the loads from here to there in a hurry."*

That's typical of the important part P&H Trav-Lifts are playing in war production. And everywhere, there is increasing recognition of what modern materials handling equipment can do in speeding production, eliminating worker fatigue, cutting costs.

P&H Trav-Lift Cranes provide an extremely flexible handling service. They enable you to move any type of load from any given point to any other within the area they serve, without rehandling. Available in sizes up to 15 tons capacity with either cage or floor control. Literature on request.

General Offices: 4411 W. National Avenue, Milwaukee, Wis.

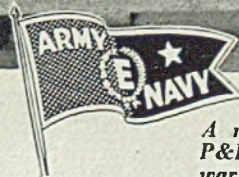
## HARNISCHFEGER CORPORATION

ELECTRIC CRANES - EXCAVATORS - ARC WELDERS

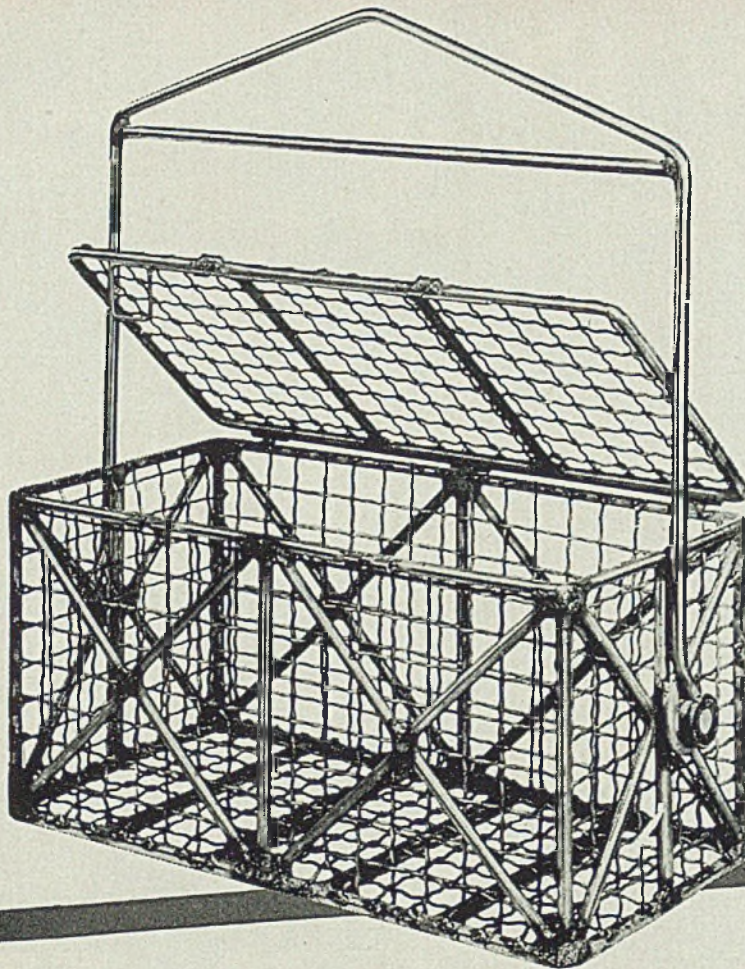


HOISTS - WELDING ELECTRODES - MOTORS

# P & H TRAV-LIFT CRANES



*A new star has been added to P&H's award for excellence in war production.*



*Trunnion pickling basket that drains quickly, completely . . . custom-made by Rolock, Inc., Bridgeport, Conn. Monel used for ease of welding, strength and resistance to corrosive effects of pickling (sulfuric) acid solution.*

## *Monel Pickling Basket that cuts down drag-out losses*

**Rolock builds trunnion basket for quick, easy and complete drainage**

All arc-welded of Monel, this pickling trunnion basket may be rocked or revolved over the pickling bath, thus draining all liquid and minimizing drag-out losses. Weighing only 130 lbs., it holds from 400 to 800 lbs. of 40 mm. steel shell cups which are pickled in a 10% sulfuric acid solution.

Since standard mill forms of Monel can almost always be used when building to specialized designs, Monel is a logical choice for pickling equipment. It is readily fabricated by all customary shop methods.

When welded, it retains its full strength and corrosion-resistant properties. Its unique excellence for pickling equipment assures long, trouble-free life with fewer costly shutdowns for repairs. For further information on the use of Monel in the pickling room, write:

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

## **INCO NICKEL ALLOYS**

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL

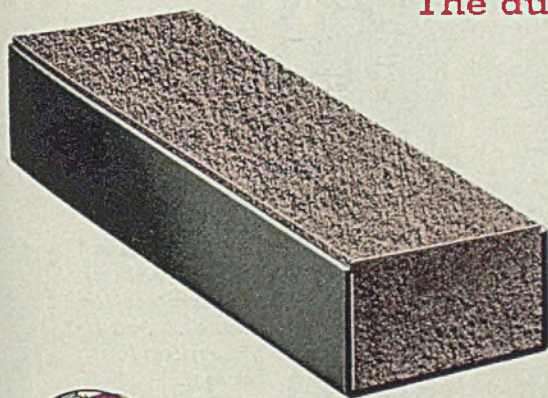
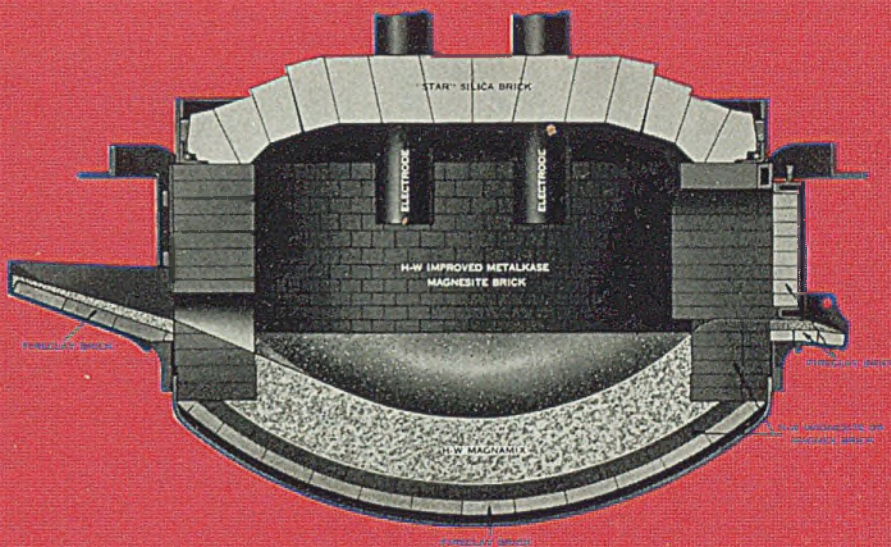
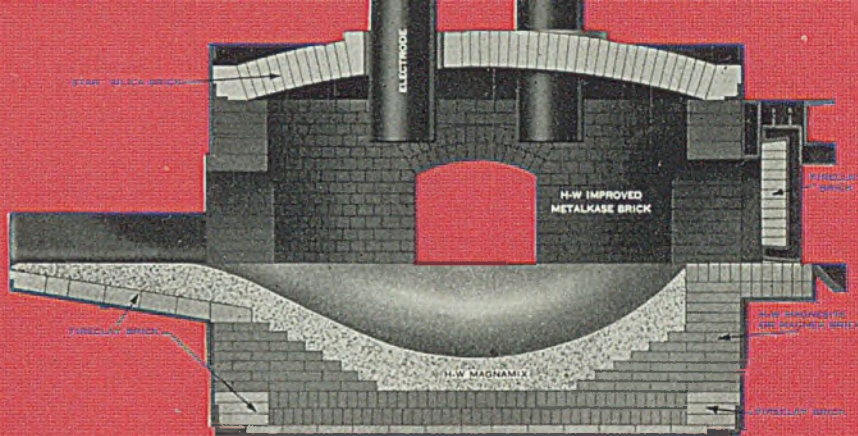
Sheet...Strip...Rod...Tubing...Wire...Castings

Production  
Records

are  
being  
made  
with

H-W *improved*

METALKASE LININGS



**The durability of H-W Improved Metalkase linings**

in electric steel furnaces is reflected in the increased tonnages being produced in the many plants where they are established. Since operating conditions unavoidably vary widely from plant to plant, comparisons of tonnages may be quite misleading. However, a report has just been received from one plant giving a total of 639 heats and a production of 20,409 tons of steel with a furnace having a 9-inch lining of H-W Improved Metalkase. It further states that there was no necessity whatsoever for patching during the furnace campaign.

We confidently believe that a comparison of H-W Improved Metalkase brick with other types of refractories in like service will definitely demonstrate their superiority.



**H-W MAGNAMIX** • A Magnesite Ramming Mixture for Basic Furnace Bottoms • Easy to Install • Economical • Durable

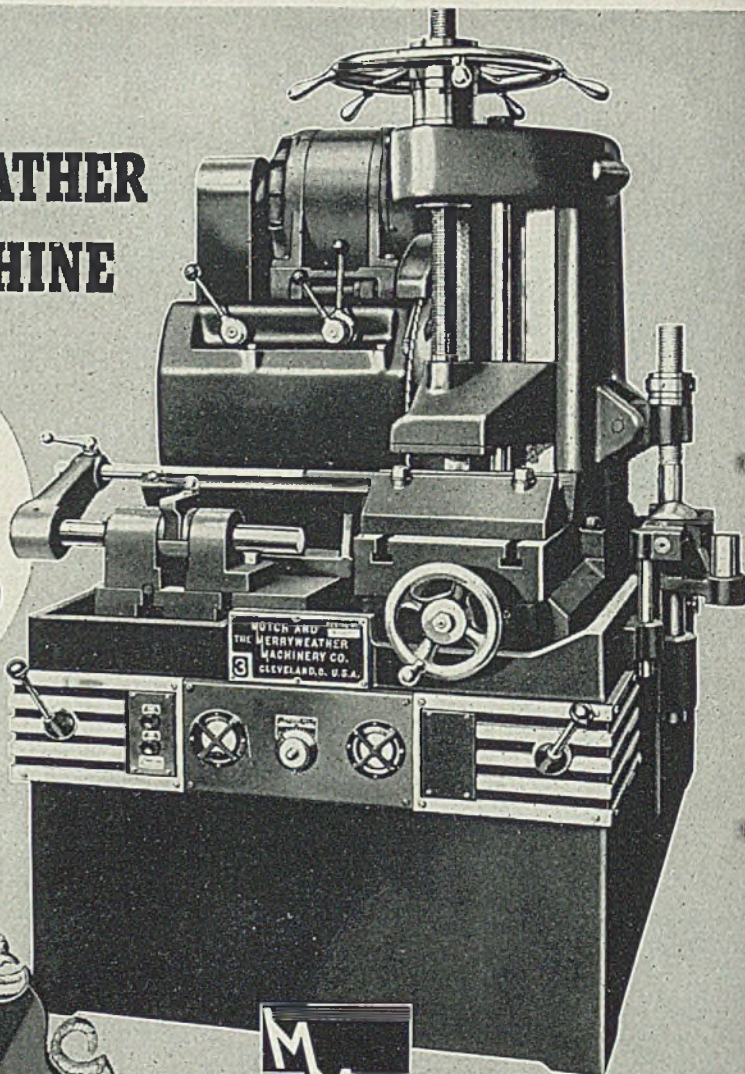
**HARBISON-WALKER REFRACTORIES COMPANY**

AND SUBSIDIARIES • WORLD'S LARGEST PRODUCER OF REFRACTORIES • GENERAL OFFICES, PITTSBURGH, PENNA.

**THE  
MOTCH & MERRYWEATHER  
COLD SAWING MACHINE  
USING THE**

***Triple-  
Chip  
METHOD***

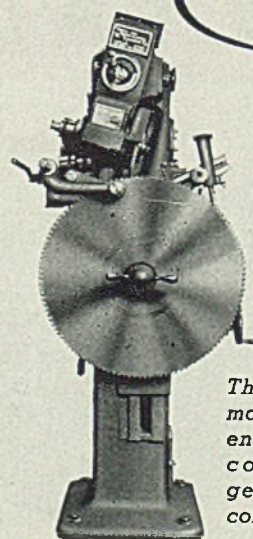
***Does  
More Work  
FASTER!***



Ask for Our  
Latest  
Blade Bulletin  
"S-6"

IF THE cold sawing of metal was once in a degree a problem, the operation has long since definitely passed into the category of work well provided for. Two Motch & Merryweather Cold Sawing Machines handle practically any kind of metal, ferrous or non-ferrous, single or multiple, up to 16" round or 14-1/2" square. They cut fast and clean, giving square ends without burrs, without scrap, at production rates that surprise experts. This is accomplished by the Motch & Merryweather Triple-Chip Method of cutting—by a blade with the distinctive Hi-Lo principle of tooth design plus many other noteworthy features . . . *Only Motch & Merryweather builds all 3; the blade itself, the saw that uses it and the machine that sharpens it.* Write for our well illustrated bulletin.

**THE MOTCH & MERRYWEATHER MACHINERY COMPANY**  
Penton Building . . . . . Cleveland, Ohio



*The M & M Automatic Saw Sharpener evolves the correct, cam-generated tooth contour.*

*Built by* **MOTCH & MERRYWEATHER**

**MOTCH AND  
MERRYWEATHER  
THE MACHINERY CO.**  
CLEVELAND DETROIT  
CINCINNATI PITTSBURGH

# VICTORY COBALT

This new **Class A** High Speed Steel is the answer to the demand for increased cutting service on heat treated steels as well as cast iron.

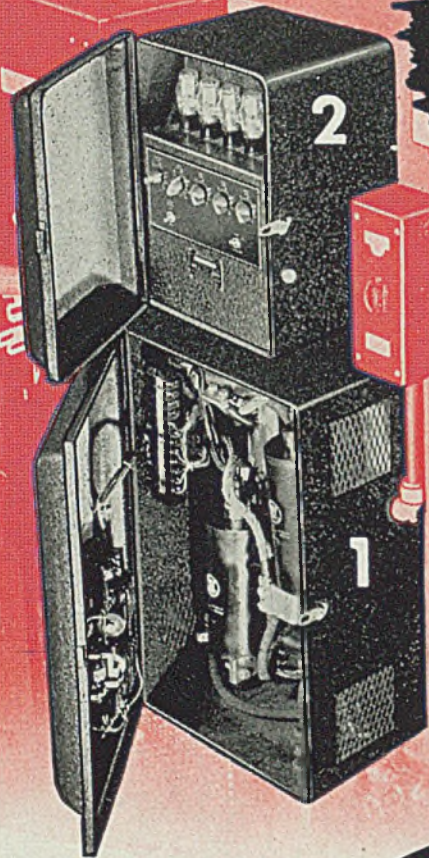
Victory Cobalt serves the war effort by combining unusual cutting ability and long wear with the conservation of strategic alloys.

## Vanadium-Alloys

**STEEL CO. LATROBE, PA.**



# ELECTRONIC Resistance Welding Control



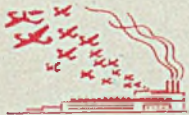
## Silent PARTNER

### FOR FASTER, STRONGER, RESISTANCE WELDING



#### VITAL MATERIALS SAVED

Eliminates rivets. No flux or solder required.



#### INCREASED PRODUCTION

Fewer welds are necessary when all are of uniform strength. Less preparation and finishing required.



#### FEWER REJECTS

Accurate control of timing eliminates weak welds and burned material.



# Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

Electronic control is a natural partner for resistance welding. It gives micro-accuracy in the variables that go into making strong, precision welds—weld time and heat. It controls high currents noiselessly, efficiently.

Westinghouse supplies all the necessary equipment for electronic control of resistance welding. Two typical units are illustrated above, mounted on a spot welder.

1 **WELD-O-TROL** "makes and breaks" heavy welding currents as high as 10,000 amperes with no arc, no noise. Complete absence of moving parts eliminates the noise and maintenance of mechanical contactors.

2 **AUTOMATIC WELD TIMER** controls duration of weld and sequence of electrode operations. Precision control to within one cycle or 1/60 of a second produces welds of uniform characteristics—even in mass production.

Specify Westinghouse controls to improve both production rates and consistency of weld quality. Ask your Westinghouse representative for recommendations and descriptive literature. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-21274

# RESISTANCE WELDING CONTROLS





# AWARDED TO REPUBLIC DRILL AND TOOL...

*“For Great Accomplishment in the  
Production of War Equipment”*

**T**HESE ARE TIMES when young and vigorous companies grow swiftly to maturity in the service of their country.

An “acorn” of industry in 1940, Republic Drill and Tool has grown into a mighty oak in its field, with an “E” Award that will spur its growth to new heights for victory.

In conferring the Award, Undersecretary of War Robert Patterson said: “For great accomplishment in the production of war equipment,

this symbolizes your country’s appreciation of the achievement of every man and woman in your plant. . . . I am confident that your outstanding record will bring victory nearer by inspiring others to similar high achievement.”

The ability to deliver—on time—essential products of high quality in large quantity, has made Republic Drill and Tool one of America’s largest manufacturers of high speed twist drills.

Republic’s advanced conceptions, methods and machines have greatly increased production of these vital tools, so necessary in the manufacture of *all* war equipment using metal or plastics.

Today, we shall supply with ever greater zeal the needs of those who use our products for war. Tomorrow, our skill and experience will supply their needs in making the products of peace for a new free world.

## REPUBLIC DRILL AND TOOL COMPANY

*Makers of CENTURY and FEDERAL High Speed Drills*

322 South Green Street, Chicago, Illinois



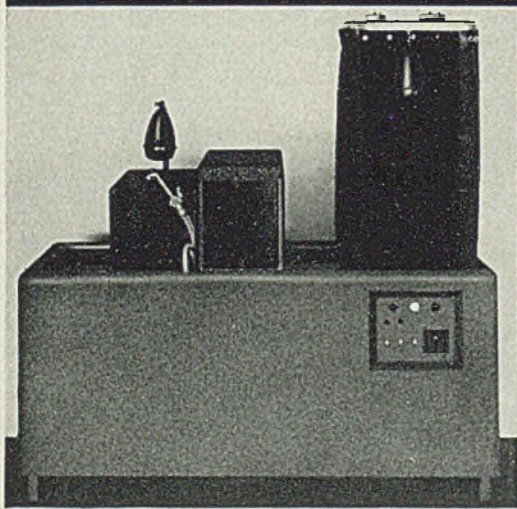
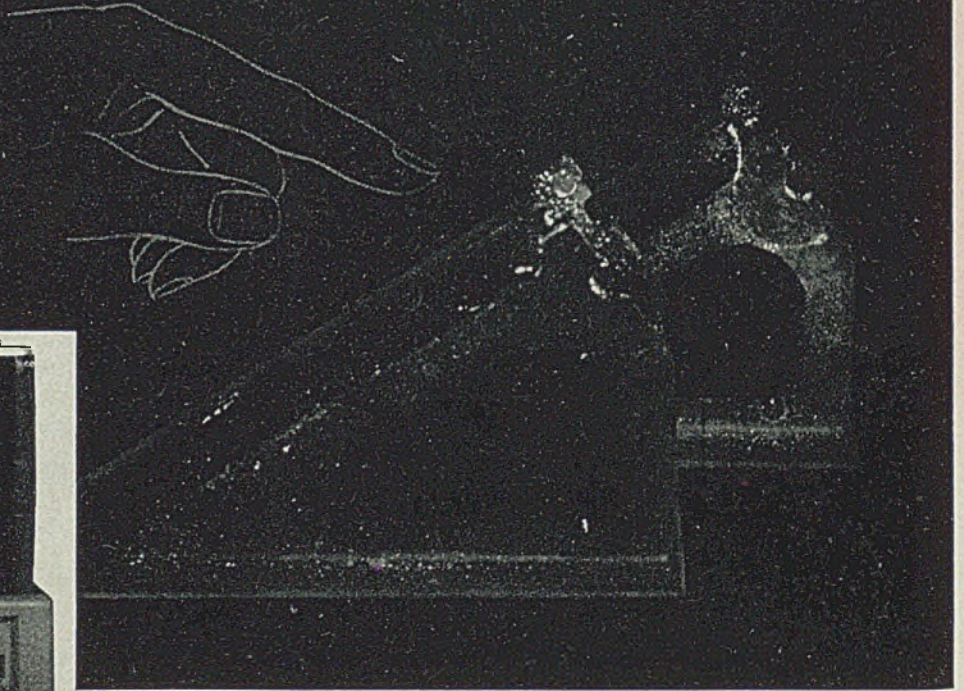
In Republic’s two plants shown above, 1800 workers are turning out millions of High Speed Twist Drills every month.

OUT OF THE DARKNESS COMES

# Zyglo

(REG. U. S. PAT. OFF.)

TO PUT THE FINGER ON FAILURE



Complete Zyglo Inspection Station ZA-2D for small volume or laboratory.

## The New Inspection Method Now Ready To Speed Your Output of Perfect Parts

(Non-Magnetic as well as Magnetic)

● Zyglo Black-Light Inspection now takes its place beside the original Magnaflux Method as industry's means of predicting areas of probable failure in non-magnetic parts. Announced some months ago, Zyglo has been put on a production-line basis in selected plants where it was needed most under war conditions. Aluminum castings (and other light metal parts) for the warplane program have had the finger of Zyglo indications put on them before assembly—before they carry a defect into finished products—long before the possibility of failure in battle. Another factor in the supremacy of American arms!

In the illustration, here, of aluminum castings—dipped in a penetrant fluorescent liquid, then rinsed, dried powdered and observed under black light—serious shrinkage cracks were shown up. The glowing fluorescent indications signal the exact locations in which the penetrant remained during rinsing, then developed finally on the surface under capillary action by the powder.

Zyglo, with its laboratory years behind it, has met the test of the production line with thoroughly practical results: *Clear, easily interpreted indications. Routine handling without delaying the flow of work. Big direct savings of labor, wasted when defective parts are assembled. Enormous indirect savings through prevention of failures.*

To fit Zyglo into the routine of factory or overhaul shops a line of equipment has been developed. A complete compact unit is shown here. All other units give larger capacity. Not only the practical equipment is available to licensed Zyglo users, but the full Magnaflux Service. This amounts to a continuing consulting and engineering service on flaw detection.

A great percentage of American manufacturing will find applications for Zyglo in the competition of the final war and early postwar years. You are urged to contact the Magnaflux Corporation to determine definitely the advantage of Zyglo in your plant. Write, requesting the new Zyglo Bulletin.



### MAGNAFLUX CORPORATION

5912 Northwest Highway, Chicago

NEW YORK

DETROIT

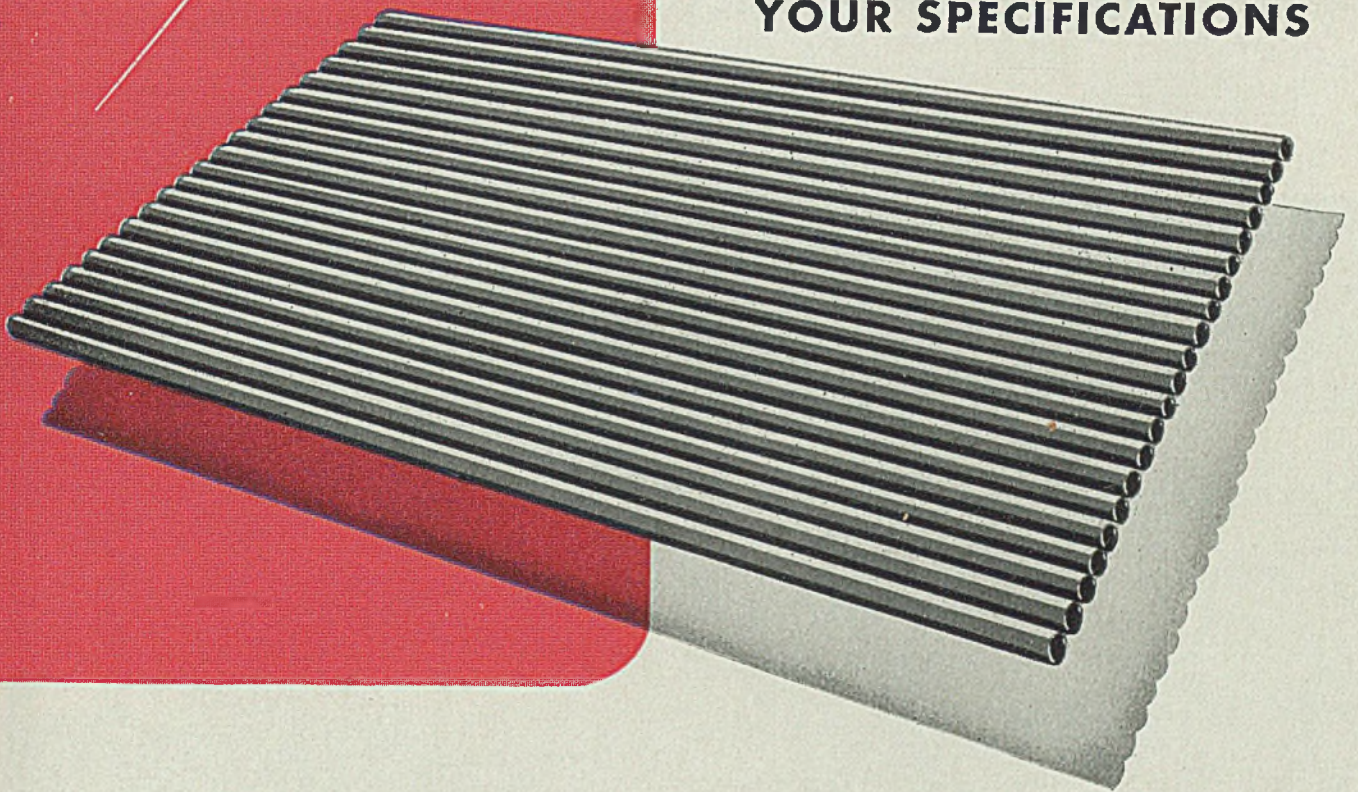
DALLAS

LOS ANGELES

# Electroweld

# Steel Tubing

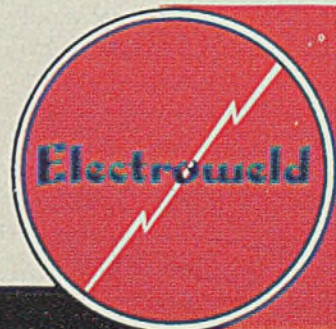
**SAVES WEIGHT AND MEETS  
YOUR SPECIFICATIONS**



## Used where performance factors are vital

When there's an extra premium upon increased as well as sustained production, specification accuracy which is dependably maintained becomes of ever increasing importance to you. The solution to that need is found in Electroweld Steel Tubing. It is lighter in weight without sacrificing strength; hence, forming, cutting, and welding operations become decidedly faster and easier. No other method of tube manufacturing can provide you with such uniform wall thickness. Furthermore, the physical and chemical properties throughout the wall can be provided exactly as specified, thus meeting your most exacting requirements at all times. The excellence of surface and uniformity of diameter provide you with additional production advantages.

These Electroweld benefits are the result of manufacturing tubing of accurate-to-specification strip steel on America's latest and most modern tube mills. Every foot of every length of Electroweld Tubing is hydrostatically tested for safety and meets Government, A.S.M.E., as well as A.S.T.M. specifications. Today we serve the Armed Forces with tubing which has these benefits, and we trust that after the war you will take advantage of Electroweld's outstanding qualities.



### SIX ADVANTAGES

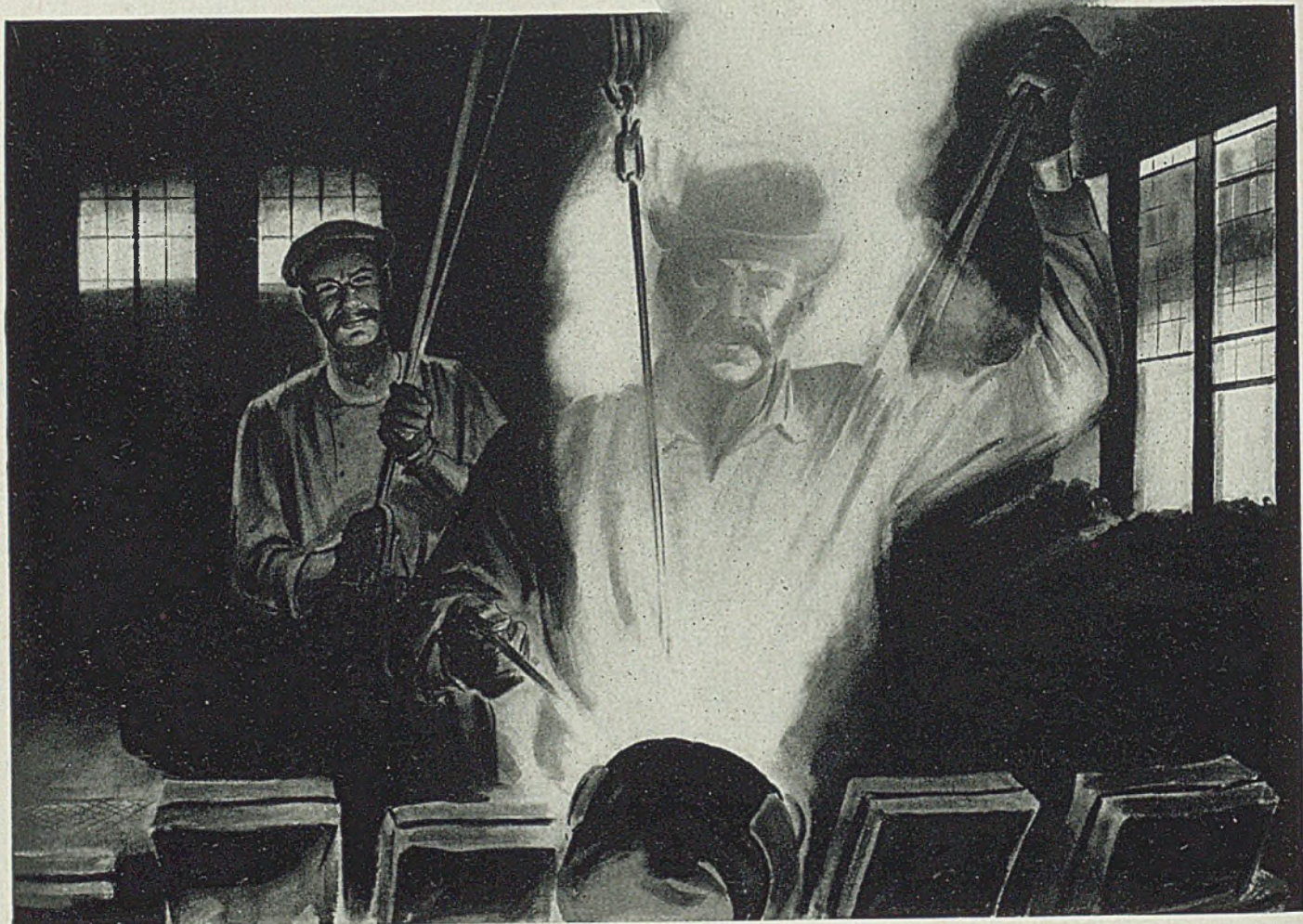
- Uniform diameter
- Uniform wall thickness
- Uniform physical properties
- Test-proven welds
- Scale-free, silver bright finish
- Square cuts, minimum burr

# Electroweld STEEL • OIL CITY, PENNA.

A Division of TALON, INC.

Manufacturers of pressure and mechanical steel tubing

# No Longer is "PHILOSOPHER'S WOOL" pulled over a Brass-Caster's Eyes



In the old days, a brass-caster stirring his crucible would often get a whiff of "Philosopher's Wool" from the boiling zinc . . . like steam from the fabled Philosopher's Stone . . . that would give him the "spelter's shakes". Yet it never occurred to him that the casting might suffer because of his passing staggers. For he did most of his work by smell or touch or some other rule of thumb. Then, brass was sold "as is", and no questions asked.

But there's no trace of fog remaining in brass-making practice today. At Bristol, any question asked by any brass-fabricator can be answered promptly and specifically . . . and the answer will hold good throughout any number of sheet, rod or wire shipments that are completed to the specifications agreed upon. Automatic production con-

trol, repeated laboratory checks, and searching physical tests guarantee that the customer gets his brass from Bristol exactly right for the job it has to do.

That's the way war-production plants all over the world are getting Bristol Brass today . . . in the ever-increasing quantities needed to seize the offensive on all United Nations fighting fronts. And when the war is won, Bristol will have a lot of new knowledge to put to work for the products of peace.

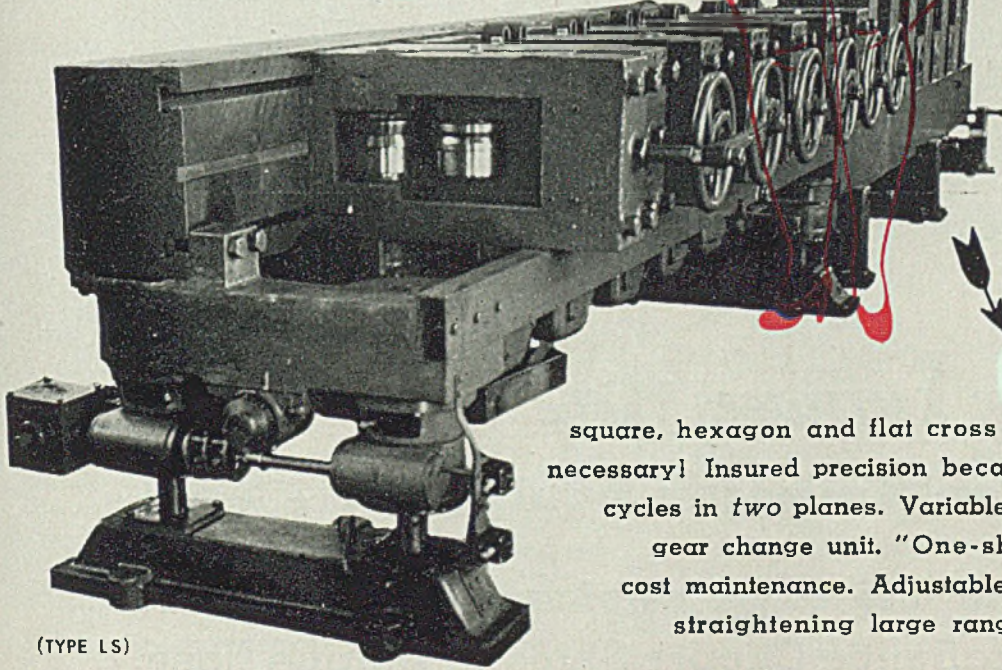
## BRISTOL BRASS

★ Buy War Bonds to Buy Brass for Bullets ★

THE BRISTOL BRASS CORPORATION, MAKERS OF BRASS SINCE 1850, AT BRISTOL, CONNECTICUT

**STRAIGHTENS THE MOST DIFFICULT SHAPES!**

**MEDART'S HIGH PRODUCTION  
shape straighteners**



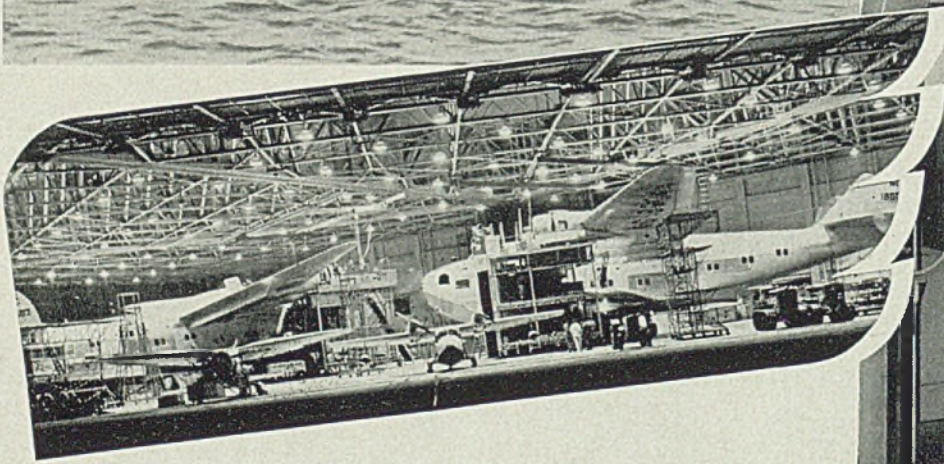
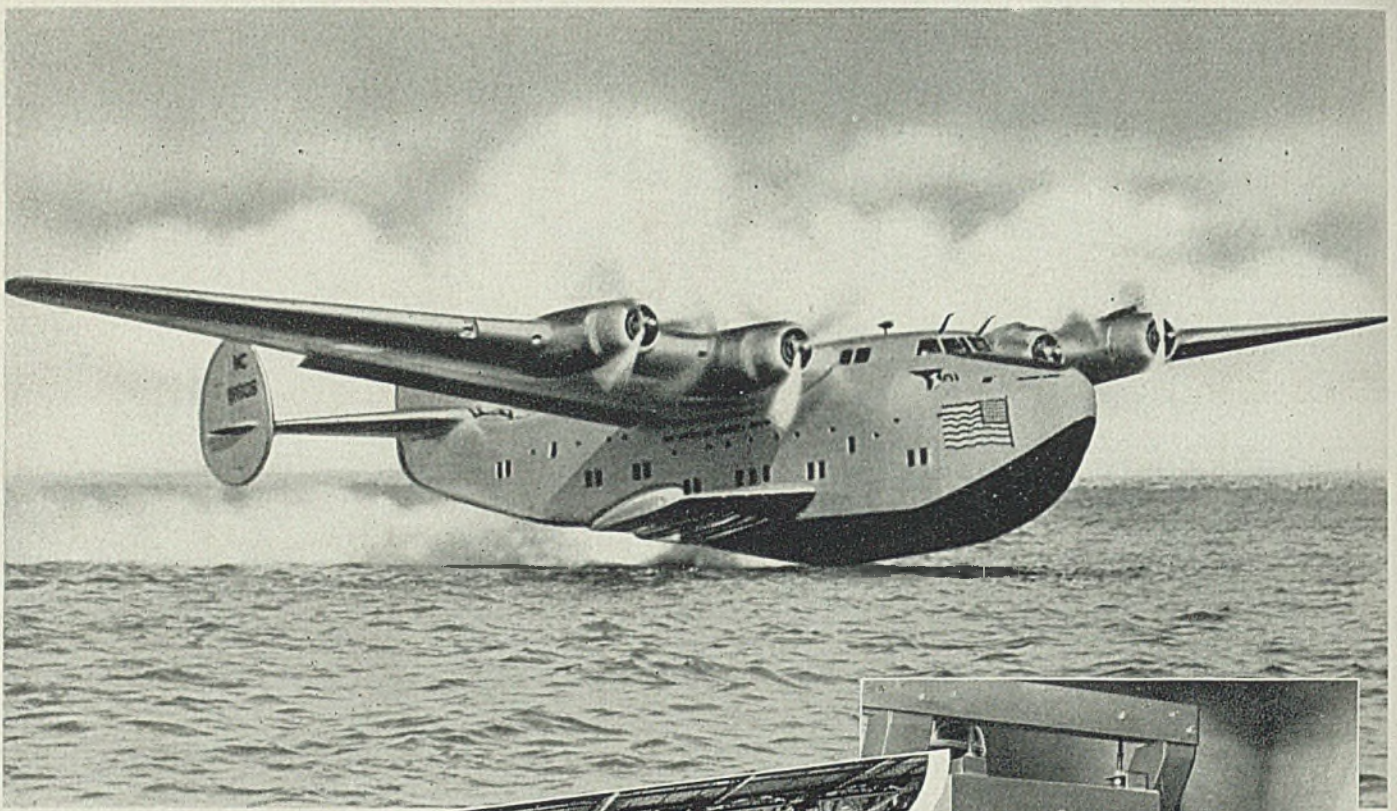
(TYPE LS)

**C**ombination type rolls handle square, hexagon and flat cross sections . . . no roll changes necessary! Insured precision because of multiple straightening cycles in *two* planes. Variable speed with 3-speed integral gear change unit. "One-shot" lubrication assures low cost maintenance. Adjustable span between rolls permits straightening large range of sizes on one machine.

Manufacturing Engineers of Complete Transmission Equipment and Specialized Machinery



THE MEDART COMPANY  
1500 DE WALS ST., ST. LOUIS, MO.



## **Hevi Duty Furnaces Help Service Pan American Equipment ★ ★ ★ ★**

In the round the clock servicing routine of the 42 Ton transatlantic Clipper Ships at Marine Base, La Guardia Field, Hevi Duty Furnaces are used for heat treating important repair parts.

*Send for Bulletins HD-934 and HD-441*

**HEVI DUTY ELECTRIC COMPANY**

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY  
MILWAUKEE, WISCONSIN

# When Considering Vanadium Ask for Electromet

Small percentages of Vanadium—0.05 to 0.15 per cent—can be used effectively to give steel extra strength and resistance to fatigue. The results are positive and predictable. Furthermore, the use of Vanadium may help to conserve other more critical alloys.

Electromet Ferrovanadium is made from domestic ores mined in adequate quantities at our Corporation mines, and is supplied in high-speed, special, and open-hearth grades.

## Vanadium Has Many Applications

—Ferrovanadium is used for making fine-grained steels having high dynamic strength, fatigue resistance, and wear



resistance. Such steels include high-speed tool steels, nitriding steels, and many engineering and structural steels. Vanadium oxide and ammonium metavanadate are used for making other vanadium compounds useful to the chemical industries. The costly platinum catalysts formerly used in manufacturing sulfuric acid, for example, may be replaced by a vanadium compound.

## Vanadium Improves Transverse Properties

—In certain grades of ordnance steels where transverse test requirements are exacting, small amounts

of Vanadium (0.05-0.10%) have a beneficial effect on the steel and give more positive results.

## Vanadium Steels for the Railroads

—Fine-grained, shock-resistant vanadium steels are used for such engine and railroad car castings as main frames, crossheads, pistonheads, wheel centers, driving boxes, rocker arms, equalizers, truck frames, bolsters, and brake rigging. Wrought vanadium steels are used for



helical springs, elliptical springs, and other parts requiring high dynamic strength.

## Vanadium Improves Steel Castings

—In steel castings a small amount of vanadium . . . usually not over 0.10 per cent . . . refines grain, materially raises yield strength without sacrificing ductility, and greatly increases resistance to shock and

fatigue. The addition of 0.10 per cent vanadium to a nickel steel was found to raise the yield strength from 53,450 to 69,900 pounds per square inch and increase the Izod impact from 35.5 to 74.3 foot-pounds.

## Vanadium Gives Extreme Toughness To Tool Steels

—Most high-speed tool



steels contain vanadium, for it gives these steels better forgeability and improved cutting efficiency. The presence of vanadium helps to maintain cutting properties at elevated temperatures.

If you need technical help in the use of Ferrovanadium or other ferro-alloys, our field metallurgists will be glad to help you. For more information about these alloys and this service, write for the booklet, "Electromet Products and Service."

BUY UNITED STATES WAR BONDS AND STAMPS

**ELECTRO METALLURGICAL COMPANY**

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street



New York, N. Y.

In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

**Electromet**  
Trade Mark  
**Ferro-Alloys & Metals**

"Electromet" is a registered trade-mark of Electro Metallurgical Company.

# PIPE helps American Industry



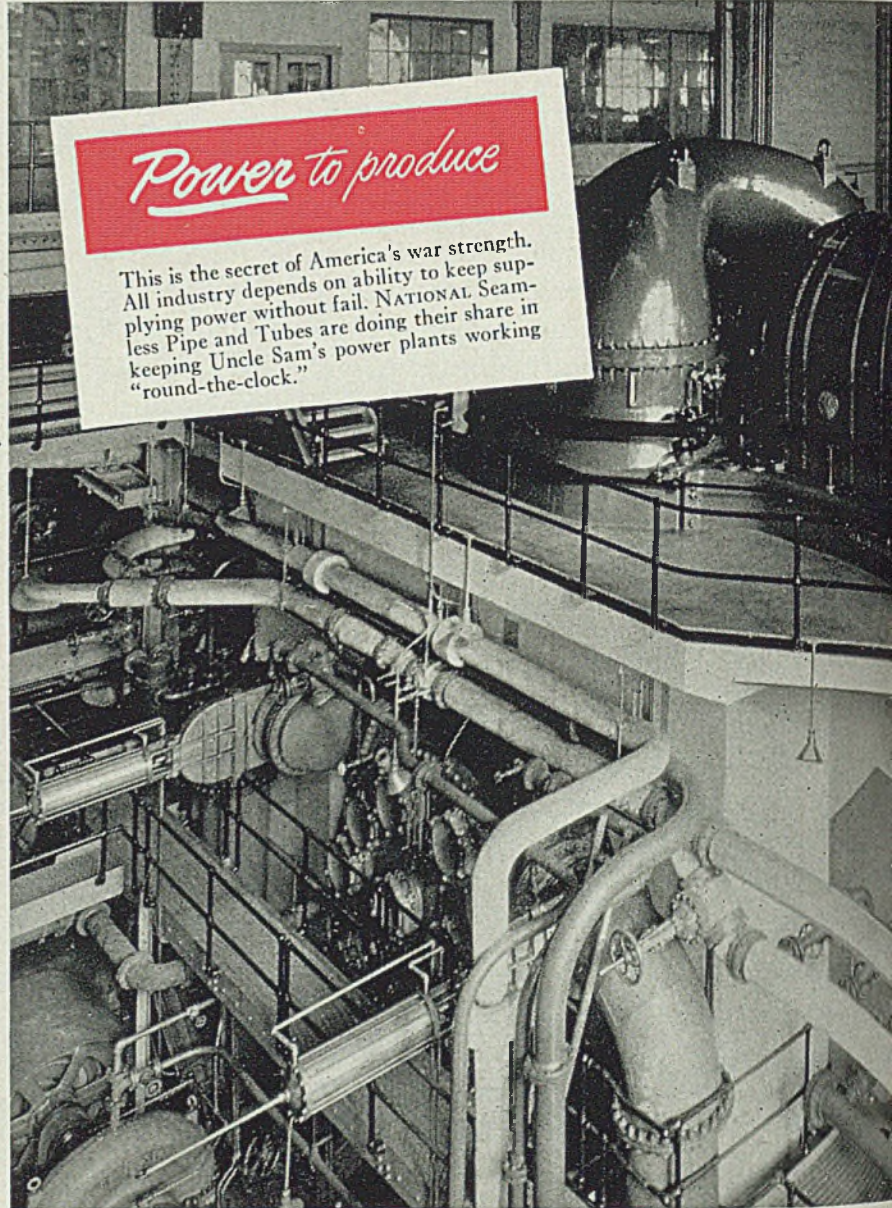
*Keeping Refineries at peak capacity*

That's a job for NATIONAL Seamless Alloy Tubes—they are serving in many of America's leading gasoline refineries and synthetic rubber processing plants.



*Railroads are doing a marvelous job*

They move the heavy stuff on fast schedules. Locomotives like this "Big Boy" are kept on the job by NATIONAL Seamless Boiler Tubes which have shown extremely long life in service.



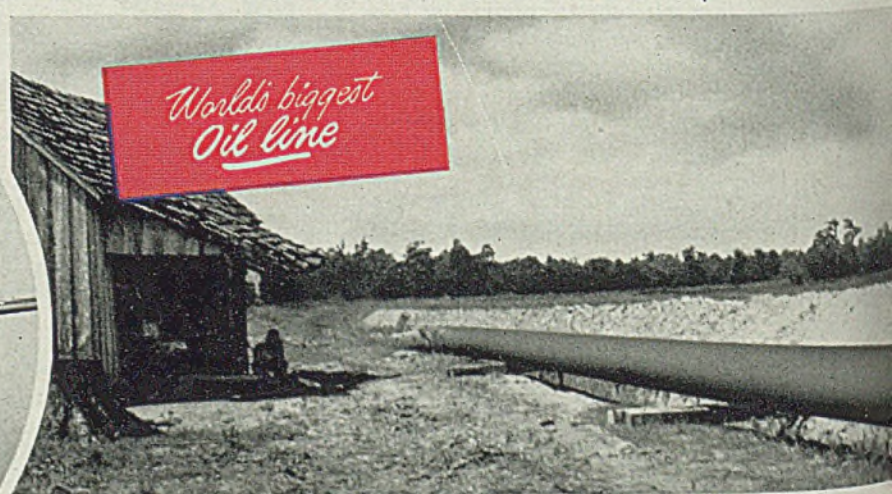
*Power to produce*

This is the secret of America's war strength. All industry depends on ability to keep supplying power without fail. NATIONAL Seamless Pipe and Tubes are doing their share in keeping Uncle Sam's power plants working "round-the-clock."



*More planes for the fighting front*

Plants of NATIONAL Tube Company have broken records again and again in meeting bigger production schedules for seamless airplane tubing.



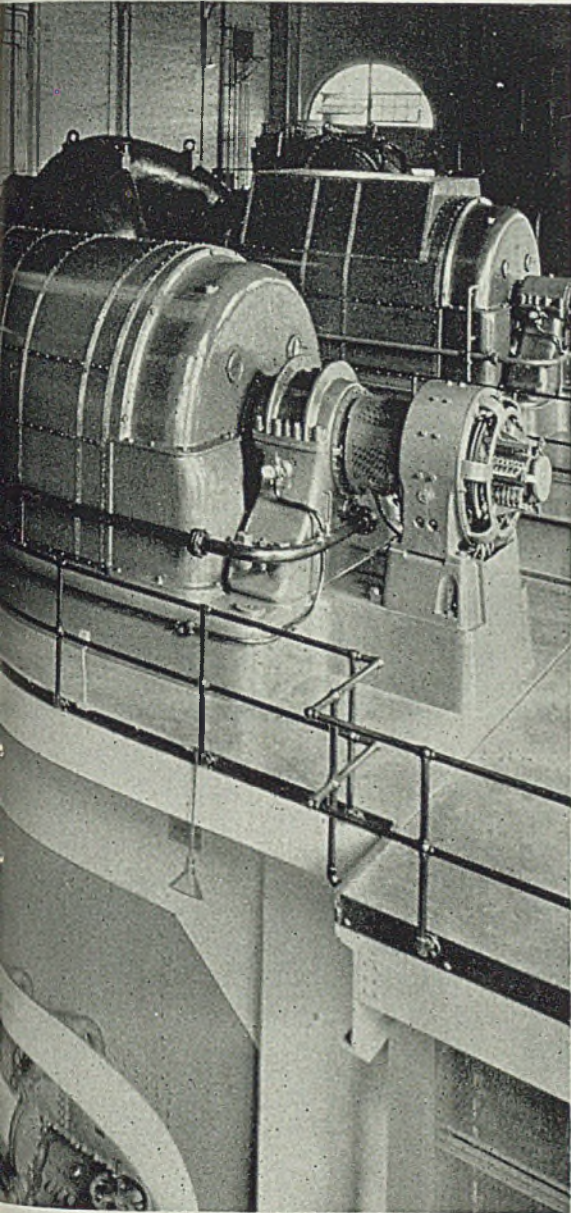
*World's biggest oil line*

Designed to deliver 300,000 barrels of crude a day to the east coast. The first unit from Texas to Illinois has already been completed, using 550 miles of 24-inch NATIONAL Seamless Pipe. Pipe for the second unit is now rolling from our mills.

U N I T E D



# achieve production miracles



IN one short year, America has transformed peace plants to war plants and achieved literally impossible goals of production. The figures were so high that Germany, Italy and Japan scoffed at them as wild dreams. 60,000 planes, 8 million tons of shipping, 45,000 tanks did look like astronomical figures. But at the year's end, most of these goals were well within sight—some even exceeded. This year, at the present rate of production, they will be far surpassed—practically doubled.

Back of these production miracles is a story of men and machines working as they never worked before—a story of equipment pushed to the limit of its capacity with mighty little time out—and, basic to all industry, a story of power generated, controlled, and delivered by *pipe*.

As America's largest producer of seamless pipe and tubing, NATIONAL Tube Company's plants are delivering more tonnage than ever before in history. This is going into the ever-expanding program for more ships, more planes, more tanks, and hundreds of other war uses.

Every day our specialists are helping to work out solutions that keep plants operating longer, that make products lighter and stronger, that save thousands of pounds of steel. If you have a pipe problem in connection with war work, our experience is placed at your disposal without obligation.

## NATIONAL TUBE COMPANY

PITTSBURGH, PA.

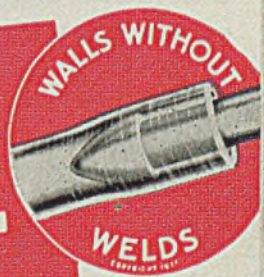


Columbia Steel Company, San Francisco, Pacific Coast Distributors  
United States Steel Export Company, New York



*High-speed Tankers*

**NATIONAL SEAMLESS**



They get their power from boilers—each containing hundreds of seamless steel boiler tubes. NATIONAL plants have kept the supply flowing to meet huge increases in demand.

**S T A T E S S T E E L**

**NO CORROSION  
DUDS HERE!**



Official  
U. S. Navy  
Photo

**Protect Your Cartridge Cases, Primers, and Other Steel Parts with  
EGYPTIAN CLEAR PHENOLIC BAKING VARNISH  
Ordnance Dept. "Spec." AXS-736 Rev. 1.**

This fast and economical special finish has been recently developed to give protection to the surfaces of ordnance parts now made of steel, such as percussion primers and the exterior and interior of shells and cartridge cases. Already it has passed the exacting tests of munition manufacturers and is standing up under the severe strains of actual service.

Following is a report we have received from the laboratory of a nationally known manufacturing concern\*:

"Mix—5 parts Varnish—1 part Reducer

Toluene	OK
Acetic Acid	OK
Ammonium Hydroxide	OK
Ethyl Alcohol	OK
Ethyl Ether	OK
Adherence	GOOD
Abrasion	OK
Salt Spray	OK

This material was applied and allowed to air dry 10 minutes after which it was baked at 350° for 30 minutes."

\*Name on request.

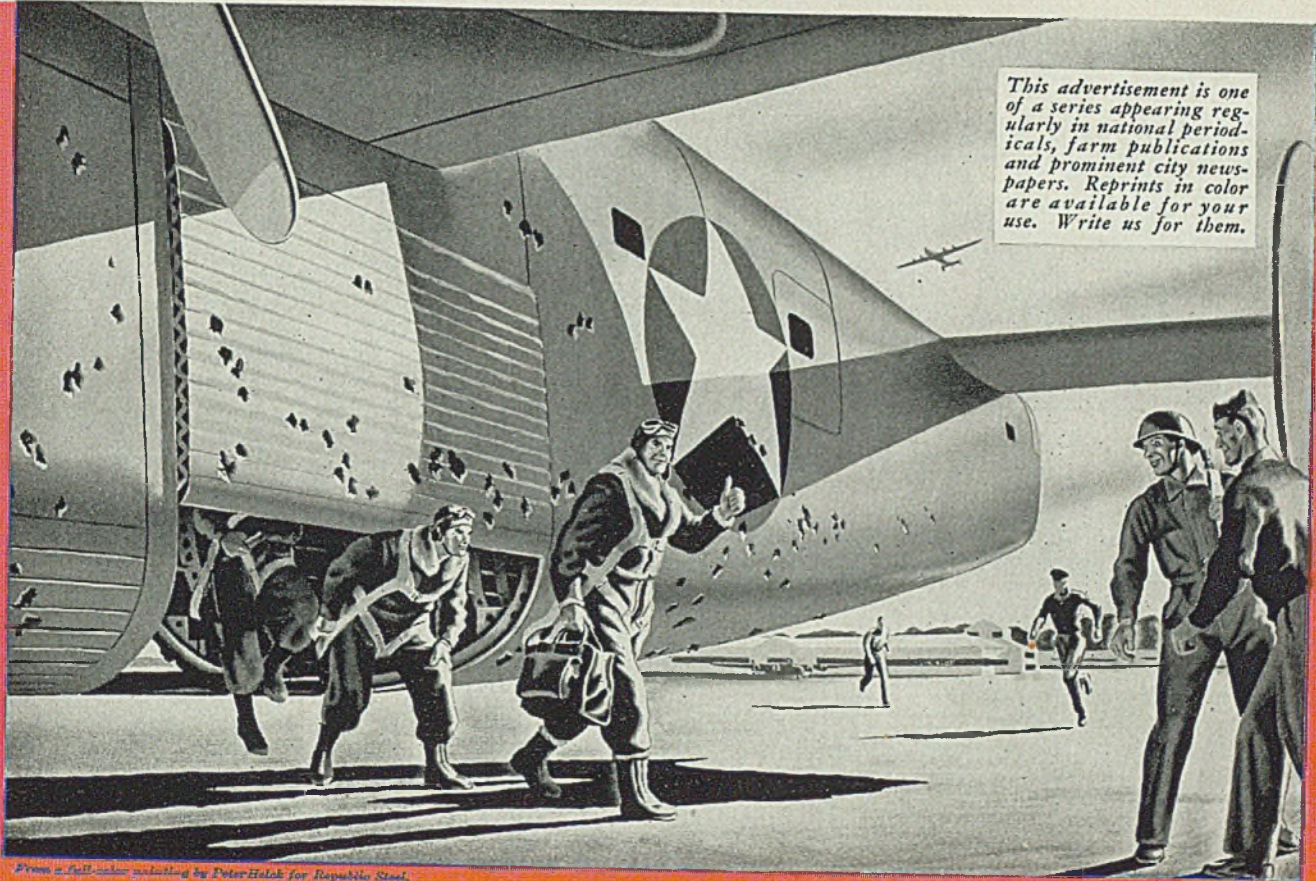
For further information regarding this or other EGYPTIAN finishes contact Dept. S

**THE EGYPTIAN LACQUER MANUFACTURING CO.**  
ROCKEFELLER CENTER—NEW YORK, N. Y.



**EGYPTIAN**  
*Superior* **FINISHES**

This advertisement is one of a series appearing regularly in national periodicals, farm publications and prominent city newspapers. Reprints in color are available for your use. Write us for them.



From a full-color painting by Peter Hales for Republic Steel.

## BELLY FULL OF BULLETS—but every man alive!

Tex., reported not one man of the bomber received as much as a scratch. One of the bomber's engines was shot up, and there were bullet holes in the fuselage. It was this bomber's first encounter with Jap Zeros. The plane crew included:

(clipped from a recent issue of the Cleveland Plain Dealer)

Unusual news? Once it was, but not today! Items like this are appearing almost every day—telling of the miraculous ability of American bombers to reach their objectives through a deadly hail of enemy fire—and return with every man alive.

★ ★ ★

American planes are proving their fighting ability in the skies over most of the globe. They can take it as well as dish it out.

Scores of American flyers in all parts of the world owe their lives to armor plate at vital points in planes—armor plate tough enough to stop enemy bullets and light enough to fly high.

The quality of these planes is a tribute

to the American system of industry. The volume of their production is amazing—from 20,000 in 1941 up to 49,000 in 1942—more planes than we produced in the 23 years preceding this war.

This production job would not have been possible without vastly increased tonnages of the fine steels necessary for engines, fuselages, propellers, landing gear, armor and armament.

Free American industry has done a far greater war production job in two years than Hitler's "efficient dictatorship" could do in ten years! And not because we are a race of supermen, but because we are **FREE** men.

In these same two years, Republic's electric furnace capacity for making "Aircraft Quality" steels, light armor plate and other fine alloy steels increased more than 700%. Output of steel plates for ships was boosted 500%. A huge stream of peacetime products was diverted into a record-breaking flood of war steels and steel products.

Until we win the victory that will insure our American way of life—freedom to live as we choose, to speak, worship and work without fear or want—Republic will continue its "full-out" war effort.

After that, Republic will utilize its past experience, enlarged facilities and new knowledge gained in wartime production and in increasing research to provide more steel, finer steels to further enhance what we have always thought was the best Country in which to live.

You and we owe it to our sons and brothers in uniform that they shall return to an America that is worth their sacrifices—an America that will grow even greater and stronger because it is **FREE**. Let's see to it that our job is done—**WELL!**

### REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division  
Niles Steel Products Division • Steel and Tubes Division  
Union Drawn Steel Division • Truscon Steel Company  
Export Department: Chrysler Building, New York, N. Y.

# Republic

## ALLOY AND ENDURO STAINLESS STEELS

Sheets—Plates—Hot Rolled and Cold Drawn Bars—  
Pipe—Upson Bolts, Nuts, Rivets—Electrunite Tubing



# A POWERFUL WEAPON FOR INDUSTRY

## THE *FAST* METAL CUTTING SAW

# Wells No. 8

On industry's fighting front Wells Saws are among the busy weapons turning out our axis-beating equipment. They are working on the production line — in the tool room — on maintenance and odd jobs — cutting metals and other materials with speed and precision.

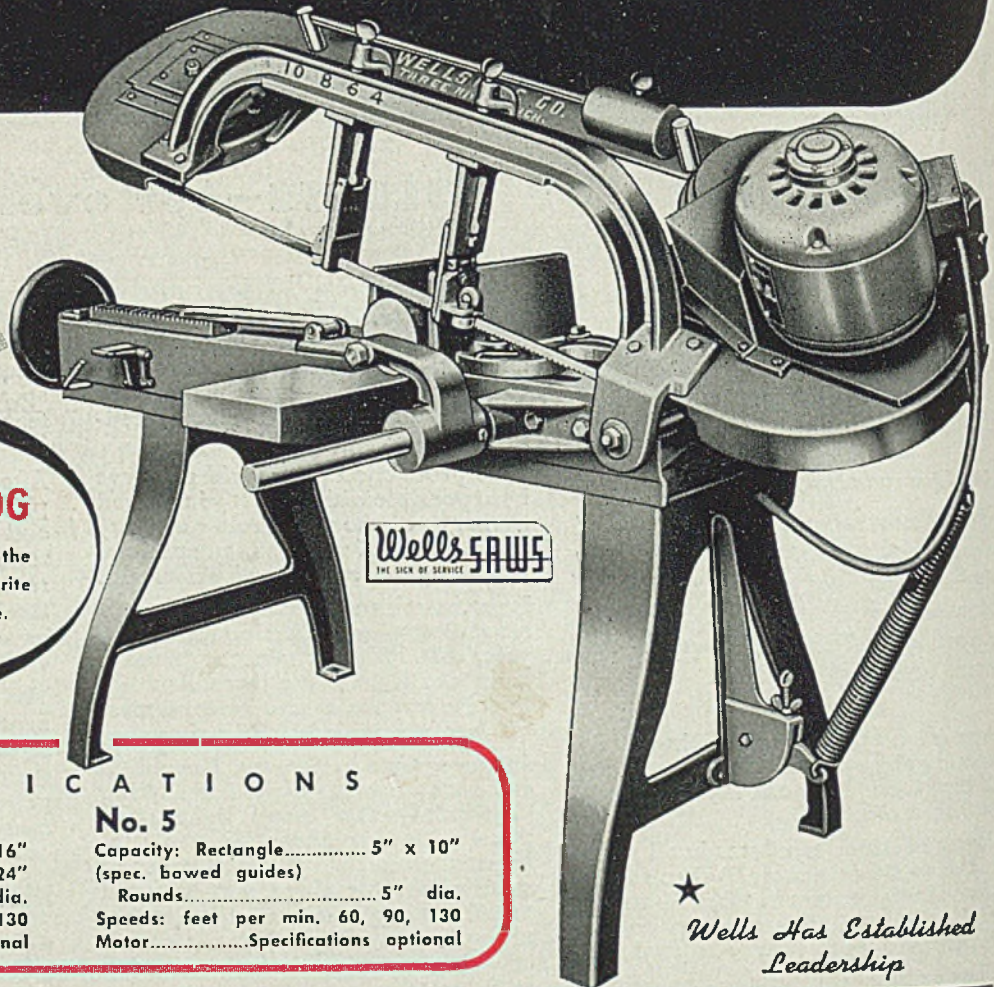
Wells Saws are rugged, versatile machines built for today's tough cut-off problems. And they will be the ideal all around saws for tomorrows jobs too!

Call your distributor or 'phone or wire direct — you can get quick delivery.



### THIS NEW CATALOG

will give you all the details on the complete line of Wells Saws. Write for your copy — free, of course.



### S P E C I F I C A T I O N S

#### No. 8

Capacity: Rectangle..... 8" x 16"  
(spec. bowed guides)..... 5" x 24"  
Rounds..... 8" dia.  
Speeds: feet per min. 60, 90, 130  
Motor..... Specifications optional

#### No. 5

Capacity: Rectangle..... 5" x 10"  
(spec. bowed guides)  
Rounds..... 5" dia.  
Speeds: feet per min. 60, 90, 130  
Motor..... Specifications optional

★  
*Wells Has Established  
Leadership*

WELLS MANUFACTURING CORPORATION

# Wells METAL CUTTING BAND SAWS

1515 FILLMORE STREET • THREE RIVERS, MICHIGAN

# TURCO



## SPECIALIZED INDUSTRIAL CHEMICAL COMPOUNDS FOR EVERY INDUSTRY

**A few typical items of the 225 Turco Products specialized for your needs:**

**TURCO STRIPPER L595**

A non-inflammable paint remover. Safe, speedy, wax-free. Eliminates after-cleanup time.

**TURCO AIRLION 81**

An alkaline hot tank material. Insures a chemically clean surface before Anodizing and Chromatizing. Will not attack aluminum.

**TURCO CARBRAX**

Removes hard carbon and grease from all types of engine parts and pistons; also used in artillery overhaul and general industry.

**TURCO POROKLEEN**

Plater's cleaner for steel, electrolytically or otherwise.

**TURCO SLIP**

Removes zinc chromate primer by immersion. Non-inflammable, non-toxic, quick acting.

**TURCO W. O. NO. 1**

A Phosphatizing compound. Creates base for paint on metals. A substitute for Anodizing under many conditions.

**TURCO PENETROL**

Decarbonizing compound for aircraft and diesel truck engines.

**TURCO MULSINE**

Potent emulsifier and grease remover. Used cold for cleaning aircraft surfaces.

**TURCO DURAMASK**

Water soluble, cream colored masking compound, for paintroom floors. Dries to hard finish.

**Consult your local Turco Service Representative or write the Main Office.**

Many Turco Specialized Industrial Chemical Compounds have been an important factor in speeding up war production operations. Others have for years played a large part in plant maintenance.

Turco methods of surface preparation for anodizing, chromatizing and phosphatizing are standard procedure in many important aircraft plants.

Turco Decarbonizing and Degreasing Compounds and their methods of application are widely accepted for engine overhaul and maintenance.

The Turco laboratory staff of highly trained chemists and technicians is constantly developing new methods and materials to speed up war production.

Turco Field Engineers and the Turco technical literature and information service are helping all war industries increase production.

Check the operations in the coupon below on which you need help, and mail to the head office. No obligation.

### TURCO PRODUCTS, INC.

Los Angeles — Chicago

Main Offices & Factory — 6135 S. Central Ave., Los Angeles, Calif.

Midwest Factory — 4856 S. Halsted Street, Chicago, Ill.

Service Representatives and Warehouse Stocks in All Principal Cities.

MAIL THIS COUPON

29-63

**TURCO PRODUCTS, INC.**  
6135 S. Central Ave., Los Angeles

Please send FREE literature on materials, methods and procedure pertaining to the operations checked below:

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

FIRM \_\_\_\_\_

ADDRESS \_\_\_\_\_ STATE \_\_\_\_\_

**I'M INTERESTED IN THE OPERATIONS WHICH I HAVE CHECKED (✓):**

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Acid Pickling                     | <input type="checkbox"/> Cleaning Prior to Plating | <input type="checkbox"/> Paint Camouflage Cleaning    |
| <input type="checkbox"/> Aluminum Spot Welding             | <input type="checkbox"/> Cold Immersion Cleaning   | <input type="checkbox"/> Paint Department Maintenance |
| <input type="checkbox"/> Anodizing                         | <input type="checkbox"/> Cold Spray Cleaning       | <input type="checkbox"/> Paint Stripping              |
| <input type="checkbox"/> Cyanide Zinc, Bright Zinc Plating | <input type="checkbox"/> Floor Maintenance         | <input type="checkbox"/> Phosphatizing                |
| <input type="checkbox"/> Steam Vapor Cleaning              | <input type="checkbox"/> Glass Cleaning            | <input type="checkbox"/> Scale Removal and Control    |
| <input type="checkbox"/> Chromatizing                      | <input type="checkbox"/> General Plant Maintenance | <input type="checkbox"/> Stainless Steel Processing   |
| <input type="checkbox"/> Cleaning Metals Before Processing | <input type="checkbox"/> Hot Immersion Cleaning    | <input type="checkbox"/> Steam Boiler Maintenance     |
|  | <input type="checkbox"/> Magnesium Processing      |   |

DOUBLE . . . TRIPLE . . .  
EVEN 20 TIMES  
**LONGER LIFE**  
FOR VITAL MACHINE PARTS

## NITRIDED NITRALLOY

brings not merely extra endurance to steel parts, but enormously added wear resistance. No other alloy has such extreme surface hardness: 900-1200 Vickers Diamond Brinell—the hardest steel surface known. No other alloy retains its hardness at the temperature of 1000° F.

Bearings and bushings of Nitrided Nitralloy, cylinders, shafts, sprockets—almost endless applications—provide unmatched resistance to abrasion, even under faulty lubrication. Core properties may be dependably controlled. Treated parts suffer little or no distortion in the nitriding process.

Nitralloy is, for the present, restricted to war equipment parts for which no other metal will do.

Available now—technical data to aid you in your post-war planning. For information write to any of the companies listed below.

### THE NITRALLOY CORPORATION 230 PARK AVENUE • NEW YORK, N. Y.

#### Companies Licensed by The Nitralloy Corporation

Allegheny Ludlum Steel Corp. . . . . Watervliet, N. Y.  
Bethlehem Steel Co. . . . . Bethlehem, Pa.  
Copperweld Steel Co. . . . . Warren, O.  
Crucible Steel Co. of America . . . . . New York, N. Y.  
Firth-Sterling Steel Co. . . . . McKeesport, Pa.  
Republic Steel Corporation . . . . . Cleveland, O.  
The Timken Roller Bearing Co. . . . . Canton, O.  
Rotary Electric Steel Co. . . . . Detroit, Mich.  
Vanadium-Alloys Steel Co. . . . . Pittsburgh, Pa.  
Atlas Steel Limited . . . . . Welland, Ontario

#### Operating & Accredited Nitriding Agents

Camden Forge Co. . . . . Camden, N. J.  
Commercial Steel Treating Corp. . . . . Detroit, Mich.  
Engelhard & Kenny . . . . . North Arlington, N. J.  
The Lakeside Steel Improvement Co. . . . . Cleveland, O.  
Link-Belt Co. . . . . Chicago, Ill.  
Lindberg Steel Treating Co. . . . . Philadelphia, Pa.  
Met-Lab, Inc. . . . . Philadelphia, Pa.  
New England Metallurgical Corp. . . . . Boston, Mass.  
Pittsburgh Commercial Heat Treating Co. . . . . Pittsburgh, Pa.  
Queen City Steel Treating Co. . . . . Cincinnati, O.  
Rex & Erb . . . . . Lansdale, Pa.

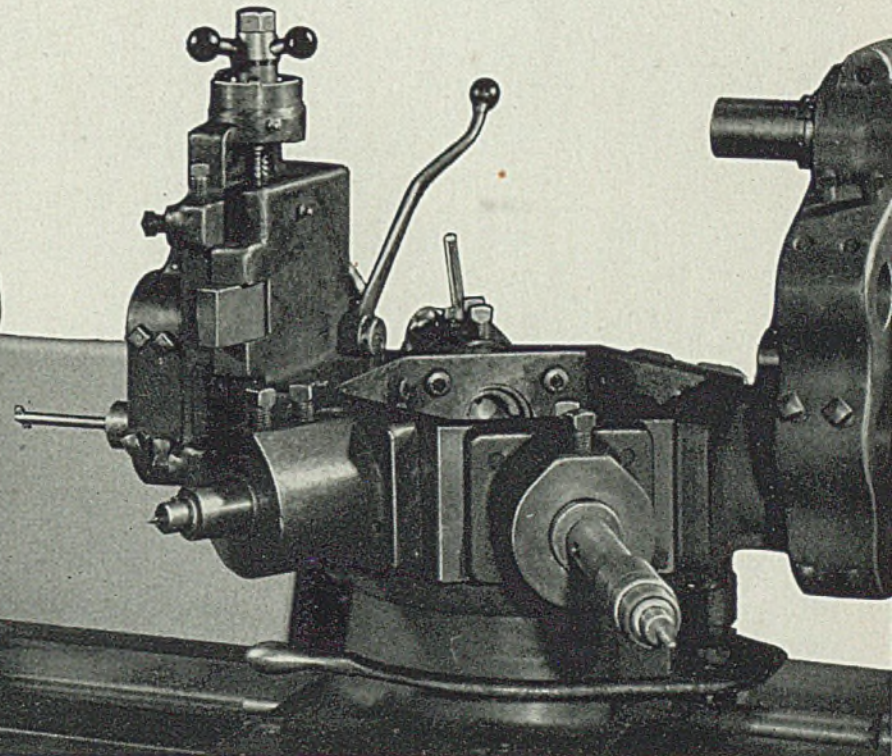
Wesley Steel Treating Co. . . . . Milwaukee, Wis.  
N. A. Woodworth Co. . . . . Ferndale, Mich.  
Ontario Research Foundation . . . . . Toronto, Ontario, Canada

#### Manufacturers of Nitralloy Steel Castings

Lebanon Steel Foundry . . . . . Lebanon, Pa.  
Empire Steel Castings Co. . . . . Reading, Pa.  
The Massillon Steel Casting Co. . . . . Massillon, O.  
Milwaukee Steel Foundry Div.,  
Grede Foundries, Inc. . . . . Milwaukee, Wis.  
Warman Steel Casting Co. . . . . Los Angeles, Cal.

3675

MAKE IT FIT TO FIGHT! \* \* \*

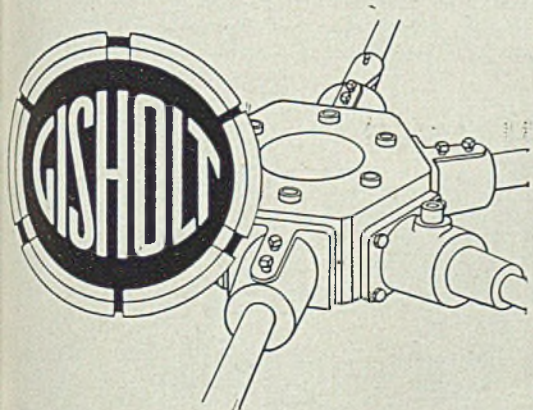


# Argue with a micrometer? not me!

A thing's either right or wrong in this business! You learn right at the start that there's no "almost" about a tolerance of .0005". In mass production, the micrometer is boss. Interchangeable parts *fit right*—or else!

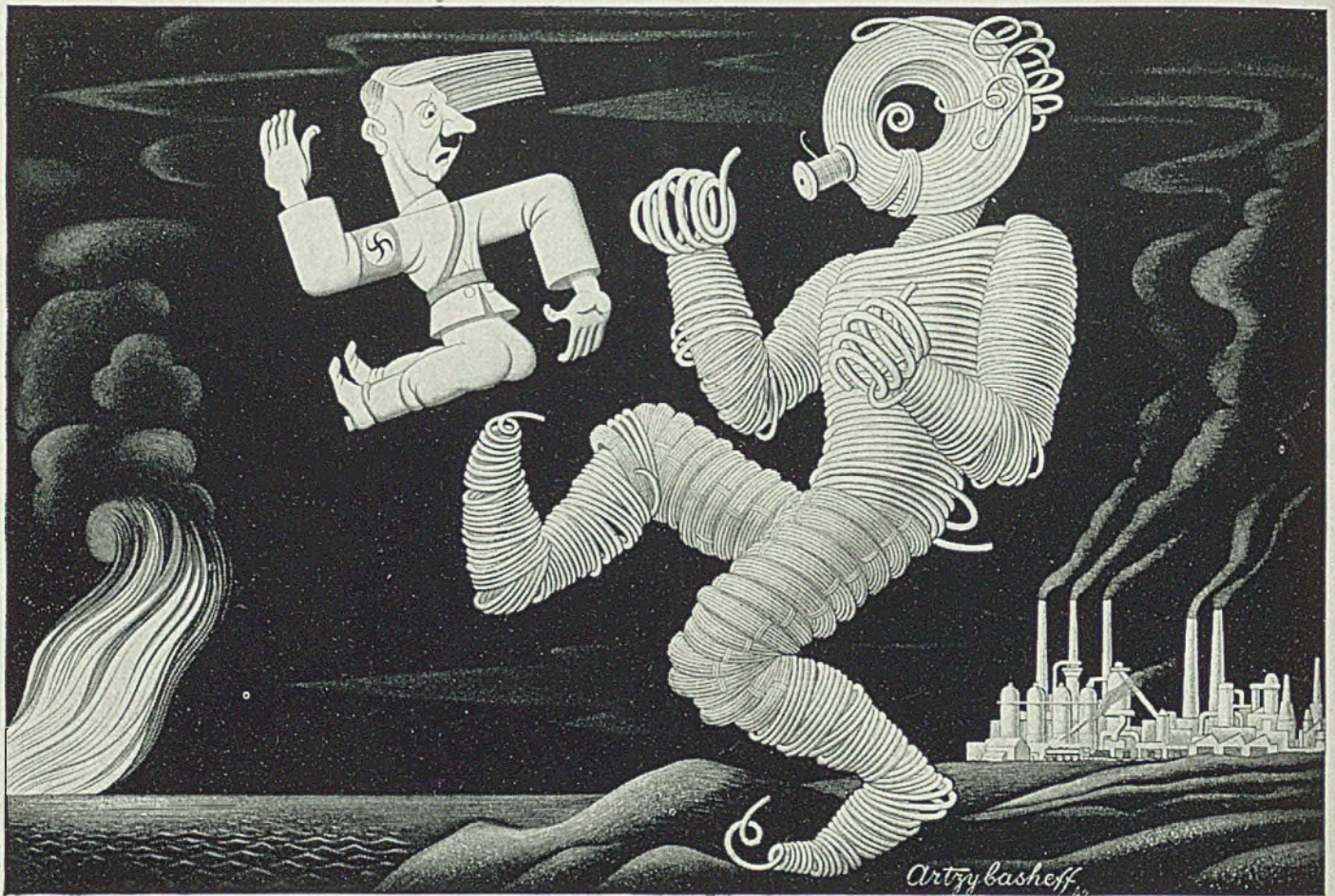
For this kind of work, calling for accuracy and speed, American industry has learned to depend on Gisholt Turret Lathes.

**GISHOLT MACHINE COMPANY**  
1217 East Washington Avenue • Madison, Wisconsin



Look Ahead . . . Keep Ahead . . . With Gisholt Improvements in Metal Turning

**TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES**



Enlarged reproduction free on request

## Wire Warrior at Your Service

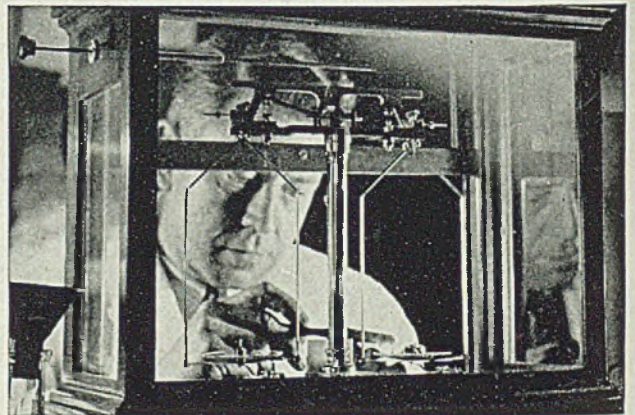
Wissco wire is putting temper, spring action, and strength into the attack.

It is fighting in everything from airplanes, to bombs, to torpedoes, to tanks, to uniforms, to warships . . . and then some.

In every foot of Wissco Wire is the fighting spirit of thousands of loyal production soldiers whose output for Victory is breaking all-time records. In every inch is the skill acquired in 122 years of research, discovery and pioneering—the things it took to make Wissco one of the world's leading wire producers.

If you have a war need for wire, put it up to experts. Wickwire Spencer Steel Company, 500 Fifth Avenue, New York; Buffalo, Chicago, Detroit, Philadelphia, San Francisco, Worcester.

**EVERYTHING IN WIRE.** High and Low Carbon Wire—Wire for Springs, for Wire Rope, for use in scores of industries, in a variety of sizes, tempers, grades and finishes.



**CURIOSITY INC.** Wissco research has produced many basic improvements in wire metallurgy, and in wire uniformity and quality. Every step from ore pile to blast furnace, to open hearth, to finished wire is done right in our own mills.

SEND YOUR WIRE QUESTIONS TO WICKWIRE SPENCER

COPYRIGHT 1943, WICKWIRE SPENCER STEEL COMPANY

**WISSCO**  **WIRE**  
**BY WICKWIRE SPENCER**





STEEL

September 21, 1942

## Works Sets World Record in Plate Production

World record production of steel ship plates, more than enough for 35 Liberty cargo vessels, was achieved in August by Works of Steel Corp., a plant that had not rolled a plate until its conversion from sheet steel production five months ago. August tonnage exceeded the known plate output of any other plant in the steel industry, and was thousands of tons greater than the maximum estimated at the time of conversion.

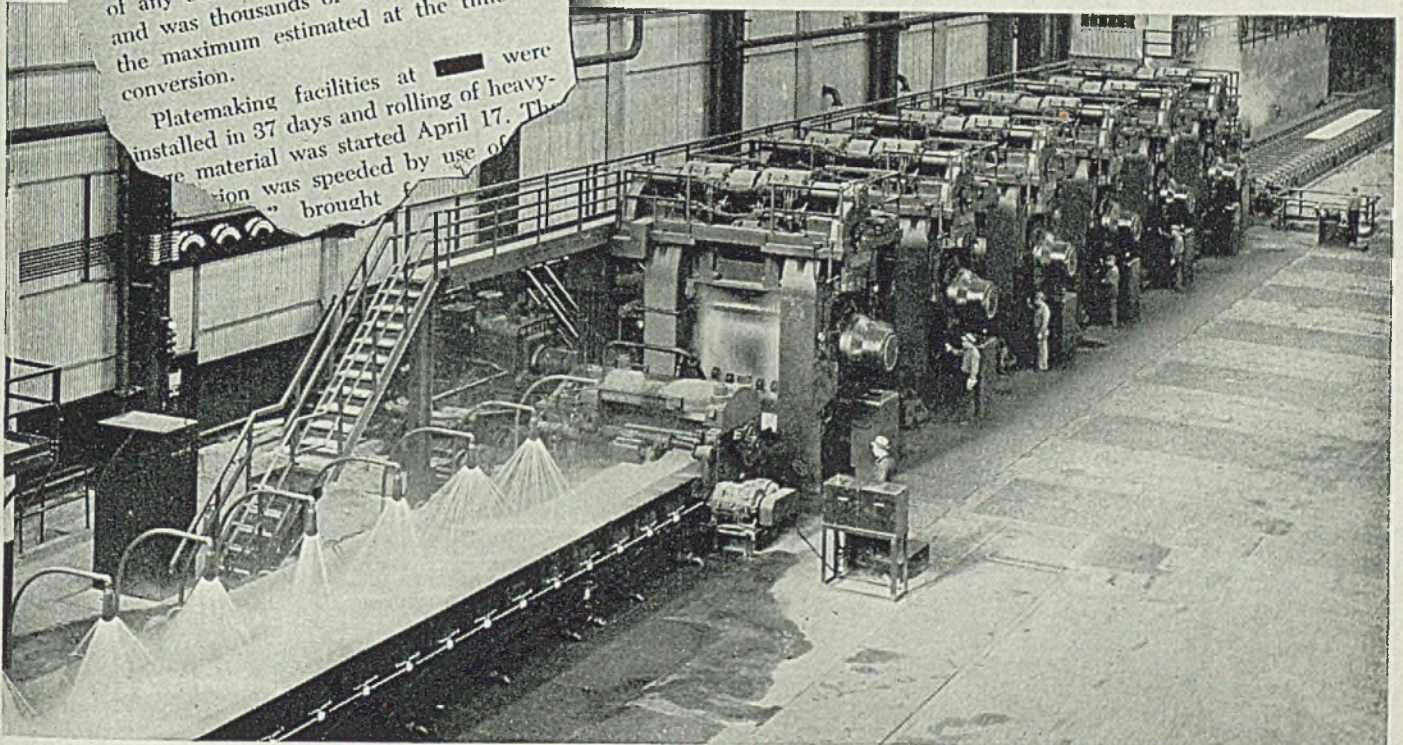
Platemaking facilities at were installed in 37 days and rolling of heavy-gauge material was started April 17. The conversion was speeded by use of brought

CAPACITY

NEW PRODUCTION RECORDS ARE BEING ESTABLISHED WITH

# TRABON LUBRICATING SYSTEMS

*They eliminate downtime for lubrication . . . assure more productive hours per shift . . . and greater output*



● You can "keep 'em rolling" hour after hour, and day after day, when your machines are equipped with Trabon Lubricating Systems,—because Trabon makes absolutely certain that every connected bearing receives just the desired amount of lubricant *while the machine is running*. You avoid costly downtime while a man crawls around lubricating each bearing individually,—and the breakdown if he misses one.

On costly steel mill equipment, overhead travel-

ing cranes, forging machines, brakes, shears, and other machinery of every description, Trabon systems—for years—have been prolonging bearing life, minimizing machine tie-ups, reducing accident and compensation costs. For outstanding performance, specify and install Trabon Lubrication, and get the advantages of the many exclusive features only Trabon can give you. Manual or fully automatic operation. Send for our new fully descriptive Engineering Bulletins TODAY!

# TRABON

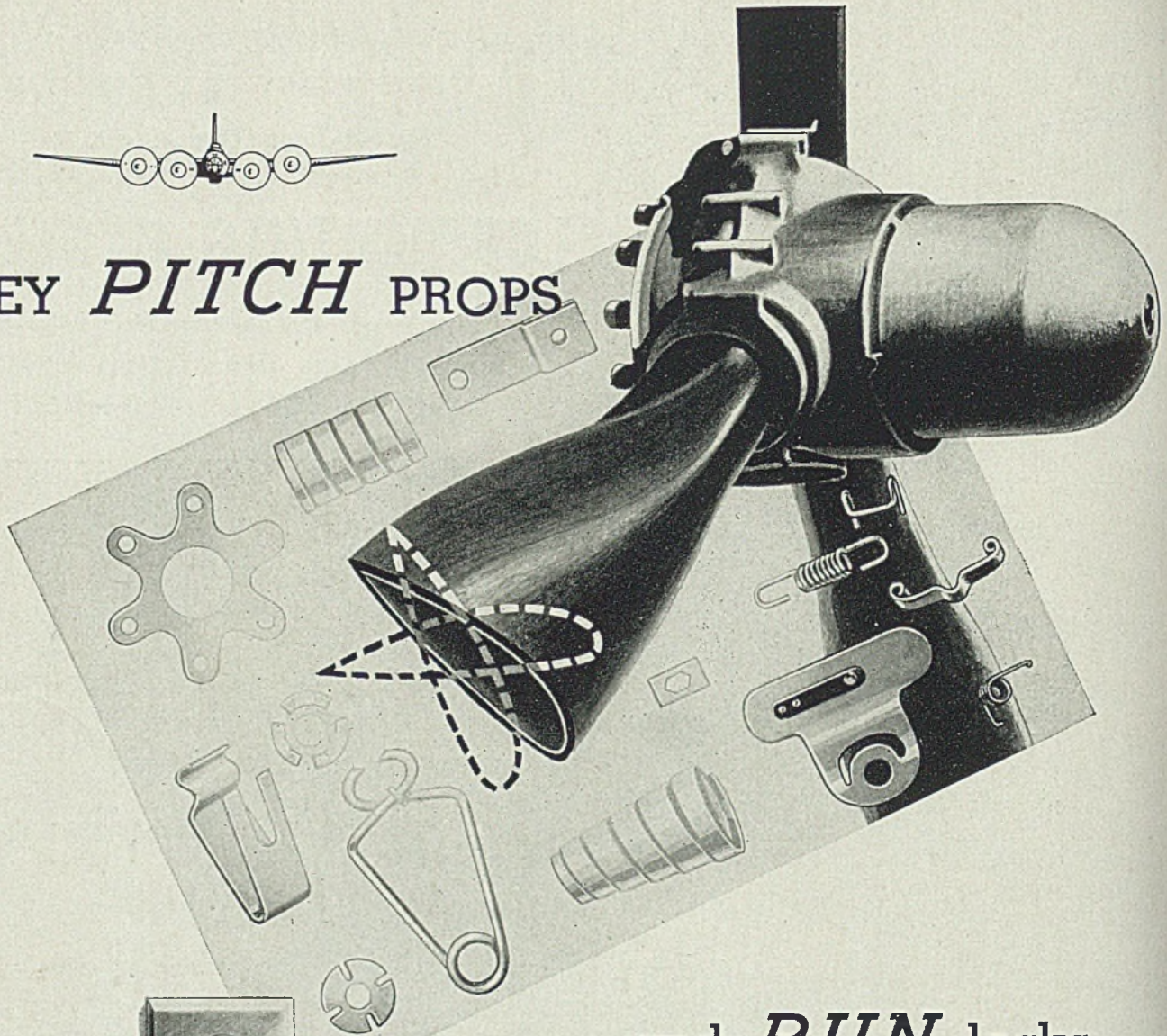
## ENGINEERING CORPORATION

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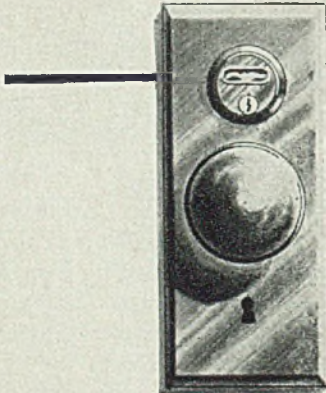
INDUSTRIAL LUBRICATION EXCLUSIVELY SINCE 1922



THEY *PITCH* PROPS



and *RUN* locks



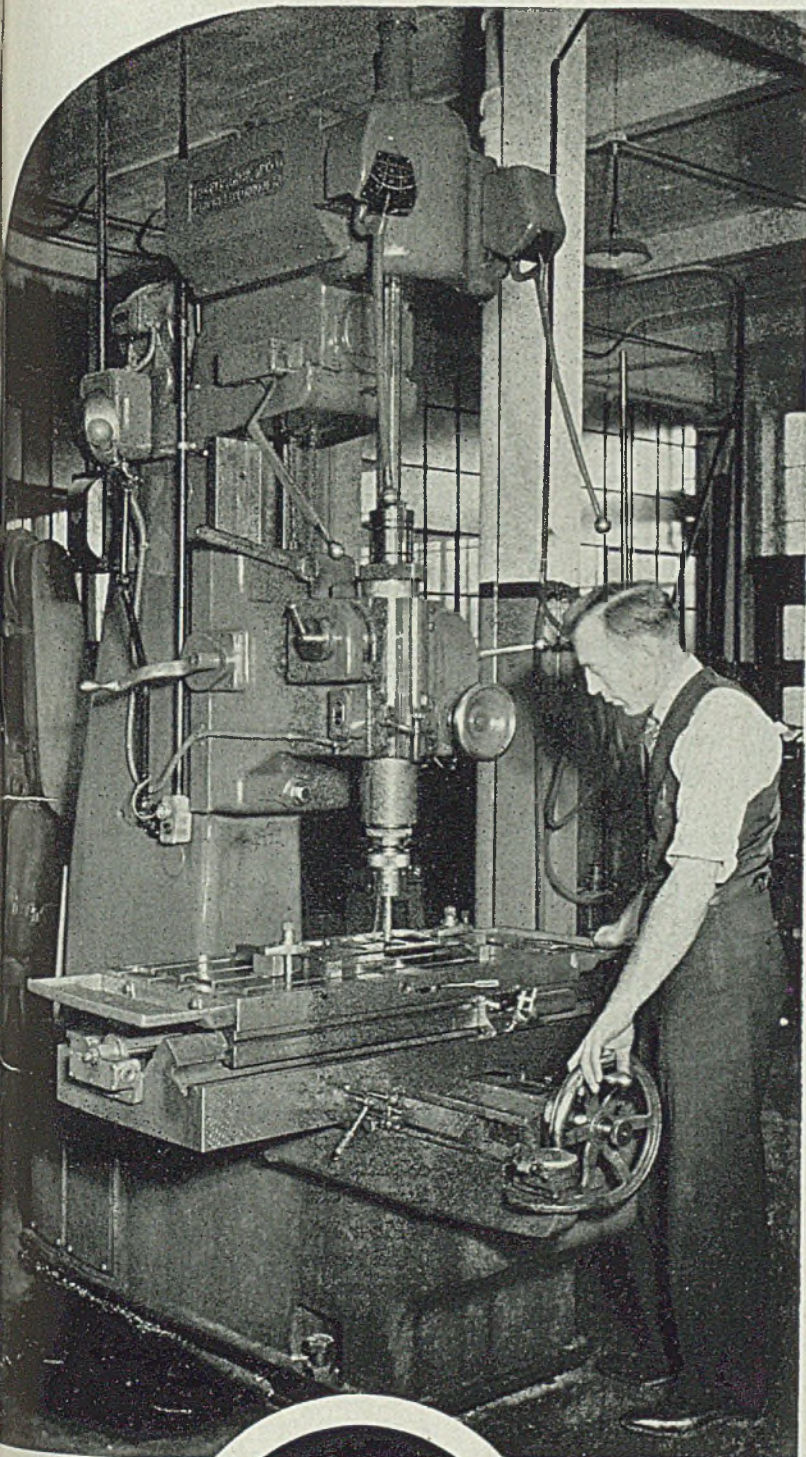
It may be the tough spring that helps "feather" the variable-pitch propellor, or a simple spring that operates a door lock—the requirement is that it work when called on—unfailingly. Among other things, war teaches the folly of hit-or-miss methods. Springs can be designed to serve a definite purpose, indefinitely. No matter how simple or involved a mechanism may be, it deserves the best spring possible in material, design and manufacture.



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ENGINEERED PEP AND POWER  
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• This is a sturdy, accurate, easily operated machine particularly versatile in the number and types of jobs it will handle. It is a most practical unit for precision boring and drilling of jigs—fixtures and production parts.

It is specifically suited to tool room work requiring extreme accuracy and may be used for duplicate operations on production jobs where it is not economical to use jigs and fixtures.

Illustrated is a Fosdick Jig Borer performing a boring operation in the plant of a mid-western tool shop.

For flexibility—ease of control—and ultimate economy make your next Jig Borer a Fosdick.

Built in two sizes the 30 and 30-A. Ask for Jig Borer Bulletin J.B.S. for Specific Information.

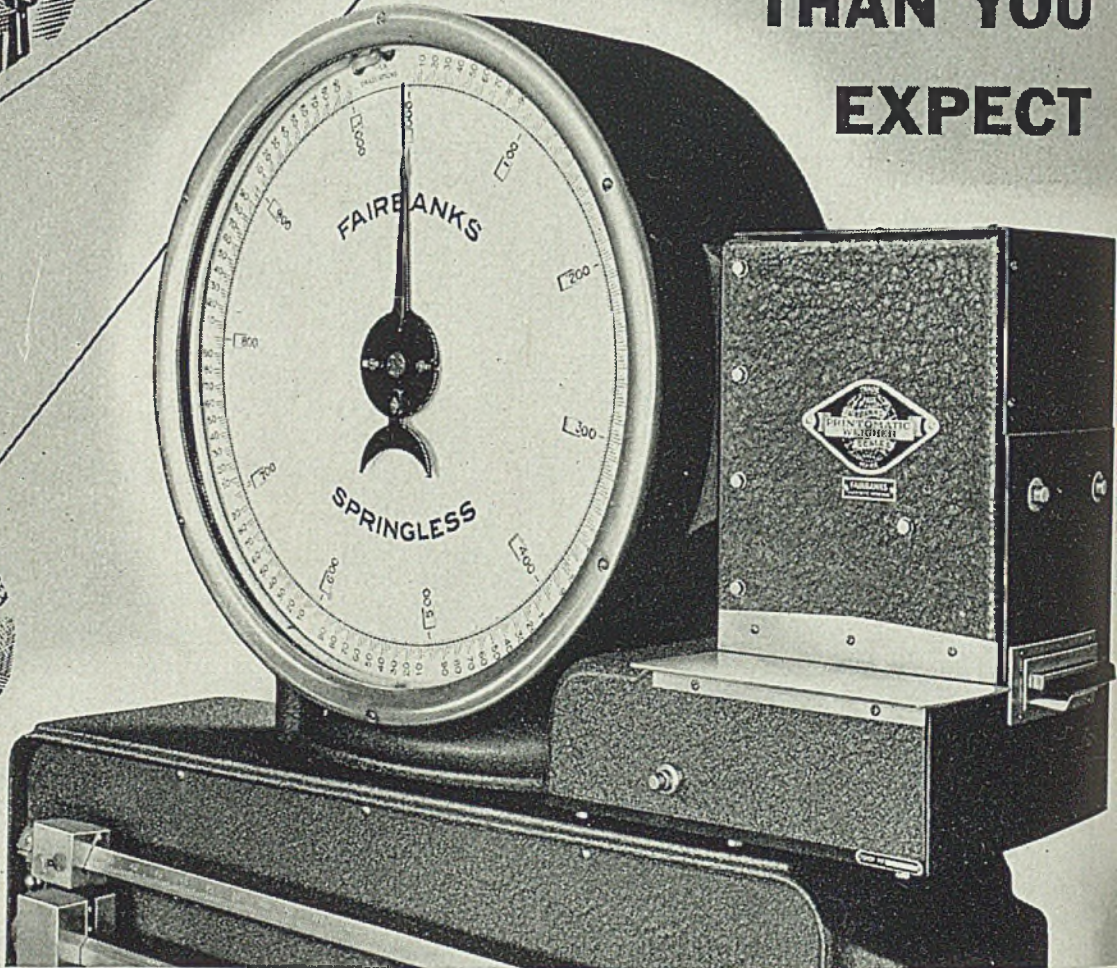
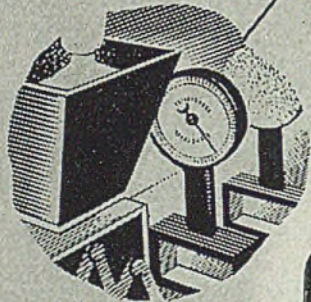
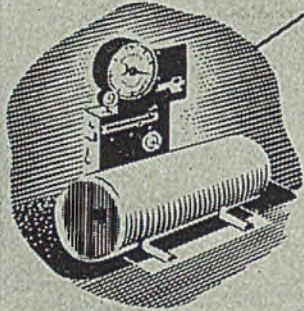
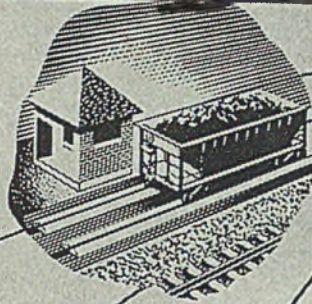
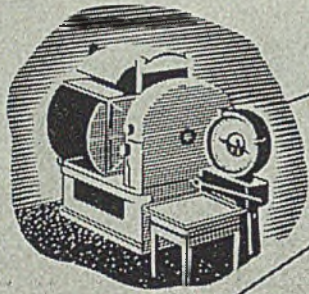


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- They "keep the books" in steel plants, making printed records of incoming and outgoing shipments
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- They record the *flow* of liquid chemicals
- They guard secret formulas in compounding
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- They prevent disputes by eliminating the human element in weighing.

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